HOW TO USE THIS MANUAL

IN047-01

GENERAL INFORMATION

1. INDEX

An INDEX is provided on the first page of each section to guide you to the item to be repaired. To assist you in finding your way through the manual, the Section Title and major heading are given at the top of every page.

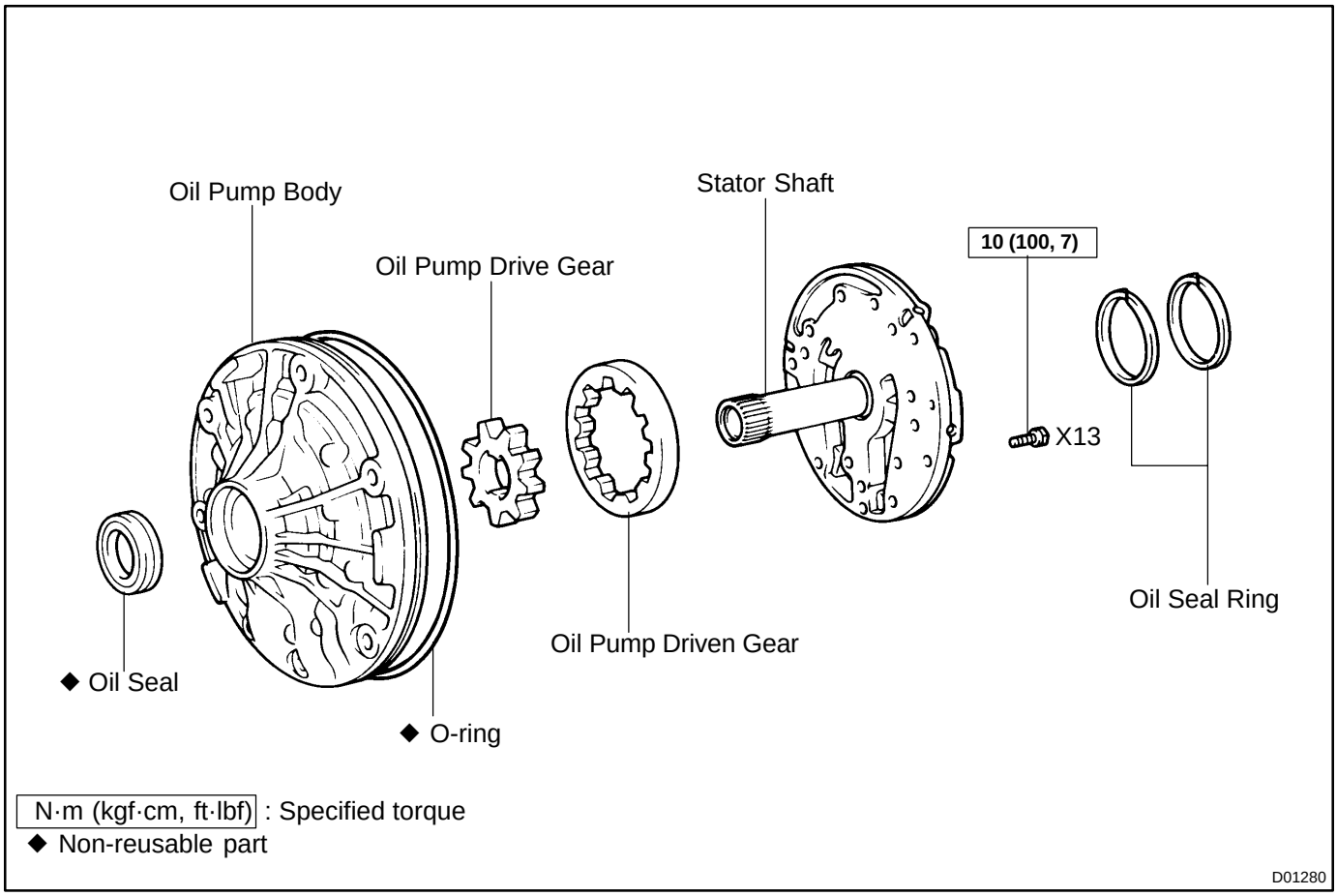
2. PREPARATION

Preparation lists the SST (Special Service Tools), recommended tools, equipment, lubricant and SSM (Special Service Materials) which should be prepared before beginning the operation and explains the purpose of each one.

3. REPAIR PROCEDURES

Most repair operations begin with an overview illustration. It identifies the components and shows how the parts fit together.

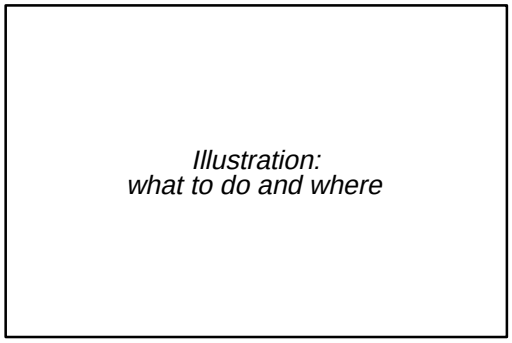
Example:



The procedures are presented in a step-by-step format:

- ○ The illustration shows what to do and where to do it.
- ○ The task heading tells what to do.
- ○ The detailed text tells how to perform the task and gives other information such as specifications and warnings.

Example:



Task heading : what to do

21. CHECK PISTON STROKE OF OVERDRIVE BRAKE

(a) Place SST and a dial indicator onto the overdrive brake piston as shown in the illustration.

SST 09350-30020 (09350-06120)

Set part No. *Component part No.*

Detailed text : how to do task

(b) Measure the stroke applying and releasing the compressed air (392 - 785 kPa, 4 - 8 kgf.cm^2 or 57 - 114 psi) as shown in the illustration.

Piston stroke: 1.40 — 1.70 mm (0.0551 — 0.0669 in.)

Specification

This format provides the experienced technician with a FAST TRACK to the information needed. The upper case task heading can be read at a glance when necessary, and the text below it provides detailed information. Important specifications and warnings always stand out in bold type.

4. REFERENCES

References have been kept to a minimum. However, when they are required you are given the page to refer to.

5. SPECIFICATIONS

Specifications are presented in bold type throughout the text where needed. You never have to leave the procedure to look up your specifications. They are also found at the end of each section, for quick reference.

6. CAUTIONS, NOTICES, HINTS:

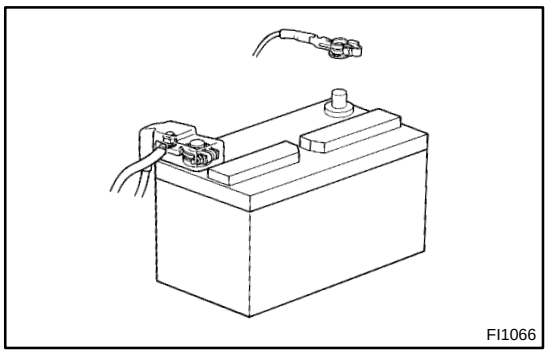
- ○ CAUTIONS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- ○ NOTICES are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- ○ HINTS are separated from the text but do not appear in bold. They provide additional information to help you perform the repair efficiently.

7. SI UNIT

The UNITS given in this manual are primarily expressed according to the SI UNIT (International System of Unit), and alternately expressed in the metric system and in the English System.

Example:

Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)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REPAIR INSTRUCTIONS

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GENERAL INFORMATION

BASIC REPAIR HINT

(a) Use fender, seat and floor covers to keep the vehicle clean and prevent damage.

(b) During disassembly, keep parts in the appropriate order to facilitate reassembly.

(c) Observe the following operations:

(1) Before performing electrical work, disconnect the negative (-) terminal cable from the battery.

(2) If it is necessary to disconnect the battery for inspection or repair, always disconnect the negative (-) terminal cable which is grounded to the vehicle body.

(3) To prevent damage to the battery terminal, loosen the cable nut and raise the cable straight up without twisting or prying it.

(4) Clean the battery terminals and cable ends with a clean shop rag. Do not scrape them with a file or other abrasive objects.

(5) Install the cable ends to the battery terminals with the nut loose, and tighten the nut after installation. Do not use a hammer to tap the cable ends onto the terminals.

(6) Be sure the cover for the positive (+) terminal is properly in place.

(d) Check hose and wiring connectors to make sure that they are secure and correct.

(e) Non-reusable parts

(1) Always replace cotter pins, gaskets, O-rings and oil seals etc. with new ones.

(2) Non-reusable parts are indicated in the component illustrations by the "◆" symbol.

(f) Precoated parts

Precoated parts are bolts and nuts, etc. that are coated with a seal lock adhesive at the factory.

(1) If a precoated part is retightened, or loosened or caused to move in any way, it must be precoated with the specified adhesive.

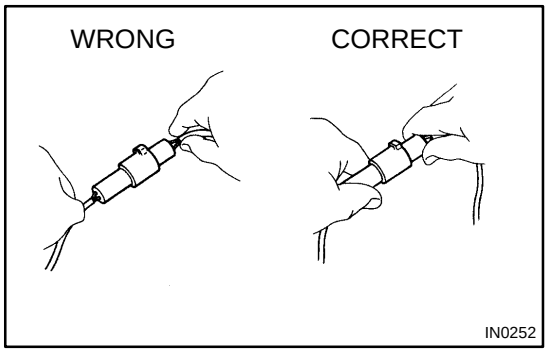
(2) When reusing precoated parts, clean off the old adhesive and dry with compressed air. Then apply the specified seal lock adhesive to the bolt, nut or threads.

(3) Precoated parts are indicated in the component illustrations by the "○" symbol.

(g) When necessary, use a sealer on gaskets to prevent leaks.

(h) Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.

(i) Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found in the preparation of AT section.



(j) To pull apart electrical connectors, pull the connector itself, not the wires.

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ABBREVIATIONS USED IN THIS MANUAL

Abbreviations	Meaning
A/X	Automatic Transaxle
ATF	Automatic Transaxle Fluid
B_1	2nd brake
B_2	1st & reverse brake
B_3	U/D brake
C_1	Forward Clutch
C_2	Direct Clutch
C_3	Underdrive Clutch
D	Disc
F	Flange
F_1	No.1 One-way Clutch
F_2	No.2 One-way Clutch
FIPG	Formed in Place Gasket
MP	Multipurose
O/D	Overdrive
P	Plate
SSM	Special Service Materials
SST	Special Service Tools
U/D	Underdrive
w/	with
w/o	without
1st	First
2nd	Second

IN03Q-01

GLOSSARY OF SAE AND LEXUS TERMS

This glossary lists all SAE-J1930 terms and abbreviations used in this manual in compliance with SAE recommendations, as well as their Lexus equivalents.

SAE ABBREVIATIONS	SAE TERMS	LEXUS TERMS ( )--ABBREVIATIONS
A/C	Air Conditioning	Air Conditioner
ACL	Air Cleaner	Air Cleaner
AIR	Secondary Air Injection	Air Injection (AI)
AP	Accelerator Pedal	-
B+	Battery Positive Voltage	+B, Battery Voltage
BARO	Barometric Pressure	-
CAC	Charge Air Cooler	Intercooler
CARB	Carburetor	Carburetor
CFI	Continuous Fuel Injection	-
CKP	Crankshaft Position	Crank Angle
CL	Closed Loop	Closed Loop
CMP	Camshaft Position	Cam Angle
CPP	Clutch Pedal Position	-
CTOX	Continuous Trap Oxidizer	-
CTP	Closed Throttle Position	-
DFI	Direct Fuel Injection (Diesel)	Direct Injection (DI)
DI	Distributor Ignition	-
DLC1 DLC2 DLC3	Data Link Connector 1 Data Link Connector 2 Data Link Connector 3	1: Check Connector 2: Total Diagnosis Comunication Link (TDCL) 3: OBD II Diagnostic Connector
DTC	Diagnostic Trouble Code	Diagnostic Code
DTM	Diagnostic Test Mode	-
ECL	Engine Control Level	-
ECM	Engine Control Module	Engine ECU (Electronic Control Unit)
ECT	Engine Coolant Temperature	Coolant Temperature, Water Temperature (THW)
EEPROM	Electrically Erasable Programmable Read Only Memory	Electrically Erasable Programmable Read Only Memory (EEPROM), Erasable Programmable Read Only Memory (EPROM)
EFE	Early Fuel Evaporation	Cold Mixture Heater (CMH), Heat Control Valve (HCV)
EGR	Exhaust Gas Recirculation	Exhaust Gas Recirculation (EGR)
EI	Electronic Ignition	Distributorless Ignition (DI)
EM	Engine Modification	Engine Modification (EM)
EPROM	Erasable Programmable Read Only Memory	Programmable Read Only Memory (PROM)
EVAP	Evaporative Emission	Evaporative Emission Control (EVAP)
FC	Fan Control	-
FEEPROM	Flash Electrically Erasable Programmable Read Only Memory	-
FEPROM	Flash Erasable Programmable Read Only Memory	-
FF	Flexible Fuel	-
FP	Fuel Pump	Fuel Pump
GEN	Generator	Alternator
GND	Ground	Ground (GND)

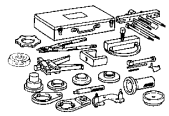
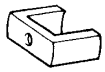
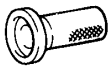
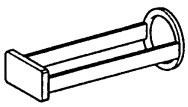
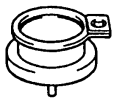
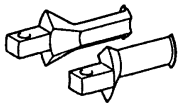
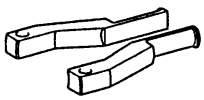
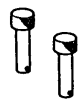
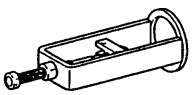
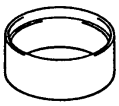
HO2S	Heated Oxygen Sensor	Heated Oxygen Sensor (HO2S)
IAC	Idle Air Control	Idle Speed Control (ISC)
IAT	Intake Air Temperature	Intake or Inlet Air Temperature
ICM	Ignition Control Module	-
IFI	Indirect Fuel Injection	Indirect Injection
IFS	Inertia Fuel-Shutoff	-
ISC	Idle Speed Control	-
KS	Knock Sensor	Knock Sensor
MAF	Mass Air Flow	Air Flow Meter
MAP	Manifold Absolute Pressure	Manifold Pressure Intake Vacuum
MC	Mixture Control	Electric Bleed Air Control Valve (EBCV) Mixture Control Valve (MCV) Electric Air Control Valve (EACV)
MDP	Manifold Differential Pressure	-
MFI	Multiport Fuel Injection	Electronic Fuel Injection (EFI)
MIL	Malfunction Indicator Lamp	Check Engine Light
MST	Manifold Surface Temperature	-
MVZ	Manifold Vacuum Zone	-
NVRAM	Non-Volatile Random Access Memory	-
O2S	Oxygen Sensor	Oxygen Sensor, O_2 Sensor (O_2S)
OBD	On-Board Diagnostic	On-Board Diagnostic (OBD)
OC	Oxidation Catalytic Converter	Oxidation Catalyst Converter (OC), CCo
OP	Open Loop	Open Loop
PAIR	Pulsed Secondary Air Injection	Air Suction (AS)
PCM	Powertrain Control Module	-
PNP	Park/Neutral Position	-
PROM	Programmable Read Only Memory	-
PSP	Power Steering Pressure	-
PTOX	Periodic Trap Oxidizer	Diesel Particulate Filter (DPF) Diesel Particulate Trap (DPT)
RAM	Random Access Memory	Random Access Memory (RAM)
RM	Relay Module	-
ROM	Read Only Memory	Read Only Memory (ROM)
RPM	Engine Speed	Engine Speed
SC	Supercharger	Supercharger
SCB	Supercharger Bypass	-
SFI	Sequential Multiport Fuel Injection	Electronic Fuel Injection (EFI), Sequential Injection
SPL	Smoke Puff Limiter	-
SRI	Service Reminder Indicator	-
SRT	System Readiness Test	-
ST	Scan Tool	-
TB	Throttle Body	Throttle Body
TBI	Throttle Body Fuel Injection	Single Point Injection Central Fuel Injection (Ci)
TC	Turbocharger	Turbocharger
TCC	Torque Converter Clutch	Torque Converter

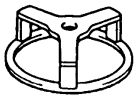
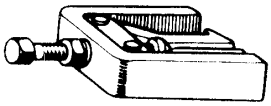
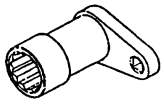
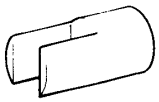
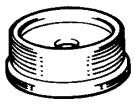
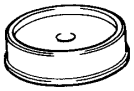
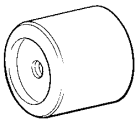
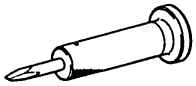
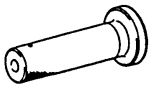
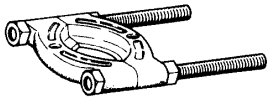
TCM	Transmission Control Module	Transmission ECU (Electronic Control Unit)
TP	Throttle Position	Throttle Position
TR	Transmission Range	-
TVV	Thermal Vacuum Valve	Bimetallic Vacuum Switching Valve (BVSV) Thermostatic Vacuum Switching Valve (TVSV)
TWC	Three-Way Catalytic Converter	Three-Way Catalytic (TWC) CC_{RO}
TWC+OC	Three-Way + Oxidation Catalytic Converter	CC_R + CCo
VAF	Volume Air Flow	Air Flow Meter
VR	Voltage Regulator	Voltage Regulator
VSS	Vehicle Speed Sensor	Vehicle Speed Sensor (Read Switch Type)
WOT	Wide Open Throttle	Full Throttle
WU-OC	Warm Up Oxidation Catalytic Converter	-
WU-TWC	Warm Up Three-Way Catalytic Converter	Manifold Converter
3GR	Third Gear	-
4GR	Fourth Gear	-

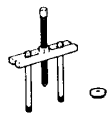
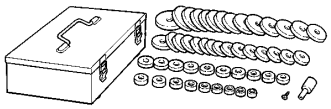
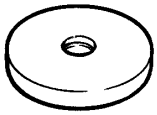
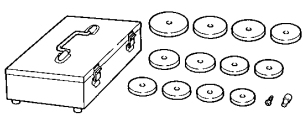
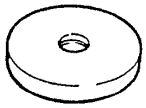
AUTOMATIC TRANSAXLE

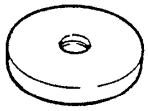
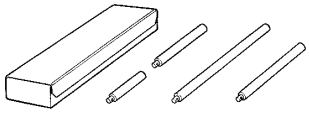
PP1TS-01

SST (Special Service Tools)

	09308-00010	Oil Seal Puller	
	09350-32014	TOYOTA Automatic Transmission Tool Set	
	(09351-32070)	No.2 Piston Spring Compressor	
	(09351-32140)	Oil Seal Replacer	
	09387-00020	Direct Clutch Wrench	
	09387-00030	Counter Drive Gear Holding Tool	
	09387-00040	Bearing Puller Assembly	
	(09387-01010)	Claw No.1	
	(09387-01020)	Claw No.2	
	(09387-01030)	Pin	
	(09387-01040)	Bearing Puller Body	
	09387-00050	Under Drive Gear Puller	

	09387-00060	Second Brake Wrench	
	09387-00070	First & Reverse Brake Wrench	
	09387-00080	Counter Drive Gear Nut Wrench	
	09514-3501 1	Rear Wheel Bearing Puller	
	09564-16020	Drive Pinion Lock Nut Wrench	
	09564-3201 1	Differential Preload Adaptor	
	09608-10010	Steering Knuckle Oil Seal Replacer	
	09608-32010	Steering Knuckle Oil Seal Replacer	
	09649-17010	Steering Knuckle Tool	
	09930-00010	Drive Shaft Nut Chisel	
	(09931-00010)	Handle	
	(09931-00020)	Nut Chisel	
	09950-00020	Bearing Remover	

	09950-00030	Bearing Remover Attachment	
	09950-60010	Replacer Set	
	(09951-00230)	Replacer 23	
	(09951-00320)	Replacer 32	
	(09951-00340)	Replacer 34	
	(09951-00350)	Replacer 35	
	(09951-00400)	Replacer 40	
	(09951-00450)	Replacer 45	
	(09951-00480)	Replacer 48	
	(09951-00500)	Replacer 50	
	(09951-00600)	Replacer 60	
	09950-60020	Replacer Set No.2	
	(09951-00810)	Replacer 81	

	(09951-00890) Replacer 89	
	09950-70010 Handle Set	
	(09951-07100) Handle 100	
	(09951-07150) Handle 150	

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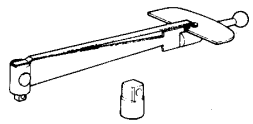
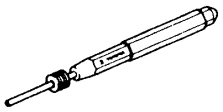
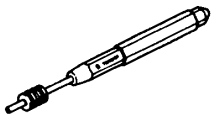
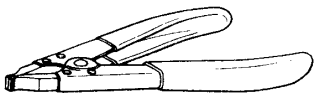
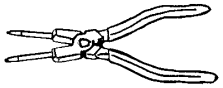
RECOMMENDED TOOLS

	09025-00010	Torque Wrench (30 kgf-cm)	
	09031-00030	Pin Punch .	
	09031-00040	Pin Punch .	
	09905-00012	Snap Ring No.1 Expander .	
	09905-00013	Snap Ring Pliers .	

PP1TU-01

EQUIPMENT

Dial indicator with magnetic base	
Feeler gauge	
Vernier calipers	
Torque wrench	
Plastic hammer	
Straight edge	
Seal packing 2403, THREE BOND 2403 or equivalent	
Seal packing 2430, THREE BOND 2430 or equivalent	

PP1TV-01

LUBRICANT

Item	Capacity	Classification
(U140E) Automatic transaxle fluid Dry fill Drain and refill	 8.25 liters (8.72 US qts, 7.26 Imp. qts) 3.5 liters (3.7 US qts, 3.1 Imp. qts)	ATF TYPE T-IV or equivalent

PP1TW-01

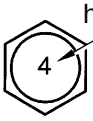
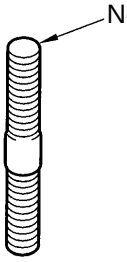
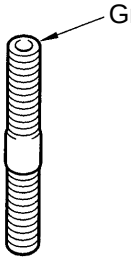
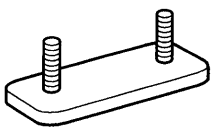
SSM (Special Service Materials)

	08826-00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)

STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

SS00F-01

	Mark	Class		Mark	Class
Hexagon head bolt	 4- 5- 6- 7- 8- 9- 10- 11-	4T 5T 6T 7T 8T 9T 10T 11T	Hexagon flange bolt w/ washer hexagon bolt	 4 Protruding lines	9T
			Hexagon flange bolt w/ washer hexagon bolt	 5 Protruding lines	10T
	 No mark	4T	Hexagon flange bolt w/ washer hexagon bolt	 6 Protruding lines	11T
Hexagon flange bolt w/ washer hexagon bolt	 No mark	4T	Stud bolt		4T
Hexagon head bolt	 2 Protruding lines	5T			
Hexagon flange bolt w/ washer hexagon bolt	 2 Protruding lines	6T			6T
Hexagon head bolt	 3 Protruding lines	7T	Welded bolt		4T
Hexagon head bolt	 4 Protruding lines	8T			

V06821

SS00G-01

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified torque						
			Hexagon head bolt			Hexagon flange bolt			
			N·m	kgf·cm	ft·lbf	N·m	kgf·cm	ft·lbf	
4T	6	1	5	55	48 in.·lbf	6	60	52 in.·lbf	
	8	1.25	12.5	130	9	14	145	10	
	10	1.25	26	260	19	29	290	21	
	12	1.25	47	480	35	53	540	39	
	14	1.5	74	760	55	84	850	61	
	16	1.5	115	1,150	83	—	—	—	
5T	6	1	6.5	65	56 in.·lbf	7.5	75	65 in.·lbf	
	8	1.25	15.5	160	12	17.5	175	13	
	10	1.25	32	330	24	36	360	26	
	12	1.25	59	600	43	65	670	48	
	14	1.5	91	930	67	100	1,050	76	
	16	1.5	140	1,400	101	—	—	—	
6T	6	1	8	80	69 in.·lbf	9	90	78 in.·lbf	
	8	1.25	19	195	14	21	210	15	
	10	1.25	39	400	29	44	440	32	
	12	1.25	71	730	53	80	810	59	
	14	1.5	110	1,100	80	125	1,250	90	
	16	1.5	170	1,750	127	—	—	—	
7T	6	1	10.5	110	8	12	120	9	
	8	1.25	25	260	19	28	290	21	
	10	1.25	52	530	38	58	590	43	
	12	1.25	95	970	70	105	1,050	76	
	14	1.5	145	1,500	108	165	1,700	123	
	16	1.5	230	2,300	166	—	—	—	
8T	8	1.25	29	300	22	33	330	24	
	10	1.25	61	620	45	68	690	50	
	12	1.25	110	1,100	80	120	1,250	90	
9T	8	1.25	34	340	25	37	380	27	
	10	1.25	70	710	51	78	790	57	
	12	1.25	125	1,300	94	140	1,450	105	
10T	8	1.25	38	390	28	42	430	31	
	10	1.25	78	800	58	88	890	64	
	12	1.25	140	1,450	105	155	1,600	116	
11T	8	1.25	42	430	31	47	480	35	
	10	1.25	87	890	64	97	990	72	
	12	1.25	155	1,600	116	175	1,800	130	

V00079

AUTOMATIC TRANSAXLE

SERVICE DATA

SS0ZA-01

Oil pump		
Body clearance	STD	0.07 - 0.15 mm (0.0028 - 0.0059 in.)
	Max.	0.30 mm (0.0118 in.)
Tip clearance	STD	0.11 - 0.14 mm (0.0043 - 0.0055 in.)
	Max.	0.30 mm (0.0118 in.)
Side clearance	STD	0.02 - 0.04 mm (0.0008 - 0.0016 in.)
	Max.	0.10 mm (0.0039 in.)
Pump body bushing inside diameter	STD	38.12 - 38.13 mm (1.5008 - 1.5012 in.)
	Max.	38.18 mm (1.5031 in.)
Stator shaft bushing inside diameter	STD	21.50 - 21.52 mm (0.8465 - 0.8472 in.)
	Max.	21.57 mm (0.8492 in.)

Direct clutch		
Piston stroke		0.61 - 0.77 mm (0.0240 - 0.0303 in.)
Piston return spring free length		22.58 mm (0.8890 in.)
Flange thickness	Mark	
	1	3.0 mm (0.118 in.)
	2	3.1 mm (0.122 in.)
	3	3.2 mm (0.126 in.)
	4	3.3 mm (0.130 in.)
	5	3.4 mm (0.134 in.)
	6	3.5 mm (0.138 in.)

Froward clutch		
Piston stroke		2.09 - 2.33 mm (0.0823 - 0.0917 in.)
Piston return spring free length		28.23 mm (1.1114 in.)
Multiple disc clutch hub bushing inside diameter	STD	23.03 - 23.04 mm (0.9067 - 0.9071 in.)
	Max.	23.09 mm (0.9091 in.)
Flange thickness	Mark	
	1	3.00 mm (0.1181 in.)
	2	3.15 mm (0.1240 in.)
	3	3.30 mm (0.1299 in.)
	4	3.45 mm (0.1358 in.)
	5	3.60 mm (0.1417 in.)

2nd brake		
Piston stroke		0.65 - 0.75 mm (0.0256 - 0.0295 in.)
Piston return spring free length		16.61 mm (0.6539 in.)
Flange thickness	Mark	
	1	3.0 mm (0.118 in.)
	2	3.1 mm (0.122 in.)
	3	3.2 mm (0.126 in.)
	4	3.3 mm (0.130 in.)
	5	3.4 mm (0.134 in.)
	6	3.5 mm (0.138 in.)
	7	3.6 mm (0.142 in.)

Input shaft	
End play	0.27 - 1.24 mm (0.0106 - 0.0417 in.)

U/D clutch	
Piston stroke	1.51 - 1.77 mm (0.0594 - 0.0697 in.)

U/D clutch drum bushing inside diameter		
	STD	37.06 - 37.08 mm (1.4591 - 1.4598 in.)
	Max.	37.13 mm (1.4618 in.)
Piston return spring free length		17.14 mm (0.6748 in.)
Flange thickness	Mark	
	1	3.0 mm (0.118 in.)
	2	3.2 mm (0.126 in.)
	3	3.4 mm (0.134 in.)

U/D brake		
Piston stroke		1.81 - 2.07 mm (0.0713 - 0.0815 in.)
Piston return spring free length		13.24 mm (0.521 in.)
Flange thickness	Mark	
	1	3.0 mm (0.118 in.)
	2	3.2 mm (0.126 in.)
	3	3.4 mm (0.134 in.)

1st & reverse brake		
Piston stroke		1.10 - 1.24 mm (0.0433 - 0.0488 in.)
Piston return spring free length		17.61 mm (0.6933 in.)
Flange thickness	Mark	
	1	1.8 mm (0.071 in.)
	2	1.9 mm (0.075 in.)
	3	2.0 mm (0.079 in.)
	4	2.1 mm (0.083 in.)
	5	2.2 mm (0.087 in.)
	6	2.3 mm (0.091 in.)
	7	2.4 mm (0.094 in.)
	8	2.5 mm (0.098 in.)

Valve body spring			
Spring (Color)	Free length	Coil outer diameter	Total No. of coils
Upper valve body			
Rock-up relay valve (None)	29.25 mm (1.1516 in.)	9.7 mm (0.382 in.)	10.50
Rock -up control valve (Green)	23.95 mm (0.9429 in.)	5.4 mm (0.213 in.)	14.94
Secondary regulator valve (Blue)	58.35 mm (2.2972 in.)	8.7 mm (0.343 in.)	20.58
C-2 lock valve (Yellow)	33.65 mm (1.3248 in.)	7.4 mm (0.291 in.)	11.82
Solenoid modulator valve (Red)	62.40 mm (2.4567 in.)	9.8 mm (0.386 in.)	22.31
B-3 orifice control valve (Grey)	62.65 mm (2.4665 in.)	7.8 mm (0.307 in.)	19.60
B-1 lock valve (White)	37.40 mm (1.4724 in.)	9.8 mm (0.386 in.)	8.84
Clutch apply control valve (Purple)	40.25 mm (1.5846 in.)	9.0 mm (0.354 in.)	13.00
C-2 exhaust check valve (Orange)	40.25 mm (1.5846 in.)	7.4 mm (0.291 in.)	17.10

Lower valve body			
3-4 shift valve (None)	29.25 mm (1.1516 in.)	9.7 mm (0.382 in.)	10.5
B-1 control valve (Green)	48.55 mm (1.9114 in.)	9.8 mm (0.386 in.)	13.43
B-2 control valve (Pink)	57.05 mm (2.2461 in.)	9.8 mm (0.386 in.)	15.34
Primary regulator valve (Orange)	57.55 mm (2.2657 in.)	19.9 mm (0.783 in.)	7.87
C-2 control valve (Brown)	34.20 mm (1.3465 in.)	9.9 mm (0.390 in.)	8.79

Valve body key			
Key	Height	Width	Thickness
Upper valve body			
Lock-up relay valve	10.0 mm (0.394 in.)	5.0 mm (0.197 in.)	3.2 mm (0.126 in.)
Lock-up control valve	10.0 mm (0.394 in.)	5.0 mm (0.197 in.)	3.2 mm (0.126 in.)
Secondary regulator valve	8.0 mm (0.315 in.)	5.0 mm (0.197 in.)	3.2 mm (0.126 in.)
C-2 lock valve	10.0 mm (0.394 in.)	5.0 mm (0.197 in.)	3.2 mm (0.126 in.)
Solenoid modulator valve	8.0 mm (0.315 in.)	5.0 mm (0.197 in.)	3.2 mm (0.126 in.)
B-3 orifice control valve	18.5 mm (0.728 in.)	-	2.3 mm (0.091 in.)
B-1 lock valve	8.0 mm (0.315 in.)	5.0 mm (0.197 in.)	3.2 mm (0.126 in.)
C-2 exhaust check valve	8.0 mm (0.315 in.)	5.0 mm (0.197 in.)	3.2 mm (0.126 in.)
3-way check valve	8.0 mm (0.315 in.)	5.0 mm (0.197 in.)	3.2 mm (0.126 in.)
Lower valve body			
3-4 shift valve	25.5 mm (1.004 in.)	-	2.3 mm (0.091in.)
B-1 control valve	14.5 mm (0.571 in.)	5.0 mm (0.197 in.)	3.2 mm (0.126 in.)
B-2 control valve	14.5 mm (0.571 in.)	5.0 mm (0.197 in.)	3.2 mm (0.126 in.)
C-2 control valve	14.5 mm (0.571 in.)	5.0 mm (0.197 in.)	3.2 mm (0.126 in.)

Accumulator			
Spring		Free length/Outer diameter	Color
B_3	Inner	60.24 mm (2.3716 in.) / 15.9 mm (0.626 in.)	Green
	Outer	72.61 mm (2.8587 in.) / 16.7 mm (0.626 in.)	Blue
C_3		86.66 mm (3.4118 in.) / 19.2 mm (0.756in.)	Yellow
C_1		90.53 mm (3.5642 in.) / 18.5 mm (0.728 in.)	Red
C_2	Inner	47.58 mm (1.8732 in.) / 11.2 mm (0.441 in.)	Brown
	Outer	47.61 mm (1.8744 in.) / 12.0 mm (0.472 in.)	
B_1	Inner	43.88 mm (1.7276 in.) / 11.0 mm (0.433 in.)	Purple
	Outer	45.12 mm (1.7764 in.) / 11.8 mm (0.465 in.)	White

Differential	
Side gear backlash	0.05 - 0.20 mm (0.0020 - 0.0079 in.)
Thrust washer thickness	1.625 mm (0.06398 in.) 1.725 mm (0.06791 in.) 1.525 mm (0.07185 in.)

Preload (at starting) New bearing Used bearing		 0.8 - 1.3 N·m (8 - 13 kgf·cm, 6.9 - 11.3 in.·lbf) 0.4 - 0.6 N·m (4 - 6 kgf·cm, 3.5 - 5.2 in.·lbf)
Shim thickness	Mark	
	0	2.00 mm (0.0787 in.)
	1	2.05 mm (0.0807 in.)
	2	2.10 mm (0.0827 in.)
	3	2.15 mm (0.0846 in.)
	4	2.20 mm (0.0866 in.)
	5	2.25 mm (0.0886 in.)
	6	2.30 mm (0.0906 in.)
	7	2.35 mm (0.0925 in.)
	8	2.40 mm (0.0945 in.)
	9	2.45 mm (0.0965 in.)
	A	2.50 mm (0.0984 in.)
	B	2.55 mm (0.1004 in.)
	C	2.60 mm (0.1024 in.)
	D	2.65 mm (0.1043 in.)
	E	2.70 mm (0.1063 in.)
	F	2.75 mm (0.1083 in.)
	G	2.80 mm (0.1102 in.)
	H	2.85 mm (0.1122 in.)

SS0ZB-01

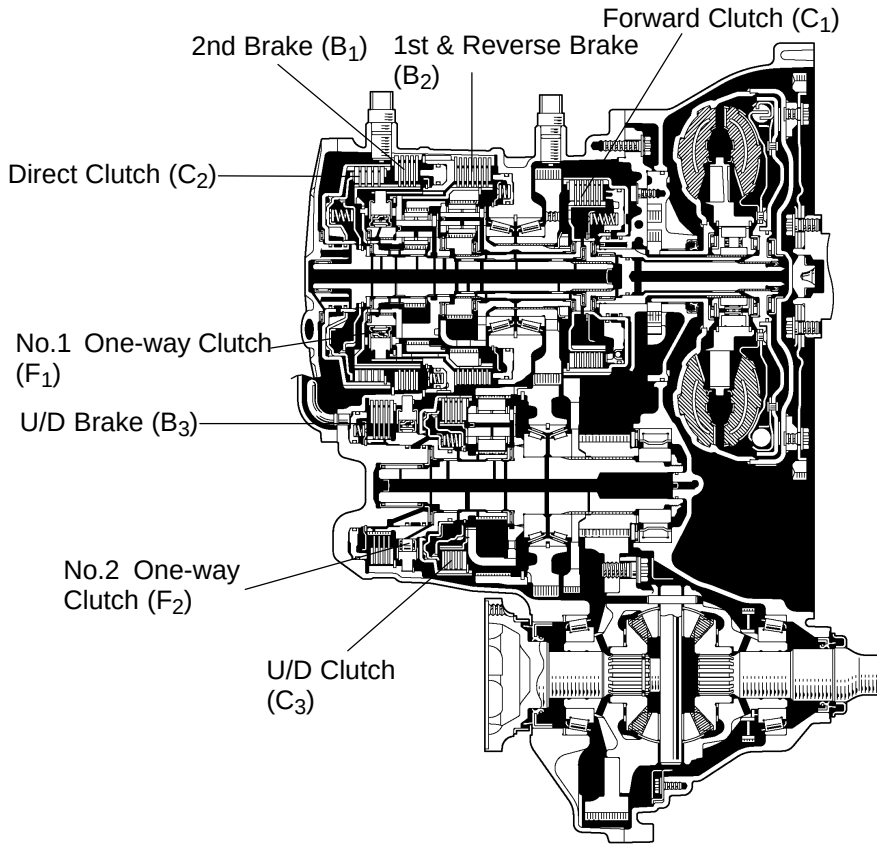
TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Separator x Transaxle housing	9.8	100	7
Apply pipe clamp x Transaxle housing	9.8	100	7
Apply pipe clamp x Transaxle case	5.4	55	48 in.·lbf
Transaxle rear cover x Transaxle case	24.5	250	18
Parking pawl shaft clamp x Transaxle case	9.8	100	7
Oil pump x Transaxle case	22	226	16
Parking bracket x Transaxle case	20	205	15
Detent spring x Transaxle case	12	120	9
Valve body x Transaxle case	11	110	8
Oil strainer x Valve body	11	110	8
Transaxle solenoid wire x Transaxle case	5.4	55	48 in.·lbf
ATF temperature sensor clamp x Valve body	6.6	67	58 in.·lbf
Oil pan x Transaxle case	7.8	80	69 in.·lbf
Counter gear speed sensor x Transaxle case	11.3	115	8
Input turbin speed sensor x Transaxle case	11.3	115	8
Union	27	276	20
Elbow	27	276	20
Park/neutral start switch Bolt: Nut:	5.4 6.9	55 70	48 in.·lbf 61 in.·lbf
Control shaft lever	6.9	70	61 in.·lbf
Counter drive gear lock nut	280	2855	207
U/D output shaft lock nut	262 (280)	2,672 (2,855)	194 (207)
Differential ring gear x Differential case	96.5	985	71

AUTOMATIC TRANSAXLE SYSTEM

AX0AG-02

OPERATION

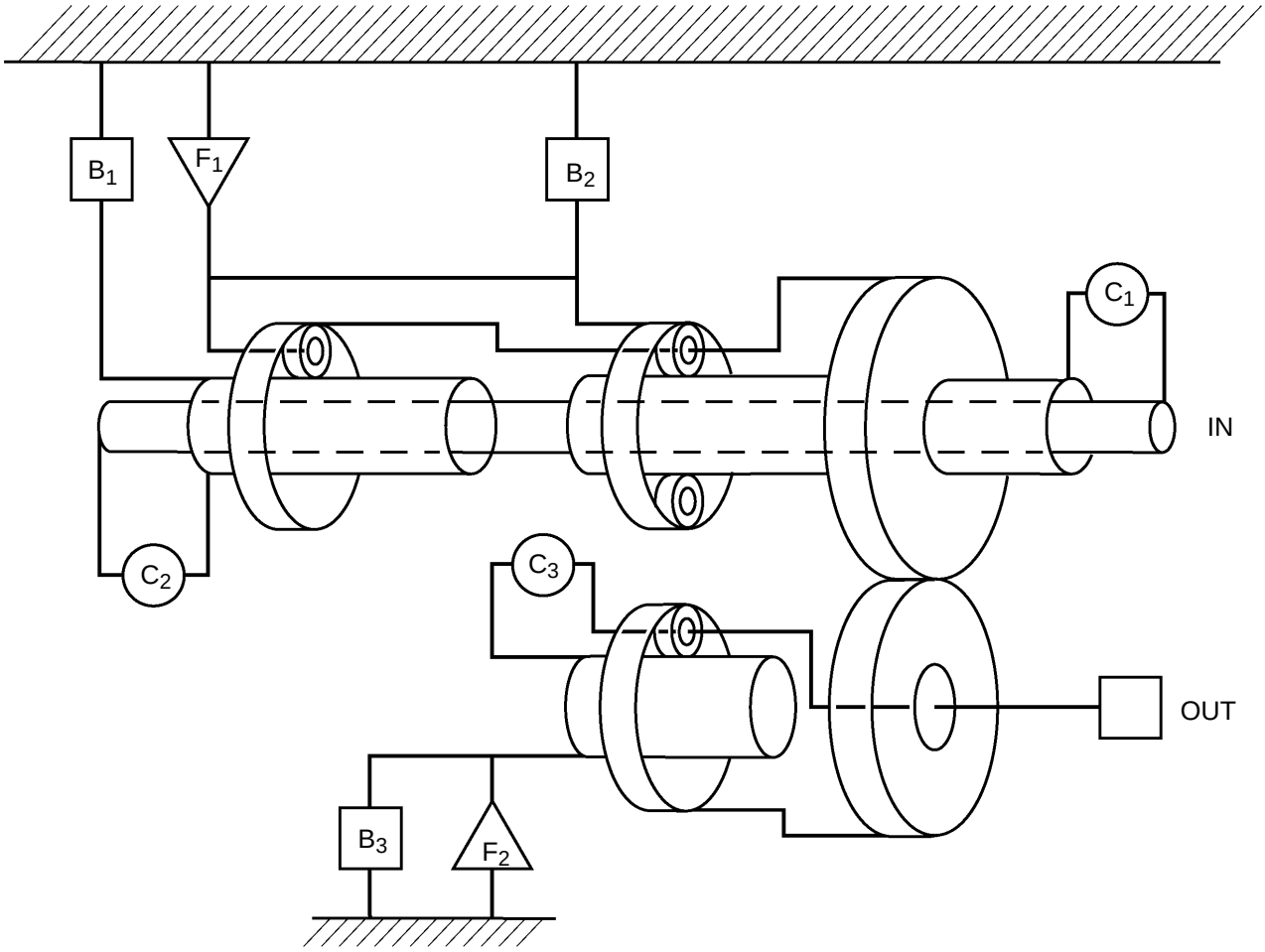


D03856

○ ... Operating

Shift lever position	Gear position	C_1	C_2	C_3	B_1	B_2	B_3	F_1	F_2
P	Parking						○		
R	Reverse		○			○	○		
N	Neutral						○		
D	1st	○					○	○	○
	2nd	○			○		○		○
	3rd	○	○				○		○
	O/D	○	○	○					
2	1st	○					○	○	○
	2nd	○			○	○	○		○
L	1st	○					○	○	○

FUNCTION OF COMPONENTS

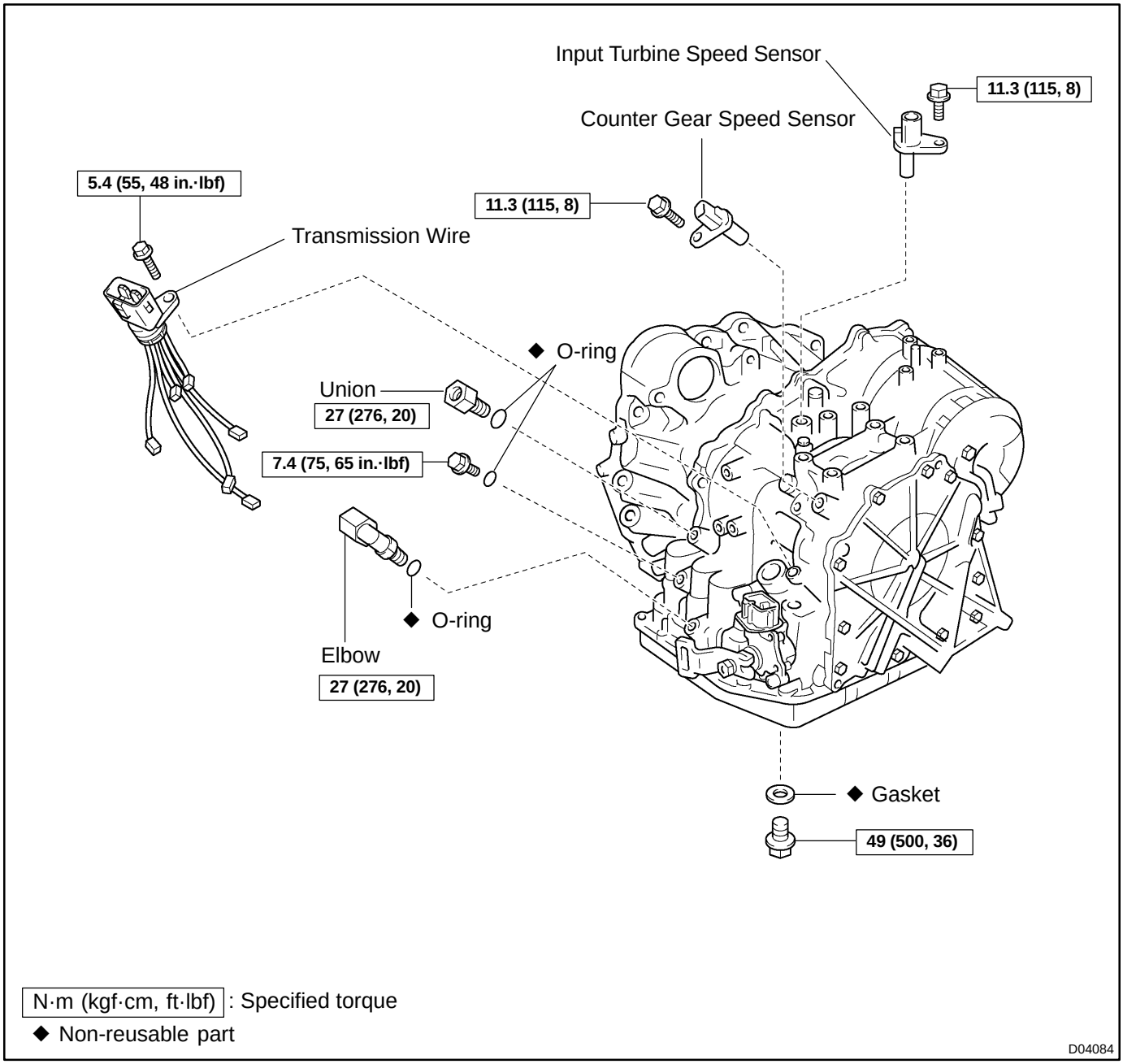


Component		Function
C_1	Forward Clutch	Connects input shaft and front planetary sun gear.
C_2	Direct Clutch	Connects input shaft and rear planetary sun gear.
C_3	U/D Clutch	Connects U/D sun gear and U/D planetary carrier.
B_1	2nd Brake	Prevents rear planetary sun gear from turning either clockwise or counterclockwise.
B_2	1st & Reverse Brake	Prevents rear planetary carrier and front planetary ring gear from turning either clockwise or counterclockwise.
B_3	U/D Brake	Prevents U/D sun gear from turning either clockwise or counterclockwise.
F_1	No.1 One-way Clutch	Prevents rear planetary carrier from turning counterclockwise.
F_2	No.2 One-way Clutch	Prevents U/D planetary sun gear from turning clockwise.
Planetary Gears		These gears change the route through which driving force is transmitted, in accordance with the operation of each clutch and brake, in order to increase or reduce the input and output speed.

COMPONENT PARTS

COMPONENTS

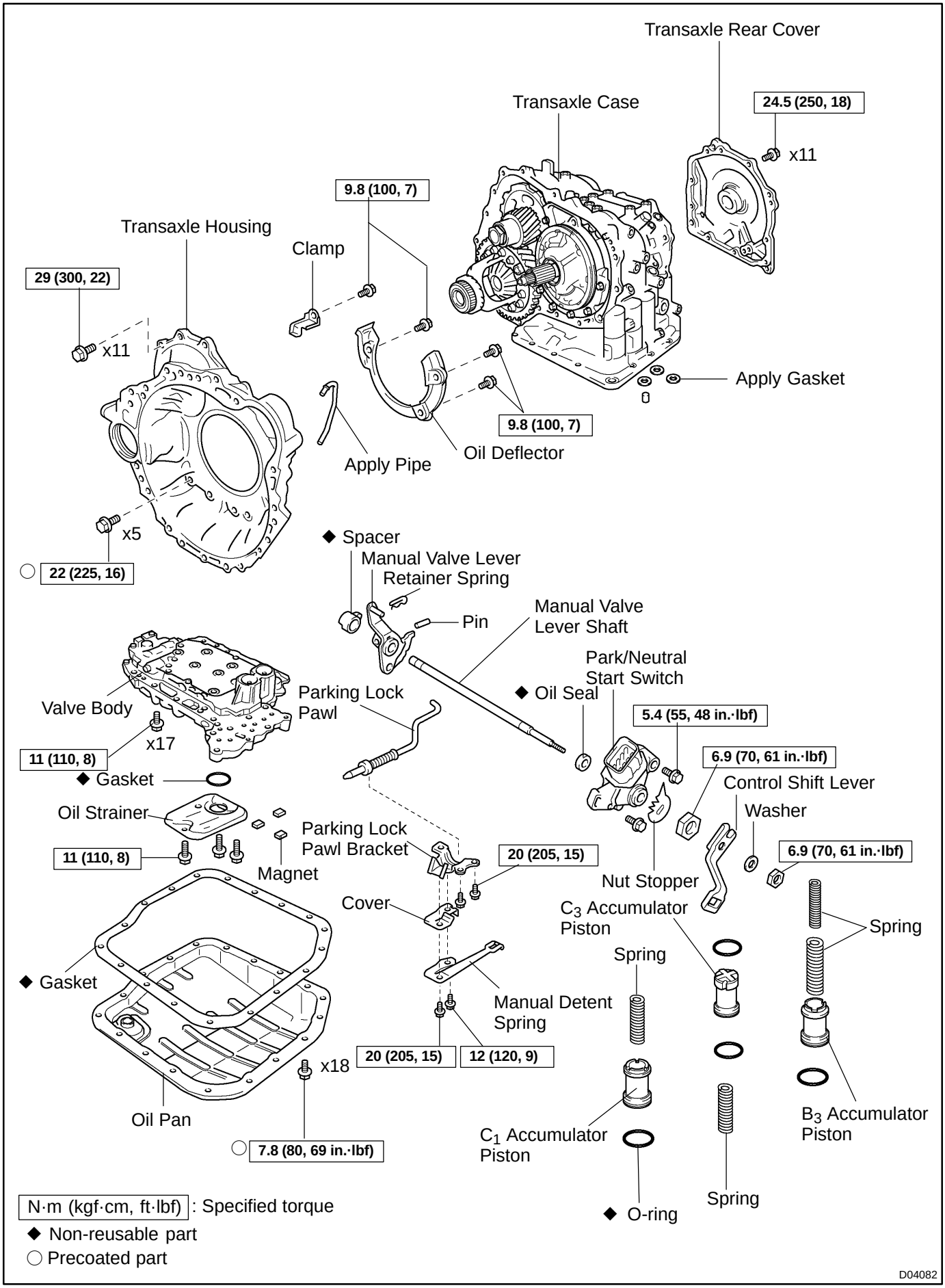
AX0AH-02

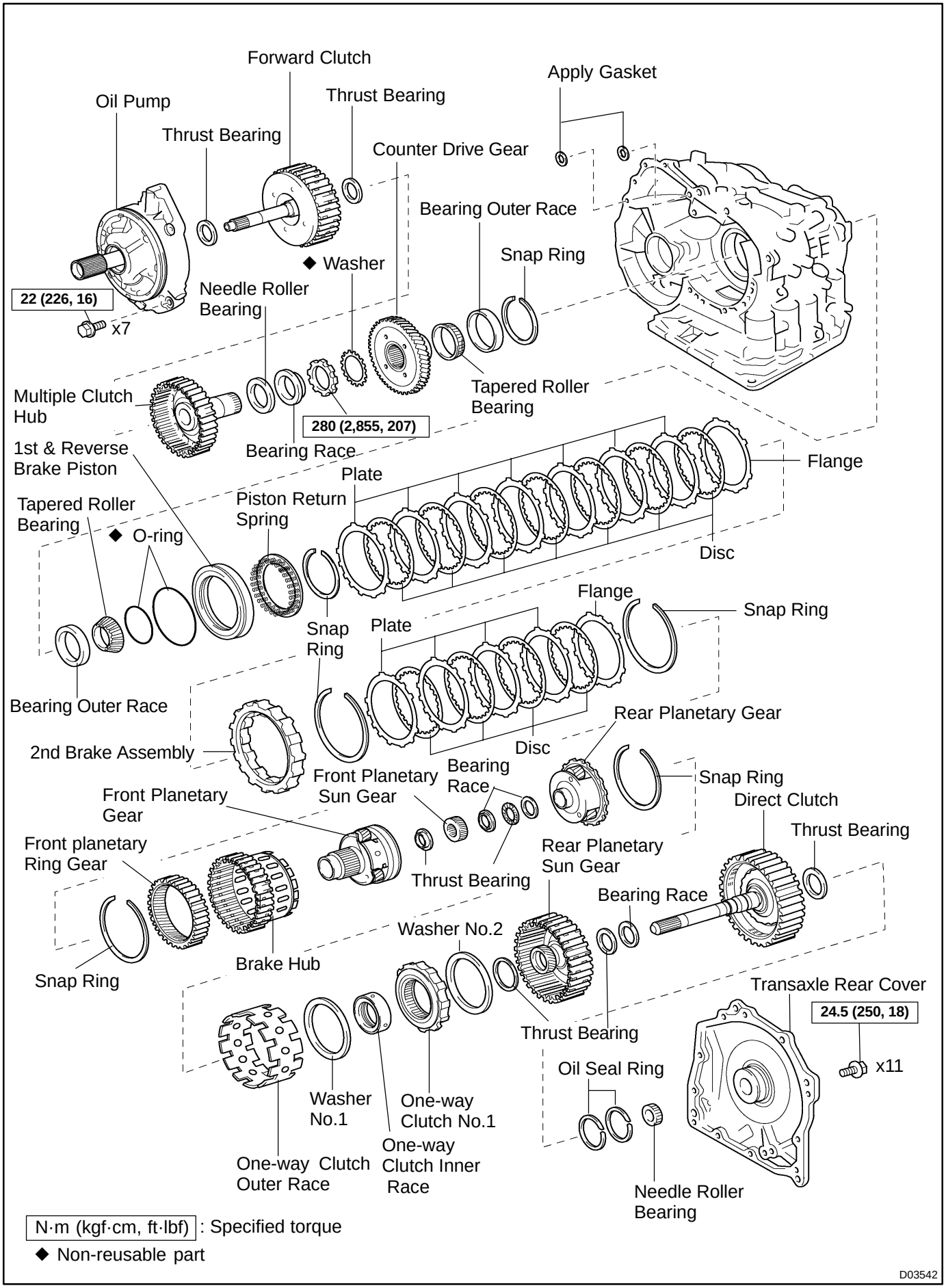


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

D04084

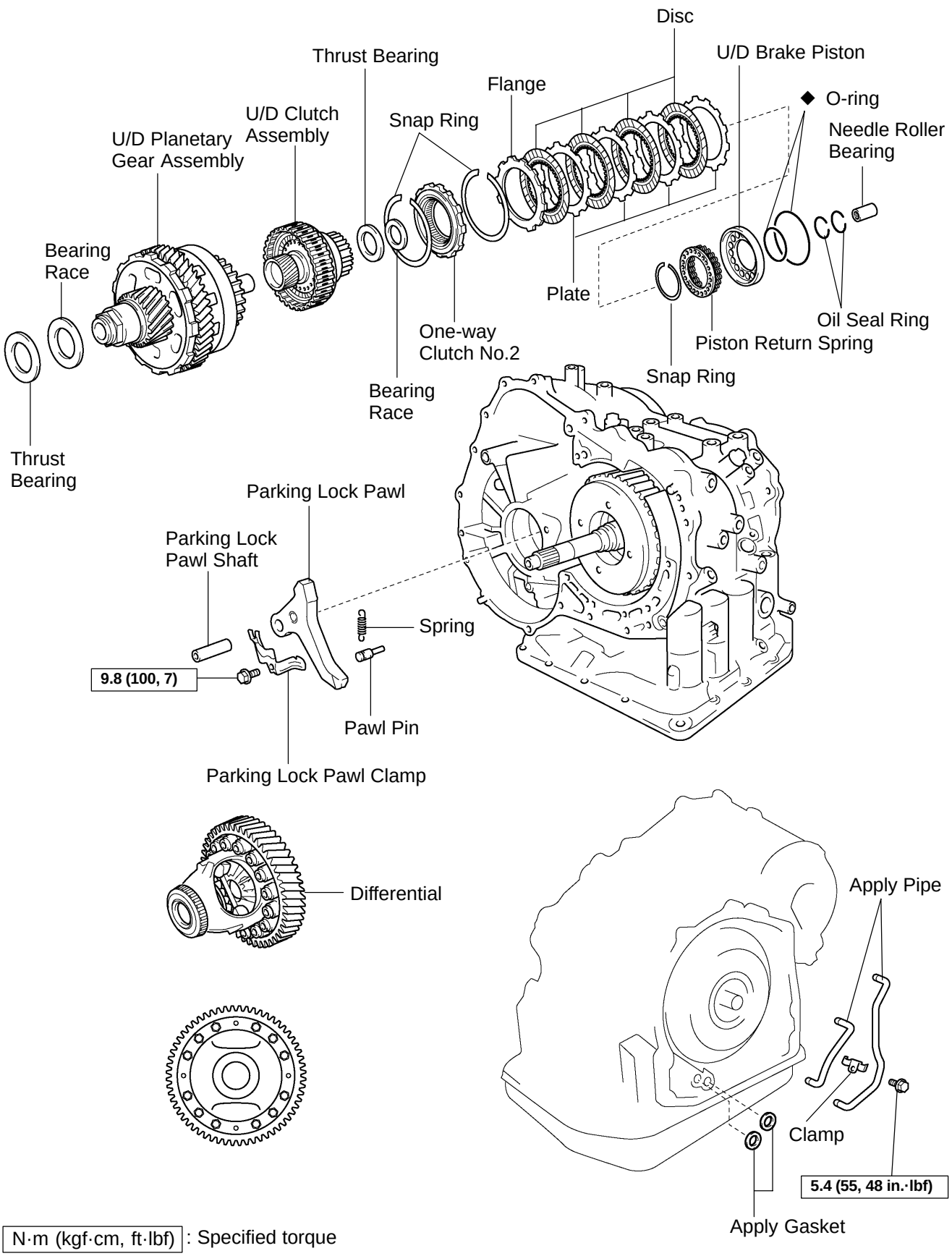

Transaxle Rear Cover
Transaxle Case
24.5 (250, 18)
x11
9.8 (100, 7)
Transaxle Housing
Clamp
29 (300, 22)
x11
Apply Gasket
9.8 (100, 7)
Apply Pipe
Oil Deflector
x5
22 (225, 16)
◆ Spacer
Manual Valve Lever
Retainer Spring
Pin
Manual Valve
Lever Shaft
Park/Neutral
Start Switch
Valve Body
Parking Lock
Pawl
◆ Oil Seal
5.4 (55, 48 in.·lbf)
6.9 (70, 61 in.·lbf)
x17
11 (110, 8)
◆ Gasket
Control Shift Lever
Washer
Oil Strainer
Parking Lock
Pawl Bracket
20 (205, 15)
6.9 (70, 61 in.·lbf)
11 (110, 8)
Magnet
Nut Stopper
Cover
C3 Accumulator
Piston
Spring
Spring
◆ Gasket
Manual Detent
Spring
20 (205, 15)
12 (120, 9)
x18
B3 Accumulator
Piston
C1 Accumulator
Piston
Oil Pan
7.8 (80, 69 in.·lbf)
Spring
◆ O-ring
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
○ Precoated part
D04082



N·m (kgf·cm, ft·lbf) : Specified torque

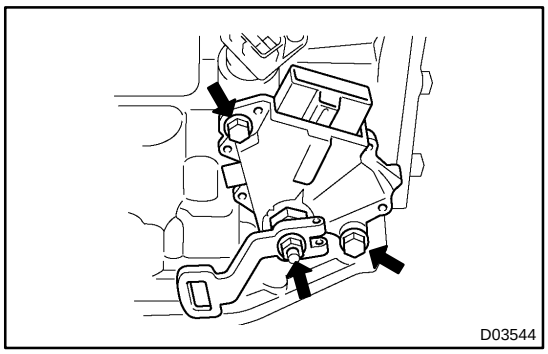
◆ Non-reusable part

D03542


Disc
Thrust Bearing
U/D Brake Piston
Flange
◆ O-ring
U/D Clutch Assembly
Snap Ring
Needle Roller Bearing
U/D Planetary Gear Assembly
Bearing Race
Plate
Oil Seal Ring
One-way Clutch No.2
Piston Return Spring
Snap Ring
Bearing Race
Thrust Bearing
Parking Lock Pawl
Parking Lock Pawl Shaft
Spring
9.8 (100, 7)
Pawl Pin
Parking Lock Pawl Clamp
Differential
Apply Pipe
Clamp
5.4 (55, 48 in.·lbf)
Apply Gasket
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
D03871

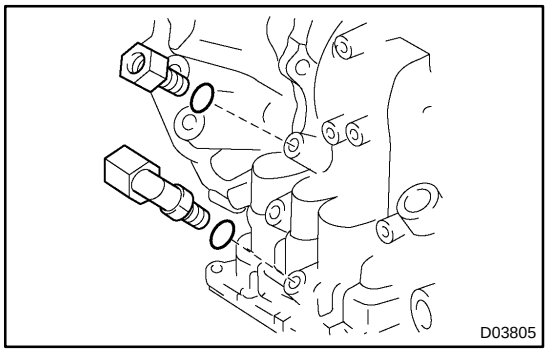
AX0BM-01

DISASSEMBLY



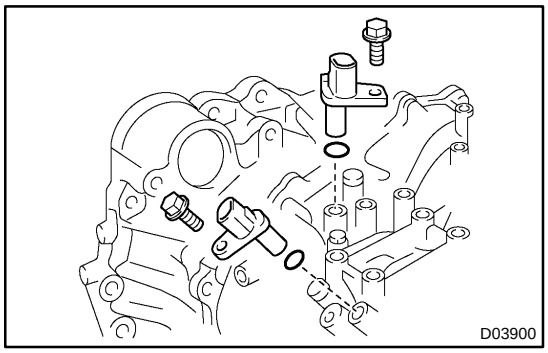
1. REMOVE PARK/NEUTRAL POSITION SWITCH

(a) Remove the nut, washer and control shaft lever.
(b) Using a screwdriver, unstake the lock washer.
(c) Remove the 2 bolts and nut, and pull out the park/neutral position switch.



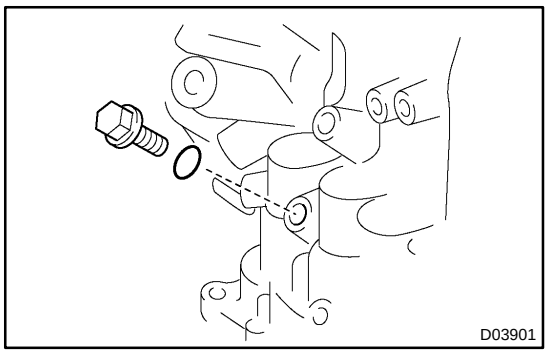
2. REMOVE UNION AND ELBOW

(a) Remove the union and elbow.
(b) Remove the 2 O-rings form the union and elbow.



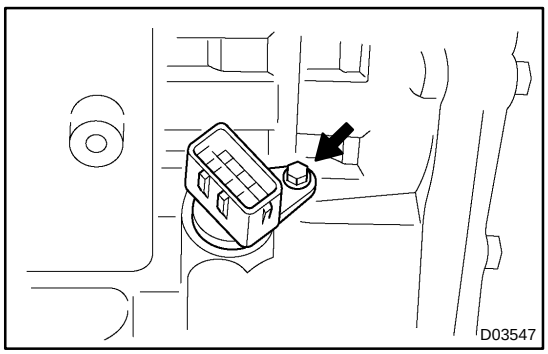
3. REMOVE SPEED SENSOR

(a) Remove the 2 bolts and the 2 speed sensors from the transaxle.
(b) Remove the 2 O-rings from the sensors.



4. REMOVE TRANSAXLE CASE PLUG NO.1

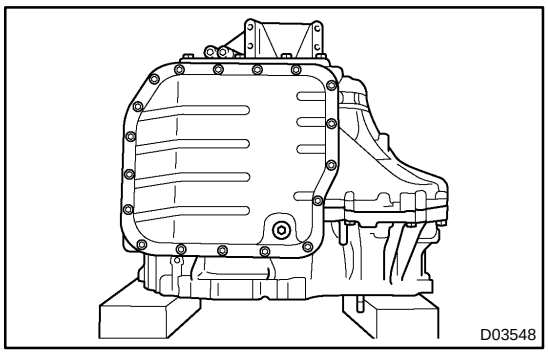
(a) Remove the transaxle case plug No.1 from the transaxle case.
(b) Remove the O-ring from the transaxle case plug No.1.



5. REMOVE SOLENOID WIRE RETAINING BOLT

NOTICE:

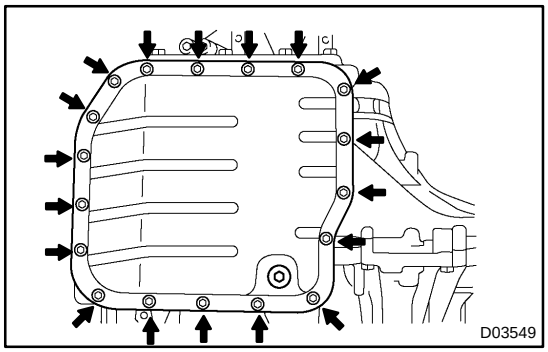
Remove the bolt only and do not remove the solenoid wire.



6. PLACE TRANSAXLE ON WOODEN BLOCKS

NOTICE:

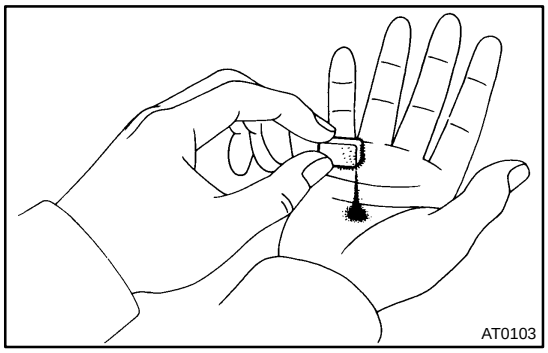
Be careful not to damage the oil seal.



7. REMOVE OIL PAN AND GASKET

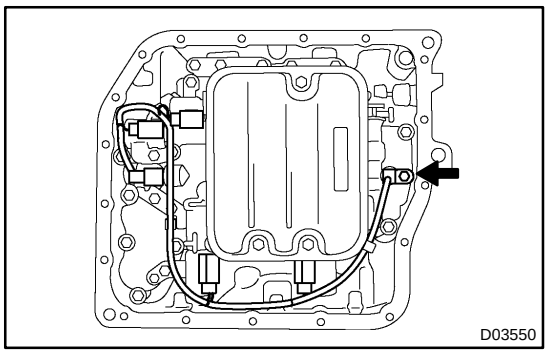
(a) Remove the 18 bolts.

(b) Remove the oil pan and gasket.



8. EXAMINE PARTICLES IN PAN

Remove the magnets and use them to collect any steel chips.
Examine the chips and particles in the pan and on the magnet to determine what type of wear has occurred in the transaxle:
Steel (magnetic)..... bearing, gear and plate wear
Brass (non-magnetic)..... bushing wear

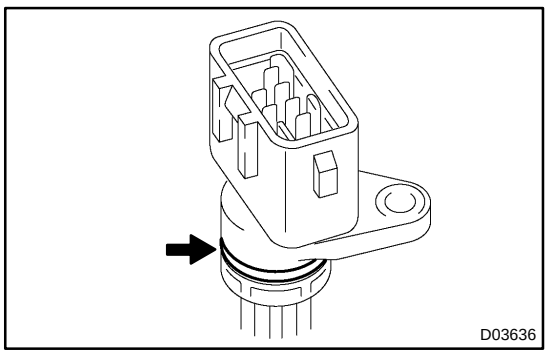


9. REMOVE TRANSAXLE SOLENOID WIRE

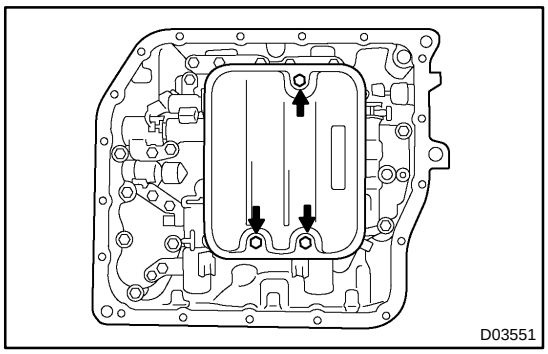
(a) Remove the 5 connectors from shift solenoid valves.

(b) Remove the bolt, the clamp and the ATF temperature sensor.

(c) Remove the transaxle solenoid wire from the transaxle case.

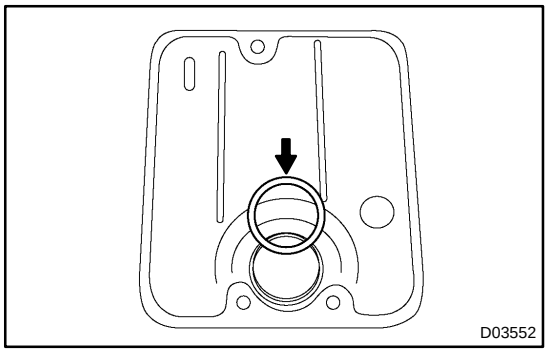


(d) Remove the O-ring from the transaxle solenoid wire.

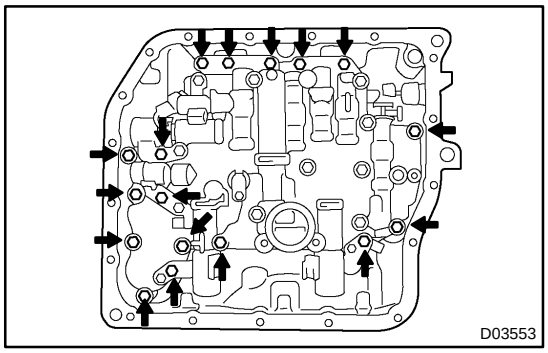


10. REMOVE OIL STRAINER

(a) Remove the 3 bolts and oil strainer.

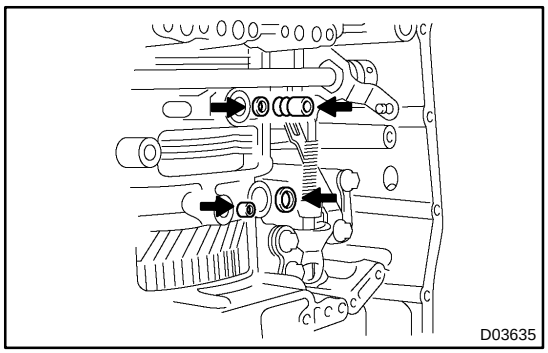


(b) Remove the gasket from the oil strainer.

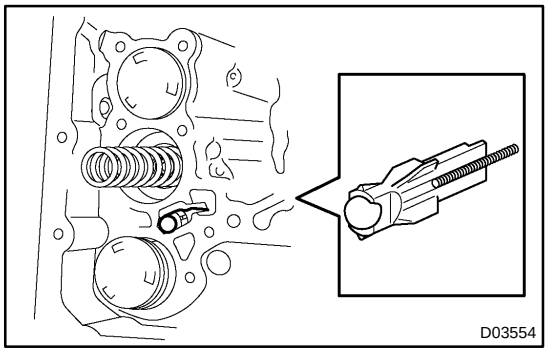


11. REMOVE VALVE BODY ASSEMBLY

Support the valve body assembly and remove the 17 bolts and the valve body assembly.

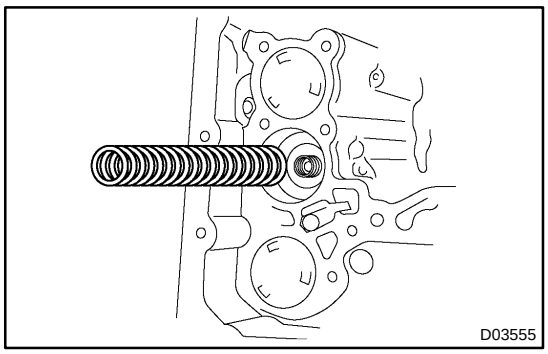


12. REMOVE 4 APPLY GASKETS



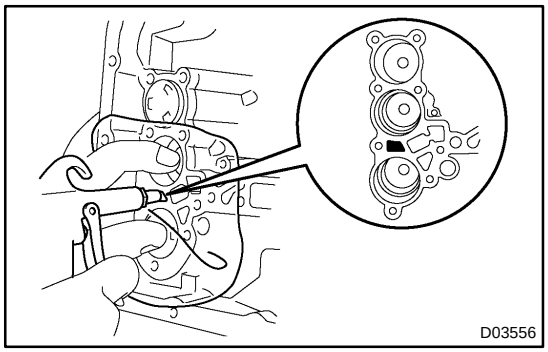
13. REMOVE CHECK BALL BODY

Remove the check ball body and spring.



14. REMOVE ACCUMULATOR SPRING AND PISTON

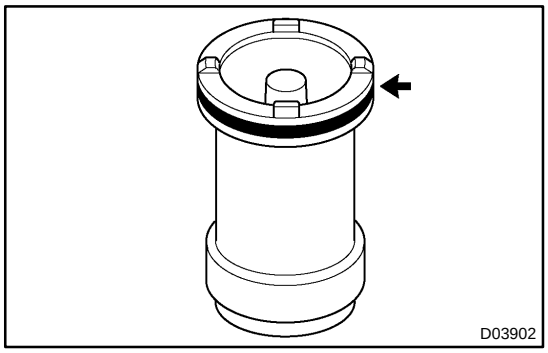
(a) Remove the spring from the C_3 accumulator piston.



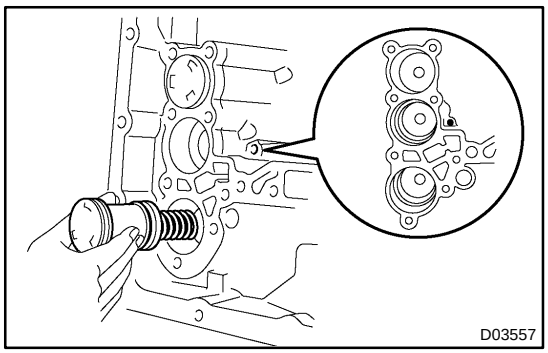
(b) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the oil hole and remove the C_3 accumulator piston.

NOTICE:

- **Blowing off the air may cause the piston's jump-out. When removing the piston, hold it with your hand using a waste cloth.**
- **Take care not to splash ATF when air-blowing.**



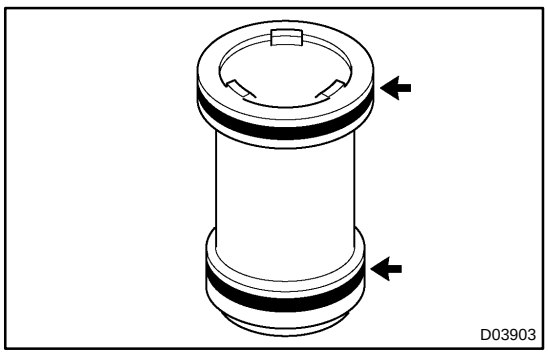
(c) Remove the O-ring from the piston.



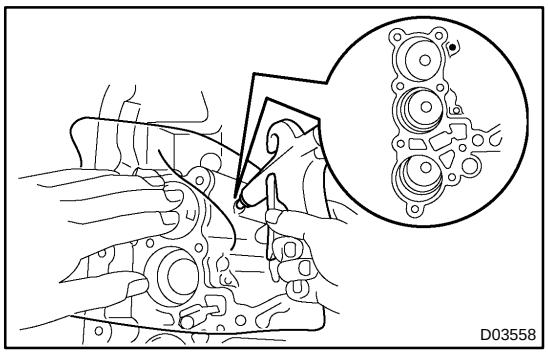
(d) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the oil hole and remove the C_1 accumulator piston and spring.

NOTICE:

- **Blowing off the air may cause the piston's jump-out. When removing the piston, hold it with your hand using a waste cloth.**
- **Take care not to splash ATF when air-blowing.**



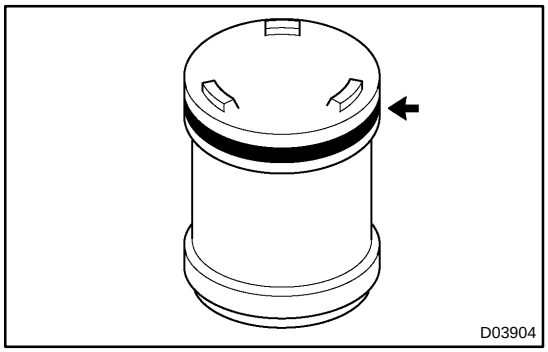
(e) Remove the 2 O-rings from the piston.



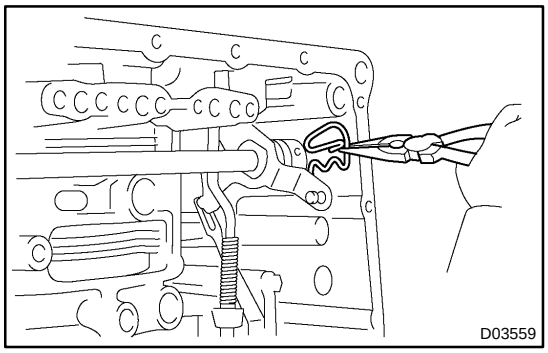
(f) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the oil hole and remove the B_3 accumulator piston and 2 springs.

NOTICE:

- **Blowing off the air may cause the piston's jump-out. When removing the piston, hold it with your hand using a waste cloth.**
- **Take care not to splash ATF when air-blowing.**

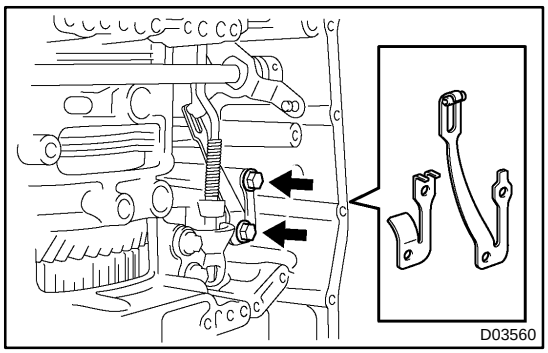


(g) Remove the O-ring from the piston.

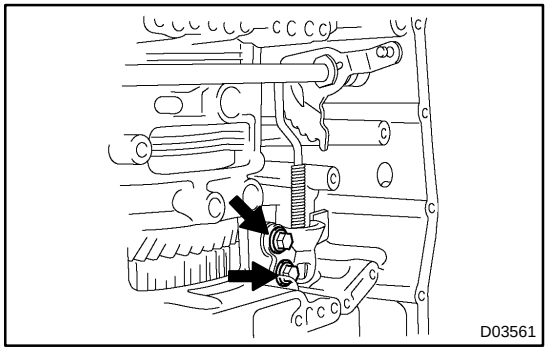


15. REMOVE MANUAL VALVE LEVER SHAFT

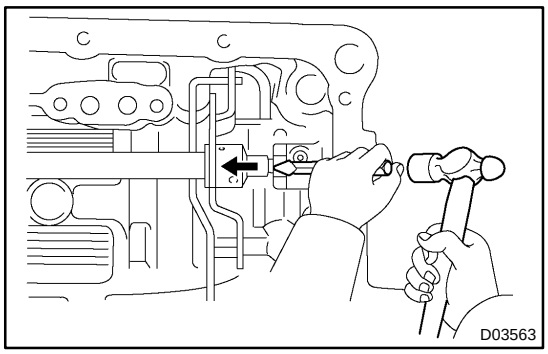
(a) Using needle-nose pliers, remove the retainer spring.



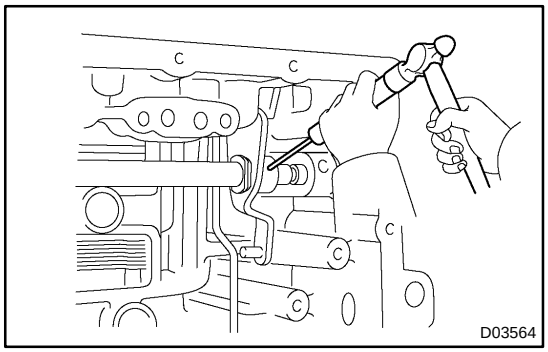
(b) Remove the 2 bolts, the manual detent spring and cover.



(c) Remove the 2 bolts and the parking lock pawl bracket.



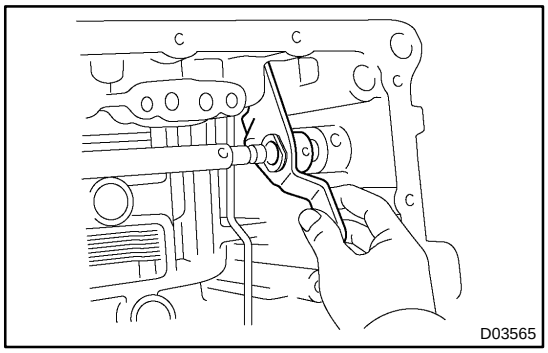
(d) Using a chisel and a hammer, unstake and remove the spacer.



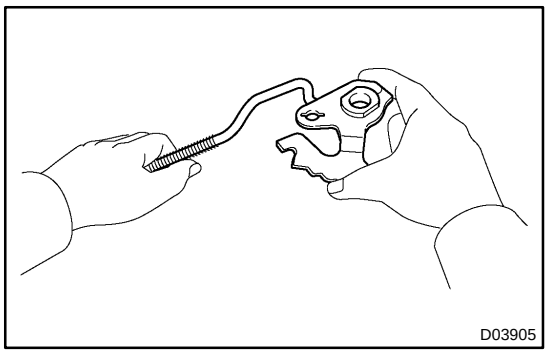
(e) Using a pin punch and a hammer, drive out the pin.

HINT:

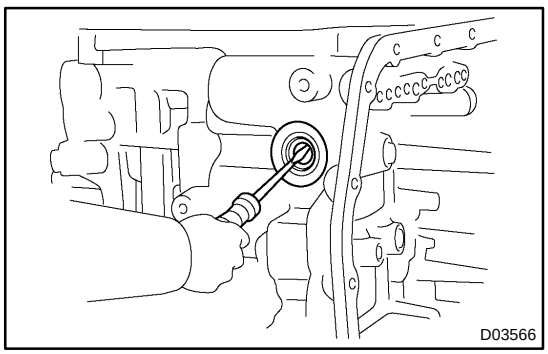
Slowly drive out the pin so that it will not fall into the transaxle case.



(f) Remove the manual valve lever shaft and the manual valve lever.



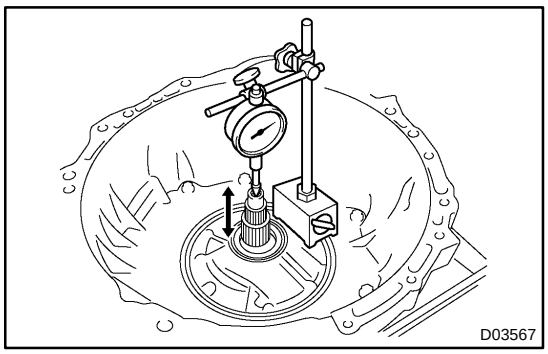
(g) Remove the parking lock rod from the manual valve lever shaft.



(h) Using a screwdriver, remove the oil seal.

16. PLACE TRANSAXLE CASE

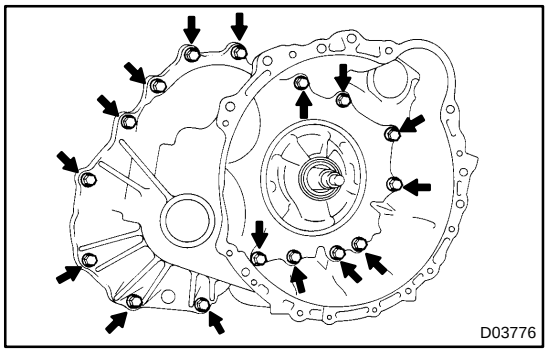
Fix the transaxle case with the oil pump side facing up.



17. INSPECT INPUT SHAFT END PLAY

Using a dial indicator, measure the input shaft end play.

End play: 0.27 - 1.24 mm (0.0106 - 0.0488 in.)



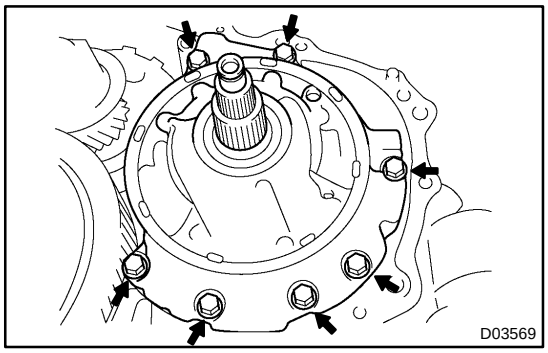
18. REMOVE TRANSAXLE HOUSING

(a) Remove the 16 bolts.

(b) Tap on the circumference of the transaxle housing with a plastic hammer to remove the transaxle housing from the transaxle case.

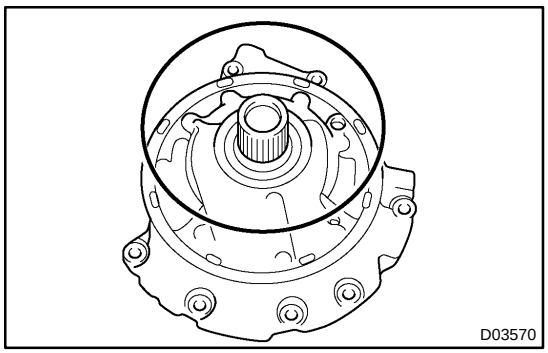
NOTICE:

Differential may be accidentally removed when the transaxle housing is removed.

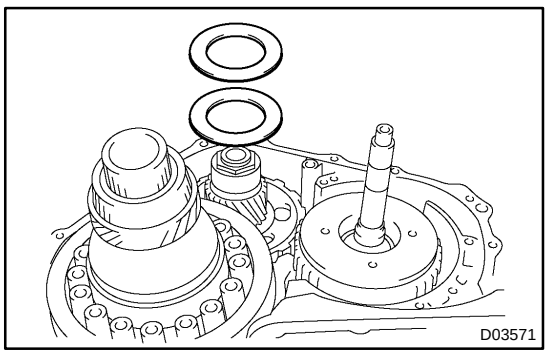


19. REMOVE OIL PUMP

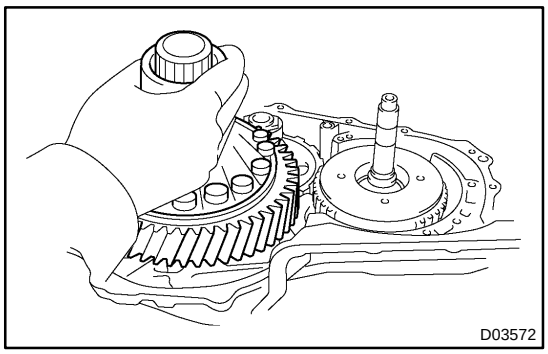
(a) Remove the 7 bolts and the oil pump.



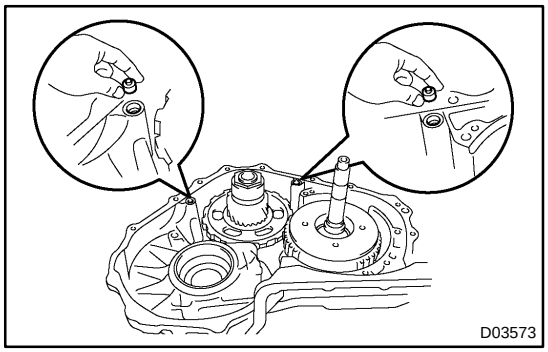
(b) Remove the O-ring from the oil pump.



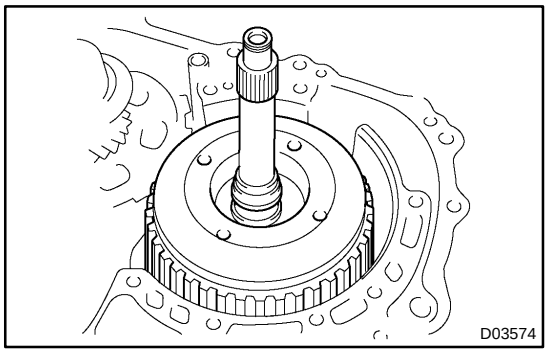
20. REMOVE THRUST BEARING AND BEARING RACE



21. REMOVE DIFFERENTIAL ASSEMBLY

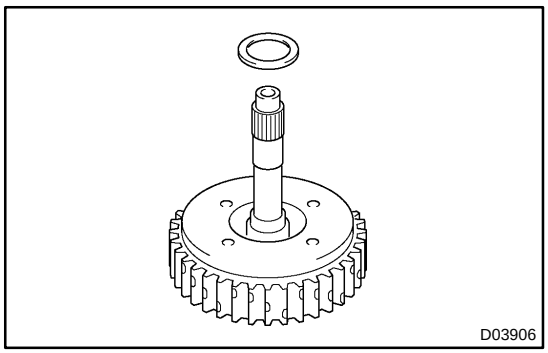


22. REMOVE 2 APPLY GASKETS

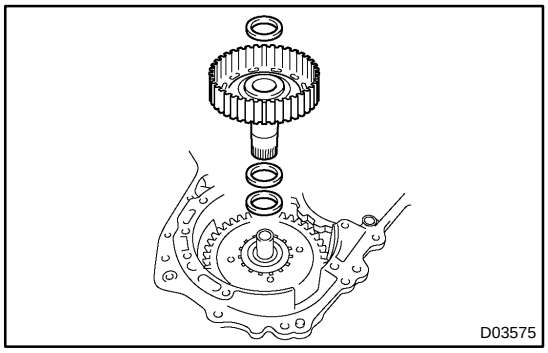


23. REMOVE FORWARD CLUTCH

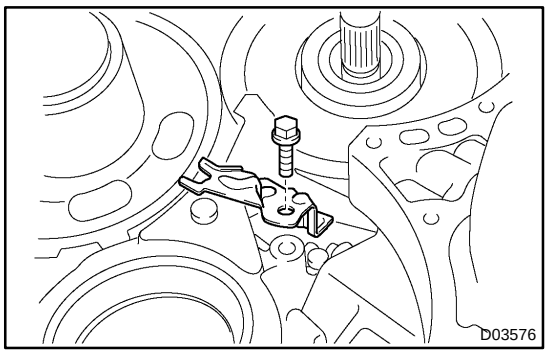
(a) Remove the forward clutch from the transaxle case.



(b) Remove the thrust bearing from the forward clutch.

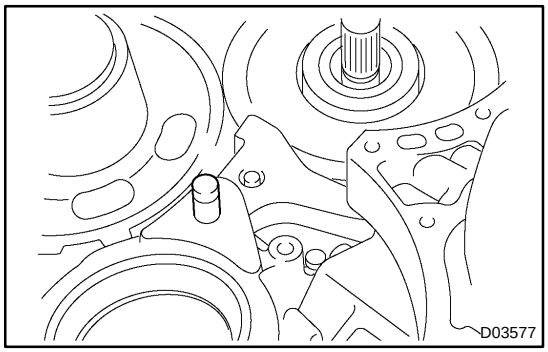


(c) Remove the multiple clutch hub, 2 thrust bearing and bearing race from the transaxle case.

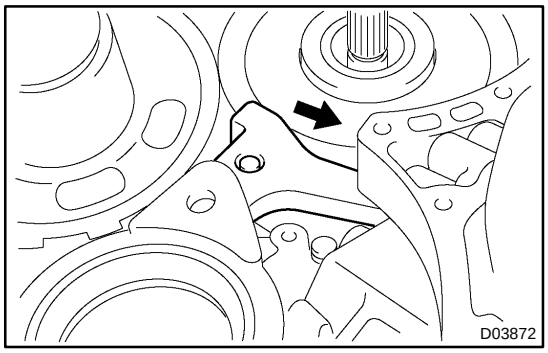


24. REMOVE U/D PLANETARY GEAR ASSEMBLY

(a) Remove a bolt and the pawl shaft clamp.



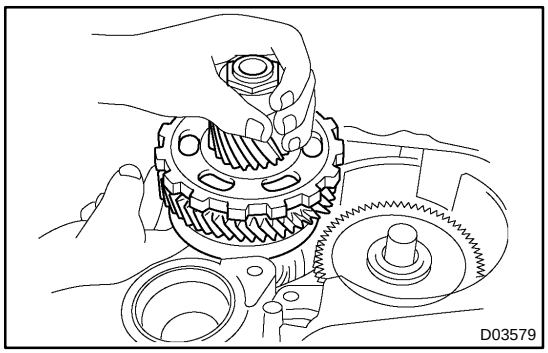
(b) Remove the parking lock pawl shaft.



(c) Push the parking lock pawl.

HINT:

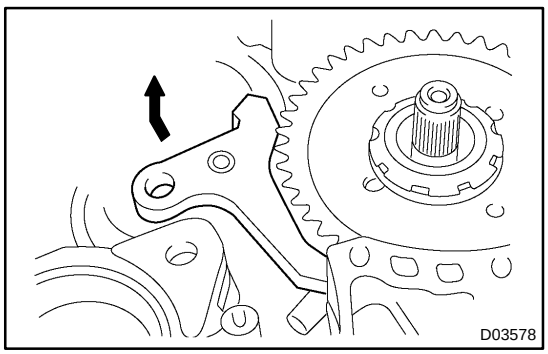
Failure to do so will cause interference when the U/D planetary gear is removed.



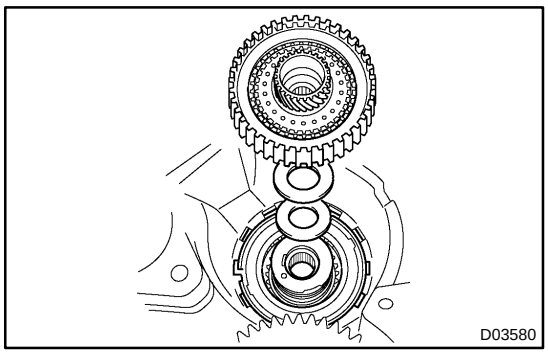
(d) Remove the U/D planetary gear assembly from the transaxle case.

NOTICE:

Be careful that the U/D planetary gear assembly do not fall out.

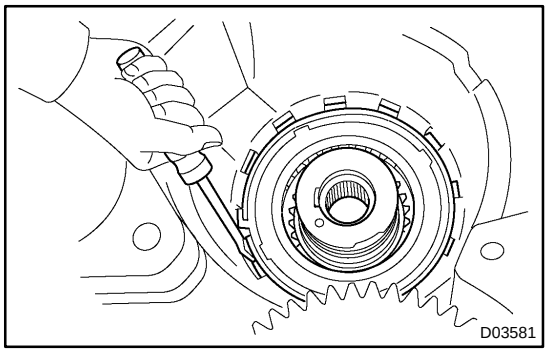


(e) Remove the spring, the pin and the parking lock pawl.



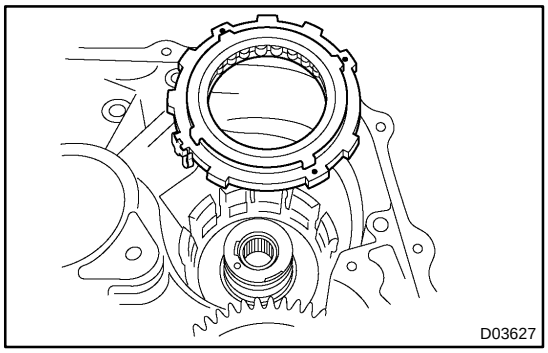
25. REMOVE U/D CLUTCH ASSEMBLY

Remove the U/D clutch assembly, the thrust bearing and the bearing race from the transaxle case.

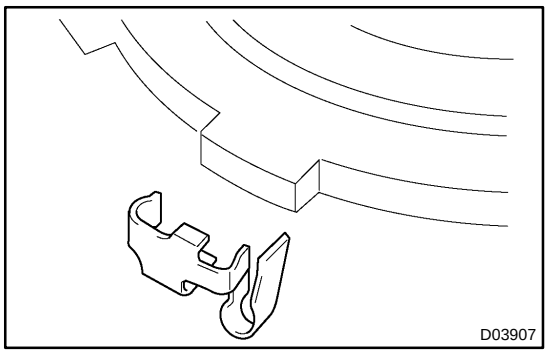


26. REMOVE ONE-WAY CLUTCH NO.2

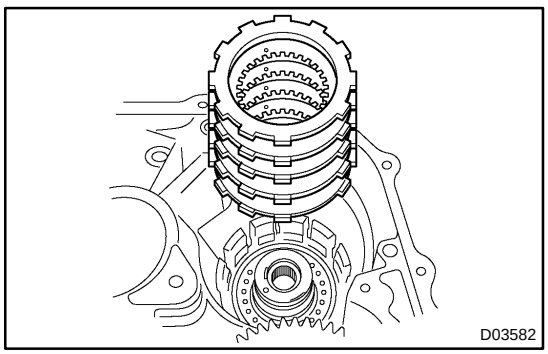
(a) Using a screwdriver, remove the snap ring.



(b) Remove the one-way clutch No.2 from the transaxle case.



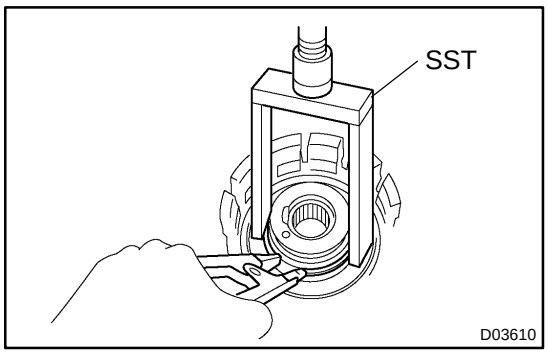
(c) Remove the outer race retainer from the one-way clutch No.2.



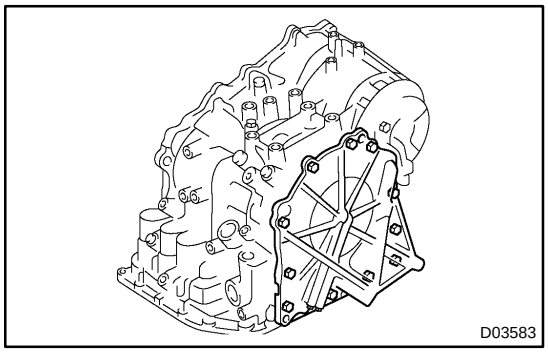
27. REMOVE U/D BRAKE

(a) Using a screwdriver, remove the snap ring.

(b) Remove the flange, 4 discs and 4 plates from the transaxle case.



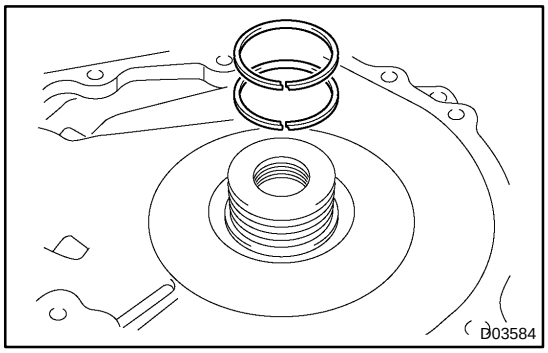
(c) Using SST, a snap ring expander and a press, remove the snap ring and return spring.
SST 09387-00020



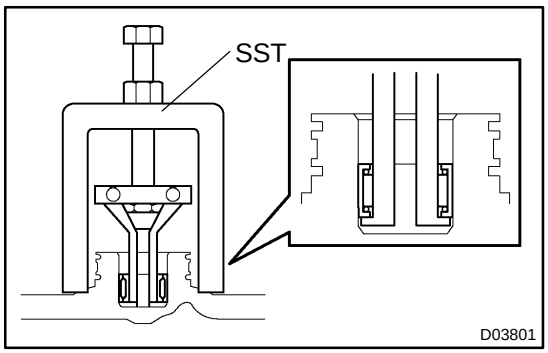
28. REMOVE TRANSAXLE REAR COVER

(a) Remove the 11 bolts.

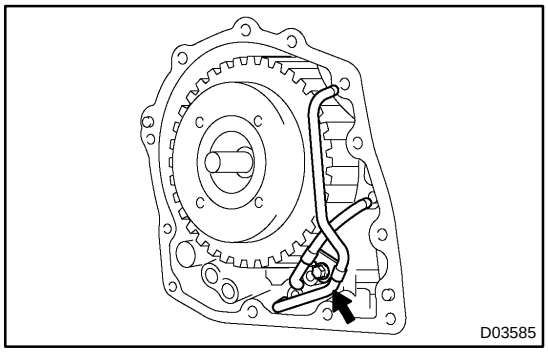
(b) Tap on the circumference of the rear cover with a plastic hammer to remove the transaxle rear cover from the transaxle case.



(c) Remove the 2 oil seal rings from the transaxle rear cover.

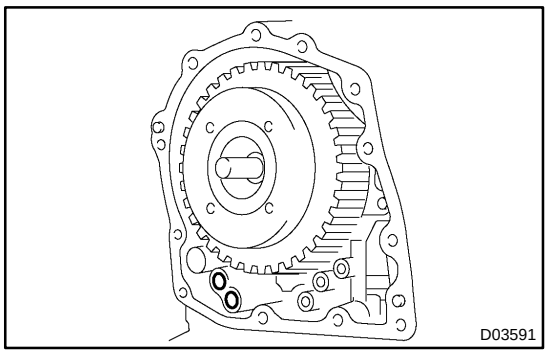


(d) Using SST, remove the needle-roller bearing.
SST 09387-00040 (09387-01010, 09387-01030, 09387-01040)



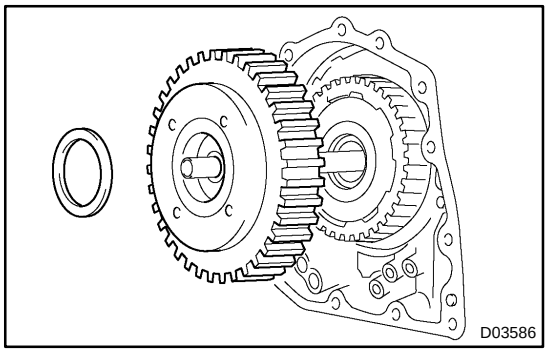
29. REMOVE BRAKE APPLY PIPE

(a) Remove a bolt, clamp and 2 brake apply pipes.



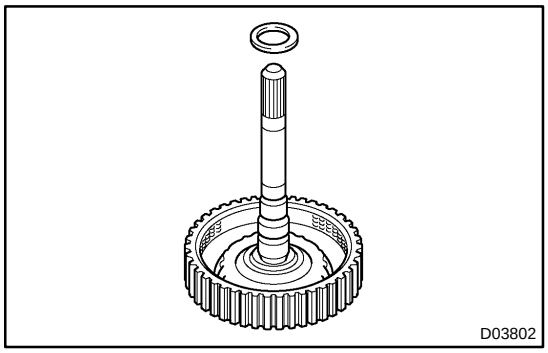
30. REMOVE TRANSAXLE CASE APPLY GASKET

Using a screwdriver, remove the 2 apply gaskets.

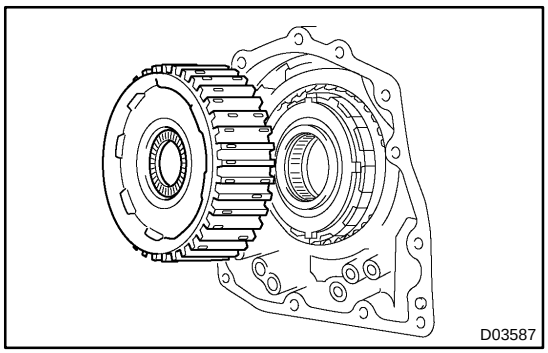


31. REMOVE DIRECT CLUTCH ASSEMBLY

(a) Remove the thrust bearing and the direct clutch from the transaxle case.

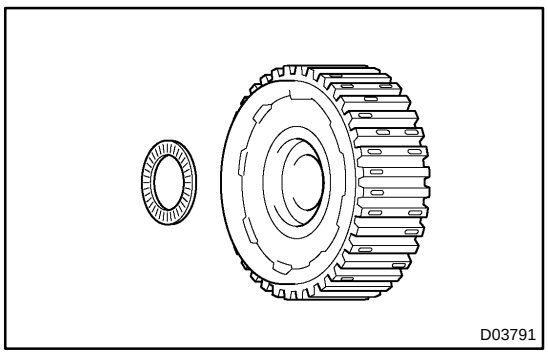


(b) Remove the bearing race from the direct clutch.

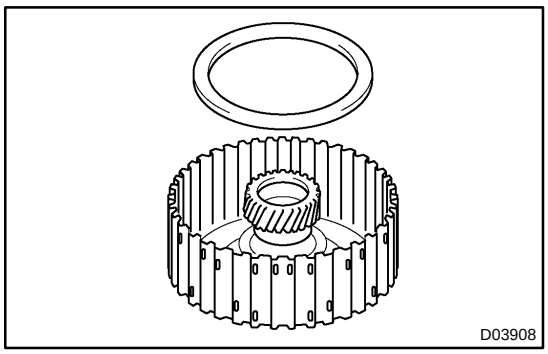


32. REMOVE REAR PLANETARY SUN GEAR ASSEMBLY

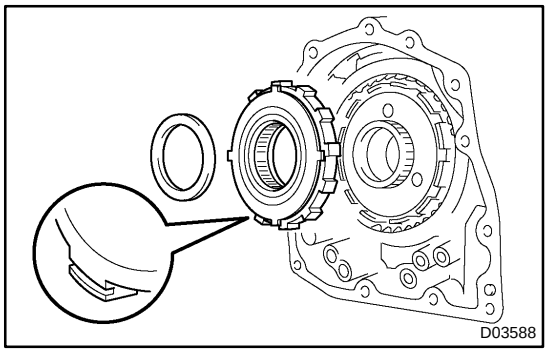
(a) Remove the rear planetary sun gear assembly from the transaxle case.



(b) Remove the thrust bearing from the rear planetary sun gear.

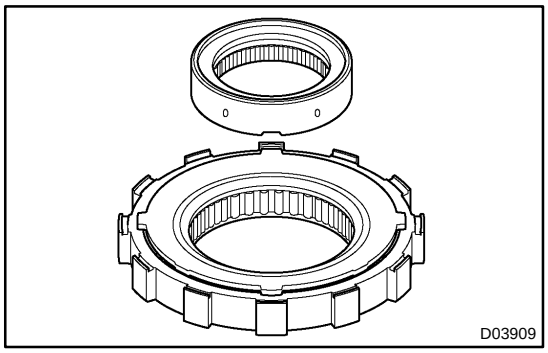


(c) Remove the thrust washer No.1 from the rear planetary sun gear.

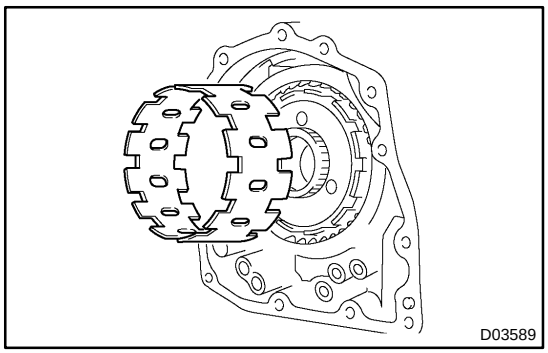


33. REMOVE ONE-WAY CLUTCH NO.1

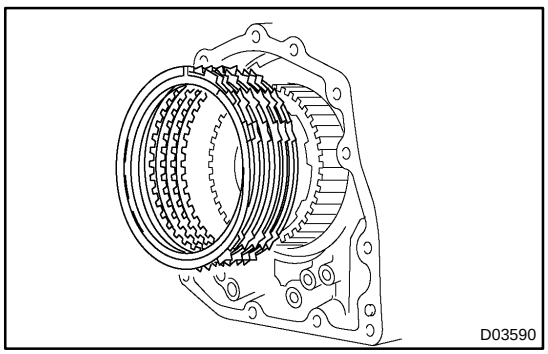
(a) Remove the one-way clutch No.1 and the thrust bearing from the transaxle case.



(b) Remove the inner race from the one-way clutch No.1.



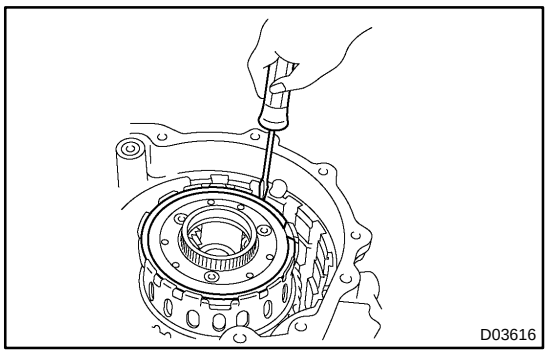
34. REMOVE ONE-WAY CLUTCH OUTER SLEEVE



35. REMOVE 2ND BRAKE

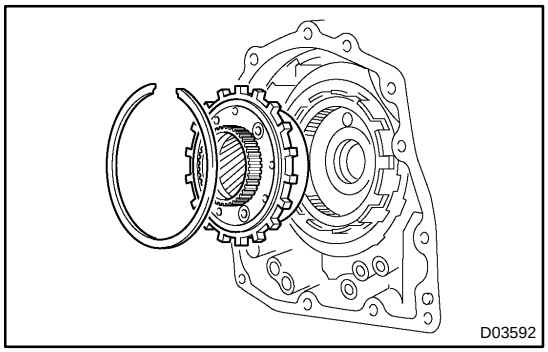
(a) Using a screwdriver, remove the snap ring.

(b) Remove the flange, 4 discs and 4 plates from the transaxle case.

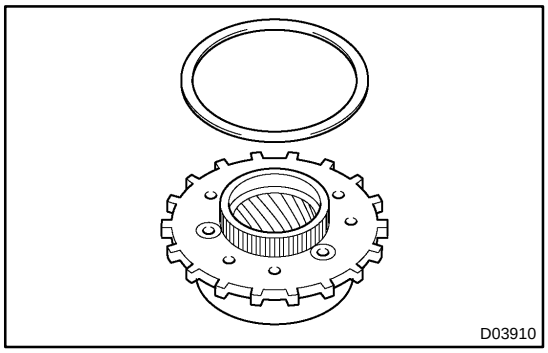


36. REMOVE REAR PLANETARY GEAR

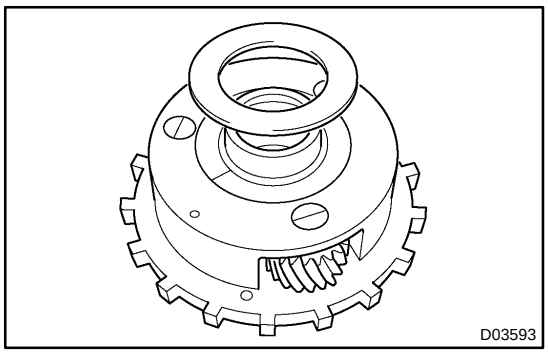
(a) Using a screwdriver, remove the snap ring.



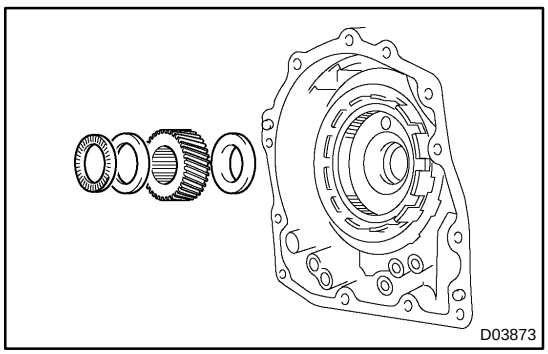
(b) Remove the rear planetary gear from the transaxle case.



(c) Remove the thrust washer No.2 from the rear planetary gear.

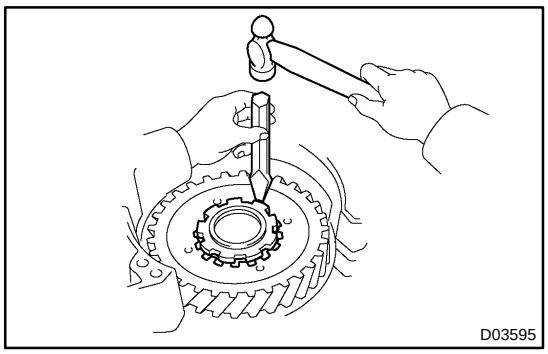


(d) Remove the bearing race from the rear planetary gear.



37. REMOVE FRONT PLANETARY SUN GEAR

(a) Remove the 2 thrust bearings, the bearing race and the front planetary sun gear from the transaxle case.

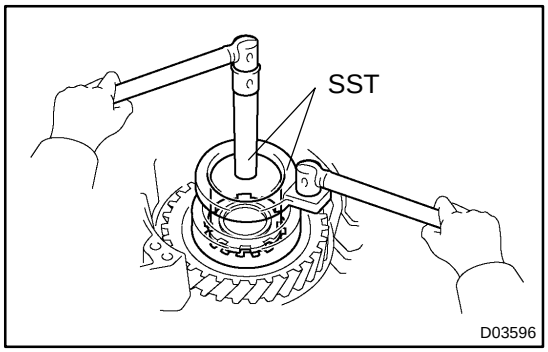


38. REMOVE FRONT PLANETARY GEAR ASSEMBLY AND BRAKE HUB

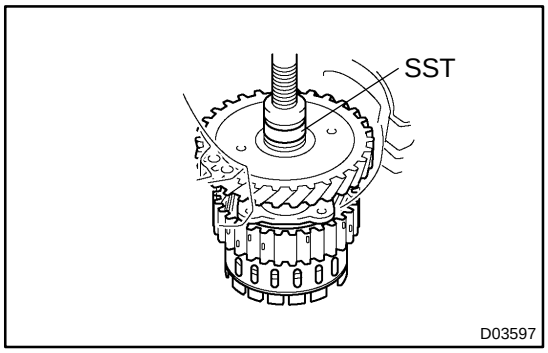
(a) Using a chisel and a hammer, unstake the lock washer.

NOTICE:

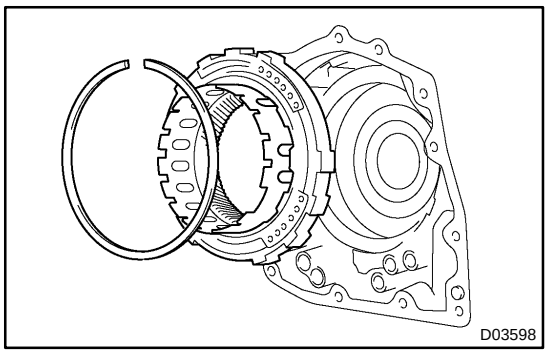
Push down all claws of the washer. Otherwise SST can not be fully pressed again the nut and can not loosen the nut.



(b) Using SST, remove the nut.
SST 09387-00030, 09387-00080

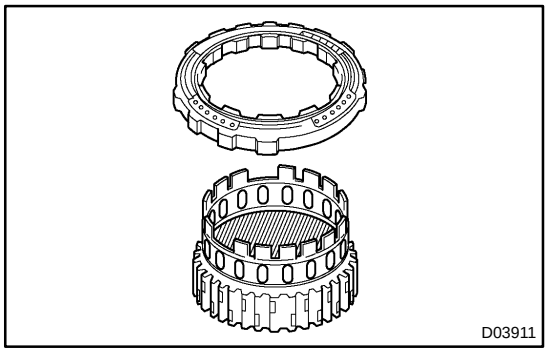


(c) Using SST and a press, remove the front planetary gear assembly from the counter drive gear.
SST 09950-60010 (09951-00450)

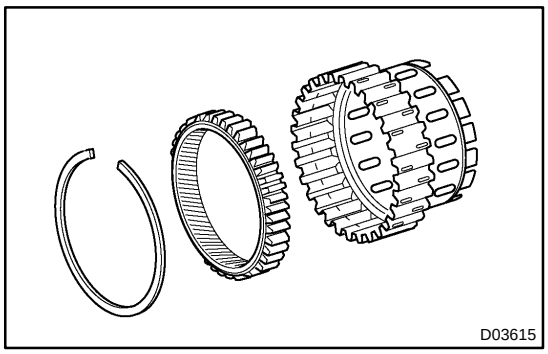


39. REMOVE 2ND BRAKE ASSEMBLY AND FRONT PLANETARY RING GEAR

(a) Using a screwdriver, remove the snap ring and the brake hub with 2nd brake cylinder assembly.

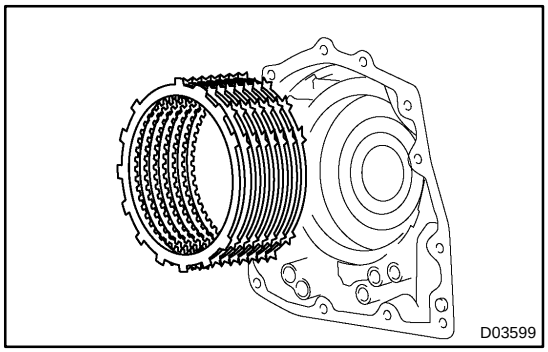


(b) Remove the brake hub from the 2nd brake cylinder assembly.



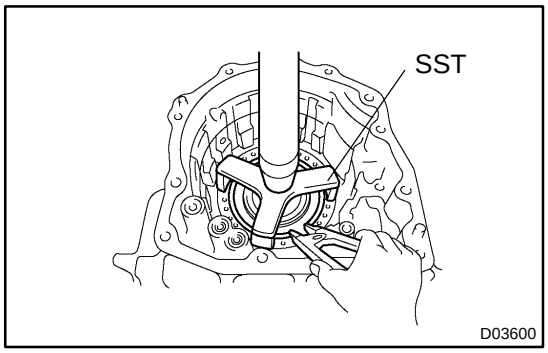
40. REMOVE FRONT PLANETARY RING GEAR

Using a screwdriver, remove the snap ring and front planetary ring gear from the brake hub.



41. REMOVE 1ST & REVERSE BRAKE

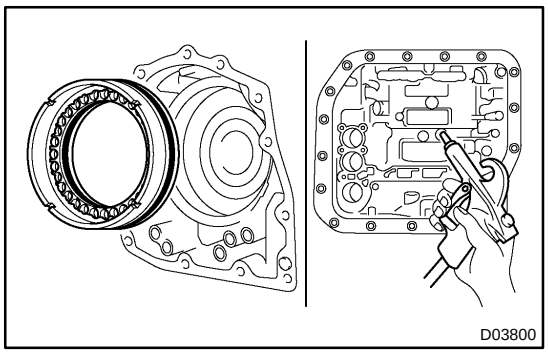
(a) Remove the flange, 7 discs and 7 plates from the transaxle case.



(b) Using SST, a press and a snap ring expander, remove the snap ring and the piston return spring.
SST 09387-00070

NOTICE:

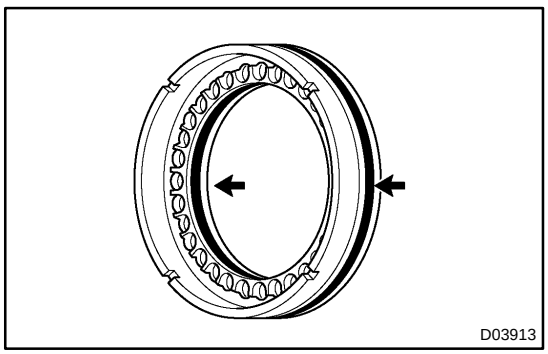
- **Stop the press when the spring sheet is lowered 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, preventing the spring sheet from deforming.**
- **Do not expand the snap ring excessively.**



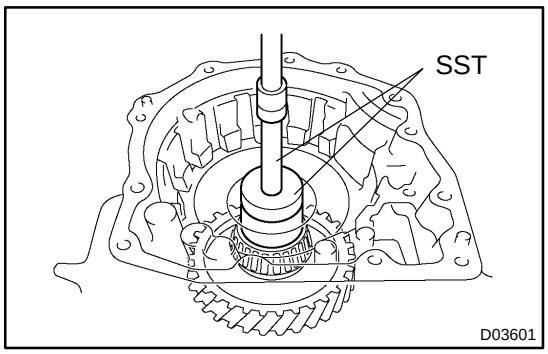
(c) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the transaxle case to remove 1st & reverse brake piston.

NOTICE:

- **Blowing off the air may cause the piston jump-out. When removing the piston, hold it with your hand using a waste cloth.**
- **Take care not to splash ATF when air-blowing.**

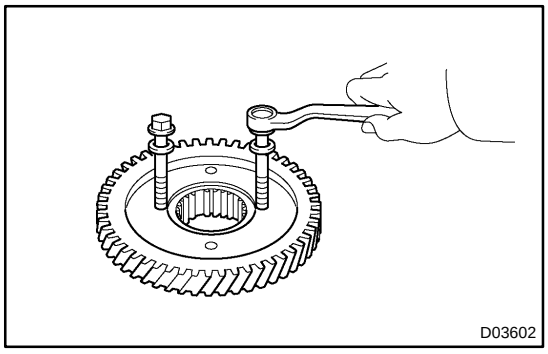


(d) Remove 2 O-rings from the 1st & reverse brake piston.

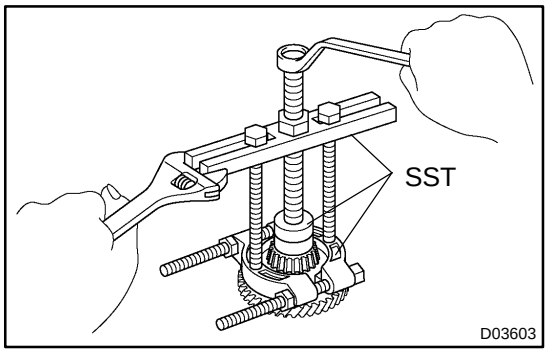


42. REMOVE COUNTER DRIVE GEAR

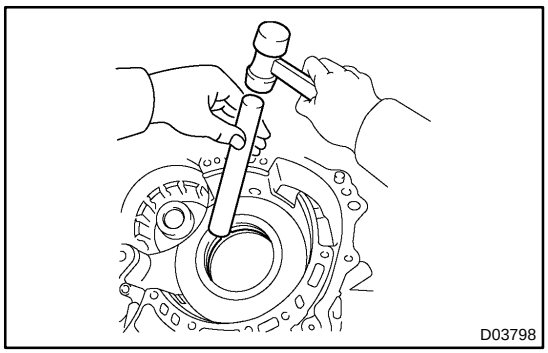
(a) Using SST and a press, remove the counter drive gear from the transaxle case.
SST 09950-60010 (09951-00600), 09950-70010 (09951-07100)



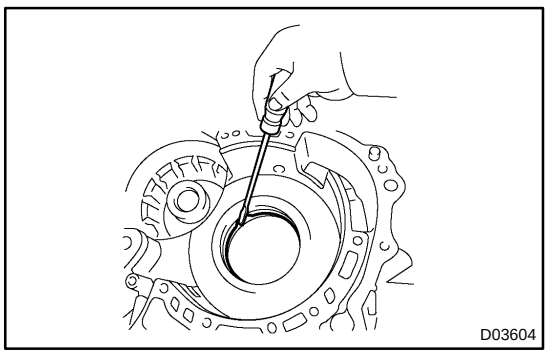
(b) As shown in the illustration, tighten 2 bolts evenly and make clearance of approx. 20.0 mm (0.797 in.) between the counter drive gear and the inner race.



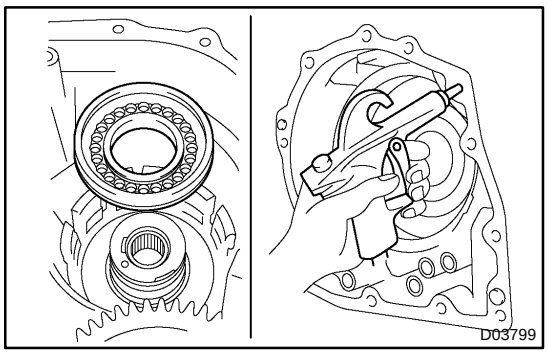
(c) Using SST, remove the tapered roller bearing RH.
SST 09950-00020, 09950-00030, 09950-60010 (09951-00590)



(d) Using a brass bar and a hammer, remove the 2 bearing outer races.

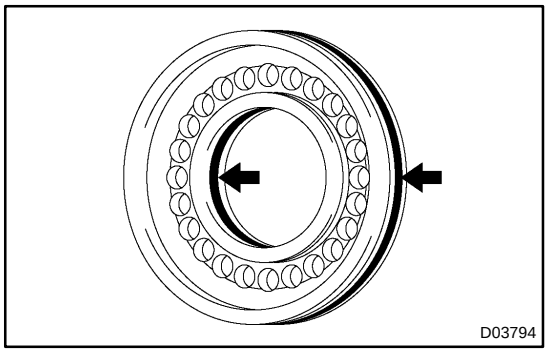


(e) Using a screwdriver, remove the snap ring from the transaxle case.

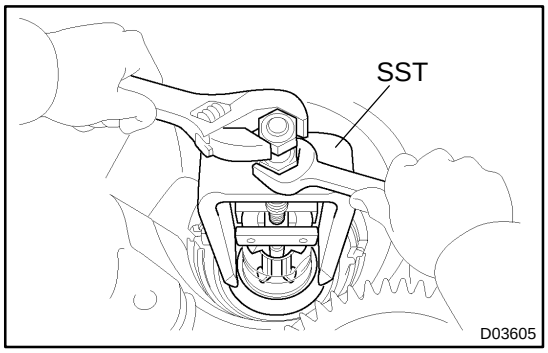


43. REMOVE U/D BRAKE PISTON

(a) Apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the transaxle case to remove the U/D brake piston.

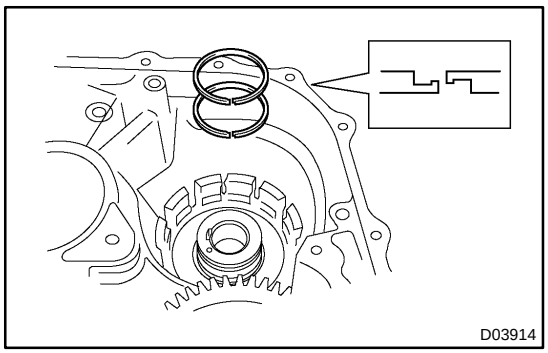


(b) Remove the 2 O-rings from the U/D brake piston.

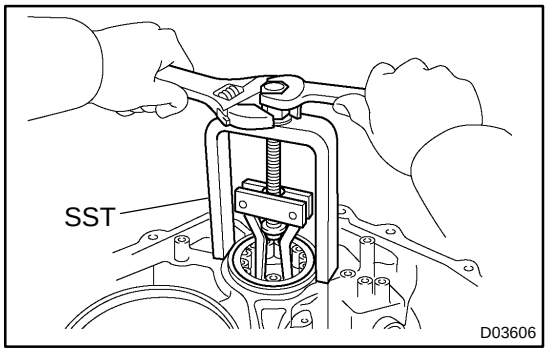


(c) Using SST, remove the needle-roller bearing from the transaxle case.

SST 09387-00040, (09387-01020, 09387-01030, 09387-01040)



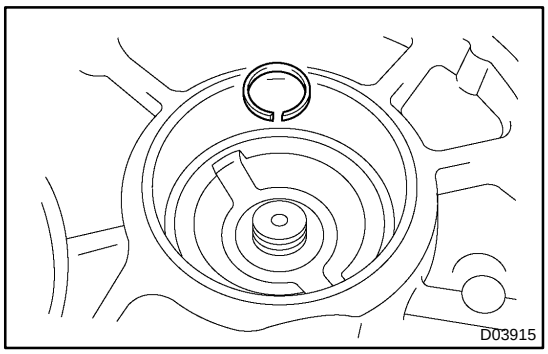
(d) Remove the 2 oil seal rings from the transaxle case.



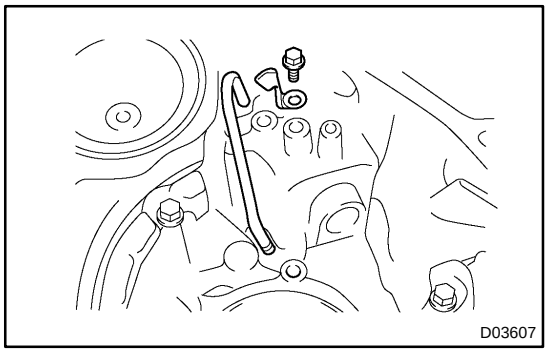
44. REMOVE U/D CYLINDRICAL ROLLER BEARING

(a) Using SST, remove the cylindrical roller bearing from the transaxle case.

SST 09514-3501 1

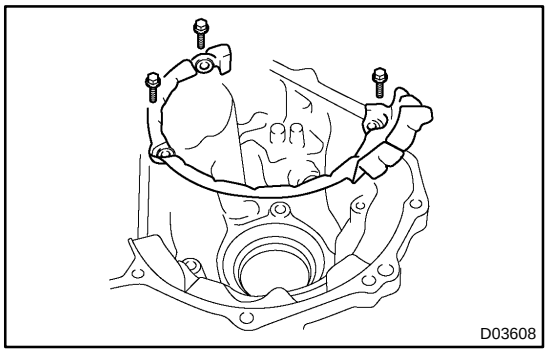


(b) Remove the oil seal ring from the transaxle housing.



45. REMOVE APPLY PIPE

Remove the bolt, the clamp and the apply pipe from the transaxle case.



46. REMOVE OIL SEPARATOR

(a) Remove the 3 bolts and oil separator from the transaxle case.

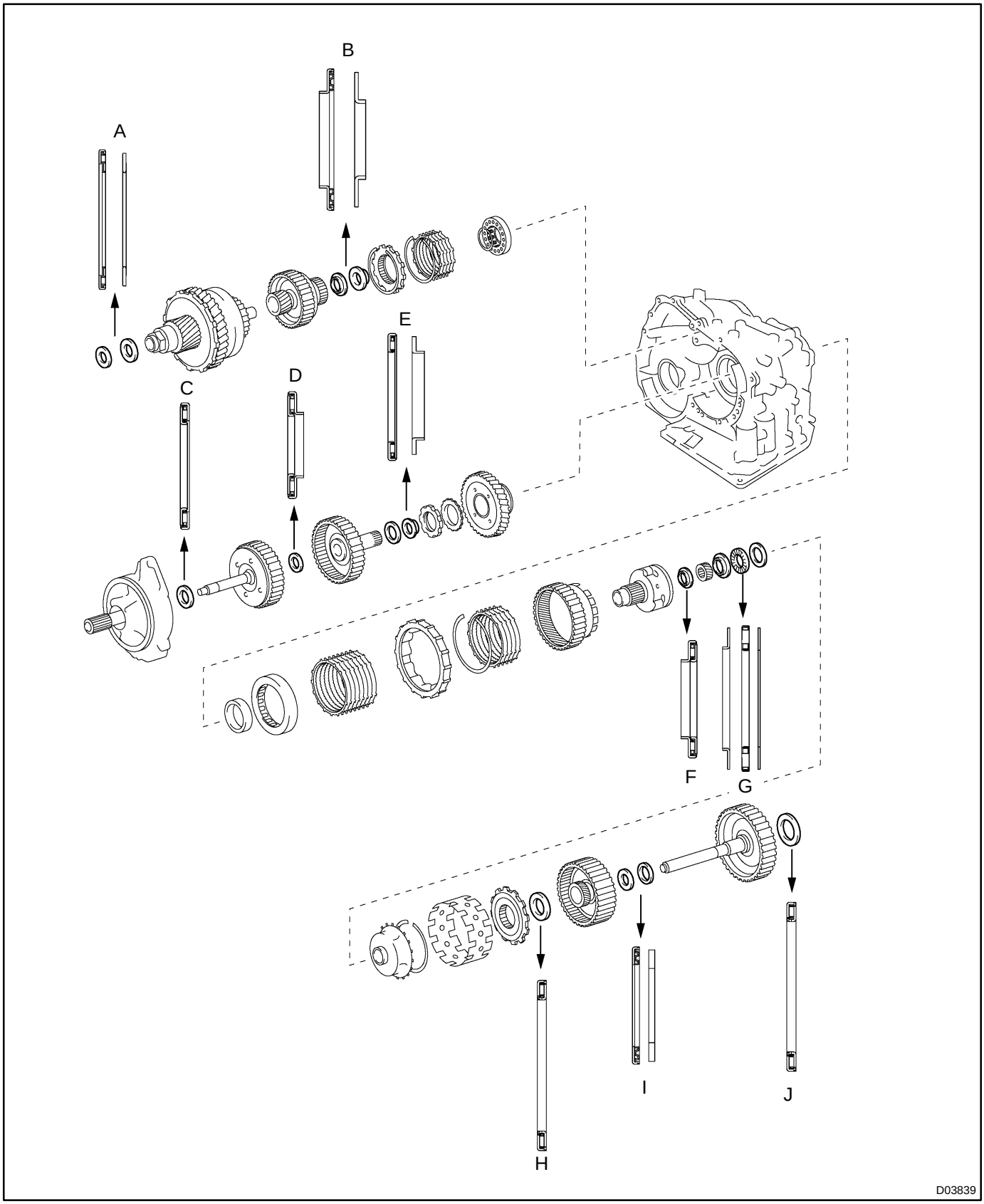
AX0BN-01

REASSEMBLY

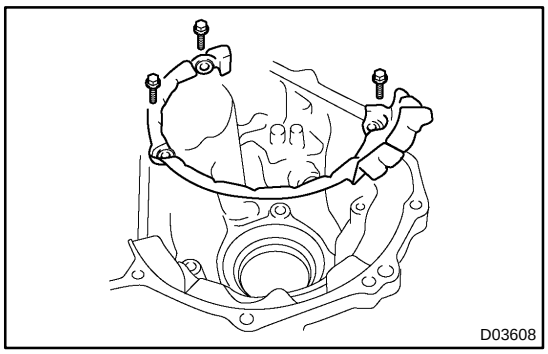
NOTICE:

- **The automatic transaxle is composed of highly precision-finished parts, necessitating careful inspection before reassembly because even a small nick could cause fluid leakage or affect the performance. The instructions here are organized so that you work on only one component group at a time. This will help avoid confusion from similar-looking parts of different sub-assemblies being on your workbench at the same time. The component groups are inspected and repaired from the converter housing side. As much as possible, complete the inspection, repair and reassembly before proceeding to the next component group. If a defect is found in a certain component group during reassembly, inspect and repair this group immediately. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of the group in a separate container while proceeding with disassembly, inspection, repair and reassembly of other component groups.**
  Recommended ATF: D-II or DEXRON® III (DEXRON® II)
- **All disassembled parts should be washed clean and any fluid passages and holes should be blown through with compressed air.**
- **Dry all parts with compressed air-never use shop rags.**
- **When using compressed air, always aim away from yourself to prevent accidentally spraying ATF or kerosene on your face.**
- **The recommended automatic transaxle fluid or kerosene should be used for cleaning.**
- **After cleaning, the parts should be arranged in the correct order for efficient inspection, repairs, and reassembly.**
- **When disassembling a valve body, be sure to match each valve together with the corresponding spring.**
- **New discs for the brakes and clutches that are to be used for replacement must be soaked in ATF for at least 15 minutes before reassembly.**
- **All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with ATF prior to reassembly.**
- **All gaskets and rubber O-rings should be replaced.**
- **Do not apply adhesive cements to gaskets and similar parts.**
- **Make sure that the ends of a snap ring are not aligned with one of the cutouts and are installed in the groove correctly.**
- **If a worn bushing is to be replaced, the sub-assembly containing the bushing must also be replaced.**
- **Check thrust bearings and races for wear or damage. Replace if necessary.**
- **Use petroleum jelly to keep parts in place.**
- **When working with FIPG material, you must observe the following.**
  Using a razor blade and a gasket scraper, remove all the old packing (FIPG) material from the gasket surface.
  Thoroughly clean all components to remove all the loose material.
  Clean both sealing surfaces with a non-residue solvent.
  Parts must be reassembled within 10 minutes of application. Otherwise, the packing (FIPG) material must be removed and reapplied.

BEARING AND RACES INSTALLATION POSITION AND DIRECTION



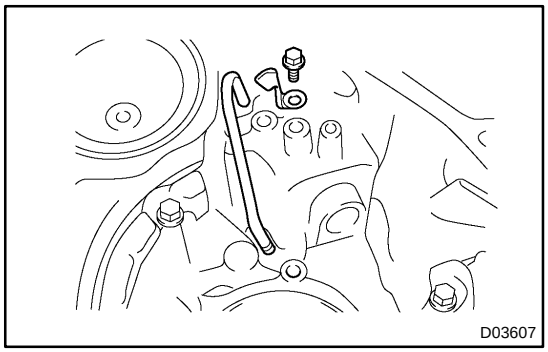
Mark	Front Race Diameter Inside / Outside mm (in.)	Thrust Bearing Diameter Inside / Outside mm (in.)	Rear Race Diameter Inside / Outside mm (in.)
A	-	57.2 (2.252) / 84.96 (3.3449)	56.4 (2.220) / 83.0 (3.268)
B	-	37.73 (1.4854) / 58.0 (2.283)	29.9 (1.177) / 55.5 (2.185)
C	-	33.85 (1.3327) / 52.2 (2.055)	-
D	-	23.5 (0.925) / 44.0 (1.732)	-
E	-	36.3 (1.429) / 52.2 (2.055)	34.5 (1.358) / 48.5 (1.909)
F	-	34.6 (1.362) / 48.5 (1.963)	-
G	40.3 (1.587) / 58.0 (2.283)	38.6 (1.520) / 60.0 (2.362)	38.6 (1.520) / 58.0 (2.283)
H	-	53.6 (2.110) / 69.6 (2.740)	-
I	-	33.7 (1.327) / 48.2 (1.898)	30.3 (1.193) / 46.0 (1.811)
J	-	53.6 (2.110) / 70.18 (2.763) or 69.6 (2.740)	-



1. INSTALL OIL SEPARATOR

Install the oil separator with the 3 bolts to the transaxle housing.

Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)



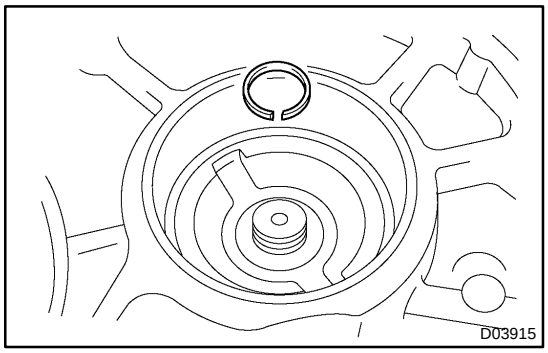
2. INSTALL APPLY PIPE

(a) Install the apply pipe, and clamp with the bolt to the transaxle case.

Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)

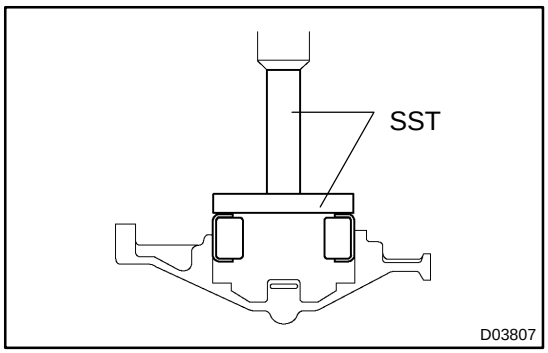
NOTICE:

Make sure to insert the pipe to the stopper.



3. INSTALL U/D CYLINDRICAL ROLLER BEARING

(a) Install the oil seal ring to the transaxle housing.

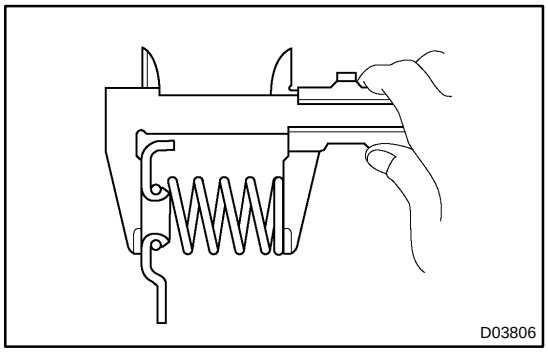


(b) Using SST and a press, install the U/D cylindrical roller bearing.

SST 09950-60020, (09951-00810), 09950-70010, (09951-07100)

NOTICE:

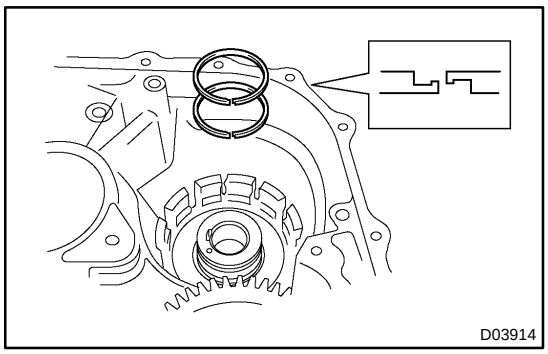
Do not apply excessive pressure to it.



4. CHECK U/D BRAKE PISTON RETURN SPRING

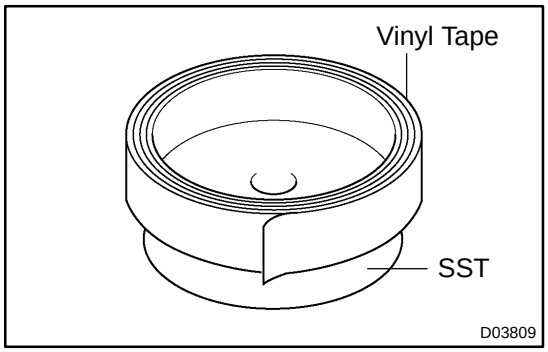
Using vernier caripers, measure the free length of the spring together with the spring seat.

Standard free length: 13.24 mm (0.5212 in.)



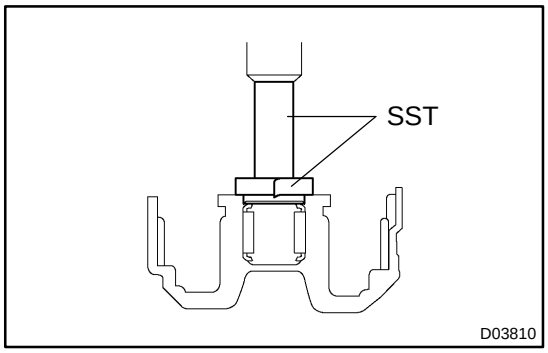
5. INSTALL U/D BRAKE

(a) Install the 2 oil seal rings to the transaxle case.



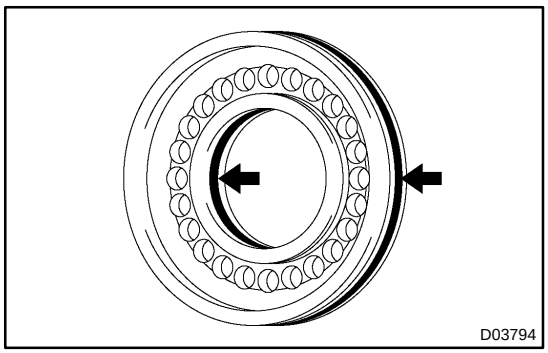
(b) Wind a vinyl tape around SST at the place 4.0 mm (0.157 in.) above from the bottom end until the thickness of the wound tape is about 5.0 mm (0.197 in.).
SST 09550-60010 (09951-00320)

NOTICE:
Clean SST to remove deposited oil, before winding a vinyl tape.

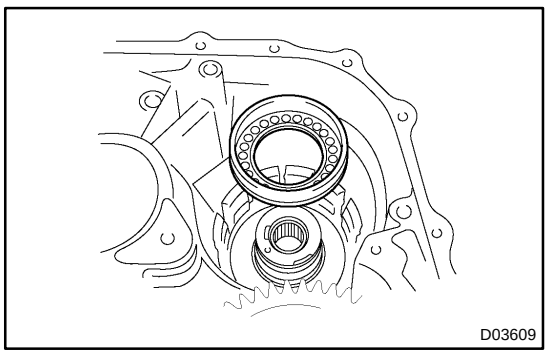


(c) Using SST and a press, install the needle-roller bearing to the transaxle case.
SST 09950-60010, (09951-00320), 09950-70010 (09951-07100)

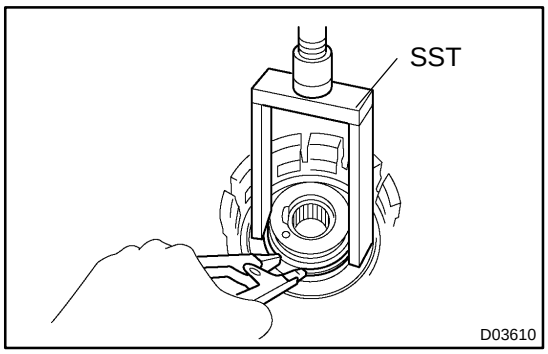
NOTICE:
When the wound vinyl tape contacts the transaxle case, stop press-fitting.



(d) Coat 2 new O-rings with ATF, install them to the U/D brake piston.



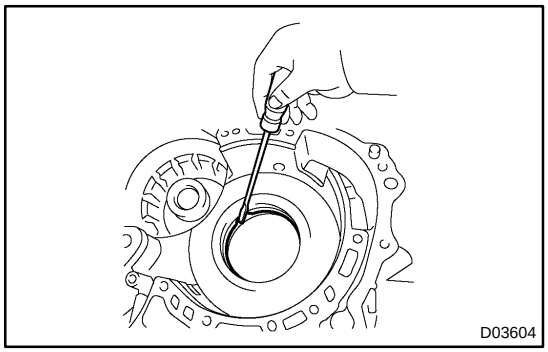
(e) Install the U/D clutch piston to the transaxle case.



(f) Using SST, a snap ring expander and a press, install the piston return spring and snap ring to the transaxle case.
SST 09387-00020

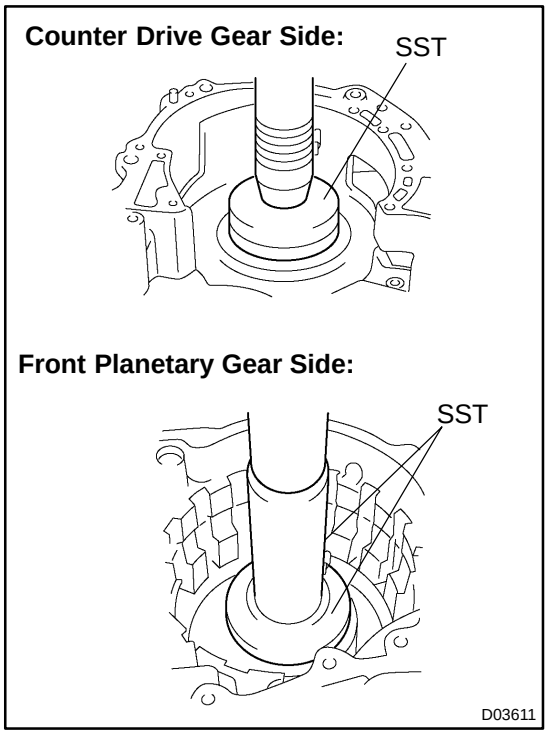
NOTICE:

- **Press-fit the bearing race RH until it contacts the snap ring.**
- **Do not apply excessive pressure to it.**



6. INSTALL COUNTER DRIVE GEAR

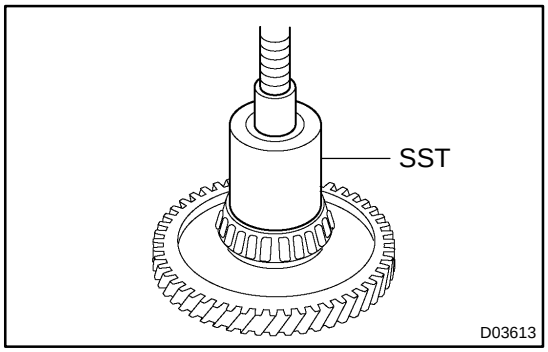
(a) Using a screwdriver, install the snap ring to the transaxle case.



(b) Using SST and a press, install the 2 bearing outer races to the transaxle case.
SST 09950-60020 (09951-00890), 09950-70010 (09951-07150)

NOTICE:

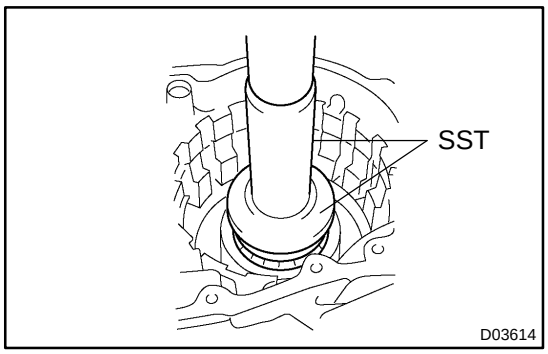
- **Press-fit the bearing race until it contacts the snap ring.**
- **Do not apply excessive pressure to it.**



(c) Using SST and a press, install the tapered roller bearing to the counter drive gear.
SST 09649-17010

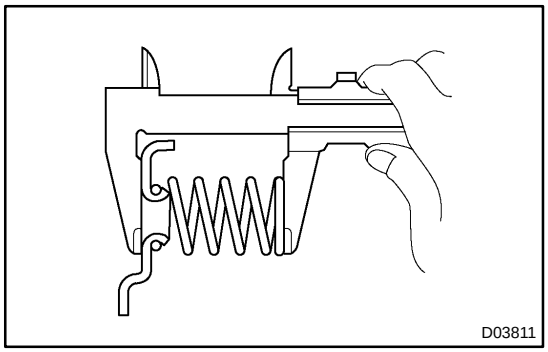
NOTICE:

- **Press-fit the bearing inner race until it contacts the counter drive gear.**
- **Do not apply excessive pressure to it.**



(d) Using SST and a press, install the counter drive gear and bearing to the transaxle case.
SST 09950-60010, (09951-00890), 09950-70010 (09951-07150)

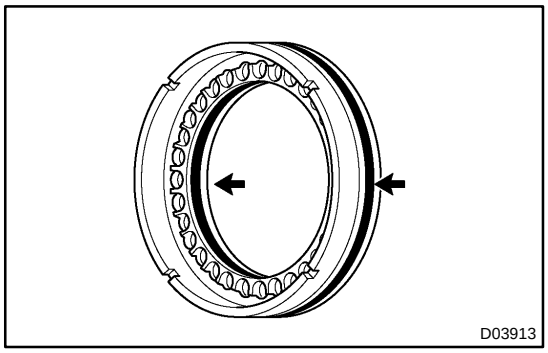
NOTICE:
Do not apply excessive pressure to it.



7. CHECK 1ST & REVERSE BRAKE PISTON RETURN SPRING

Using vernier caripers measure the free length of the spring together with the spring seat.

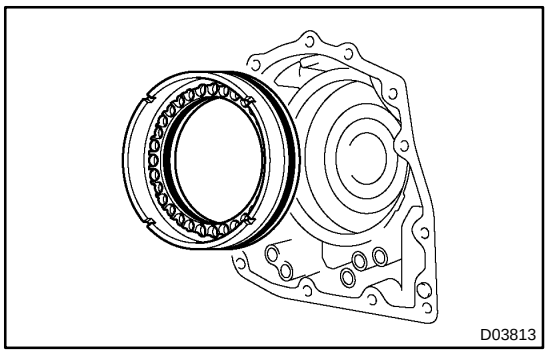
Standard free length: 17.61 mm (0.6933 in.)



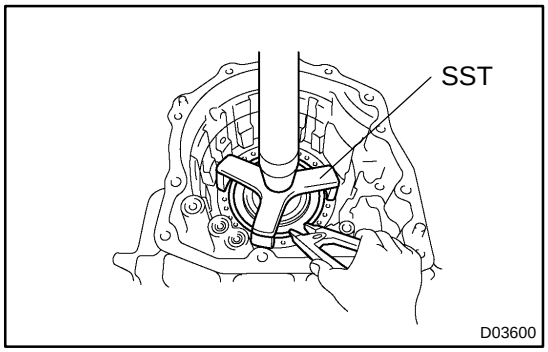
8. INSTALL 1ST & REVERSE BRAKE PISTON

(a) Coat 2 new O-rings with ATF.

(b) Install the 2 O-rings to the 1st & reverse brake piston.



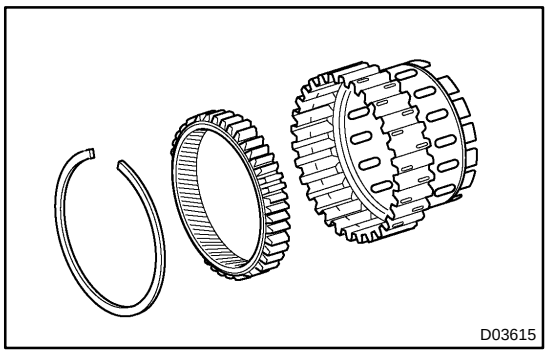
(c) Coat a 1st & reverse brake piston with ATF, install the 1st & reverse brake piston to the transaxle case.



(d) Using SST, a press, and snap ring pliers, install the piston return spring and snap ring to the transaxle case.
SST 09387-00070

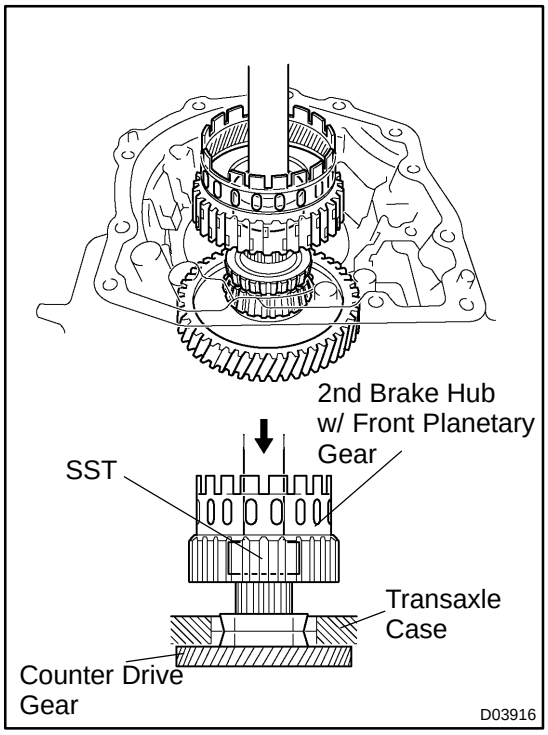
NOTICE:

- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, preventing the spring sheet from deforming.**
- **Do not expand the snap ring excessively.**



9. INSTALL FRONT PLANETARY GEAR ASSEMBLY

(a) Using a screwdriver, install the front planetary ring gear and the snap ring to the brake hub.

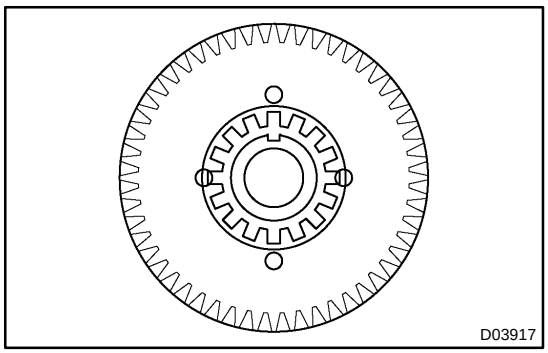


(b) Install the front planetary gear to the 2nd brake.

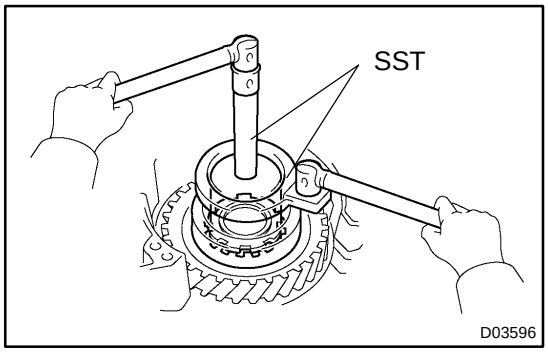
(c) Using SST, a press and press-fit the front planetary gear.
SST 09950-60010 (09951-00400)

NOTICE:

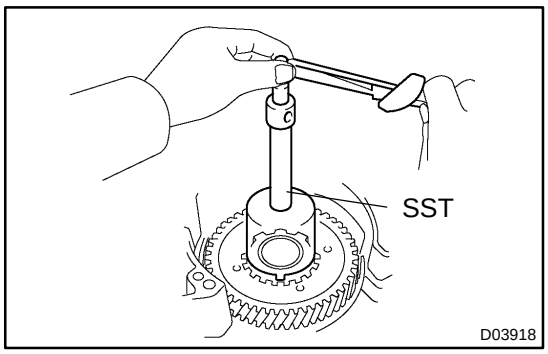
Do not apply excessive pressure to it.



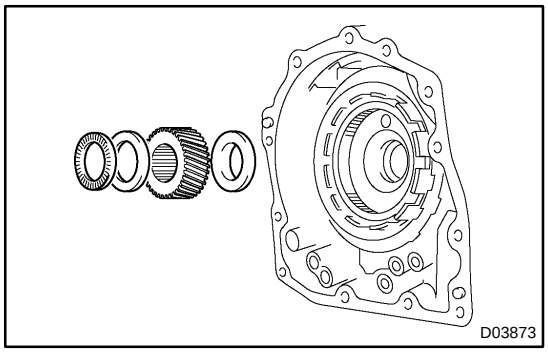
(d) Install the washer, as shown in the illustration.



(e) Using SST, install the nut.
SST 09387-00030, 09387-00080
Torque: 280 N·m (2855 kgf·cm, 207 ft·lbf)

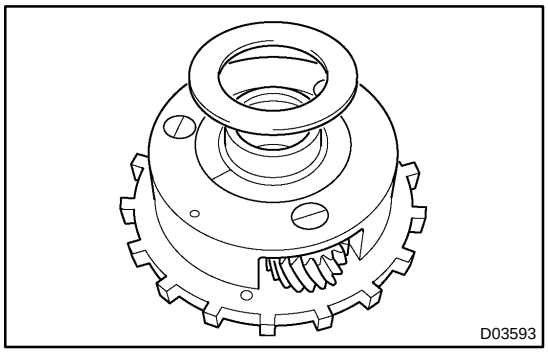


(f) Using SST and a torque wrench, measure the starting torque of the bearing. When the measured value is not within the specified value, gradually tighten the nut until it reaches the specified value.
SST 09387-00080
Starting torque:
0.6 - 1.0 N·m (5.5 - 10.0 kgf·cm, 4.8 - 8.7 in.·lbf)



(g) Install the 2 bearings, 2 races and front planetary sun gear to the front planetary gear.
Bearing and race diameter: mm (in.)

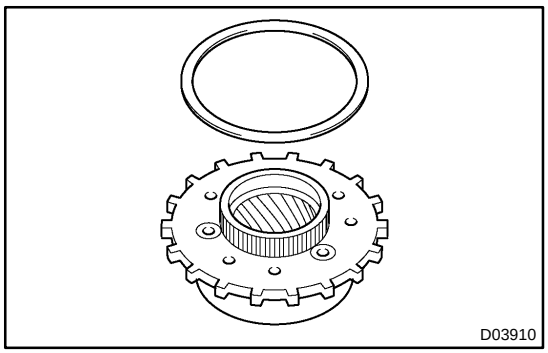
	inside	out side
Bearing	34.6 (1.362)	48.5 (1.909)
race	40.3 (1.587)	58.0 (2.283)
Bearing	38.6 (1.520)	60.0 (2.362)



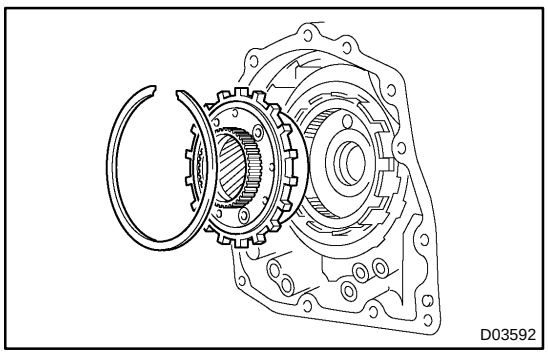
10. INSTALL REAR PLANETARY GEAR

(a) Coat a bearing race with ATF, install it to the rear planetary gear assembly.
Bearing race diameter:

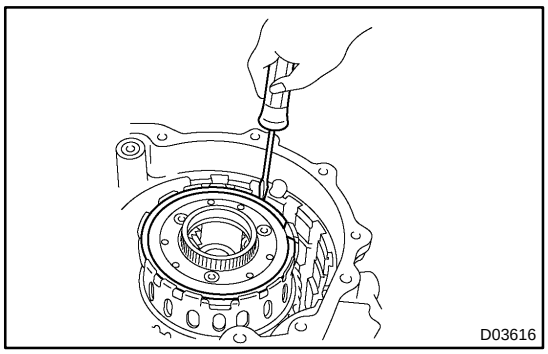
	inside	out side
race	38.6 (1.520)	58.0 (2.283)



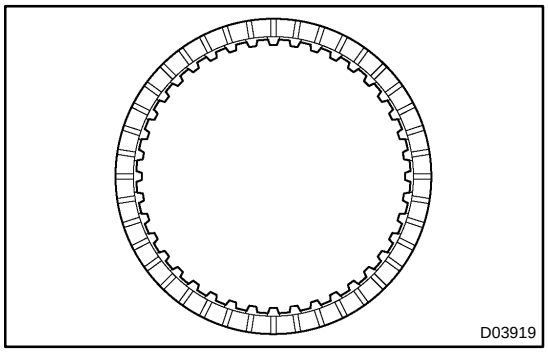
(b) Install the thrust washer No.2.



(c) Install the rear planetary gear from the rear planetary ring gear.



(d) Using a screwdriver, install the and snap ring.

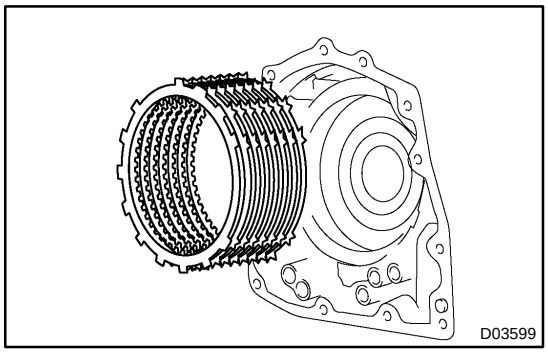


11. INSPECT DISC AND FLANGE OF 1ST & REVERSE BRAKE

Check to see if the sliding surface of the disc, plate and flange are worn or burnt. If necessary, replace them.

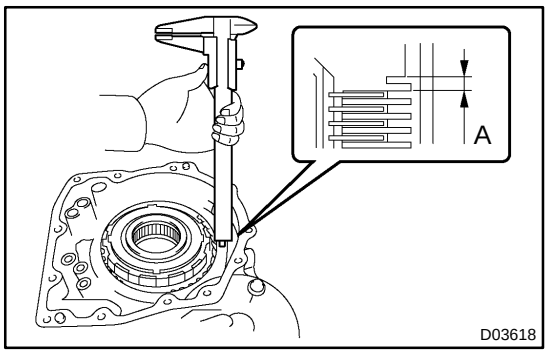
HINT:

- If the lining of the disc is peeling off or discolored, or even if a part of the printed mark is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



12. INSTALL 1ST & REVERSE BRAKE

(a) Install the 7 plates and 7 discs.



(b) Using vernier calipers, measure the distance between the disc surface and the contact surface of the 2nd brake cylinder and transaxle case.(Dimension A)

(c) Select an appropriate flange so that the piston stroke will meet the specified value.

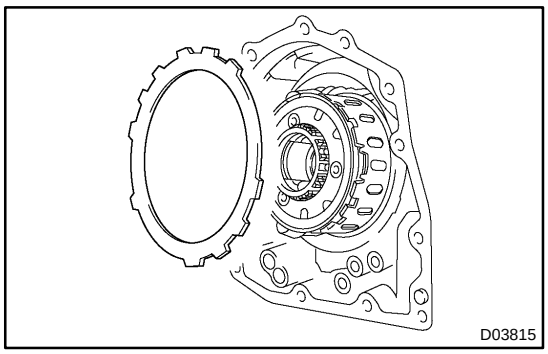
Piston stroke: 1.10 - 1.24 mm (0.0433 - 0.0488 in.)

HINT:

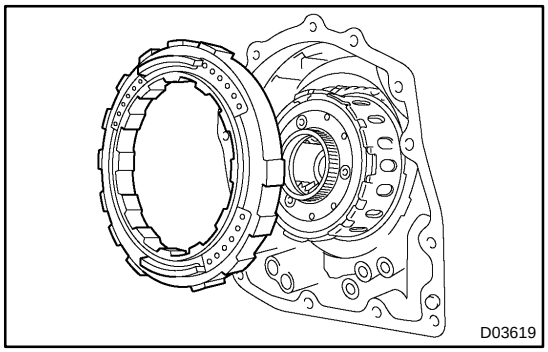
Piston stroke = Dimension A - Flange thickness

Flange thickness = mm (in.)

Mark	Thickness	Mark	Thickness
1	1.8 (0.071)	5	2.2 (0.087)
2	1.9 (0.075)	6	2.3 (0.091)
3	2.0 (0.079)	7	2.4 (0.094)
4	2.1 (0.083)	8	2.5 (0.098)



(d) Install the flange.



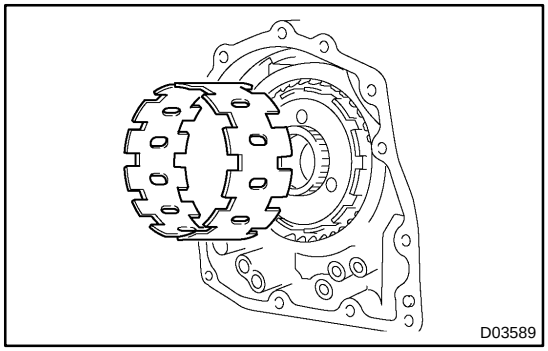
13. INSTALL 2ND BRAKE CYLINDER ASSEMBLY, ONE-WAY CLUTCH NO.1 AND REAR PLANETARY SUN GEAR ASSEMBLY

(a) Install the 2nd brake cylinder assembly to the transaxle case.

(b) Install the snap ring and measure the inside diameter.
Inside diameter: More than 167 mm (6.57 in.)

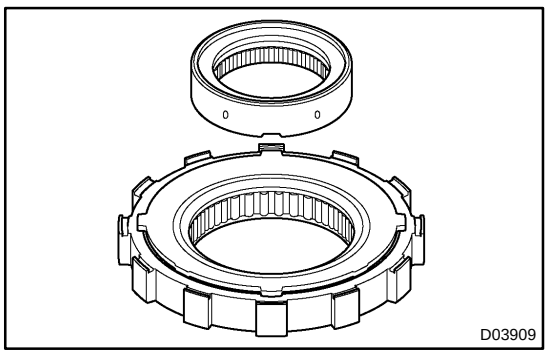
NOTICE:

- **Because the taper snap ring has the positioning direction, check it when installing.**
- **When the diameter does not satisfy the specified value, replace the snap ring with new one.**



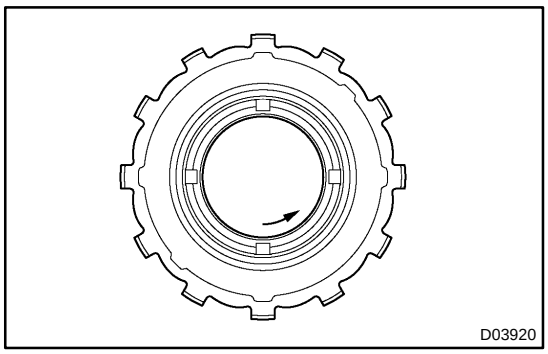
(c) Install the one-way clutch outer race sleeve to the 2nd brake cylinder assembly.

NOTICE:
Check the positioning direction of the outer sleeve.

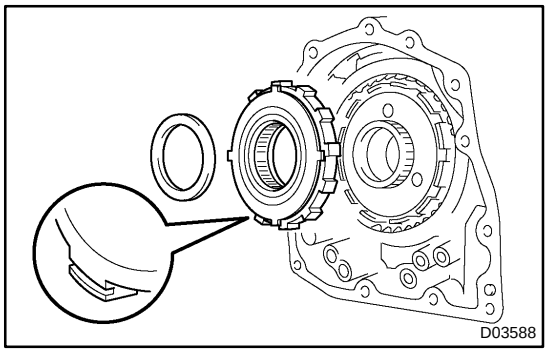


(d) Install the inner race to the one-way clutch.

NOTICE:
Check the direction of the inner race.



(e) Check the rotating direction of one-way clutch for the lock or free operation as shown in illustration.

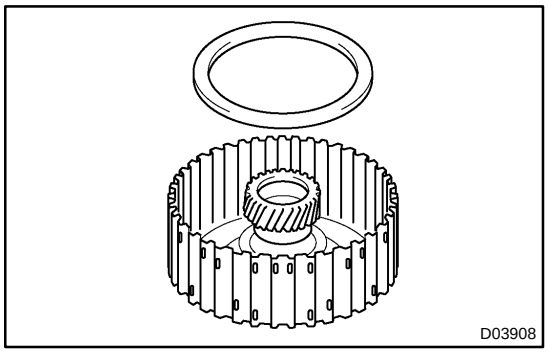


(f) Install the one-way clutch No.1 and bearing to the one-way clutch outer race sleeve.

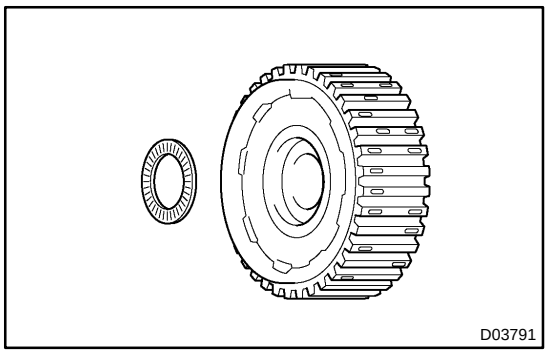
Bearing diameter: mm (in.)

	Inside	Outside
Bearing	53.6 (2.110)	69.6 (2.740)

NOTICE:
Install the thrust bearing properly so that the black race will be risible.



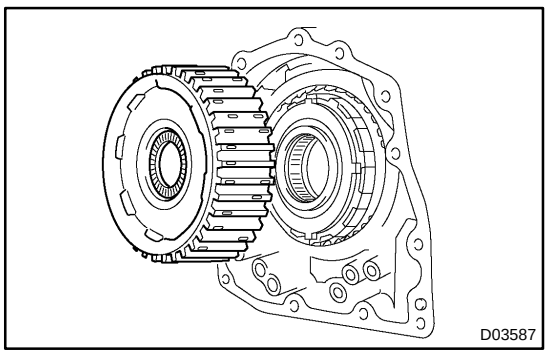
(g) Coat the thrust washer No.1 with petroleum jelly install it onto the rear planetary sun gear.



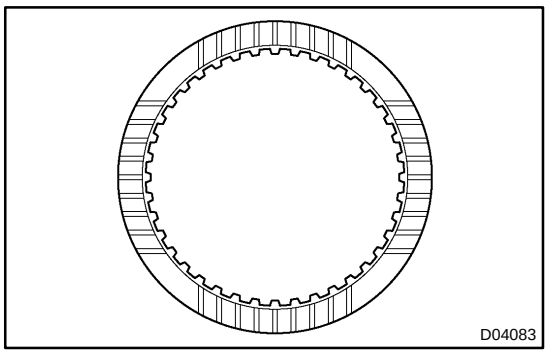
(h) Coat the bearing with petroleum jelly and install it onto the rear planetary sun gear.

Bearing diameter: mm (in.)

	Inside	Outside
Bearing	33.7 (1.327)	48.2 (1.898)



(i) Install the rear planetary sun gear assembly to the rear planetary gear.

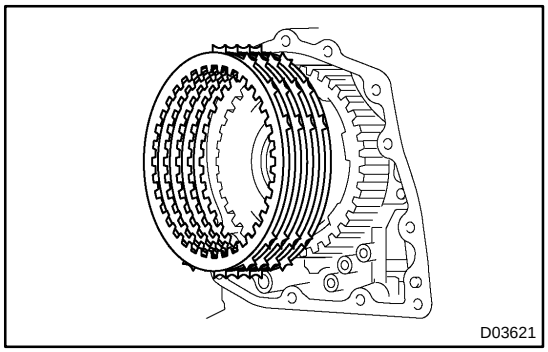


14. INSPECT DISC AND FLANGE OF 2ND BRAKE

Check to see if the sliding surface of the disc, plate and flange are worn or burnt. If necessary, replace them.

HINT:

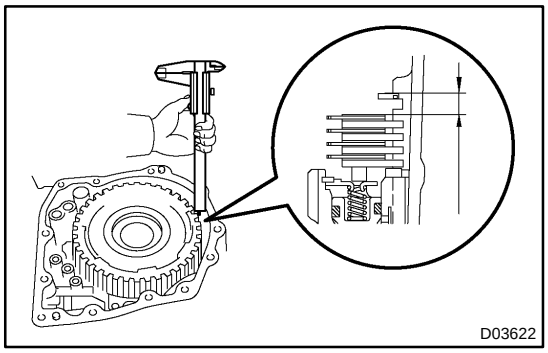
- If the lining of the disc is peeling off or discolored, or even if a part of the printed mark is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



15. INSTALL 2ND BRAKE

(a) Install the 4 discs and 4 plates to the transaxle case.

(b) Temporarily install the snap ring.



(c) Using vernier calipers, measure the distance between the disk surface and snap ring surface.

(d) Select an appropriate flange so that the piston stroke will meet the specified value.

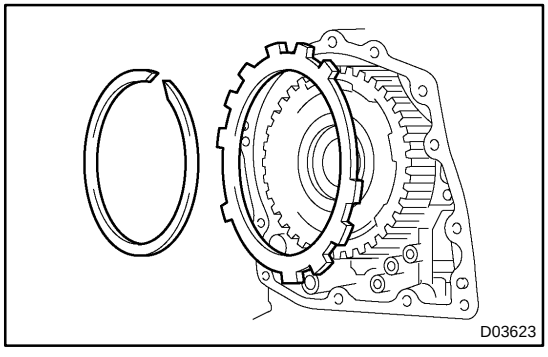
Piston stroke: 0.65 - 0.75 mm (0.0256 - 0.0295 in.)

HINT:

Piston stroke = Clearance - Flange thickness - Snap ring thickness 1.6 mm (0.063 in.).

Flange thickness: mm (in.)

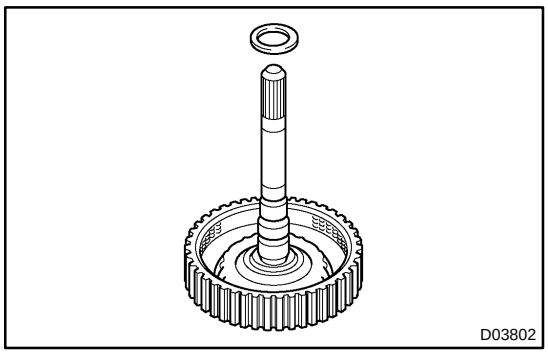
Mark	Thickness	Mark	Thickness
1	3.0 (0.118)	5	3.4 (0.134)
2	3.1 (0.122)	6	3.5 (0.138)
3	3.2 (0.126)	7	3.6 (0.142)
4	3.3 (0.130)	-	-



(e) Temporarily remove the snap ring, attach the selected flange and restore the snap ring.

NOTICE:

Secure the snap ring so that its end gap is visible through the groove of the transaxle case.

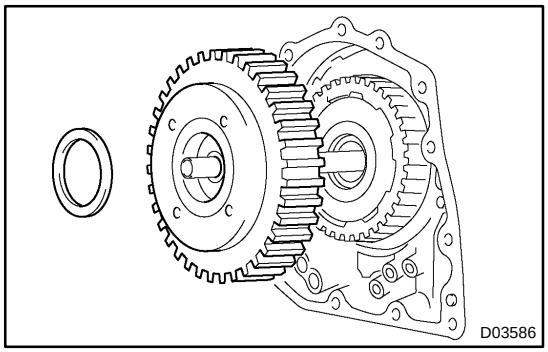


16. INSTALL DIRECT CLUTCH ASSEMBLY

(a) Install the bearing race to the direct clutch.

Bearing race diameter:

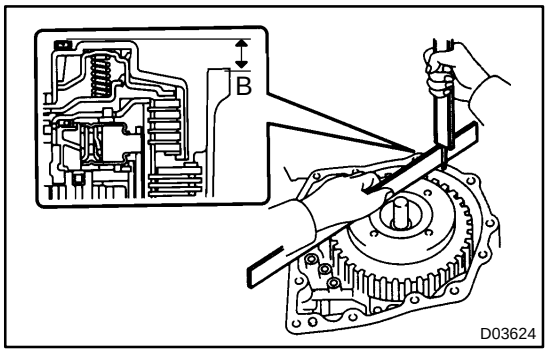
	Inside	Outside
Bearing race	30.3 (1.193)	46.0 (1.811)



(b) Install direct clutch assembly and thrust bearing to the rear planetary sun gear assembly.

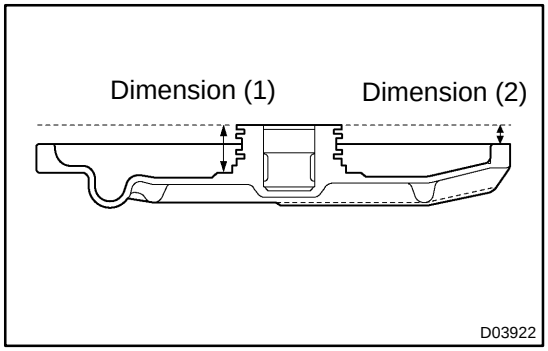
NOTICE:

The disk in the direct clutch should completely mate with the hub attached outside the rear planetary sun gear. Otherwise, the rear cover can not be installed.



(c) Clean the connected part of the transaxle case and rear cover.

(d) As shown in the illustration, place a straight edge on the direct clutch drum and measure the distance between the transaxle case and the straight edge using vernier calipers. (Dimension B)



(e) Measure the 2 places of the rear cover as shown in the illustration and calculate a dimension C using the following formula.

HINT:

Dimension C = Dimension (1) - Dimension (2)

(f) Calculate the end play value using the following formula. Select a thrust bearing which satisfies the end play value and install it.

End play: 0.2 - 0.9 mm (0.008 - 0.035 in.)

NOTICE:

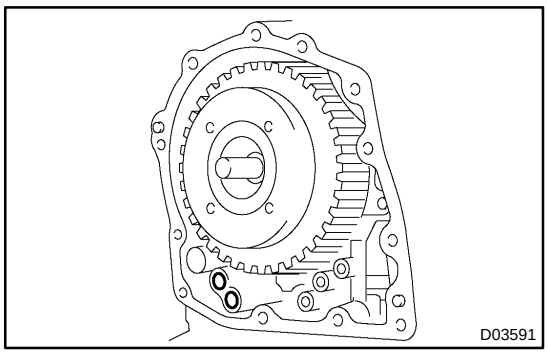
Make sure that the black race side is facing the rear cover.

HINT:

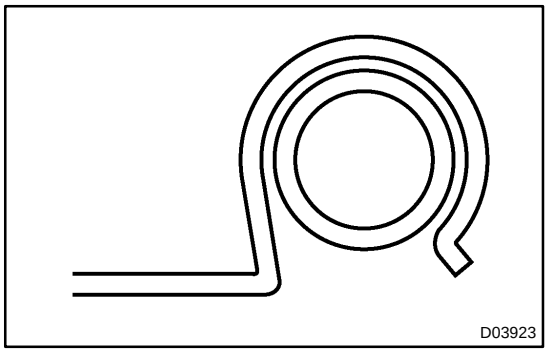
End play = Dimension C - Dimension B

Bearing thickness and diameter: mm (in.)

Thickness	Inside	Outside
3.55 (0.1397)	53.6 (2.110)	69.6 (2.740)
3.85 (0.1515)	53.6 (2.110)	70.18 (2.763)



17. INSTALL 2 NEW APPLY GASKETS

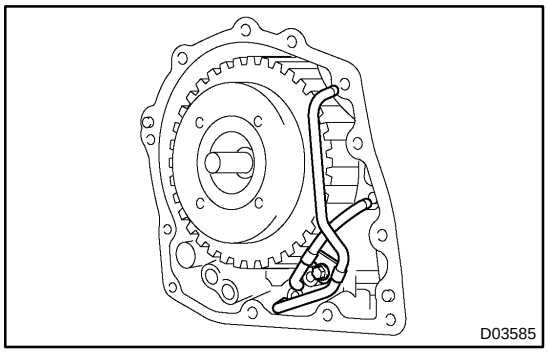


18. INSTALL APPLY TUBE

(a) Install the clamp to the apply pipe.

NOTICE:

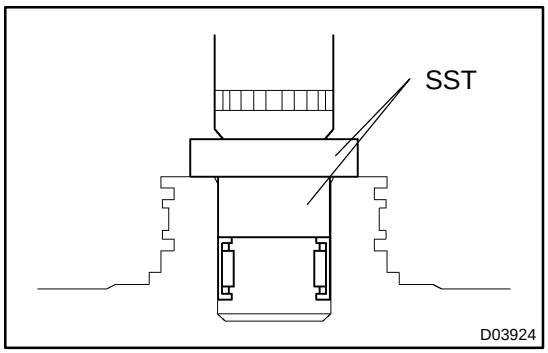
Make sure to install the clamp to the apply pipe before installing the apply tube to the transaxle case. This prevents the apply pipe from being deformed or damaged.



(b) Install the 2 apply pipe and a bolt to the transaxle case.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

NOTICE:

Each pipe is securely inserted until it reaches the stopper.

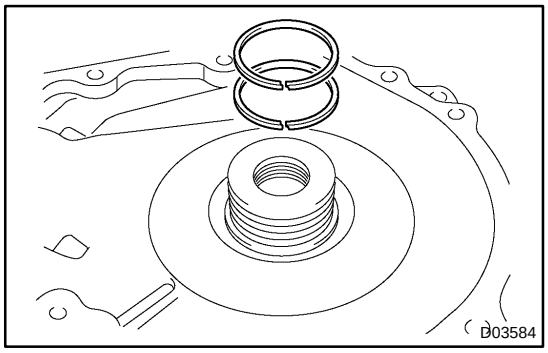


19. INSTALL TRANSAXLE REAR COVER

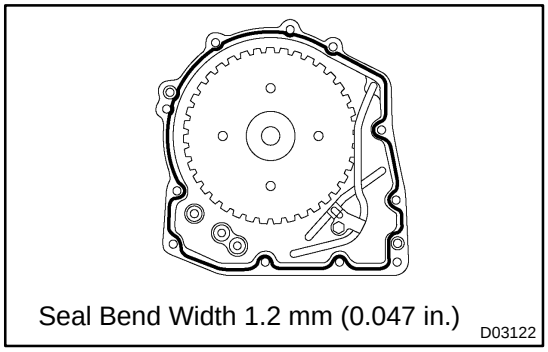
(a) Using SST and a press, install the bearing.
SST 09950-60010 (09951-00230, 09951-00350)
Press fit depth: 12.05 - 12.75 mm (0.4744 - 0.5020 in.)

NOTICE:

- **Face the inscribed mark side of the bearing race up.**
- **Repeat the press fit and the measurement until the specified value above is obtained.**



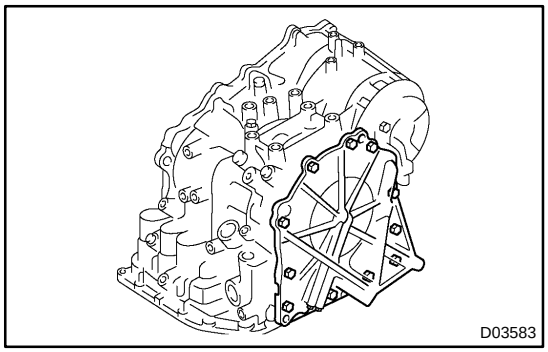
(b) Coat 2 oil seal rings with ATF, install them to transaxle rear cover.



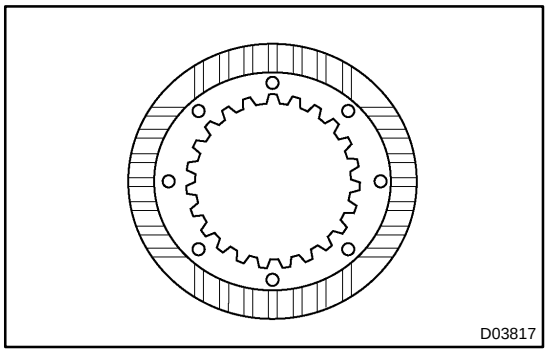
(c) Remove any packing material and be careful not to get oil on the contacting surfaces of the transaxle rear cover or the transaxle case.

(d) Apply FIPG to the rear cover.
FIPG:
Part No. 08826-00090, THREE BOND 1281 or equivalent.

(e) Coat a needle roller bearing with ATF.



(f) Install the transaxle rear cover and 11 bolts to the transaxle case.
Torque: 24.5 N·m (250 kgf·cm, 18 ft·lbf)

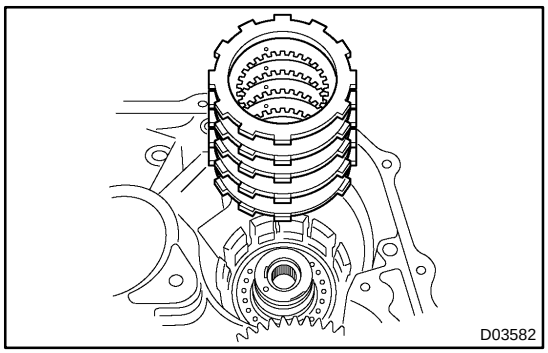


20. INSPECT DISC AND FLANGE OF U/D BRAKE

Check to see if the sliding surface of the disc, plate and flange are worn or burnt. if necessary, replace them.

HINT:

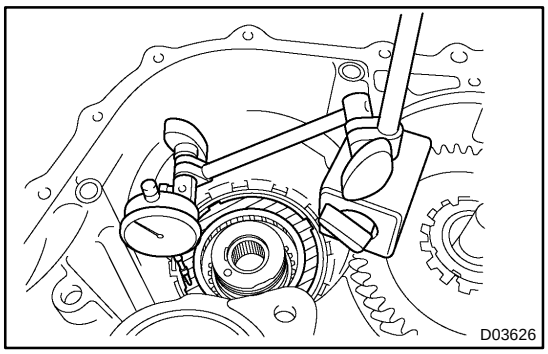
- If the lining of the disc is peeling off or discolored, or even if a part of the printed mark is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least 15 minutes.



21. INSTALL U/D BRAKE

(a) Install the 4 discs and 4 plates to the transaxle case.

(b) Using a screwdriver, install the snap ring.



(c) Using a dial indicator, measure the U/D brake piston stroke while applying and releasing compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi).

Piston stroke: 1.81 - 2.07 mm (0.0713 - 0.0815 in.)

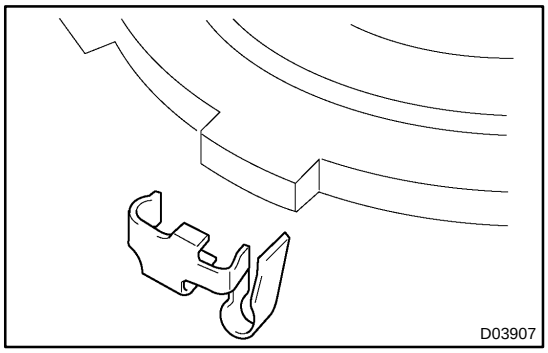
HINT:

Select an appropriate flange from the table below so that it will meet the specified value.

Flange thickness: mm (in.)

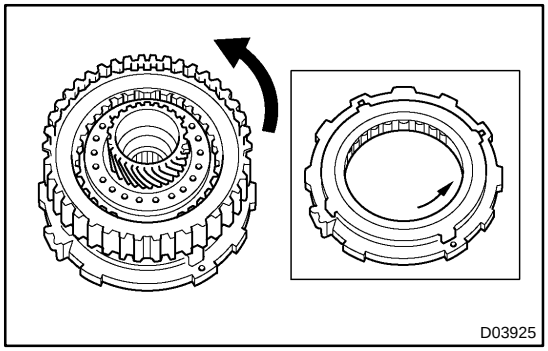
Mark	Thickness	Mark	Thickness
1	3.0 (0.118)	3	3.4 (0.134)
2	3.2 (0.126)	-	-

(d) Temporarily remove the snap ring and attach the flange. Restore the snap ring.

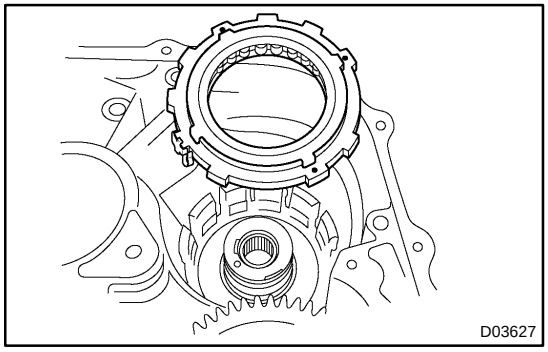


22. INSTALL ONE-WAY CLUTCH NO.2

(a) Install the outer race retainer to the one-way clutch No.2.



(b) Install the U/D clutch assembly to the one-way clutch. Rotate the U/D clutch assembly to check the rotating direction for the lock or free operation.

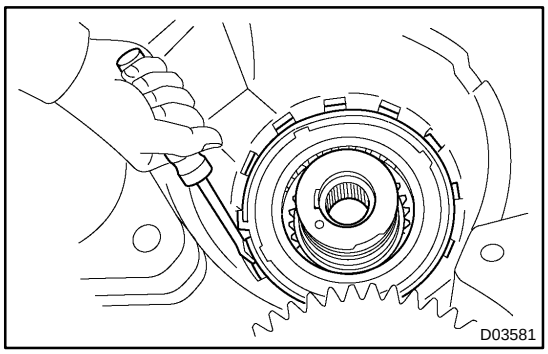


23. INSTALL ONE-WAY CLUTCH NO.2

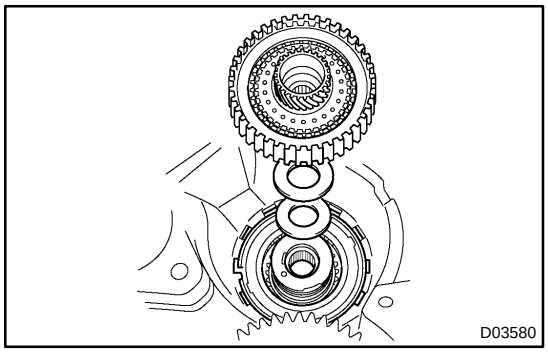
(a) Install the one-way clutch No.2 to the transaxle case.

NOTICE:

Make sure that the mark on the one-way clutch outer race is visible.



(b) Using a screwdriver, install the snap ring to the transaxle case.



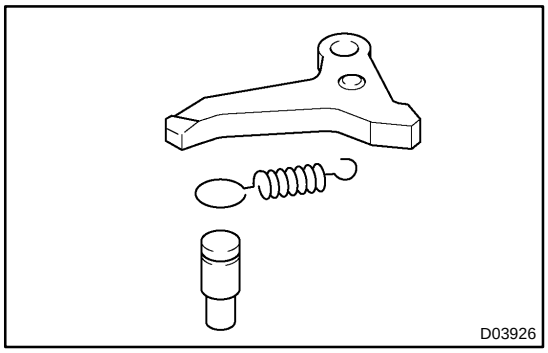
24. INSTALL U/D CLUTCH ASSEMBLY

(a) Coat the bearing and bearing race with petroleum jelly and install it onto the U/D clutch.

Race diameter: mm (in.)

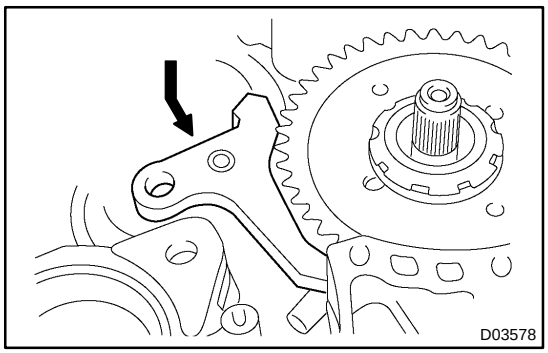
	Inside	Outside
Bearing	37.73 (1.485)	58.0 (2.283)
Race	29.9 (1.177)	55.5 (2.185)

(b) Install the U/D clutch assembly to the transaxle case.

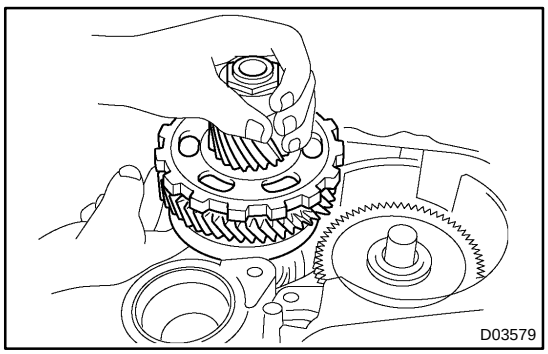


25. INSTALL U/D PLANETARY GEAR ASSEMBLY AND DIFFERENTIAL ASSEMBLY

(a) Install the pawl pin and spring to the parking lock pawl.



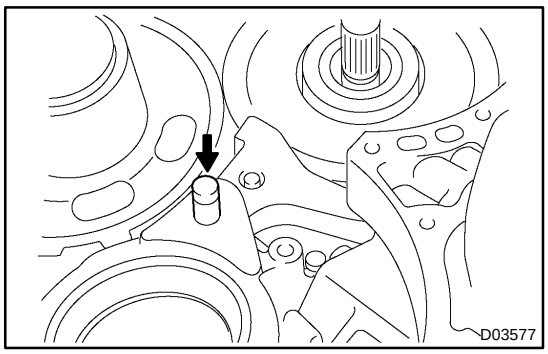
(b) Temporarily install the parking lock pawl, shaft and spring to the transaxle case as shown in the illustration.



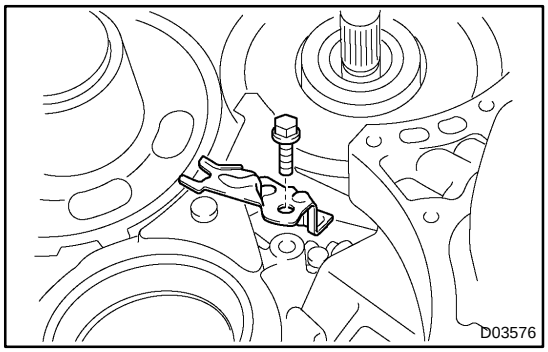
(c) Install the U/D planetary gear assembly to the transaxle case.

NOTICE:

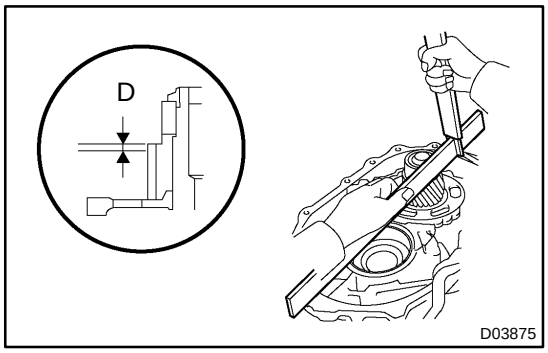
Engage all the discs of U/D clutch and hub sprine of the U/D planetary gear assembly firmly and assemble them securely.



(d) Install the parking lock pawl shaft.

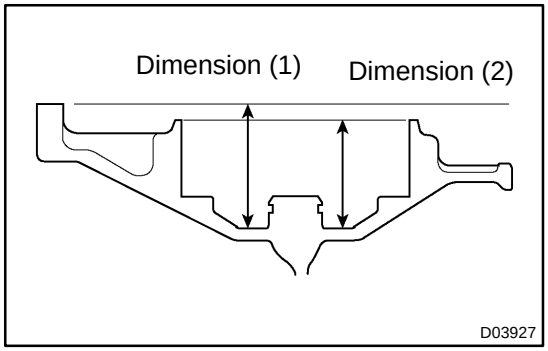


(e) Install the pawl shaft with the bolt.
Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)



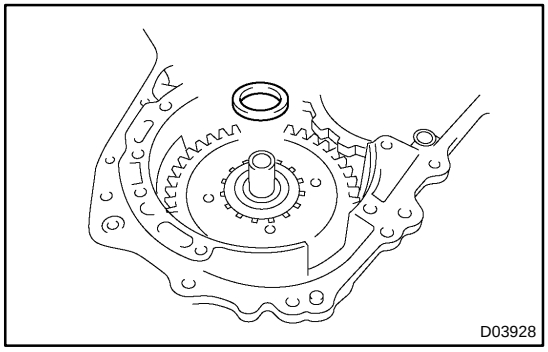
(f) Using a straight edge and vernier calipers as shown in the illustration, measure the gap between the top of the differential drive pinion in the U/D planetary gear and contact surface of the transaxle case and housing. (Dimension D)

NOTICE:
Note down the dimension D as it is necessary for the following process.



(g) As shown in the illustration, measure the 2 places of the transaxle housing. Calculate the dimension E using the formula.

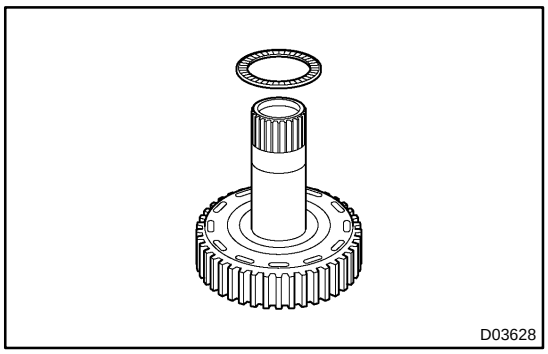
NOTICE:
Note down the dimension E as it is necessary for the following process.
HINT:
Dimension E = Dimension (1) - Dimension (2)



26. INSTALL MULTIPLE DISC CLUTCH HUB

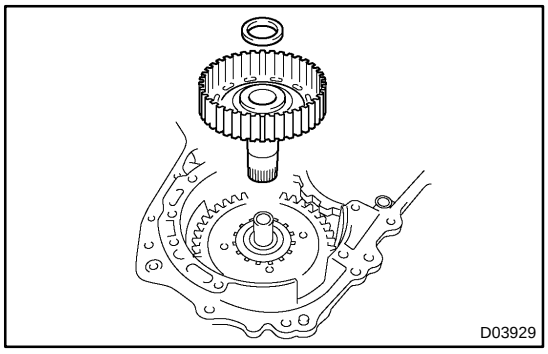
(a) Install the bearing race to the transaxle while checking its direction.
Bearing race diameter: mm (in.)

	Inside	Outside
Bearing race	34.5 (1.358)	48.5 (1.909)



(b) Coat the thrust bearing and race with petroleum jelly and install them onto the multiple disc clutch hub.
Thrust bearing and race diameter: mm (in.)

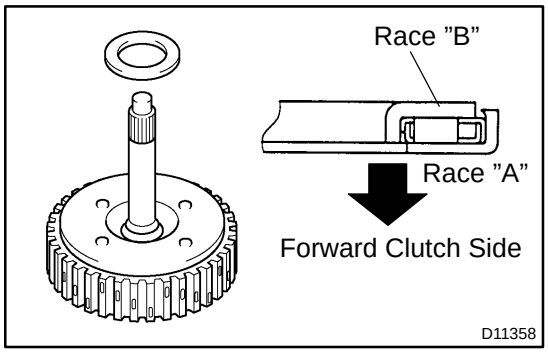
	Inside	Outside
Bearing	36.3 (1.429)	52.2 (2.055)



(c) Install the bearing to the forward clutch hub.
Bearing diameter: mm (in.)

	Inside	Outside
Bearing	23.5 (0.925)	44.0 (1.732)

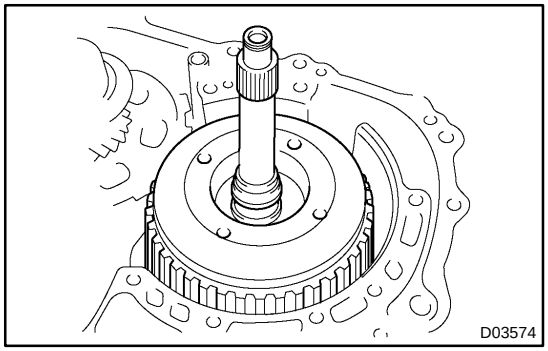
(d) Install the forward clutch hub to the transaxle case.



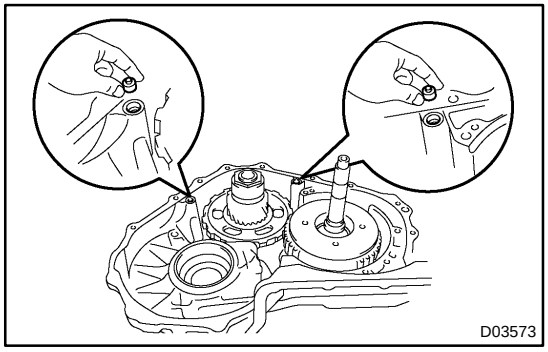
(e) Install the thrust bearing to the forward clutch.
Bearing diameter: mm (in.)

	Inside	Outside
Bearing	33.85 (1.3327)	52.2 (2.055)

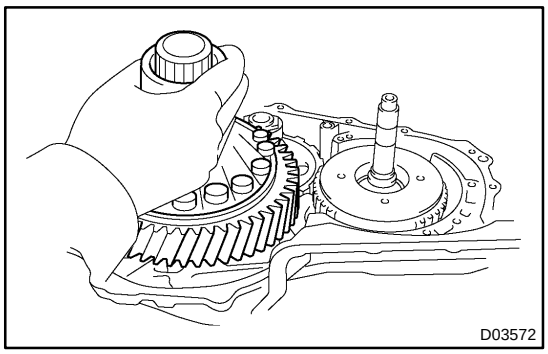
NOTICE:
Install the thrust bearing properly so that the race “B” will be visible.



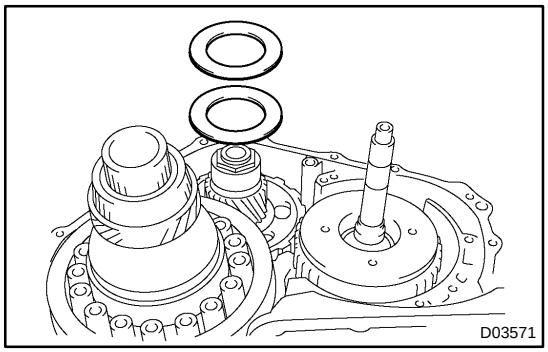
(f) Install the forward clutch to the multiple clutch hub.
NOTICE:
Align the splines of all discs in the forward clutch with those of multiple clutch hub to assemble them securely.



27. INSTALL 2 NEW APPLY GASKET



28. INSTALL DIFFERENTIAL ASSEMBLY



29. INSTALL TRANSAXLE HOUSING

(a) Calculate the end play value using the following formula and values of Dimension D and E that were measured when installing cylindrical roller bearing and U/D planetary gear. Select an appropriate U/D planetary gear thrust bearing race No.2 which satisfies the specified end play value, and install it.

End play: 0.50 - 0.99 mm (0.0197 - 0.0390 in.)

HINT:

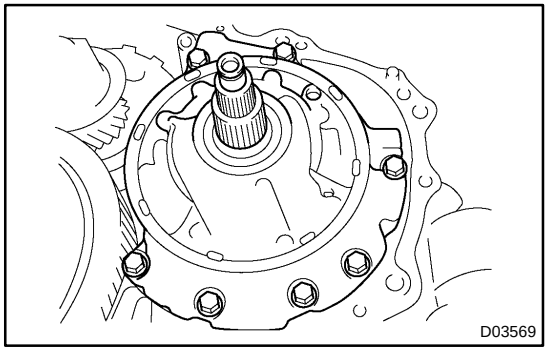
End play = Dimension E - Dimension D - thrust bearing thickness 3.28 mm (0.1291 in.) - U/D gear thrust bearing race No.2 thickness

Race thickness: mm (in.)

E - D	Thickness
Less than 7.42 (0.2921)	3.5 (0.138)
7.42 (0.2921) or more	3.8 (0.150)

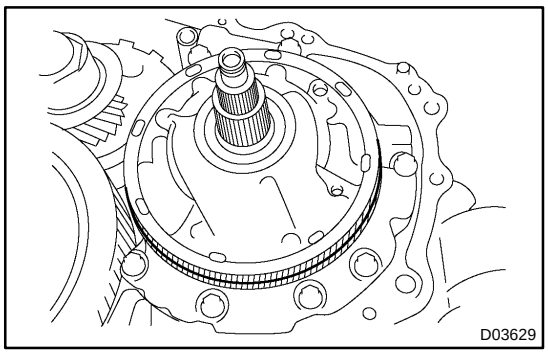
Bearing and bearing race diameter: mm (in.)

	Inside	Outside
Bearing	57.2 (2.252)	84.96 (3.3449)
Bearing race	56.4 (2.220)	83.0 (3.2649)

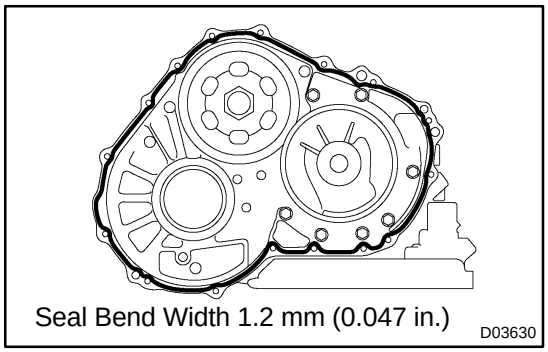


(b) Install the oil pump and 7 bolts to the transaxle case

Torque: 22 N·m (226 kgf·cm, 16 ft·lbf)



(c) Coat on O-ring of oil pump with ATF.

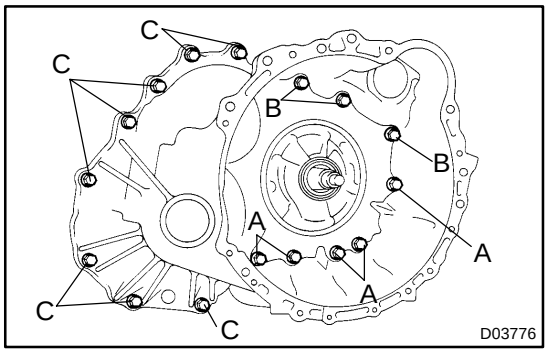


(d) Remove any packing material and be careful not to get oil on the contacting surfaces of the transaxle case or transaxle housing.

(e) Apply FIPG to the transaxle case.

FIPG:

Part No. 08826-00090, THREE BOND 1281 or equivalent



(f) Install the transaxle housing and 16 bolts to the transaxle case.

Torque:

Bolt A: 22 N·m (226 kgf·cm, 16 ft·lbf)

Bolt B and C: 29 N·m (300 kgf·cm, 22 ft·lbf)

HINT:

Apply seal packing or equivalent to the bolt A.

Seal packing:

THREE BOND 2403 or equivalent

Bolt length:

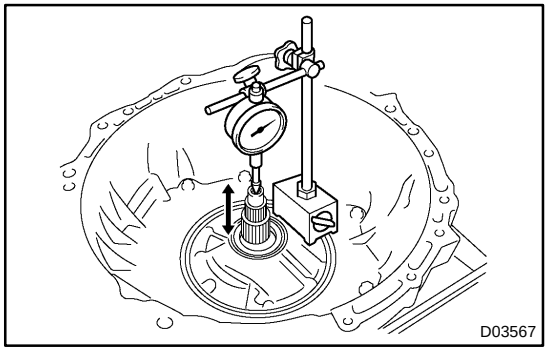
Bolt A: 50 mm (1.969 in.)

Bolt B: 50 mm (1.969 in.)

Bolt C: 42 mm (1.654 in.)

NOTICE:

Because the bolt A is a seal bolt, apply the seal packing to new bolts and tighten them within 10 minutes after application.



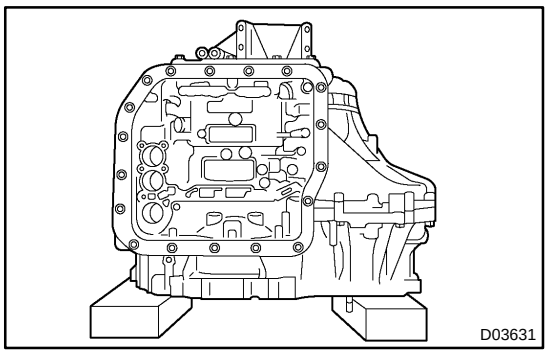
30. INSPECT INPUT SHAFT END PLAY

Using a dial indicator, measure the input shaft end play.

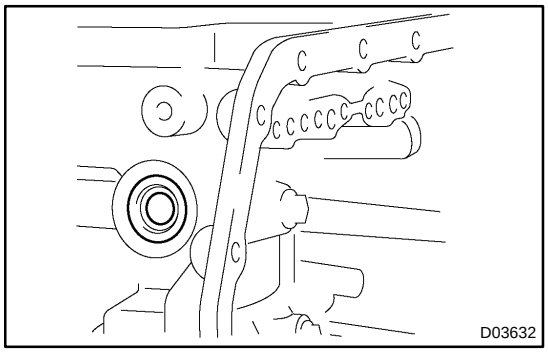
End play: 0.27 - 1.24 mm (0.0106 - 0.0417 in.)

31. CHECK DIFFERENTIAL PRELOAD

(See page AX-106)



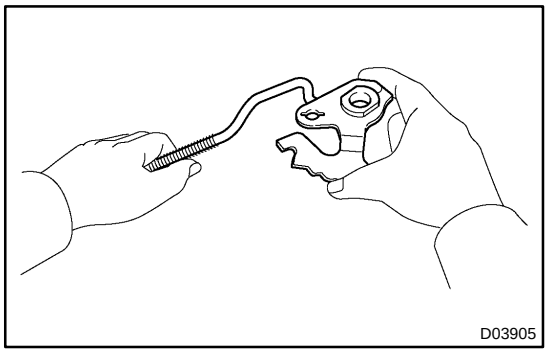
32. PLACE TRANSAXLE HOUSING



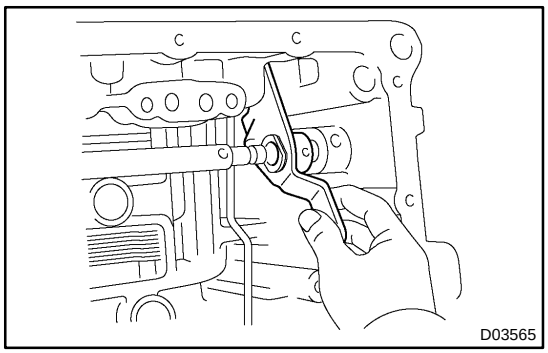
33. INSTALL MANUAL VALVE LEVER SHAFT

(a) Coat the new oil seal with ATF.

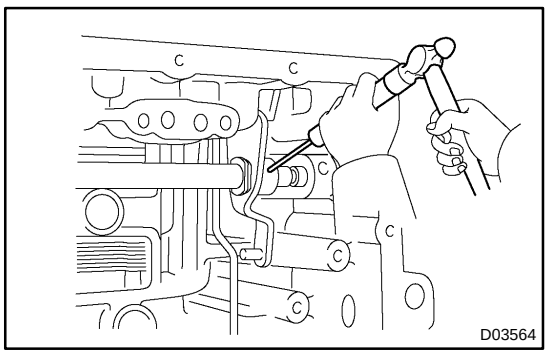
(b) Install the oil seal to the transaxle case.



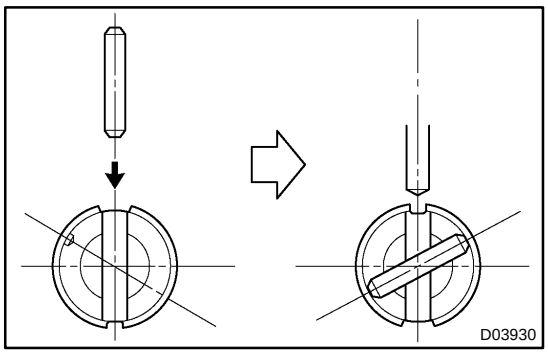
(c) Install the parking lock rod to the manual valve lever.



(d) Install a new spacer and manual valve lever shaft to the transaxle case.



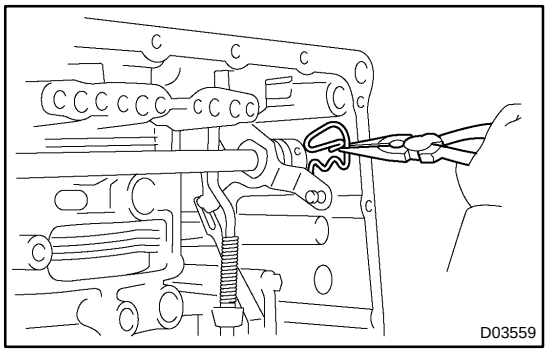
(e) Using a pin punch and a hammer, drive in a new pin.



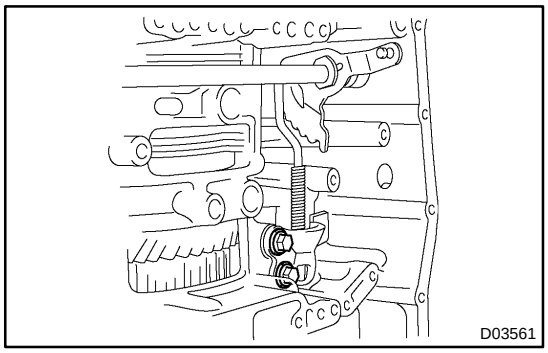
(f) Turn the spacer and the lever shaft to aligh the small hole for locating the staking position in the spacer with the staking position mark on the lever shaft.

(g) Using a pin punch, stake the spacer through the small hole.

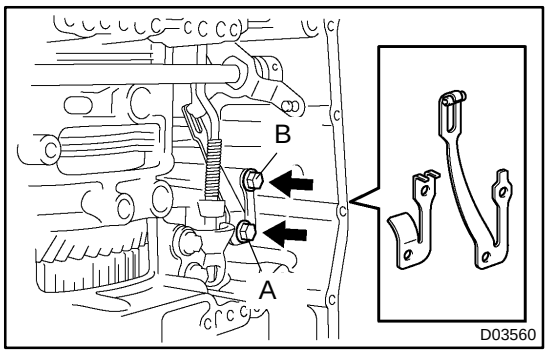
(h) Check that the spacer does not turn.



(i) Using needle-nose pliers, install the return spring.



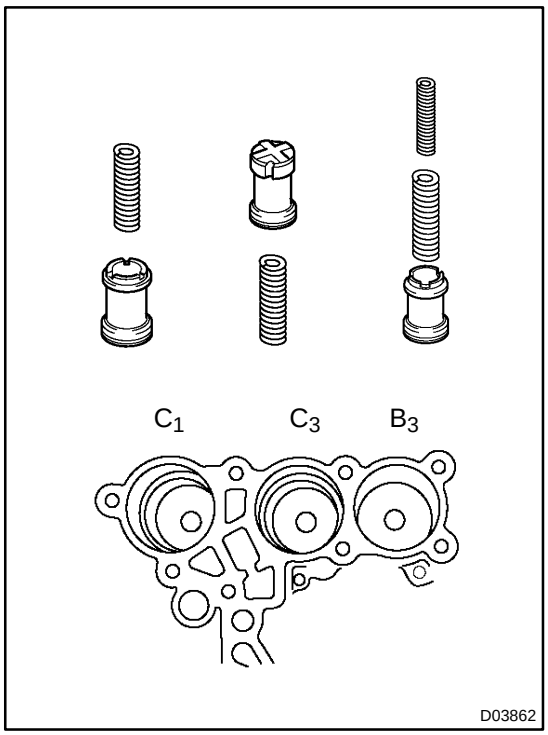
(j) Install the parking lock pawl bracket with 2 bolts.
Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)
Bolt length: 25 mm (0.984 in.)



(k) Install the manual detent spring with 2 bolts.

NOTICE:
Make sure to install the manual detent spring and cover in this order.

Torque:
Bolt A: 20 N·m (205 kgf·cm, 15 ft·lbf)
Bolt B: 12 N·m (120 kgf·cm, 9 ft·lbf)
Bolt length:
Bolt A: 27 mm (1.063 in.)
Bolt B: 16 mm (0.630 in.)



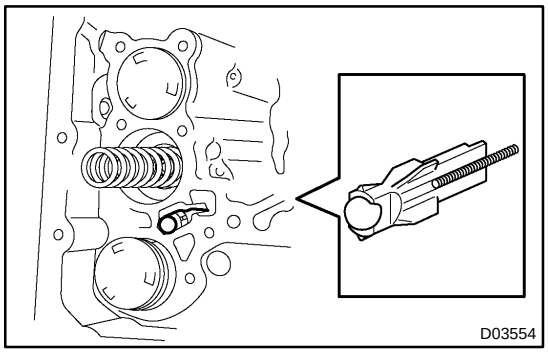
34. INSTALL ACCUMULATOR PISTONS AND SPRINGS

(a) Coat new 4 O-rings with ATF and install them to the pistons.

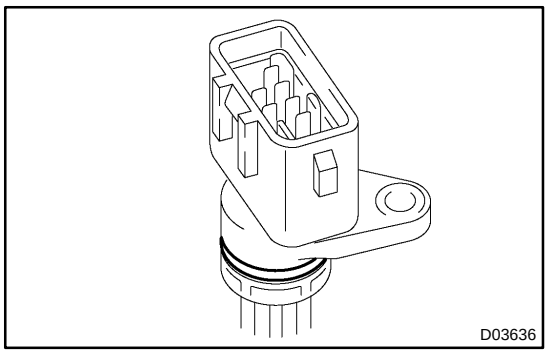
(b) Coat the 4 springs and 3 accumulator pistons with ATF, install them to the holes.

Accumulator spring:

Spring		Free length Outer diameter mm (in.)	Color
B_3	Inner	60.24 (2.3716) / 15.9 (0.626)	Green
	Outer	72.61 (2.8587) / 16.7 (0.657)	Blue
C_3		86.66 (3.4118) / 19.2 (0.756)	Yellow
C_1		90.53 (3.5642) / 18.5 (0.728)	Red

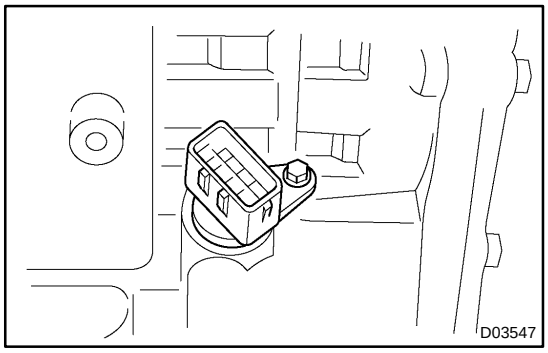


35. INSTALL CHECK BALL BODY AND SPRING



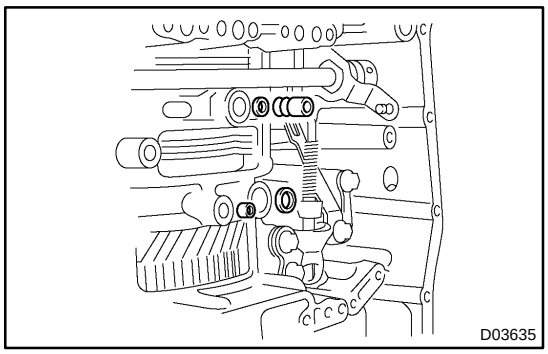
36. INSTALL TRANSAXLE SOLENOID WIRE

(a) Coat a new O-ring with ATF, install it to the transaxle solenoid wire.



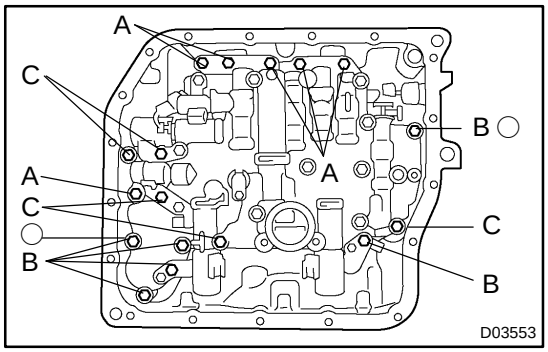
(b) Install the solenoid wire retaining bolt

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



37. INSTALL APPLY GASKET

(a) Coat 4 apply gaskets with ATF and install them to the transaxle case.



38. INSTALL VALVE BODY ASSEMBLY

(a) Align the groove of the manual valve with the pin of lever.

(b) Install the 17 bolts.

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

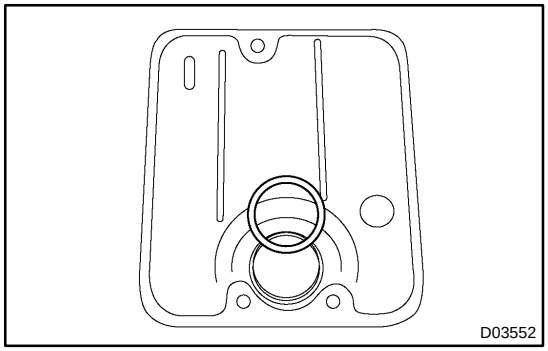
NOTICE:

- **Push the valve body against the accumulator piston spring and the check ball body to install it.**
- **Tighten those bolts marked by ○ in the illustration first temporarily because they are postioning bolts.**

HINT:

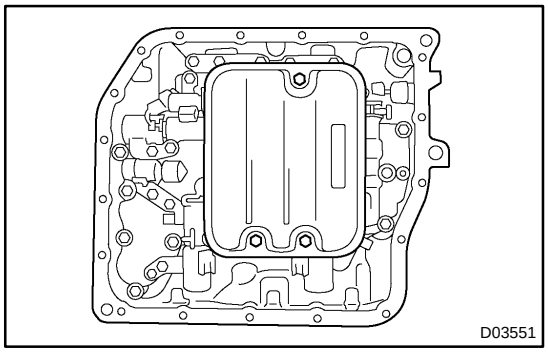
Each bolt length is indicated below.

Bolt length:
Bolt A: 25 mm (0.984 in.)
Bolt B: 41 mm (1.614 in.)
Bolt C: 45 mm (1.771 in.)



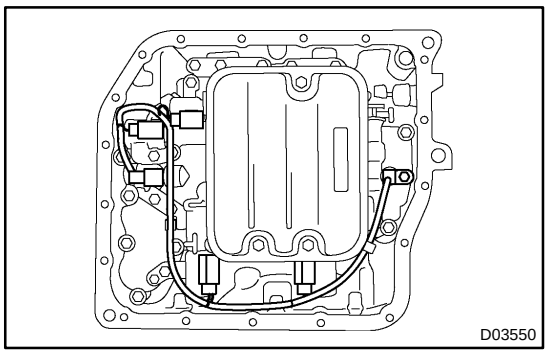
39. INSTALL OIL STRAINER

(a) Coat new gasket with ATF, install it to the oil strainer.

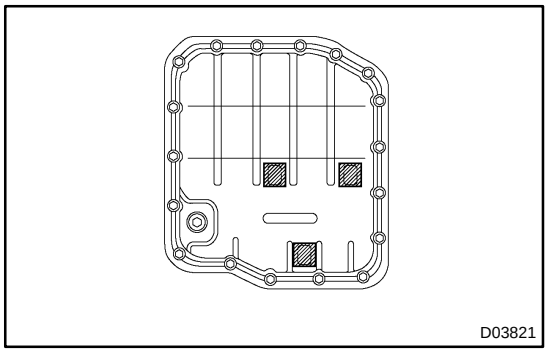


(b) Install the oil strainer and 3 bolts to the valve body.

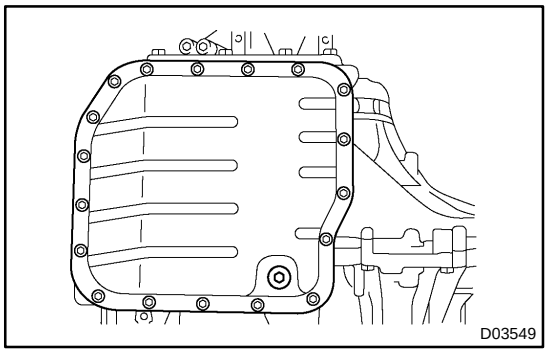
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



(c) Connect the 5 solenoid connectors.
(d) Install the ATF temperature sensor, clamp and bolt.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)

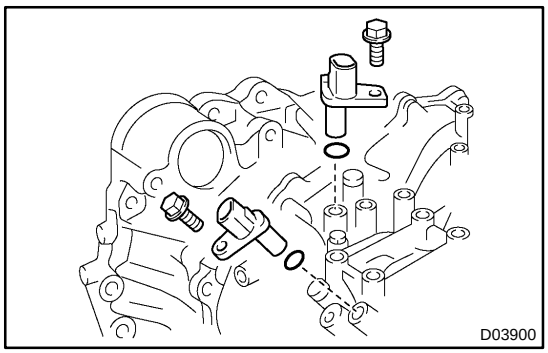


40. INSTALL OIL PAN
(a) Install the 3 magnets in the oil pan.
(b) Apply seal packing or equivalent to the new 18 bolts.
Seal packing:
THREE BOND 2430 or equivalent

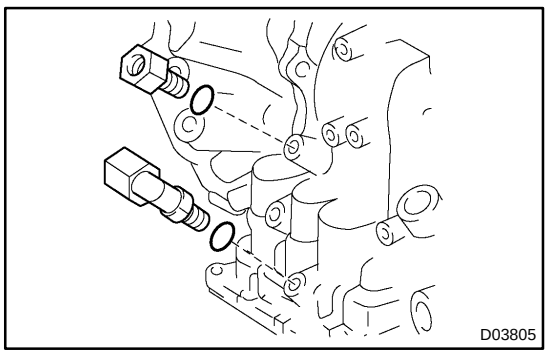


(c) Install a new gasket, oil pan and 18 bolts to the transaxle case.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

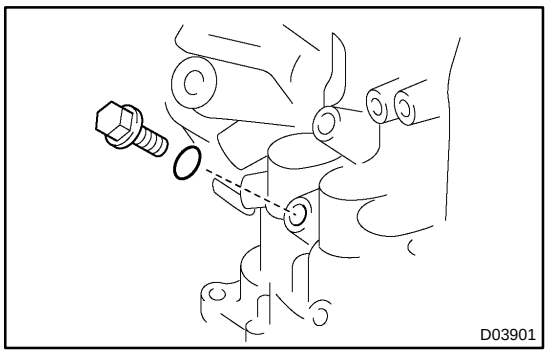
NOTICE:
Because the bolts should be seal bolts, apply seal packing to new bolts and tighten them within 10 minutes after application.



41. INSTALL SPEED SENSOR
(a) Coat new 2 O-rings with ATF, install it to the 2 sensors.
(b) Install the 2 sensors with 2 bolts to the transaxle case.
Torque: 11 N·m (110 kgf·cm, 8 in.·lbf)



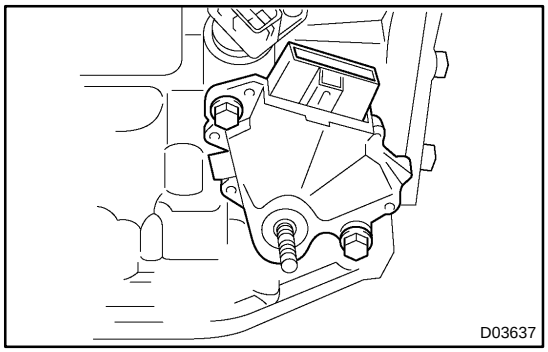
42. INSTALL UNION AND ELBOW
(a) Coat new 2 O-rings with ATF, install them to the union and elbow.
(b) Install the union and elbow to the transaxle case.
Torque: 27 N·m (276 kgf·cm, 20 ft·lbf)



43. INSTALL TRANSAXLE CASE PLUG NO.1

(a) Coat a new O-ring with ATF, install it to the transaxle case plug No.1.

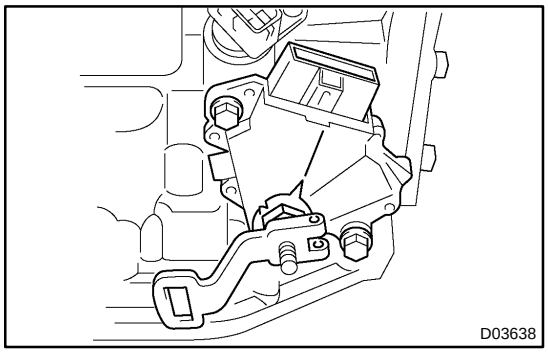
(b) Install the transaxle case plug No.1 to the transaxle case.



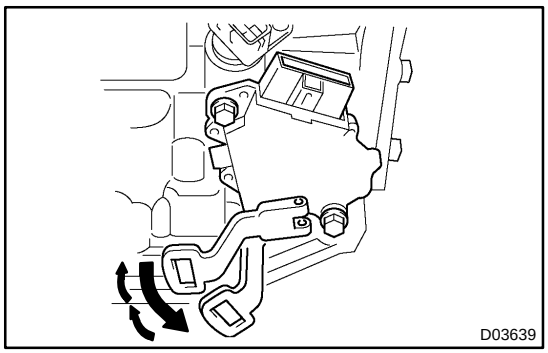
44. INSTALL PARK/NEUTRAL POSITION SWITCH

(a) Install the park/neutral position switch onto the manual valve lever shaft and temporarily install the 2 adjusting bolts.

(b) Install the new nut stopper and nut.
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)

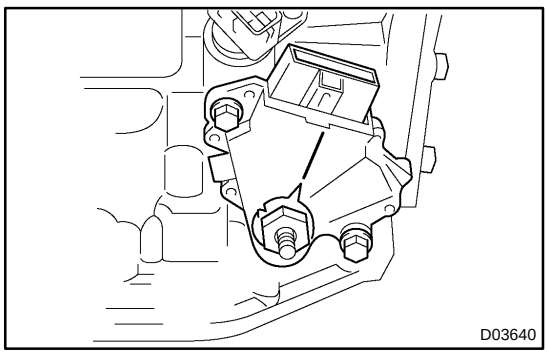


(c) Temporarily install control shaft lever.



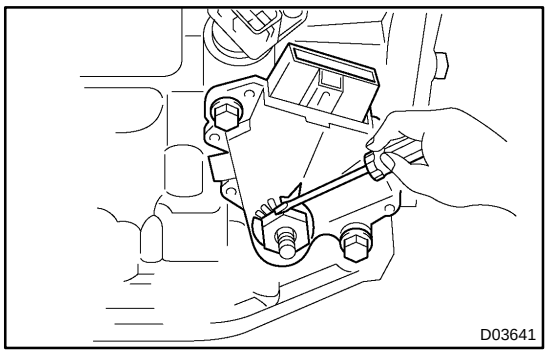
(d) Turn the lever counterclockwise until it stops, them turn it clockwise 2 notches.

(e) Remove the control shaft lever.

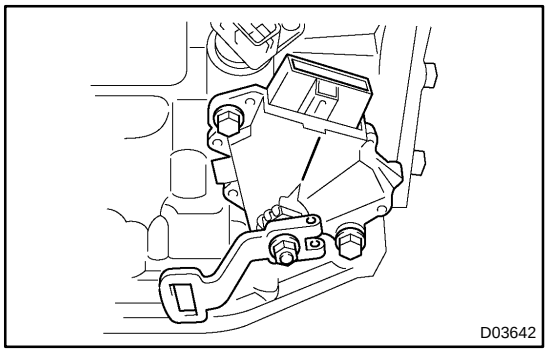


(f) Align the groove with neutral basic line.

(g) Tighten the 2 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



(h) Using a screwdriver, stake the nut with the nut stopper.

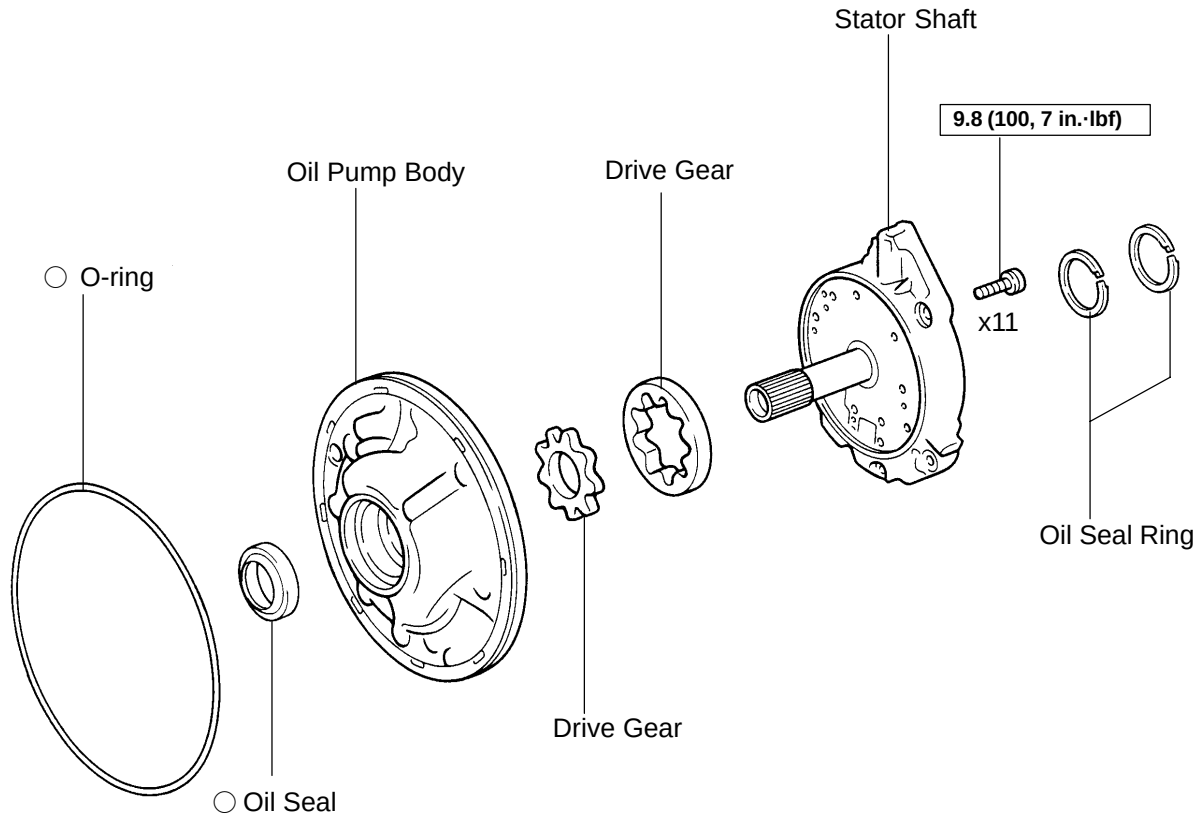


(i) Install control shaft lever, washer and nut.
Torque: 6.9 N·m (70 kgf·cm,61 in.·lbf)

OIL PUMP

COMPONENTS

AX0AK-01

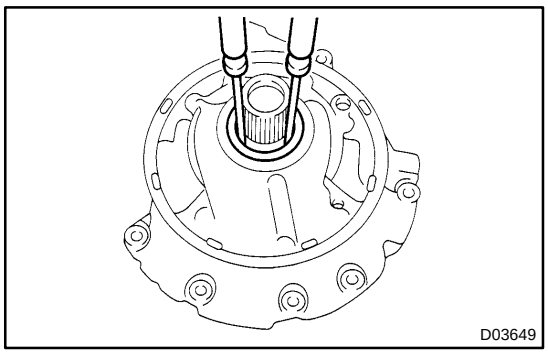


N·m (kgf·cm, ft·lbf) : Specified torque
○ Non-reusable part

D03643

AX0AL-01

DISASSEMBLY

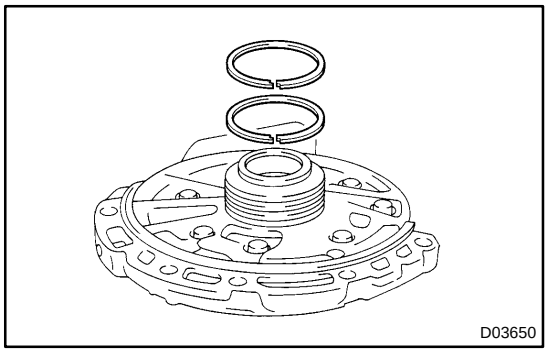


1. CHECK PUMP DRIVE GEAR ROTATION

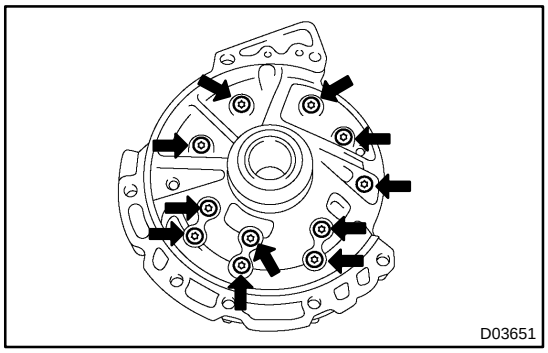
Turn the drive gear with 2 screwdrivers and make sure it rotates smoothly.

NOTICE:

Be careful not to damage the oil seal lip.

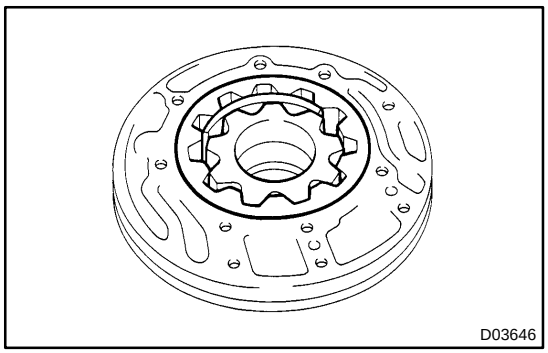


2. REMOVE 2 OIL SEAL RINGS

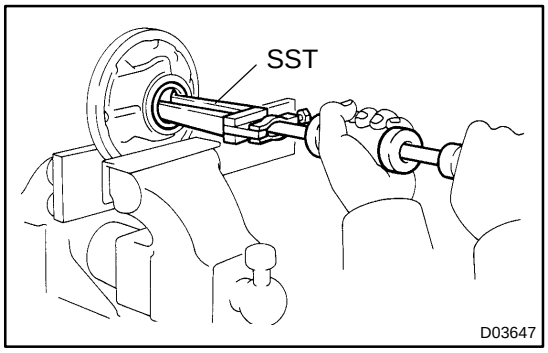


3. REMOVE STATOR SHAFT

Using a torx socket T30, remove the 11 bolts and stator shaft.
Keep the gears in assembling order.



4. REMOVE OIL PUMP DRIVE GEAR AND DRIVEN GEAR



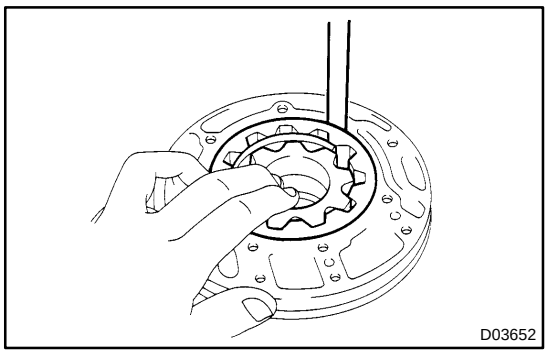
5. REMOVE OIL SEAL

(a) Mount oil pump in a soft jaw vise.

(b) Using SST, remove oil seal from the oil pump body.
SST 09308-00010

AX0AM-01

INSPECTION

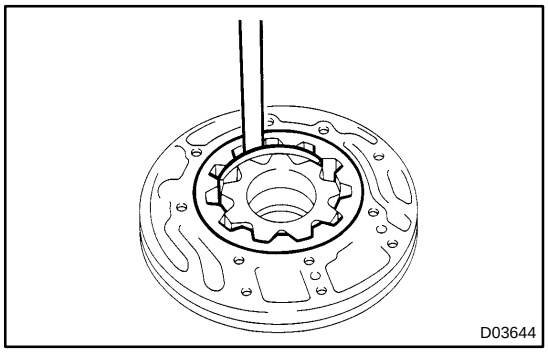

D03652

1. CHECK BODY CLEARANCE OF DRIVEN GEAR

Push the driven gear to one side of the body. Using a feeler gauge, measure the clearance.

Standard body clearance:
0.075 - 0.150 mm (0.0030 - 0.0059 in.)
Maximum body clearance: 0.30 mm (0.0118 in.)

If the body clearance is greater than the maximum, replace the oil pump body sub-assembly.

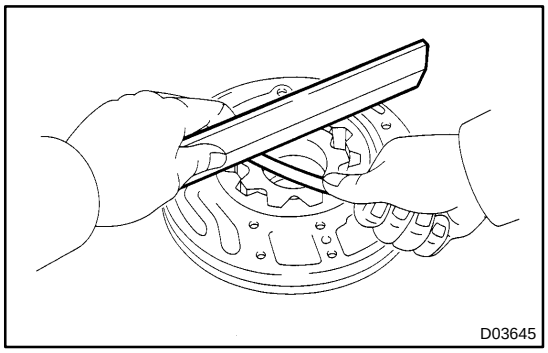

D03644

2. CHECK TIP CLEARANCE OF DRIVEN GEAR

Measure the tip clearance between the driven gear teeth and crescent-shaped part of the pump body.

Standard tip clearance:
0.11 - 0.14 mm (0.0043 - 0.0055 in.)
Maximum tip clearance: 0.30 mm (0.0118 in.)

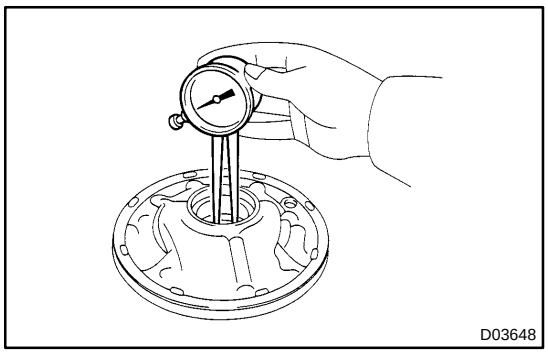
If the tip clearance is greater than the maximum, replace the oil pump body sub assembly.


D03645

3. CHECK SIDE CLEARANCE OF BOTH GEAR

Using a steel straight edge and feeler gauge, measure the side clearance of both gears.

Standard side clearance:
0.02 - 0.04 mm (0.0008 - 0.0016 in.)
Maximum side clearance: 0.10 mm (0.0039 in.)

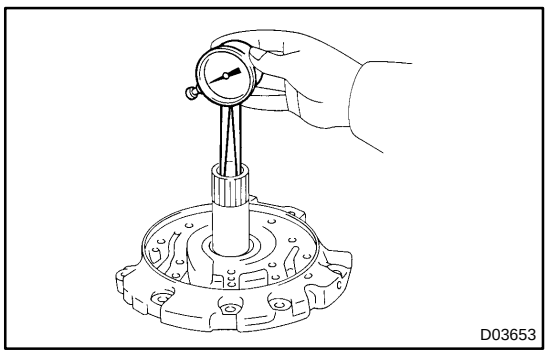

D03648

4. CHECK OIL PUMP BODY BUSHING

Using a dial indicator, measure the inside diameter of the oil pump body bushing.

Standard inside diameter:
38.12 - 38.13 mm (1.5008 - 1.5012 in.)
Maximum inside diameter: 38.18 mm (1.5031 in.)

If the inside diameter is greater than the maximum, replace the oil pump body sub-assembly.


D03653

5. CHECK STATOR SHAFT BUSHING

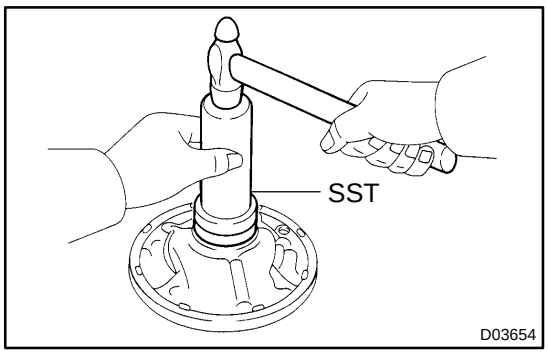
Using a dial indicator, measure the inside diameter of the stator shaft bushings.

Standard inside diameter:
21.50 - 21.52 mm (0.8465 - 0.8472 in.)
Maximum inside diameter: 21.57 (0.8492 in.)

If the inside diameter is greater than the maximum, replace the stator shaft.

AX0AN-01

REASSEMBLY

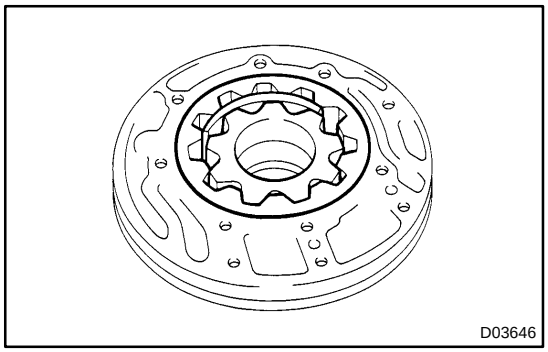


1. INSTALL OIL SEAL

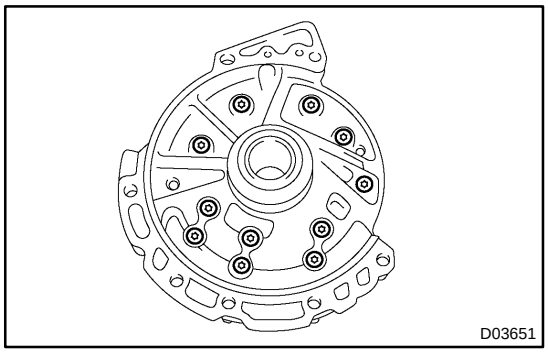
(a) Using SST, install a new oil seal from oil pump.
SST 09350-32014 (09351-32140)

HINT:
The seal end should be flat with the outer edge of the oil pump.

(b) Coat the lip of oil seal with petroleum jelly.



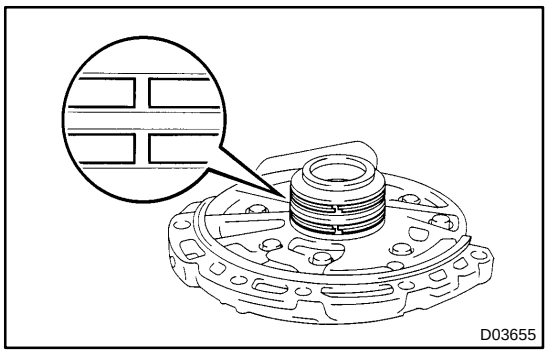
2. INSTALL OIL PUMP DRIVE GEAR AND DRIVEN GEAR



3. INSTALL STATOR SHAFT

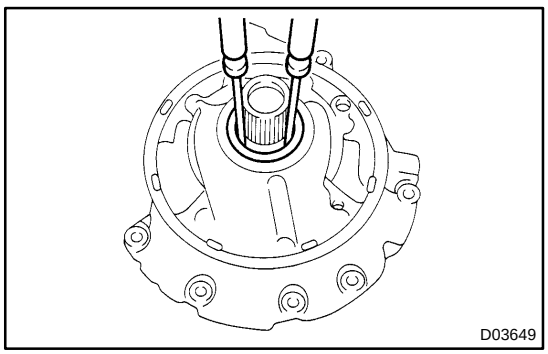
(a) Align the stator shaft with each bolt hole.

(b) Using a torx socket T30, install the 11 bolts.
Torque: 9.8 N·m (100 kgf·cm, 7 in.·lbf)



4. INSTALL 2 OIL SEAL RINGS

NOTICE:
Do not expand the ring ends excessively.



5. CHECK PUMP DRIVE GEAR ROTATION

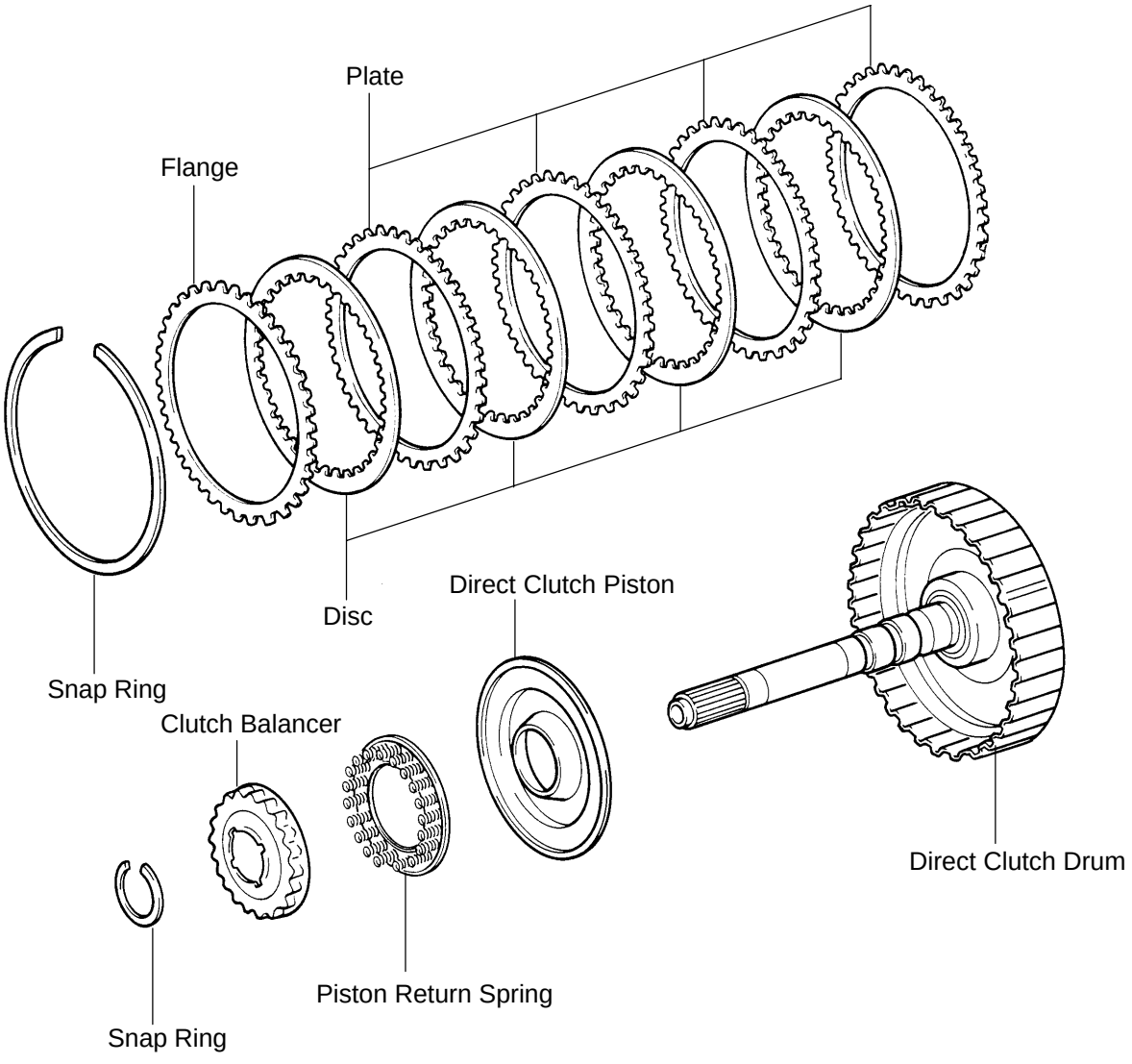
Turn the drive gear with 2 screwdrivers and make sure it rotates smoothly.

NOTICE:
Be careful not to damage the oil seal lip.

DIRECT CLUTCH

COMPONENTS

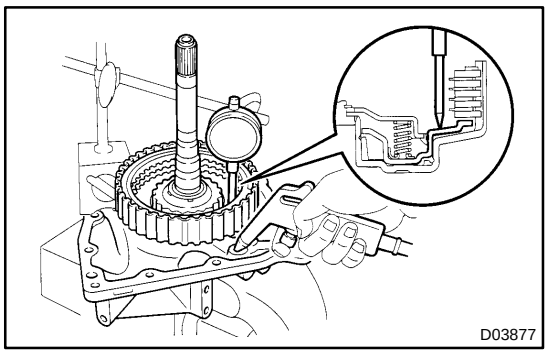
AX0AO-01



D03673

AX0AP-01

DISASSEMBLY



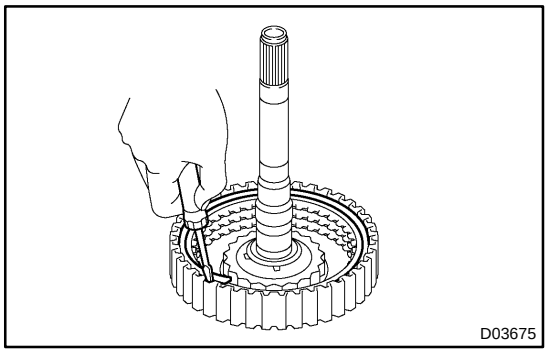
1. CHECK PISTON STROKE OF DIRECT CLUTCH

(a) Install the direct clutch and needle roller bearing on the transaxle rear cover.

(b) Using a dial indicator, measure the direct clutch piston stroke while applying and releasing compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi).

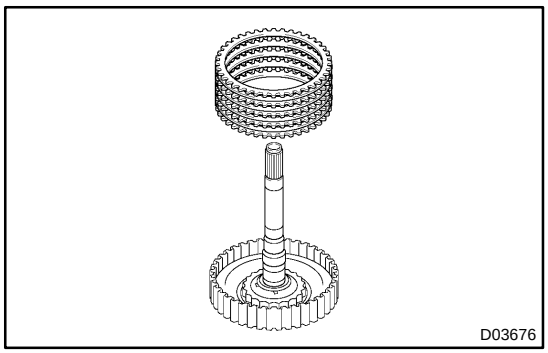
Piston stroke:0.61 - 0.77 mm (0.0240 - 0.0303 in.)

If the stroke is non-standard, inspect the discs, plates and flange.



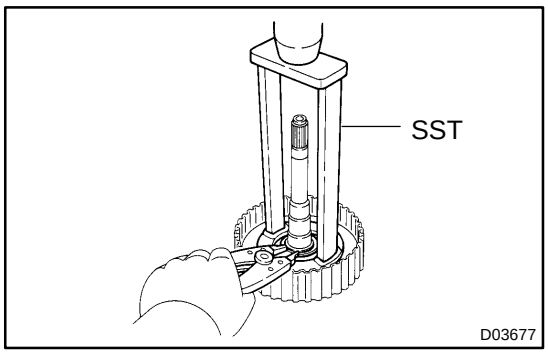
2. REMOVE SNAP RING

Using a screwdriver, remove the snap ring from the direct clutch.



3. REMOVE FLANGE, DISC AND PLATE

Remove the flange, 4 discs and 4 plates from the direct clutch drum.



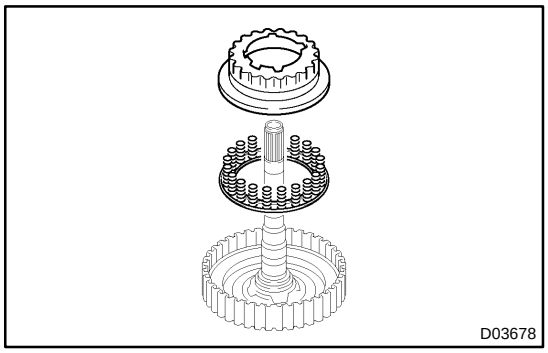
4. REMOVE PISTON RETURN SPRING

(a) Place SST on the clutch balancer and compress the springs with a press.
SST 09387-00020

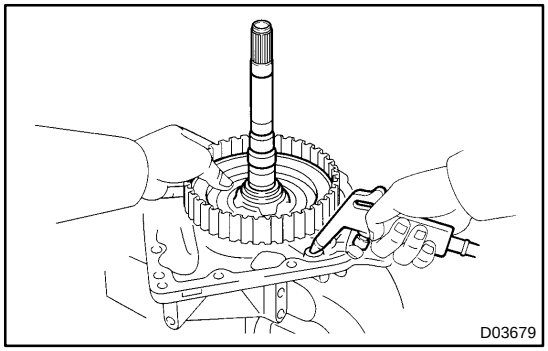
(b) Using a snap ring expander, remove the snap ring from the direct clutch drum.

NOTICE:

- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, preventing the spring sheet from the deforming.**
- **Do not expand the snap ring excessively.**



(c) Remove the clutch balancer and piston return spring from the direct clutch drum.

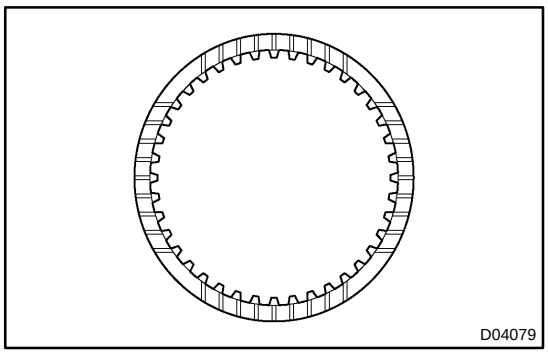


5. REMOVE DIRECT CLUTCH PISTON

(a) Install direct clutch on the transaxle rear cover.

(b) Holding the direct clutch piston with your hand, apply compressed air (392 kPa, 4.0 kgf·cm^2, 57 psi) to the transaxle rear cover to remove the direct clutch piston.

AX0AQ-01



INSPECTION

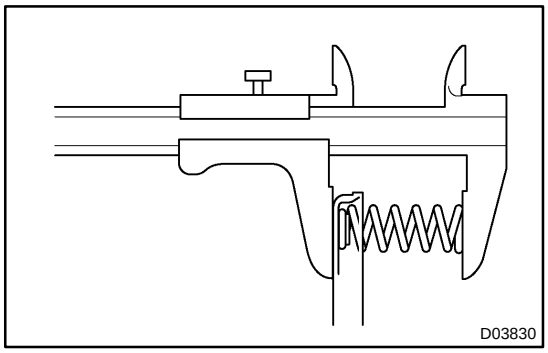
1. INSPECT DISC AND FLANGE

Check to see if the sliding surface of the disc, plate and flange are worn or burnt.

If necessary, replace them.

HINT:

- ○ If the lining of the disc is peeling off or discolored, or even if a part of the printed mark is defaced, replace all discs.
- ○ Before assembling new discs, soak them in ATF for at least 15 minutes.



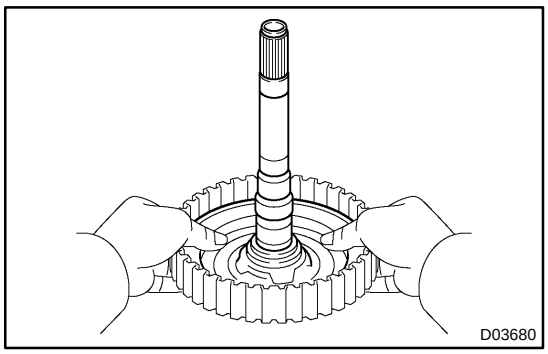
2. CHECK DIRECT CLUTCH RETURN SPRING

Using a vernier calipers, measure the free length of the spring together with the spring seat.

Standard free length: 22.58 mm (0.8890 in.)

AX0AR-01

REASSEMBLY

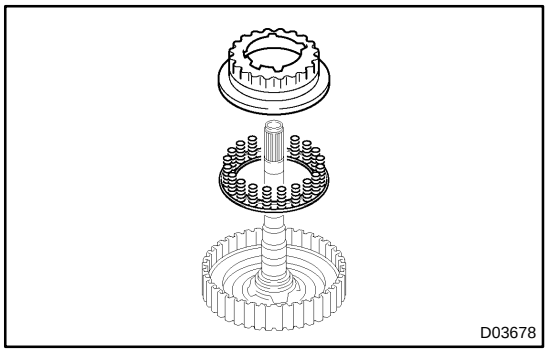


1. INSTALL DIRECT CLUTCH PISTON

Coat the direct clutch piston with ATF, install it to the direct clutch drum.

NOTICE:

Be careful not to damage the lip seal of direct clutch piston.

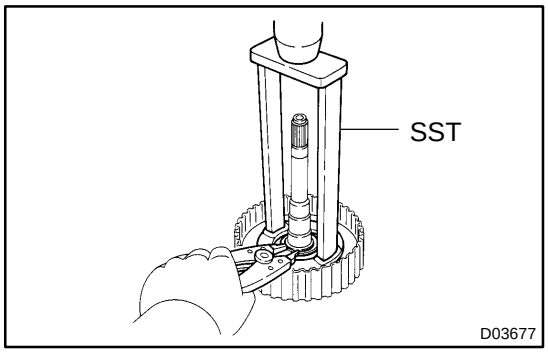


2. INSTALL PISTON RETURN SPRING

(a) Install the piston return spring and clutch balancer to the direct clutch drum.

NOTICE:

Be careful not to damage the lip seal of direct clutch balancer.

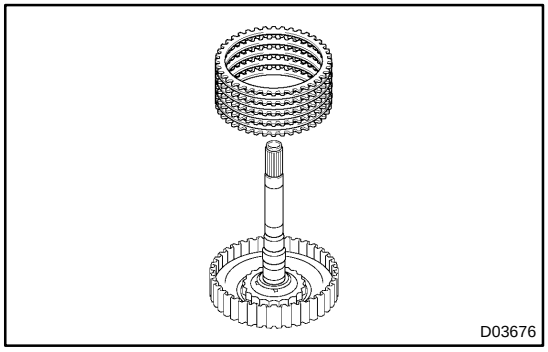


(b) Place SST, on the clutch balancer and compress the piston return spring with a press.
SST 09387-00020

(c) Using a snap ring expander, install the snap ring to the direct clutch drum.

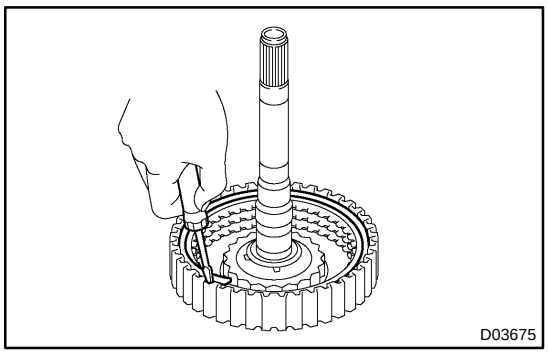
NOTICE:

- **Be sure the end gap of the snap ring is not aligned with the clutch balancer claw.**
- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, preventing the spring sheet from the deforming.**
- **Do not expand the snap ring excessively.**

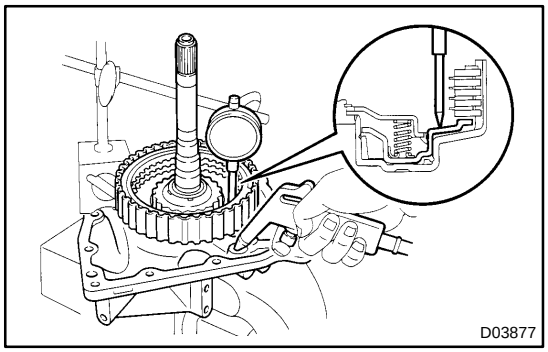


3. INSTALL PLATE, DISC AND FLANGE

(a) Install the 4 plates, 4 discs and flange.
Install in order: P=Plate, D=Disc, F=Flange
P - D - P - D - P - D - P - D - F



(b) Using a screwdriver, install the snap ring.
(c) Check that the end gap of the snap ring is not aligned with one of the cutouts.



4. CHECK PISTON STROKE OF DIRECT CLUTCH

(a) Install the direct clutch on the transaxle rear cover.
(b) Using and a dial indicator, measure the direct clutch piston stroke while applying and releasing compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi).

Piston stroke: 0.61 - 0.77 mm (0.024 - 0.030 in.)

If the piston stroke is less than the limit of piston stroke, parts may have been assembled incorrectly, so check and reassemble again.

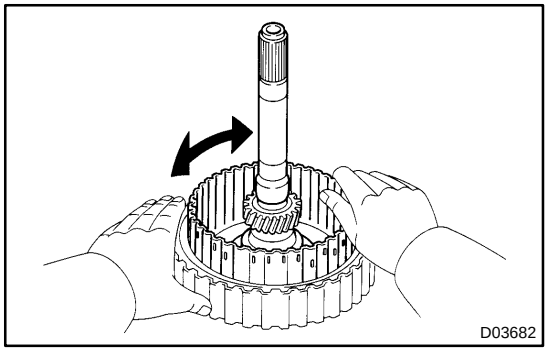
If the stroke is non-standard, select another flange.

HINT:

There are 6 flanges in different thickness.

Flange Thickness: mm (in.)

No.	Thickness	No.	Thickness
1	3.0 (0.118)	4	3.3 (0.130)
2	3.1 (0.122)	5	3.4 (0.134)
3	3.2 (0.126)	6	3.5 (0.138)



5. CHECK DISK ROTATE

Check that the disc rotates when rotating the disk after inserting the rear planetary sun gear.

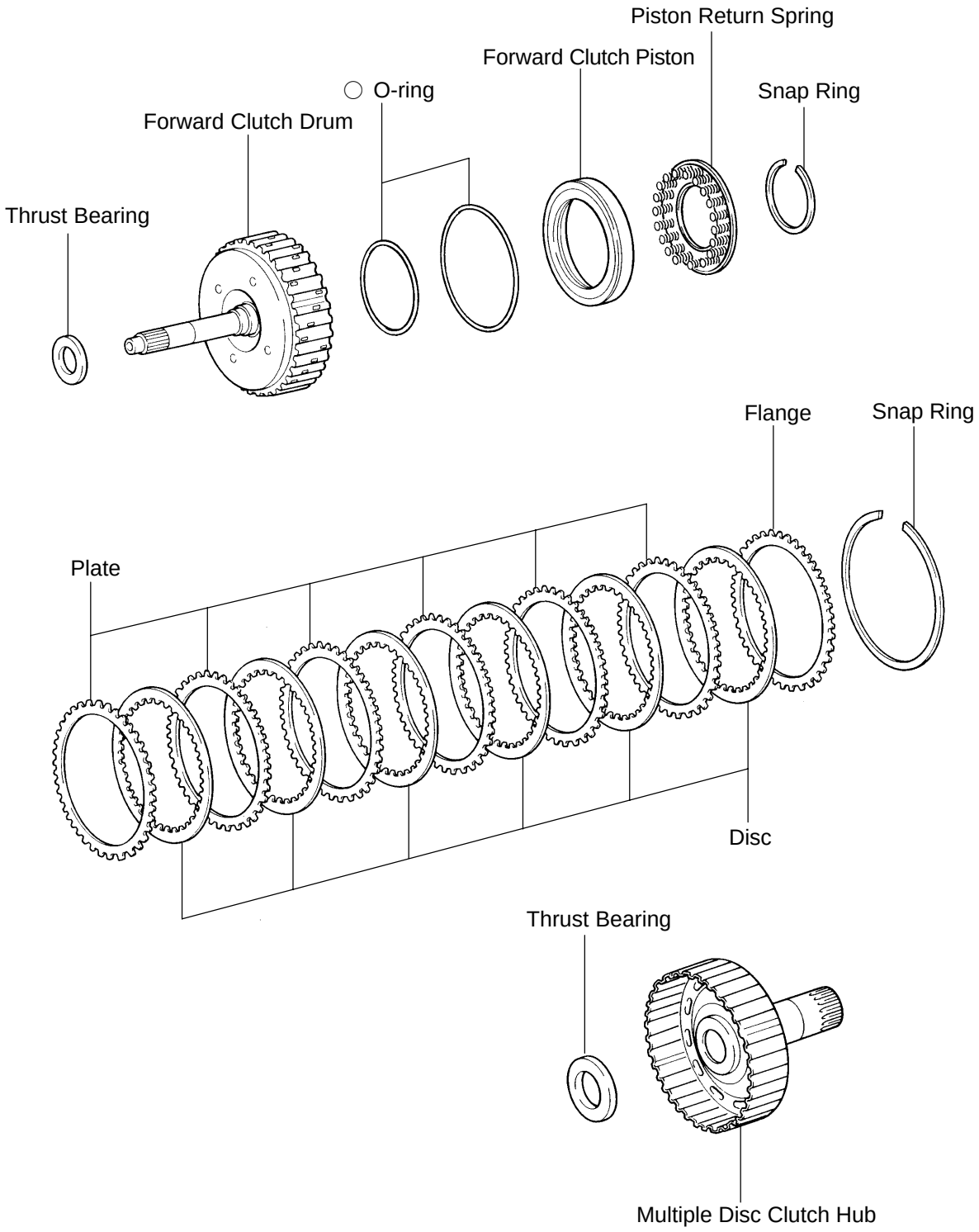
NOTICE:

Do not place the rear planetary sun gear in a vise.

FORWARD CLUTCH

AX0AS-01

COMPONENTS

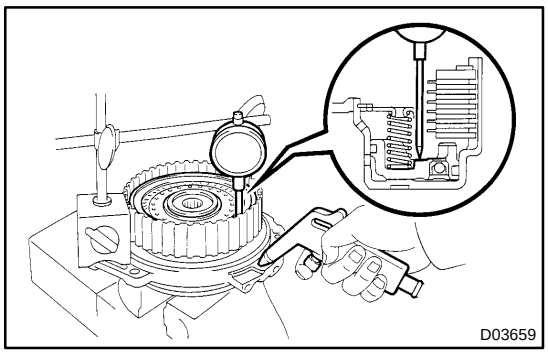


○ Non-reusable part

D03656

AX0AT-01

DISASSEMBLY



1. CHECK PISTON STROKE OF FORWARD CLUTCH

(a) Install the forward clutch on the oil pump.

NOTICE:

Be careful not to damage the oil seal ring of oil pump.

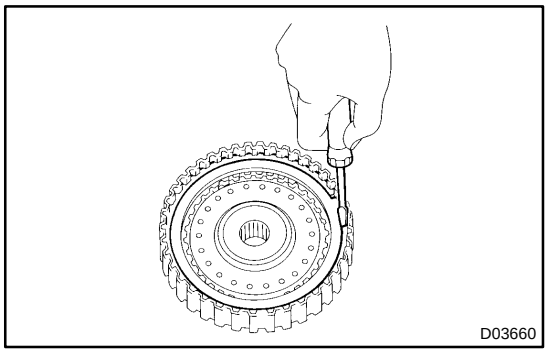
(b) Using a dial indicator, measure the forward clutch piston stroke while applying and releasing compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi).

Piston stroke: 2.09 - 2.23 mm (0.0823 - 0.0878 in.)

If the clearance is non-standard, inspect the discs, plates flange.

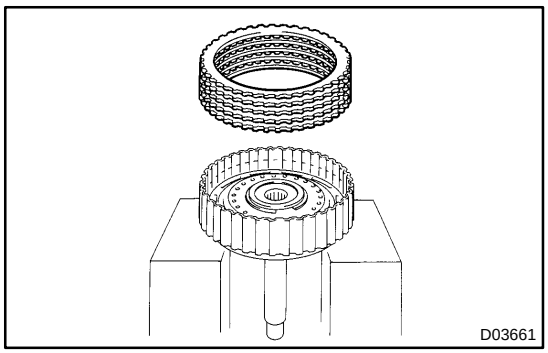
HINT:

As the opening is big, cover it with a shop rug as well as an compressed air th prevent the air from discharging.

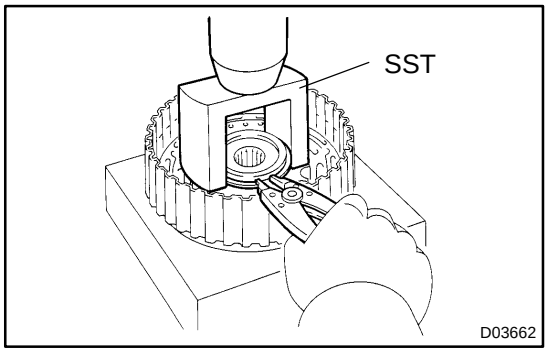


2. REMOVE FLANGE, PLATE AND DISC

(a) Using a screwdriver, remove the snap ring from the forward clutch drum.



(b) Remove the flange, 6 discs and 6 plates.

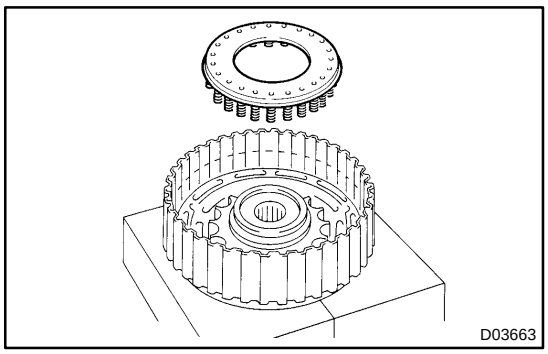


3. REMOVE PISTON RETURN SPRING

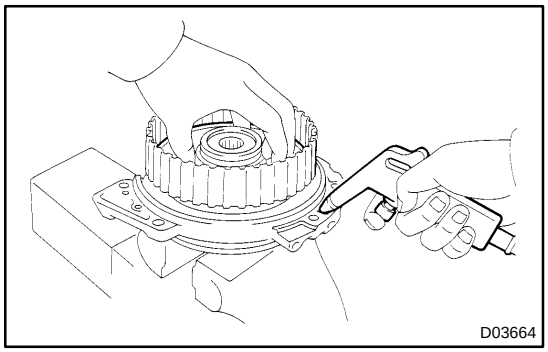
(a) Place SST on the spring retainer and compress the return spring with a press.

SST 09350-32014 (09351-32070)

(b) Using a snap ring expander, remove the snap ring.



(c) Remove the piston return spring.



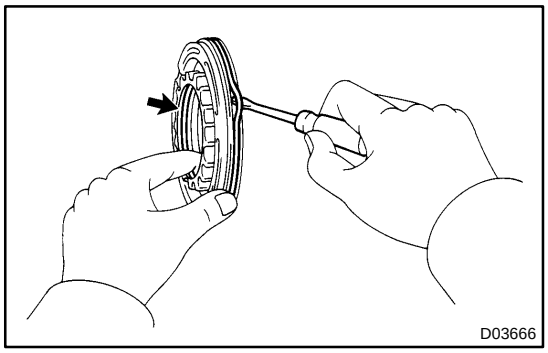
4. REMOVE FORWARD CLUTCH PISTON

(a) Place the forward clutch drum onto the oil pump.

(b) Holding the forward clutch piston with your hard, apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the oil pump to remove the forward clutch piston.

HINT:

When the piston can not be removed as it is slanted, either blow the air again with the protruding side pushed or remove the piston using the needle nose plier with vinyl tape on the tip.

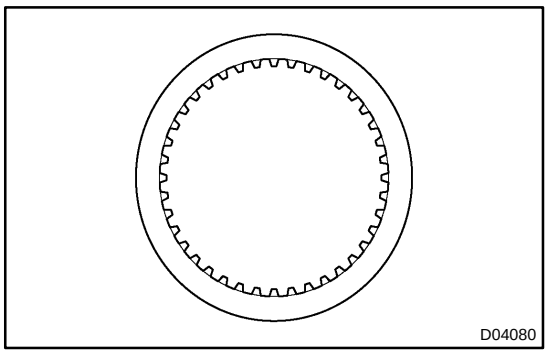


5. REMOVE O-RING

Using a small screwdriver, remove the 2 O-rings.

AX0AU-01

INSPECTION


D04080

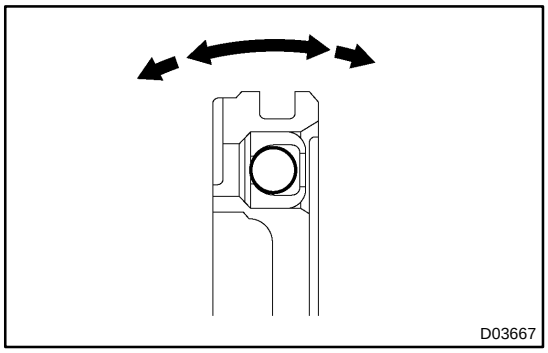
1. INSPECT DISC, PLATE AND FLANGE

Check to see if the sliding surface of the disc, plate and flange are worn or burnt.

If necessary, replace them.

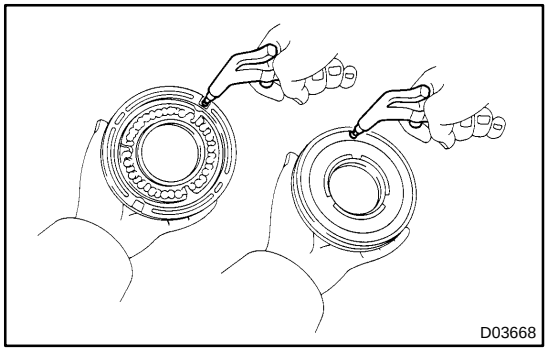
HINT:

- ○ If the lining of the disc is peeling off or discolored, or even if a part of the printed mark is defaced, replace all discs.
- ○ Before assembling new discs, soak them in ATF for at least 15 minutes.

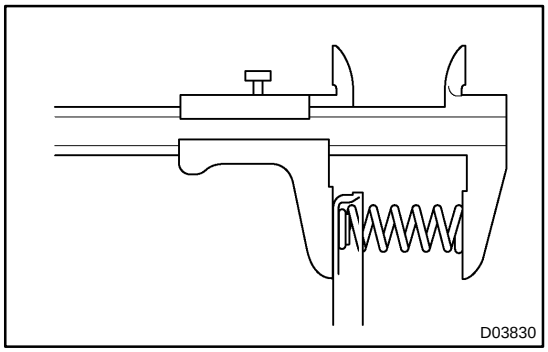

D03667

2. CHECK FORWARD CLUTCH PISTON

(a) Shake the piston to check that the check ball is not stuck.


D03668

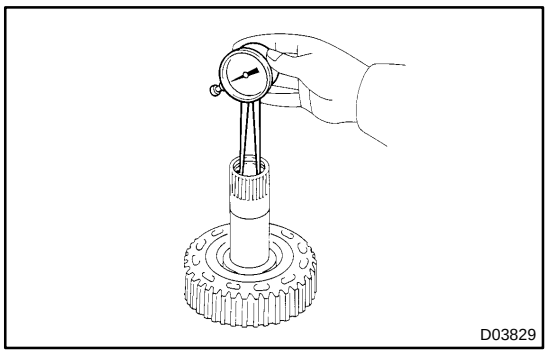
(b) Check that the valve does not leak when applying low compressed air (392 kgf/cm^2, 4.0 pKa, 57 psi).


D03830

3. CHECK FORWARD CLUTCH PISTON RETURN SPRING

Using a vernier caripers, measure the free length of the spring together with the spring seat.

Standard free length: 28.23 mm (1.1114 in.)



4. CHECK MULTIPLE DISC CLUTCH HUB BUSHING

Using a dial indicator, measure the inside diameter of the forward clutch hub bushing.

Standard inside diameter:
23.03 - 23.04 mm (0.9067 - 0.9071 in.)
Maximum inside diameter: 23.09 mm (0.9091 in.)

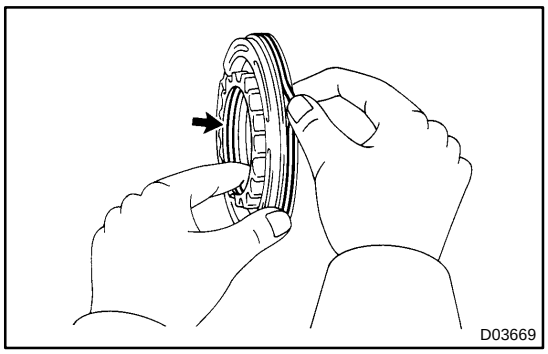
NOTICE:

- **When the diameter is over the maximum, replace the multiple disc clutch hub with new one.**
- **Check the contact surface of the bush in the direct clutch shaft. If any scratch or discolor is identified, replace the direct clutch sub-assembly with new one.**

If the inside diameter is greater than the maximum, replace the forward clutch hub.

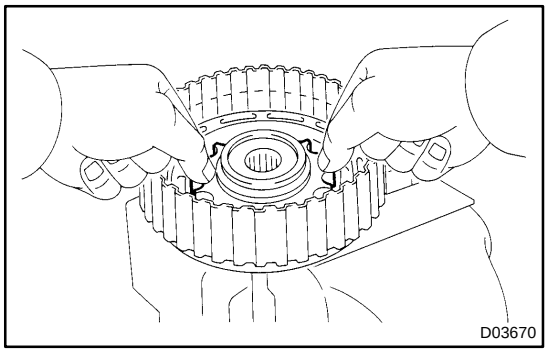
AX0AV-01

REASSEMBLY

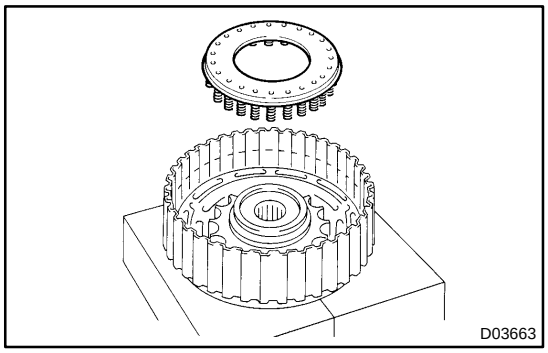


1. INSTALL FORWARD CLUTCH PISTON

(a) Coat 2 new O-rings with ATF, and install them to the forward clutch piston.

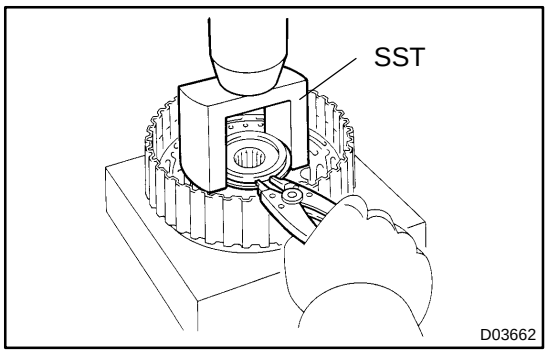


(b) Install the forward clutch piston to the forward clutch drum.



2. INSTALL PISTON RETURN SPRING

(a) Place the return spring onto the piston.

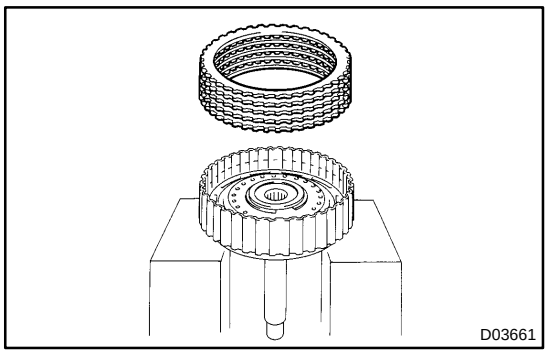


(b) Place SST on the return spring, and compress the return spring with a press.
SST 09350-32014 (09351-32070)

(c) Install the snap ring with a snap ring expander. Be sure the end gap of the snap ring is not aligned with the spring retainer claw.

NOTICE:

- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, preventing the spring sheet from the deforming.**
- **Do not expand the snap ring excessively.**

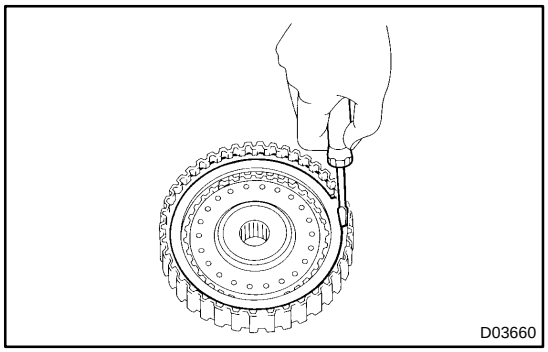


3. INSTALL PLATE, DISC AND FLANGE

Install the 6 plates and 6 discs in order.

Install in order: P=Plate, D=Disc, F=Flange

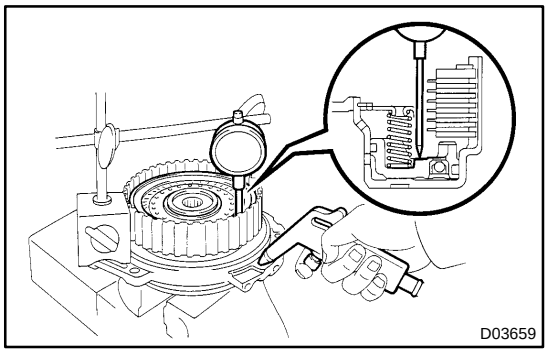
P - D - P - D - P - D - P - D - P - D - P - D - F



4. INSTALL SNAP RING

(a) Using a screwdriver, install the snap ring.

(b) Check that the end gap of the snap ring is not aligned with one of the cutouts.



5. CHECK PISTON STROKE OF FORWARD CLUTCH

(a) Using a dial indicator, measure the forward clutch piston stroke while applying and releasing compressed air (392 kgf/cm^2, 4.0 kPa, 57 psi).

Piston stroke: 2.09 - 2.23 mm (0.0823 - 0.0878 in.)

If the piston stroke is less than the limit, parts may have been assembled incorrectly, check and reassemble again.

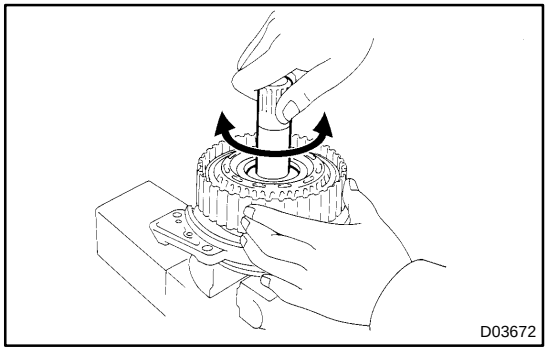
If the clearance is non-standard, select another flange.

HINT:

There are 5 different flanges in thickness.

Flange thickness: mm (in.)

No.	Thickness	No.	Thickness
1	3.00 (0.1181)	4	3.45 (0.1358)
2	3.15 (0.1240)	5	3.60 (0.1417)
3	3.30 (0.1299)	-	-



6. CHECK DISK ROTATE

Check that the disc lightly rotates when rotating the forward clutch assembly after inserting the multiple disc clutch into it.

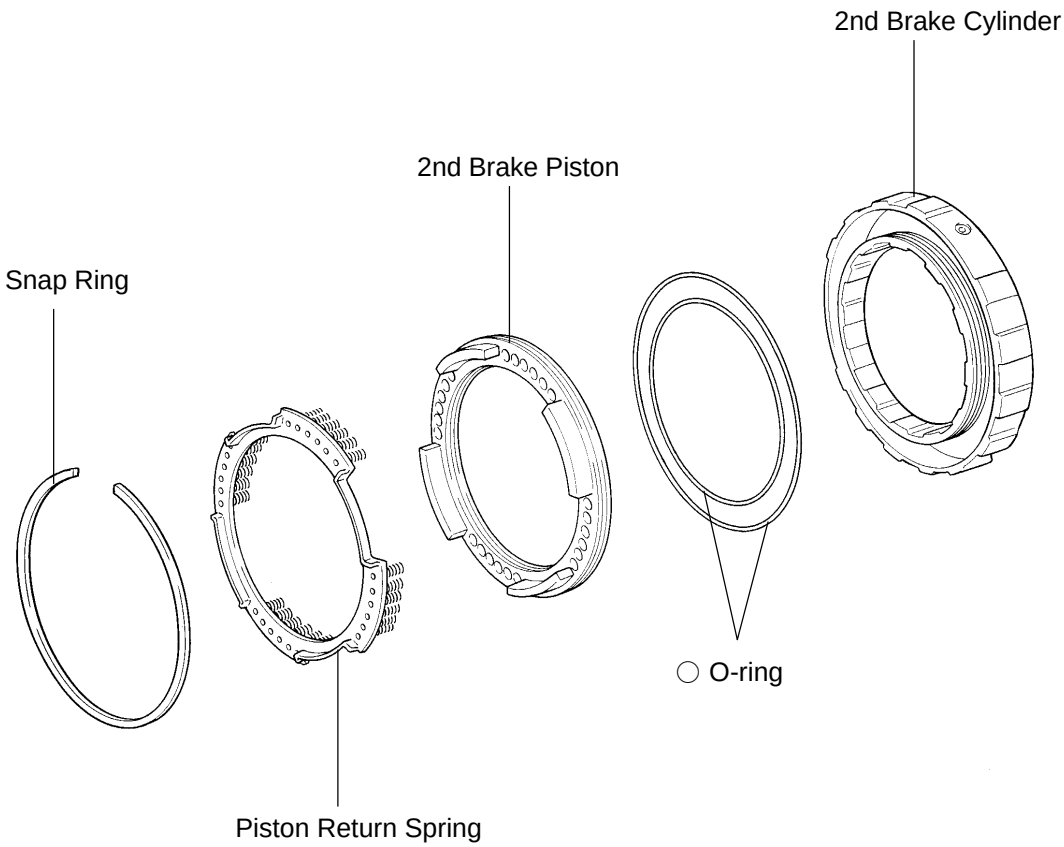
NOTICE:

Do not place the forward clutch assembly in a vise.

SECOND BRAKE

COMPONENTS

AX0AW-01

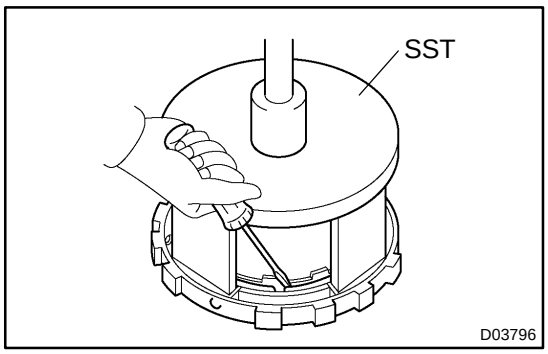


○ Non-reusable part

D03842

AX0AX-01

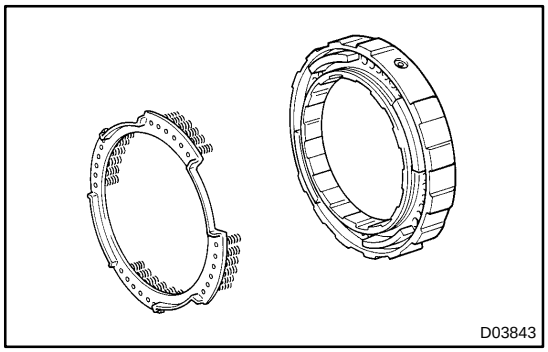
DISASSEMBLY



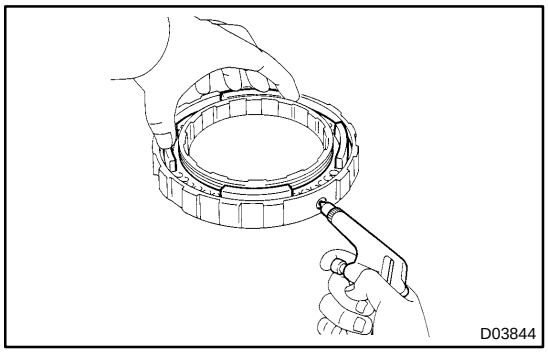
1. REMOVE PISTON RETURN SPRING

(a) Place SST on the piston return spring and compress.
SST 09387-00060

(b) Using a screwdriver, remove the snap ring.

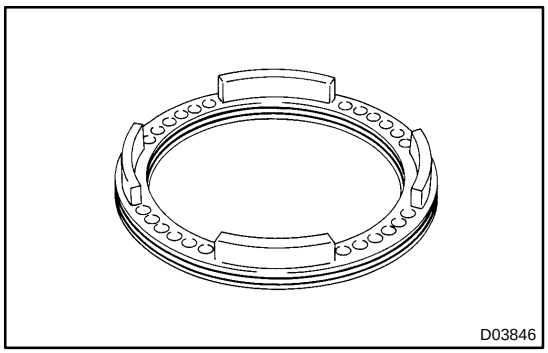


(c) Remove the piston return spring.



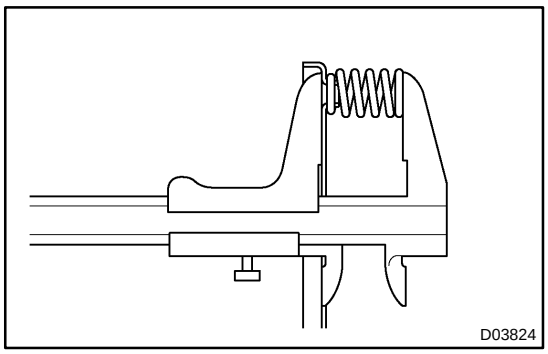
2. REMOVE 2ND BRAKE PISTON

(a) Hold the 2nd brake piston and apply compressed air (392 kPa, 4.0 kgf/cm^{2,} 57 psi) to the 2nd brake cylinder to remove the 2nd brake piston.



(b) Remove the 2 O-rings from the 2nd brake piston.

AX0AY-01



INSPECTION

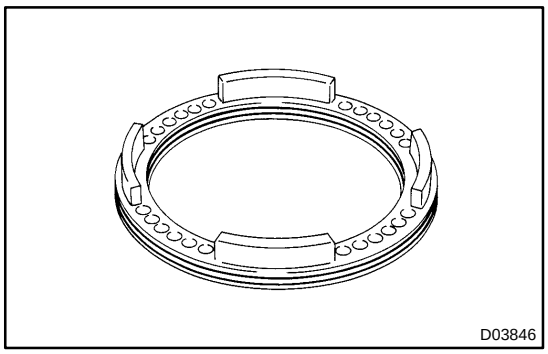
1. CHECK 2ND BRAKE PISTON RETURN SPRING

Using vernier calipers, measure the free length of the spring together with the spring seat.

Standard free length: 16.61 mm (0.6539 in.)

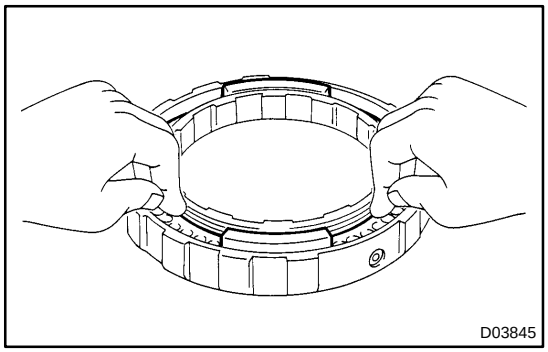
AX0AZ-01

REASSEMBLY

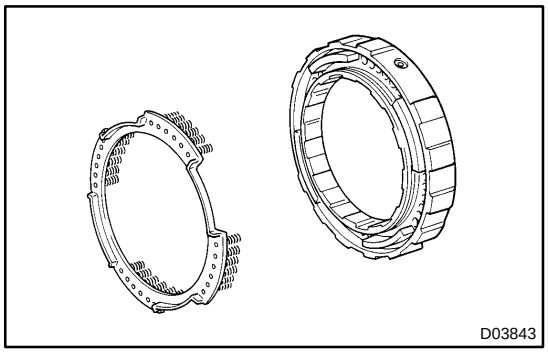

D03846

1. INSTALL 2ND BRAKE PISTON

(a) Coat 2 new O-rings with ATF and install them in the 2nd brake piston.

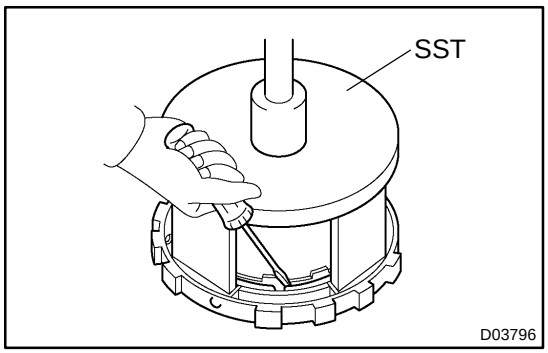

D03845

(b) Be careful not to damage the O-rings and press in the 2nd brake piston into the 2nd brake cylinder with a your hands.


D03843

2. INSTALL PISTON RETURN SPRING

(a) Install the piston return spring.



D03796

(b) Place SST on the piston return spring, and compress the piston return spring with a press.
SST 09387-00060

(c) Using a screwdriver, install the snap ring.

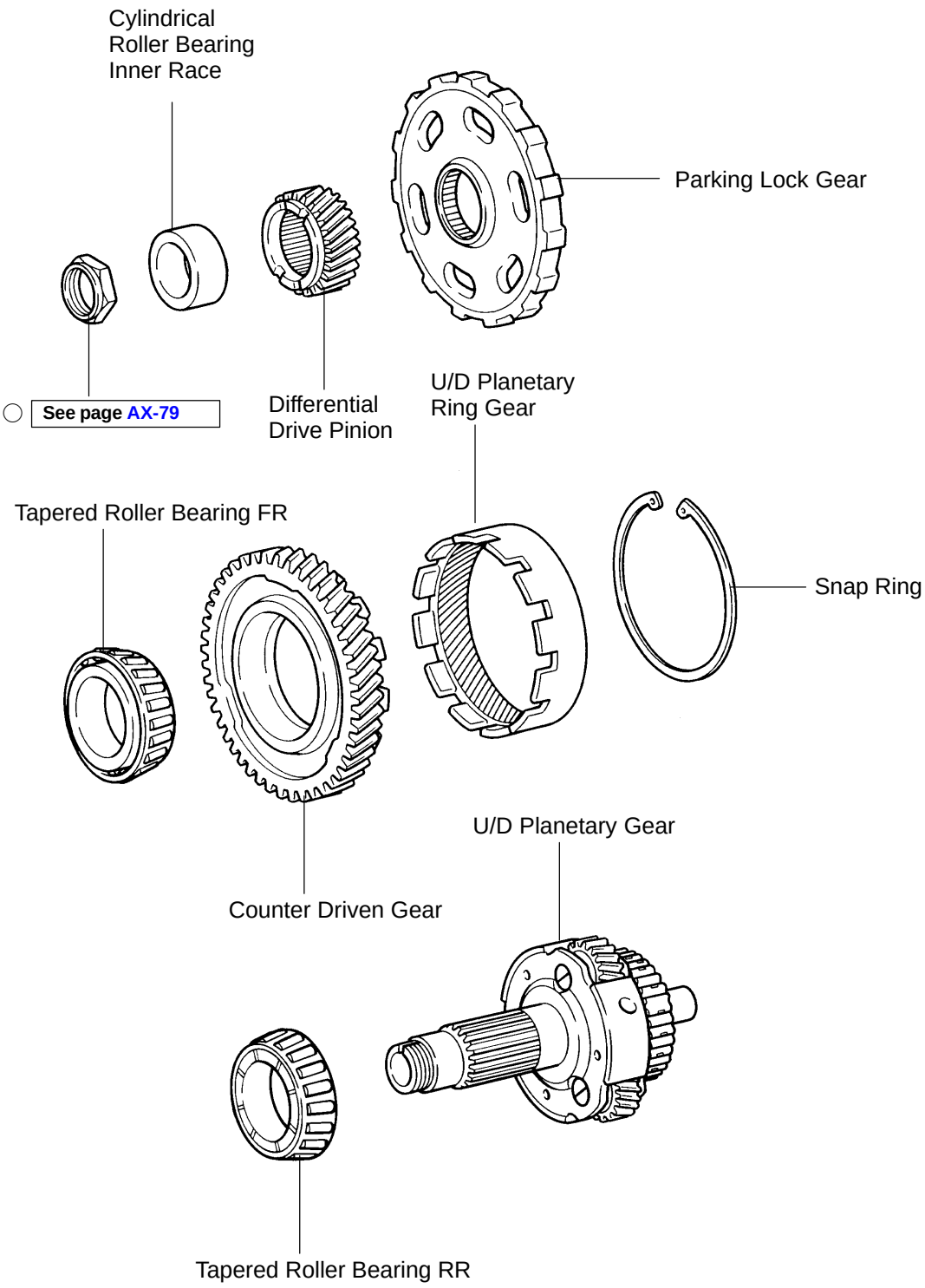
NOTICE:

Be sure the end gap of the snap ring is not aligned with the piston return spring claw.

UNDERDRIVE PLANETARY GEAR

AX0B4-01

COMPONENTS



○ Non-reusable part

D03683

AX0B5-01

DISASSEMBLY

1. MEASURE STARTING TORQUE OF U/D INPUT SHAFT

Using SST and a torque wrench, measure the staring torque of the U/D input shaft.

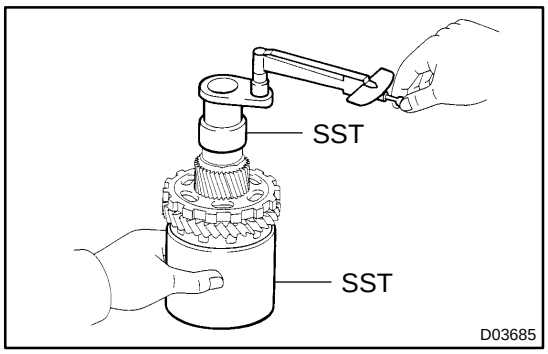
SST 09387-00050, 09564-16020

Starting torque:

0.5 - 3.3 N·m (5 - 33 kgf·cm, 4.3 - 28.6 in.·lbf)

HINT:

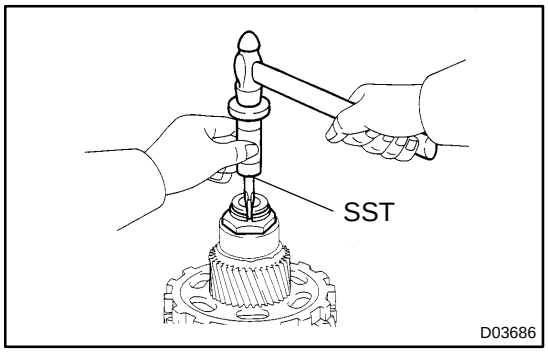
Use a torque wrench with a fulcrum length of 160 mm (6.3 in.).



2. REMOVE CYLINDRICAL ROLLER BEARING INNER RACE

(a) Using SST, loosen the staked part of the nut.

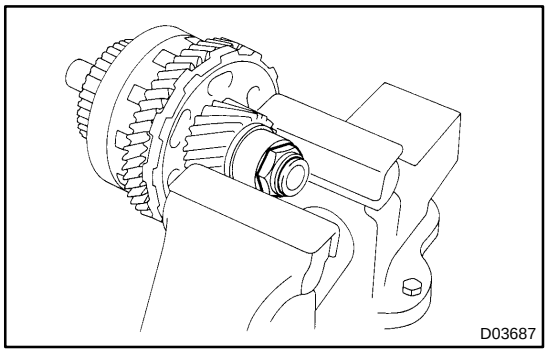
SST 09930-00010 (09931-00010, 09930-00020)



(b) Clamp the U/D planetary gear in soft jaw vise.

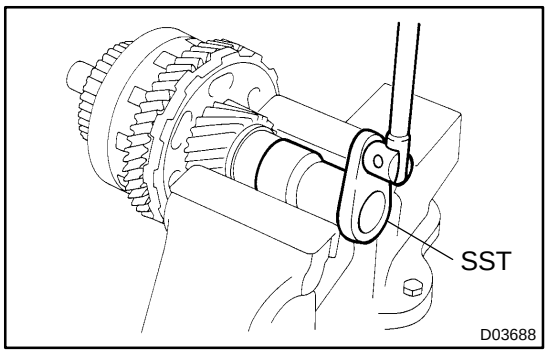
NOTICE:

Be careful not to damage the differential drive pinion.



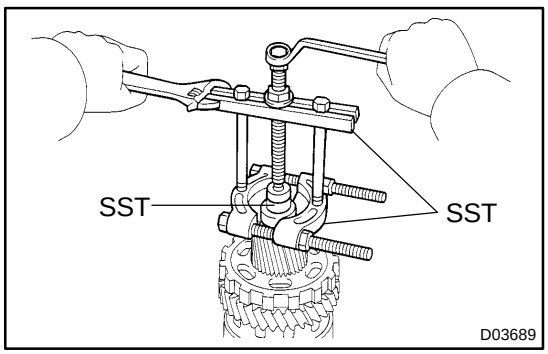
(c) Using SST, remove lock nut.

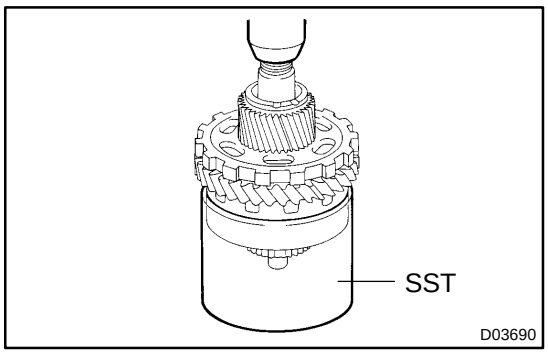
SST 09564-16020



(d) Using SST, remove cylindrical roller bearing inner race.

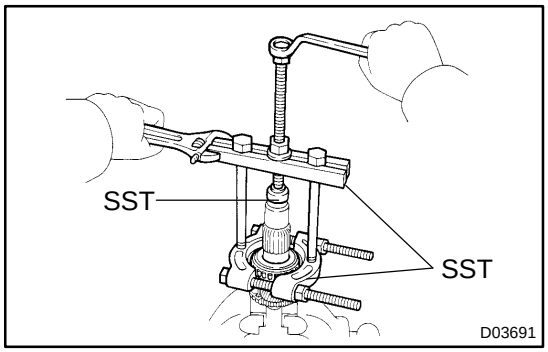
SST 09950-00020, 09950-00030, 09950-60010 (09951-00340)





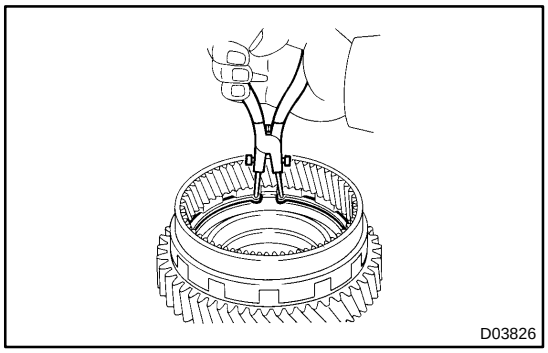
3. REMOVE U/D PLANETARY GEAR

(a) Using SST and a press, remove the differential drive pinion, parking lock gear, counter driven gear with U/D planetary ring gear and tapered roller bearing FR.
SST 09387-00050



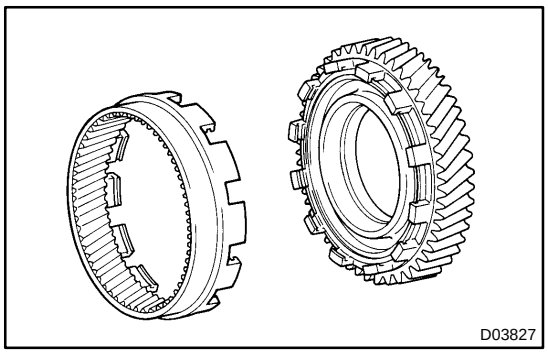
(b) Clamp the U/D planetary gear in soft jaw vise.

(c) Using SST, remove the tapered roller bearing RR from the U/D planetary gear.
SST 09950-00020, 09950-00030, 09950-60010 (09951-00320)



4. REMOVE U/D PLANETARY RING GEAR

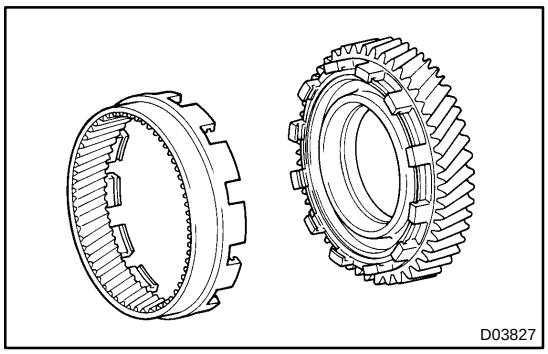
(a) Using snap ring pliers, remove snap ring.



(b) Remove the U/D planetary ring gear from the counter driven gear.

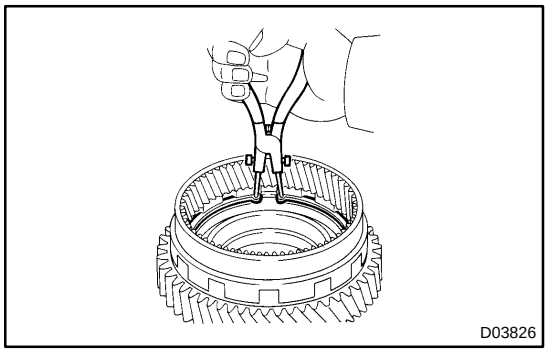
AX0B6-01

REASSEMBLY

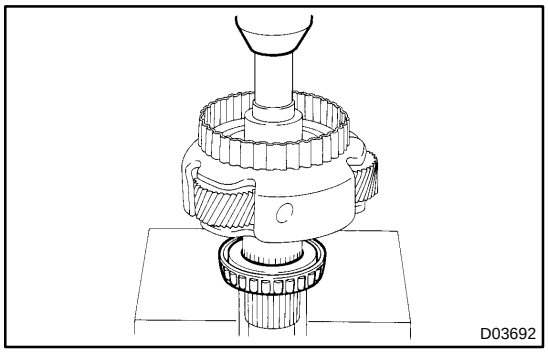


1. INSTALL U/D PLANETARY RING GEAR

(a) Install the U/D planetary ring gear to the counter driven gear.



(b) Using snap ring pliers, install snap ring.

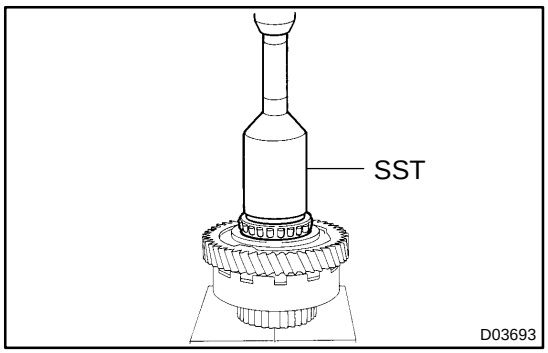


2. INSTALL U/D PLANETARY GEAR

(a) Using a press, install the tapered roller bearing RR to the U/D planetary gear.

NOTICE:

Press in the bearing until it becomes flat at the bottom.



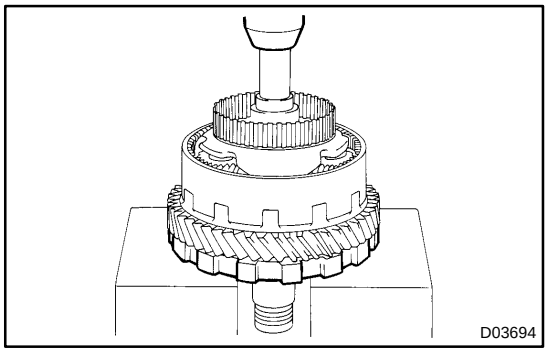
(b) Install the counter driven gear with the U/D planetary ring gear.

(c) Using SST and a press, install the tapered roller bearing FR.

SST 09214-7601 1

NOTICE:

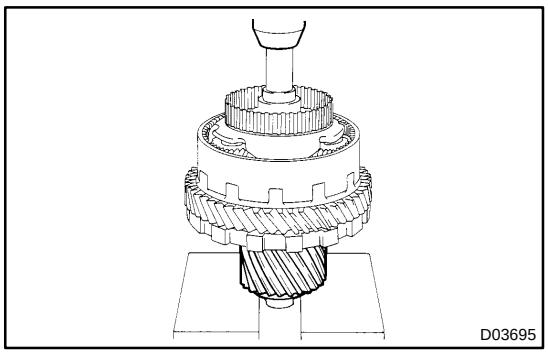
Press in the counter driven gear while rotating it.



(d) Using a press, install the parking lock gear.

NOTICE:

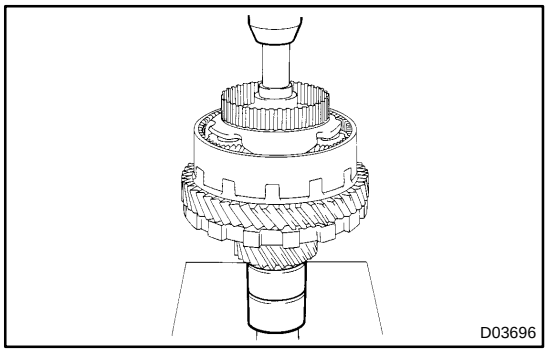
Press in the counter driven gear while rotating it.



(e) Using a press, install the differential drive pinion.

NOTICE:

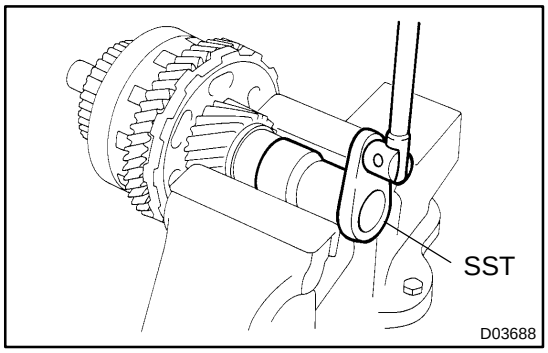
Press in the counter driven gear while rotating it.



(f) Using a press, install the cylindrical roller bearing inner race.

NOTICE:

Press in the counter driven gear while rotating it.



(g) Clamp the U/D planetary gear in soft jaw vise.

NOTICE:

Be careful not to damage the differential drive pinion.

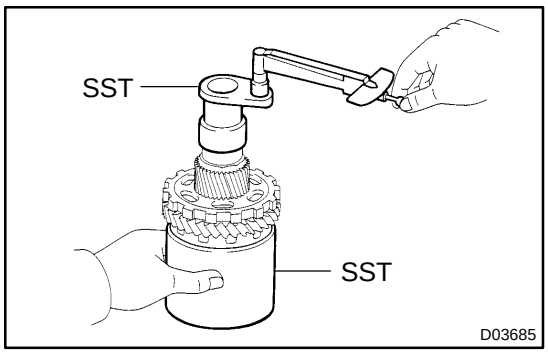
(h) Using SST, install a new lock nut.

Torque: 262 N·m (2672 kgf·cm, 194 ft·lbf)

SST 09564-16020

HINT:

Use a torque wrench with a fulcrum length of 750 mm (29.53 in.).



3. MEASURE STARTING TORQUE OF U/D INPUT SHAFT

Using SST and a torque wrench, measure the starting torque of U/D input shaft.

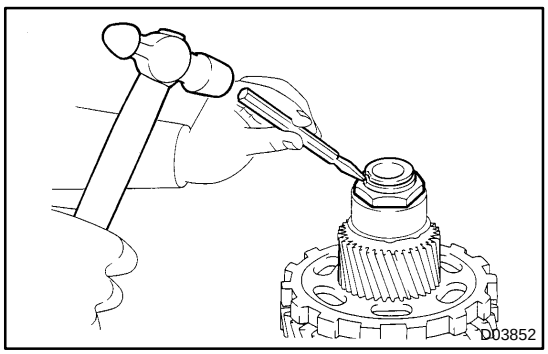
SST 09387-00050, 09564-16020

Starting torque:

0.5 - 3.3 N·m (5 - 33 kgf·cm, 4.3 - 28.6 in.·lbf)

HINT:

Use a torque wrench with a fulcrum length 160 mm (6.3 in.).



4. STAKE LOCK NUT

Using a pin punch and hammer, stake the lock nut.

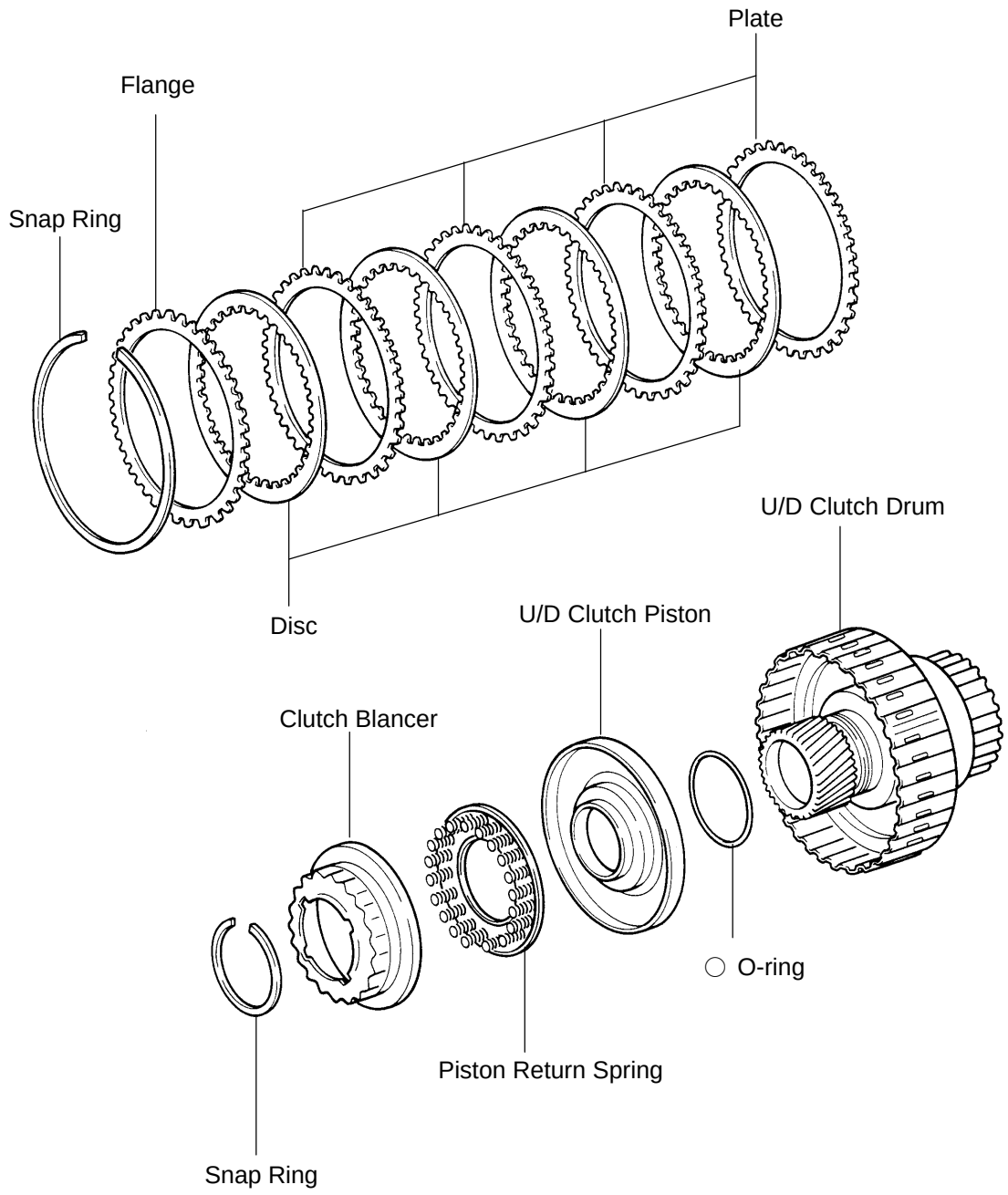
NOTICE:

Also, make sure that there are no cracks on the nut.

UNDERDRIVE CLUTCH

COMPONENTS

AX0B0-01

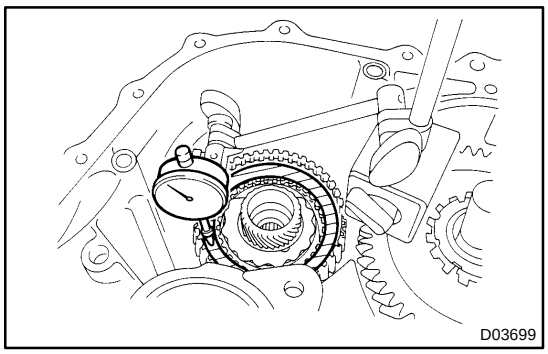


○ Non-reusable part

D03697

AX0B1-01

DISASSEMBLY



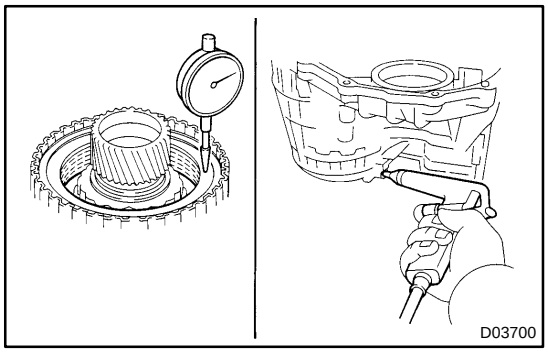
1. CHECK PISTON STROKE OF U/D CLUTCH

(a) Install the U/D clutch to the transaxle case.

NOTICE:

Be careful not to damage the oil seal rings.

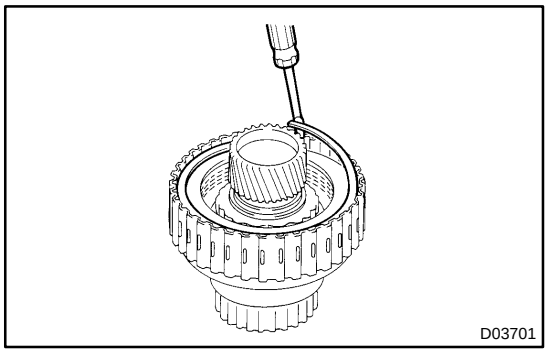
(b) Install the dial indicator, as shown in the illustration.



(c) Measure the U/D clutch piston stroke while applying and releasing compressed air (392 kgf/cm^2, 4.0 kPa, 57 psi).

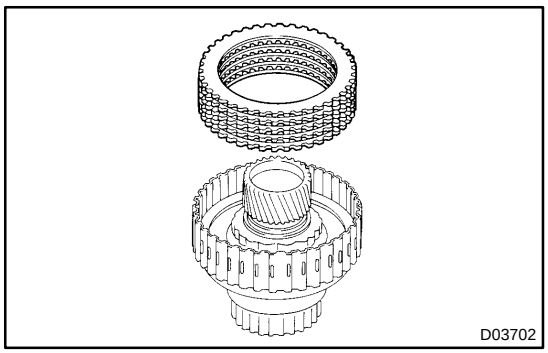
Piston stroke: 1.51 - 1.77 mm (0.0594 - 0.0697 in.)

If the piston stroke is non-standard inspect the discs, plates and flange.

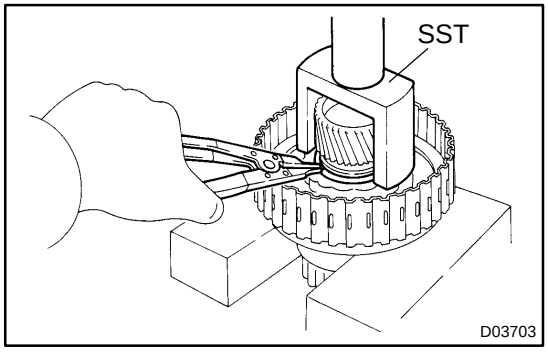


2. REMOVE FLANGE, DISC AND PLATE

(a) Using a screwdriver, remove the snap ring.



(b) Remove the flange, 4 discs and 4 plates from the U/D clutch drum.



3. REMOVE PISTON RETURN SPRING

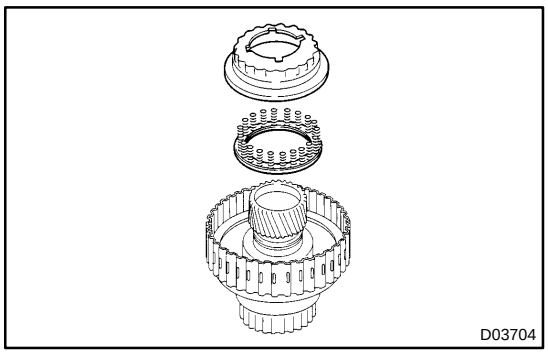
(a) Place SST on the clutch balancer and compress the spring with a press.

SST 09350-32014 (09351-32070)

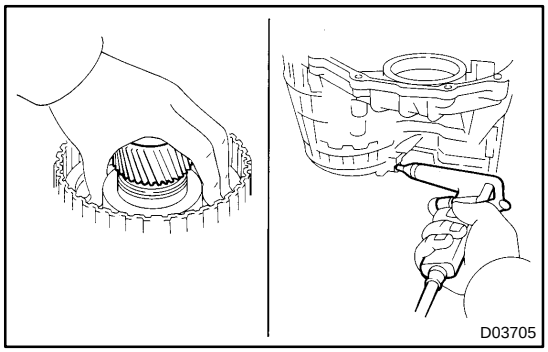
(b) Using a snap ring expander, remove the snap ring.

NOTICE:

- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, preventing the spring sheet from deforming.**
- **Do not expand the snap ring excessively.**



(c) Remove the clutch balancer and piston return spring from the U/D clutch drum.



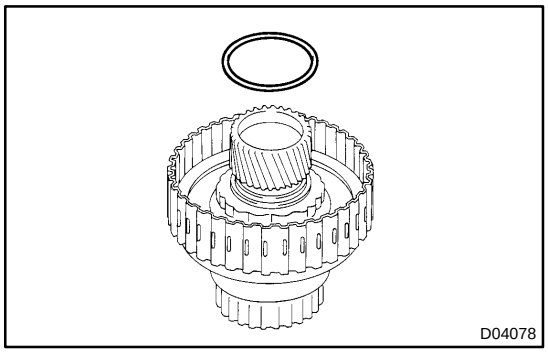
4. REMOVE U/D CLUTCH PISTON

(a) Install the U/D clutch to the transfer case.

NOTICE:

Be careful not to damage the oil seal rings.

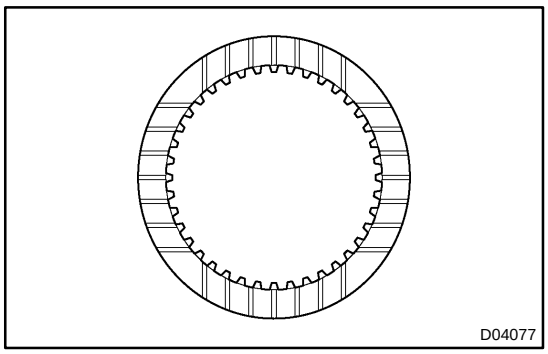
(b) Holding the U/D clutch piston with your hand, apply compressed air (392 kPa, 4.0 kgf/cm^2, 57 psi) to the transaxle case to remove the U/D clutch piston.



5. REMOVE O-RING

AX0B2-01

INSPECTION

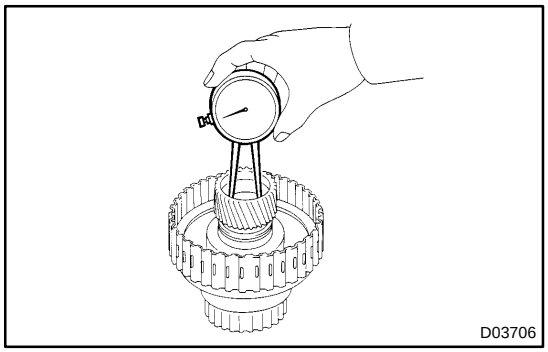


1. INSPECT DISC, PLATE AND FLANGE

Check to see if the sliding surface of the disc, plate and flange are worn or burnt. If necessary, replace them.

HINT:

- ○ If the lining of the disc is peeling off or discolored, or even if a part of the printed mark is defaced, replace all discs.
- ○ Before assembling new discs, soak them in ATF for at least 15 minutes.

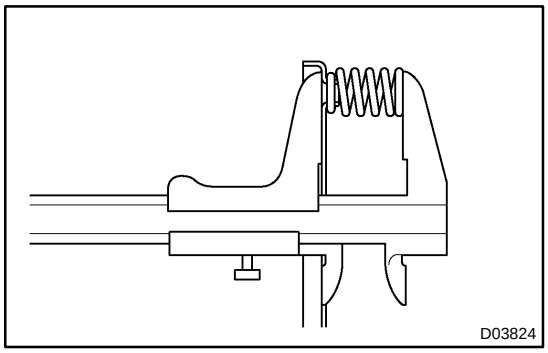


2. CHECK U/D CLUTCH DRUM BUSHING

Using a dial indicator, measure the inside diameter of the U/D clutch drum bushing.

Standard drum bushing:
37.06 - 37.08 mm (1.4591 - 1.4598 in.)
Maximum drum bushing: 37.13 mm (1.4618 in.)

If the inside diameter is greater than the maximum, replace the U/D clutch drum.



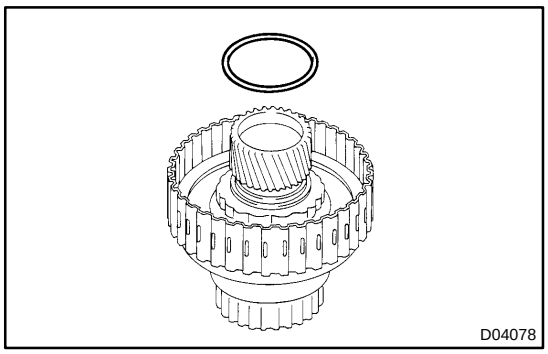
3. CHECK U/D CLUTCH PISTON RETURN SPRING

Using vernier calipers, measure the free length of the spring together with spring seat.

Standard free length: 17.14 mm (0.6748 in.)

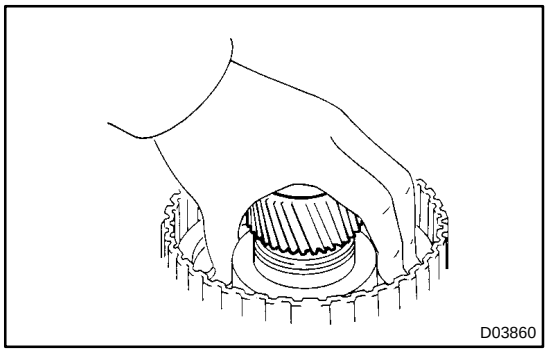
AX0B3-01

REASSEMBLY



1. INSTALL O-RING

Coat new O-ring with ATF, install it to the U/D clutch drum.

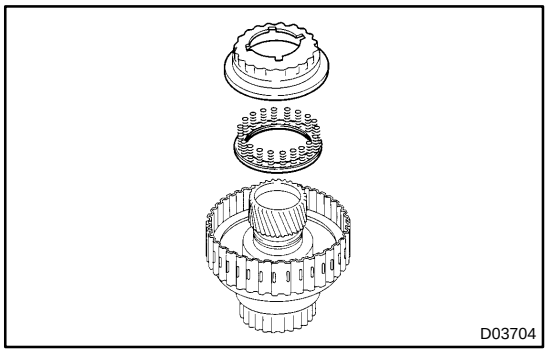


2. INSTALL U/D CLUTCH PISTON

Coat the U/D clutch piston with ATF, install it to the U/D clutch piston drum.

NOTICE:

Be careful not to damage the O-ring.

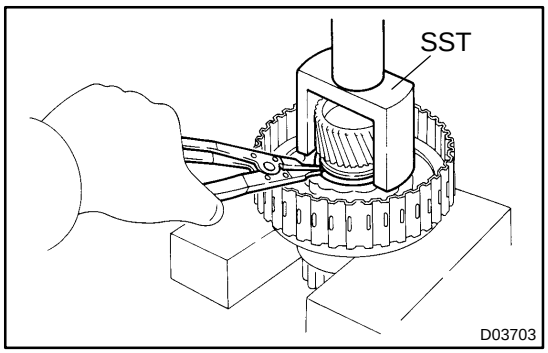


3. INSTALL PISTON RETURN SPRING

(a) Install the piston return spring and clutch balancer to the U/D clutch drum.

NOTICE:

Be careful not to damage the lip seal of clutch balancer.

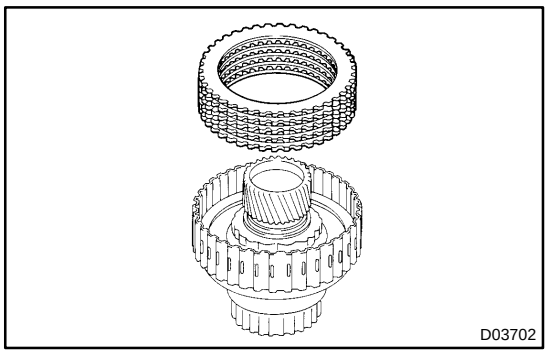


(b) Place SST on the clutch balancer and compress the piston return spring with a press.
SST 09350-32014 (09351-32070)

(c) Using a snap ring expander, install the snap ring to U/D clutch drum.

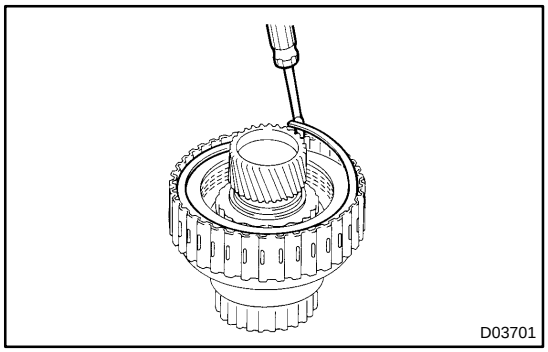
NOTICE:

- **Be sure the end gap of the snap ring is not aligned with the clutch balancer claw.**
- **Stop the press when the spring sheet is lowered to the place 1 - 2 mm (0.039 - 0.078 in.) from the snap ring groove, preventing the spring sheet from deforming.**
- **Do not expand the snap ring excessively.**

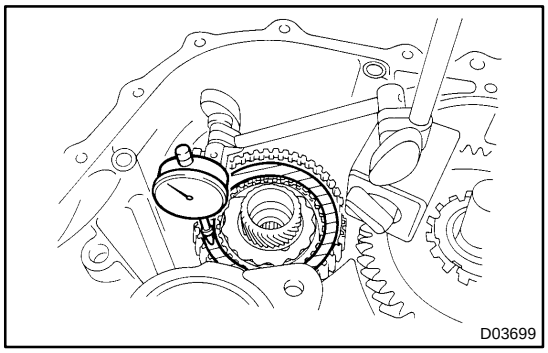


4. INSTALL PLATE, DISC AND FLANGE

(a) Install the 4 plates, 4 discs and flange.
Install in order: P = Plate, D = Disc, F = Flange
P - D - P - D - P - D - P - D - F



(b) Using a screwdriver, install the snap ring.
(c) Check that the end gap of snap ring is not aligned with one of the cutouts.



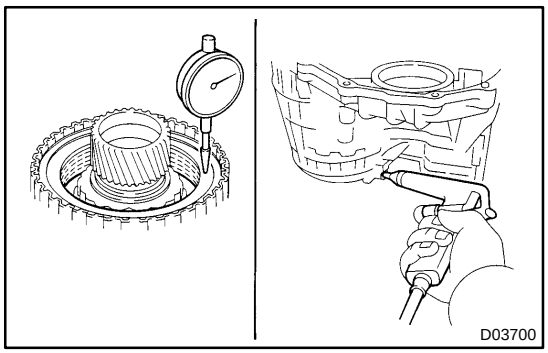
5. CHECK PISTON STROKE OF U/D CLUTCH

(a) Install the U/D clutch to the transaxle case.

NOTICE:

Be careful not to damage the oil seal rings.

(b) Install the dial indicator, as shown in the illustration.



(c) Measure the U/D clutch piston stroke while applying and releasing compressed air (392 kgf/cm^2, 4.0 kPa, 57 psi).
Piston stroke: 1.51 - 1.77 mm (0.059 - 0.070 in.)

If the piston stroke is less than the limit of piston stroke, parts may have been assembled incorrectly, so check and reassemble again.

If the stroke is non-standard, select another flange.

HINT:

There are 3 flanges in different thickness.

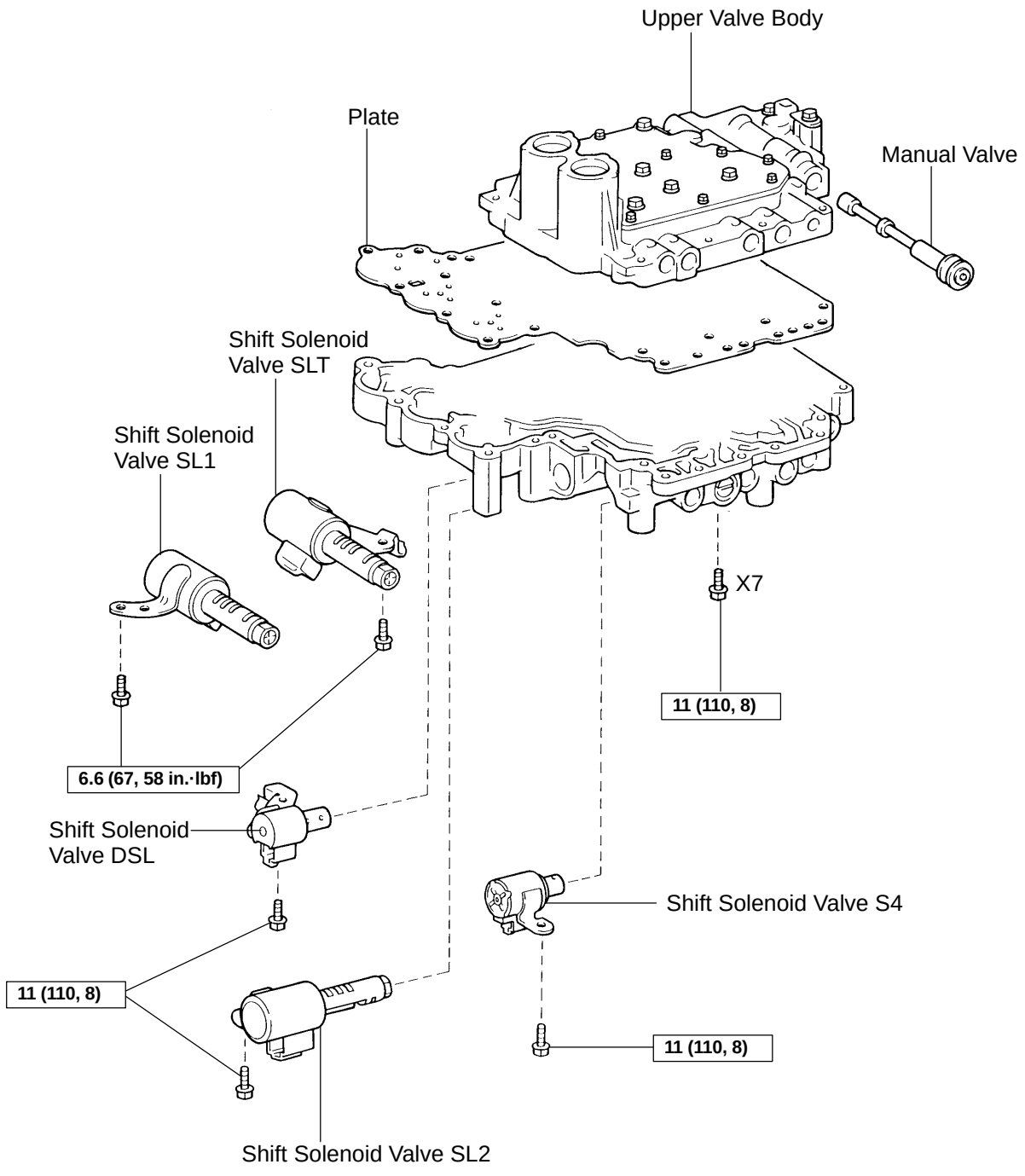
Flange Thickness: mm (in.)

No.	Thickness	No.	Thickness
1	3.0 (0.118)	3	3.4 (0.134)
2	3.2 (0.126)		

VALVE BODY

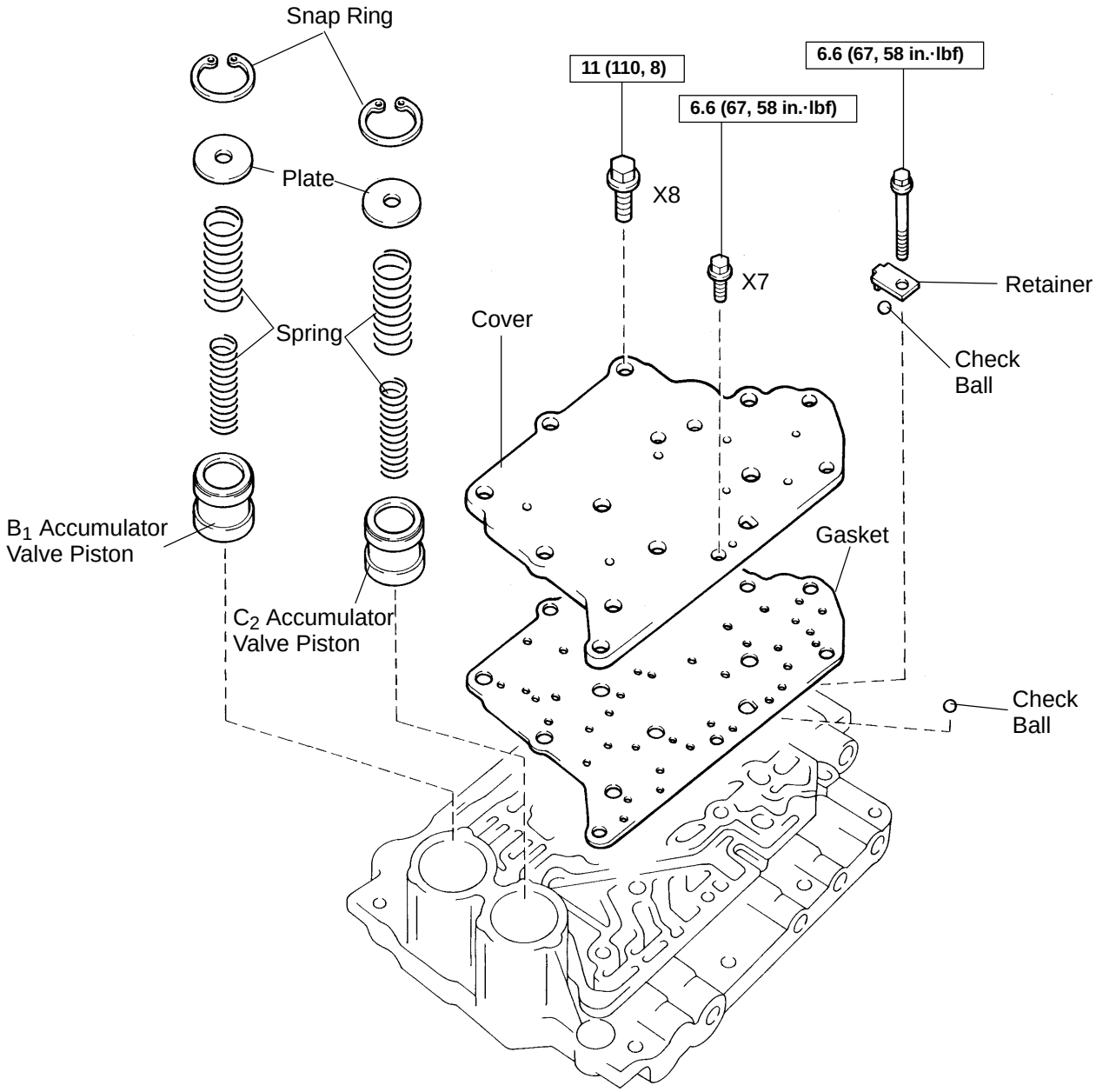
AX0B7-01

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

D03780



N·m (kgf·cm, ft·lbf) : Specified torque

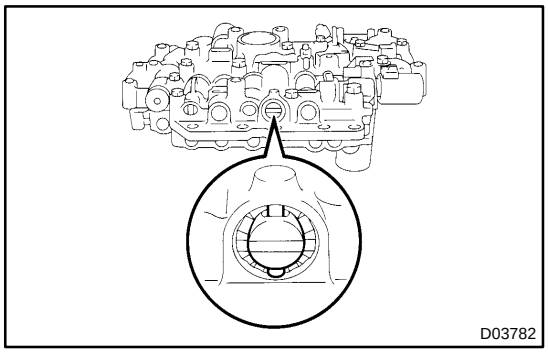
D03781

AX0B8-01

DISASSEMBLY

NOTICE:

- **Disassembling and reassembling should be conducted on a clean vinyl sheet or mat, or aluminum tray.**
- **Make the valve slide through the valve hole by its own weight. Do not forcibly pull out the valve using needle nose pliers. When having difficulty in removing it, slant and shake the valve body or use a magnet hand.**
- **Do not place the disassembled parts directly on metal work bench or waste cloth.**
- **Do not use dropped parts.**
- **Make sure that no burr is identified before assembling.**

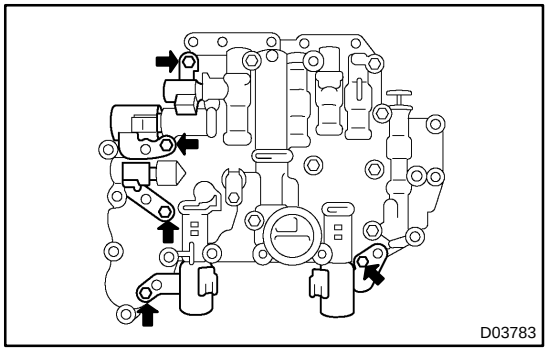


1. CHECK PRIMARY REGULATOR VALVE POSITION

Write down the relative position of the primary regulator valve sleeve, the plug and the pin.

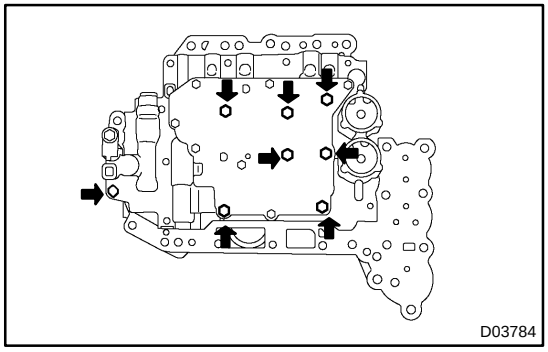
NOTICE:

Because the line pressure is changed by the position of the pin and the groove in the sleeve end, make sure to check the position.



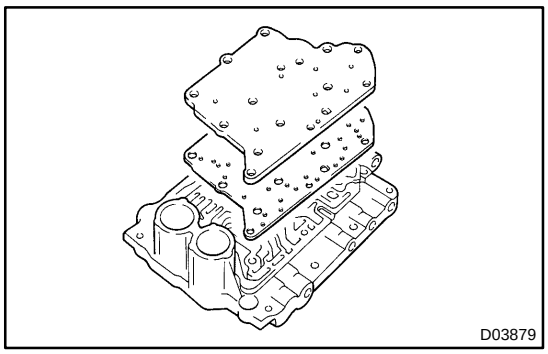
2. REMOVE SHIFT SOLENOID VALVE

(a) Remove the 5 bolts and 5 shift solenoid valves.

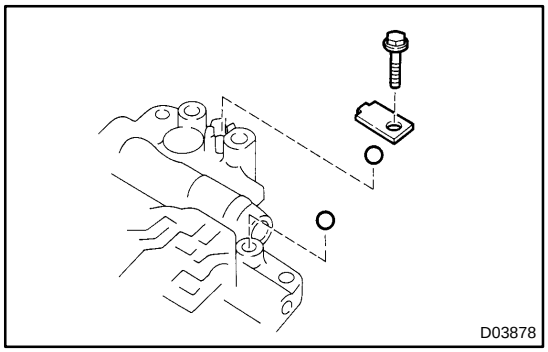


3. REMOVE LOWER VALVE BODY

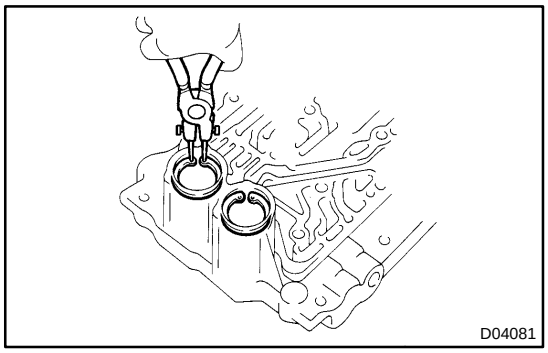
(a) Remove the 8 bolts.



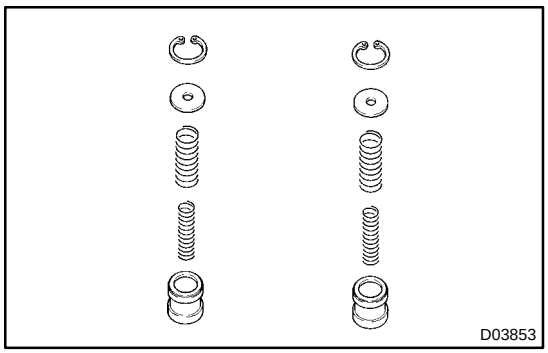
(b) Remove the 7 bolts, cover and gasket.



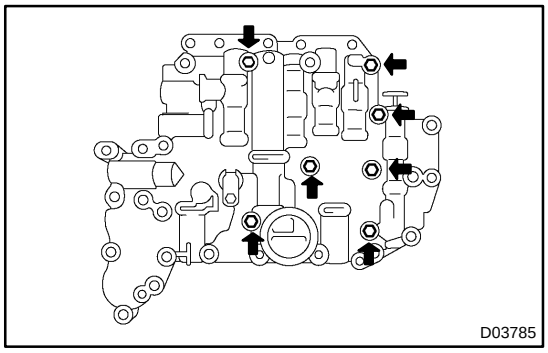
(c) Remove the bolt, cover and 2 pressure relief balls.



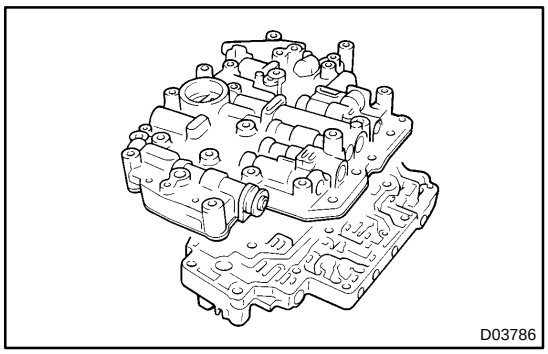
(d) Using snap ring pliers, remove the 2 snap rings.



(e) Remove 4 springs from the valve body.
(f) Remove 2 pistons from the valve body.



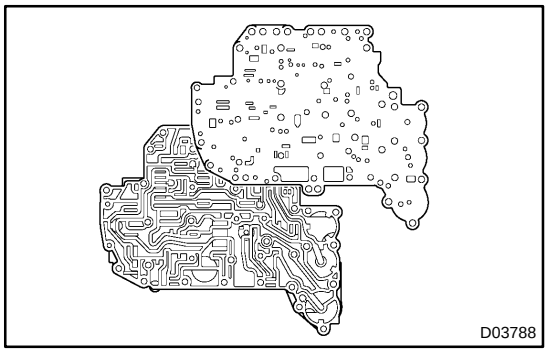
(g) Remove the 7 bolts from lower value body.



(h) Remove lower value body with plate from the upper value body.

NOTICE:

Be careful that the check balls do not fall out.



(i) Turn over the lower valve body with plate.

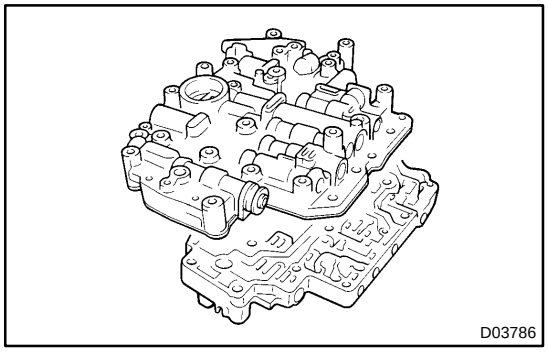
(j) Remove the plate from lower valve body.

NOTICE:

Be careful that the check balls do not fall out.

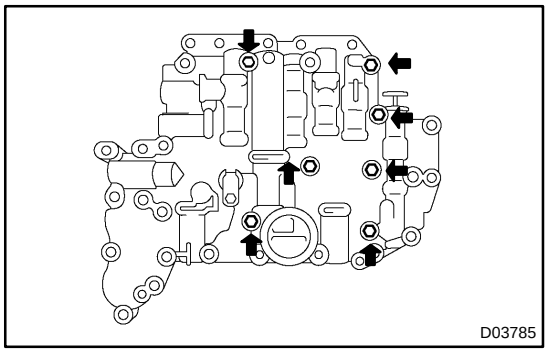
AX0B9-01

REASSEMBLY

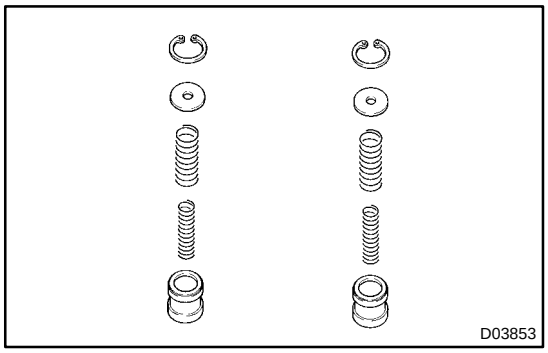

D03786

1. ASSEMBLE VALVE BODY

(a) Install the check balls to the upper and lower valve body.
(b) Install the plate to the lower valve body.
(c) Install the lower valve body with plate to the upper valve body.


D03785

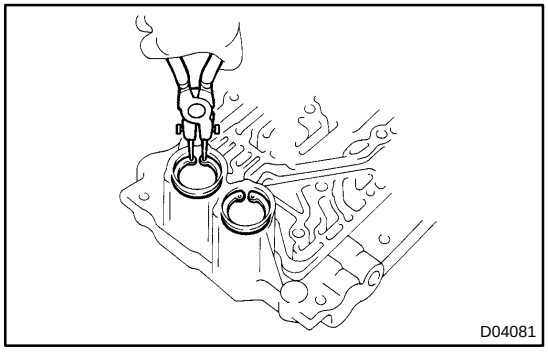
(d) Install the 7 bolts to the lower valve body.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)
Bolt length: 41 mm (1.614 in.)


D03853

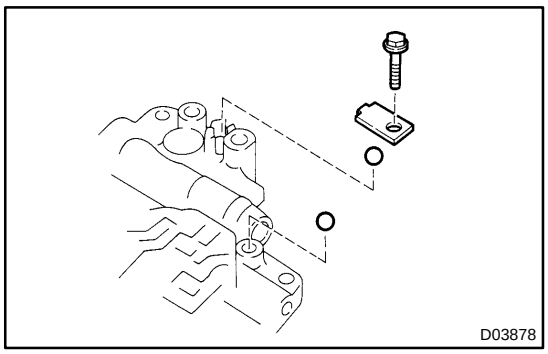
2. INSTALL ACCUMULATOR

(a) Install 2 accumulator valves to the valve body.
(b) Install 4 springs to the valve body.
Spring length: mm (in.)

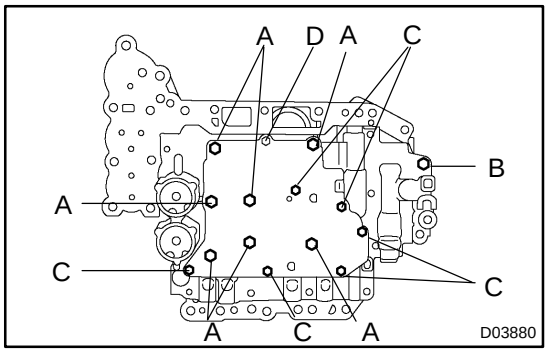
Spring		Free length / Outer diameter mm (in.)	Color
C_2	Inner:	47.58 (1.8732) / 11.2 (0.441)	Brown
	Outer:	47.61 (1.8744) / 12.0 (0.472)	Brown
B_1	Inner:	43.88 (1.7276) / 11.0 (0.433)	Parpl
	Outer:	45.12 (1.7764) / 11.8 (0.465)	White


D04081

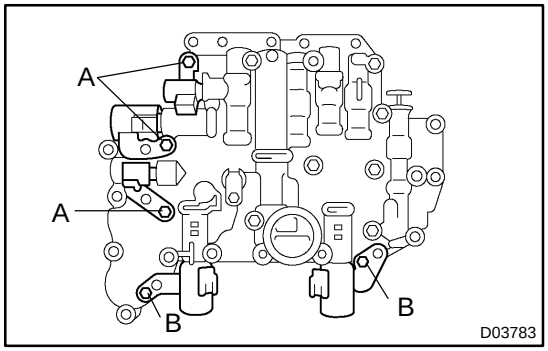
(c) Using snap ring pliers, install the snap ring.



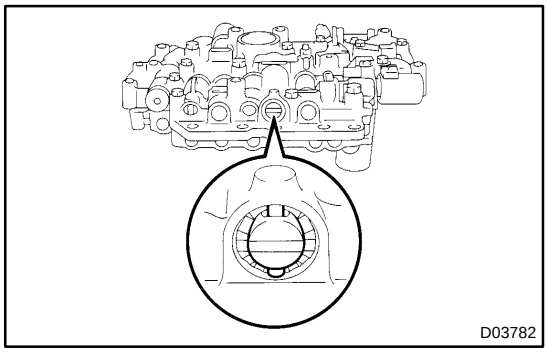
(d) Install a check ball, a retainer and a bolt to the upper valve body.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



(e) Turn over the valve body.
(f) Install the 14 bolts, gasket and upper body cover.
Torque:
Bolt A: 11 N·m (110 kgf·cm, 8 ft·lbf)
Bolt B: 11 N·m (110 kgf·cm, 8 ft·lbf)
Bolt C: 6.6 N·m (67 kgf·cm, 58 in.·lbf)
Bolt D: 6.6 N·m (67 kgf·cm, 58 in.·lbf)
HINT:
Each bolts length is indicated below.
Bolt A: 41 mm (1.614 in.)
Bolt B: 30 mm (1.181 in.)
Bolt C: 15 mm (0.591 in.)
Bolt D: 10 mm (0.394 in.)



3. INSTALL SHIFT SOLENOID VALVE
Install the 5 shift solenoid valves with 5 bolts.
Torque:
Bolt A: 11 N·m (110 kgf·cm, 8 ft·lbf)
Bolt B: 6.6 N·m (67 kgf·cm, 58 in.·lbf)
Bolt length:
Bolt A: 45 mm (1.77 in.)
Bolt B: 12 mm (0.45 in.)



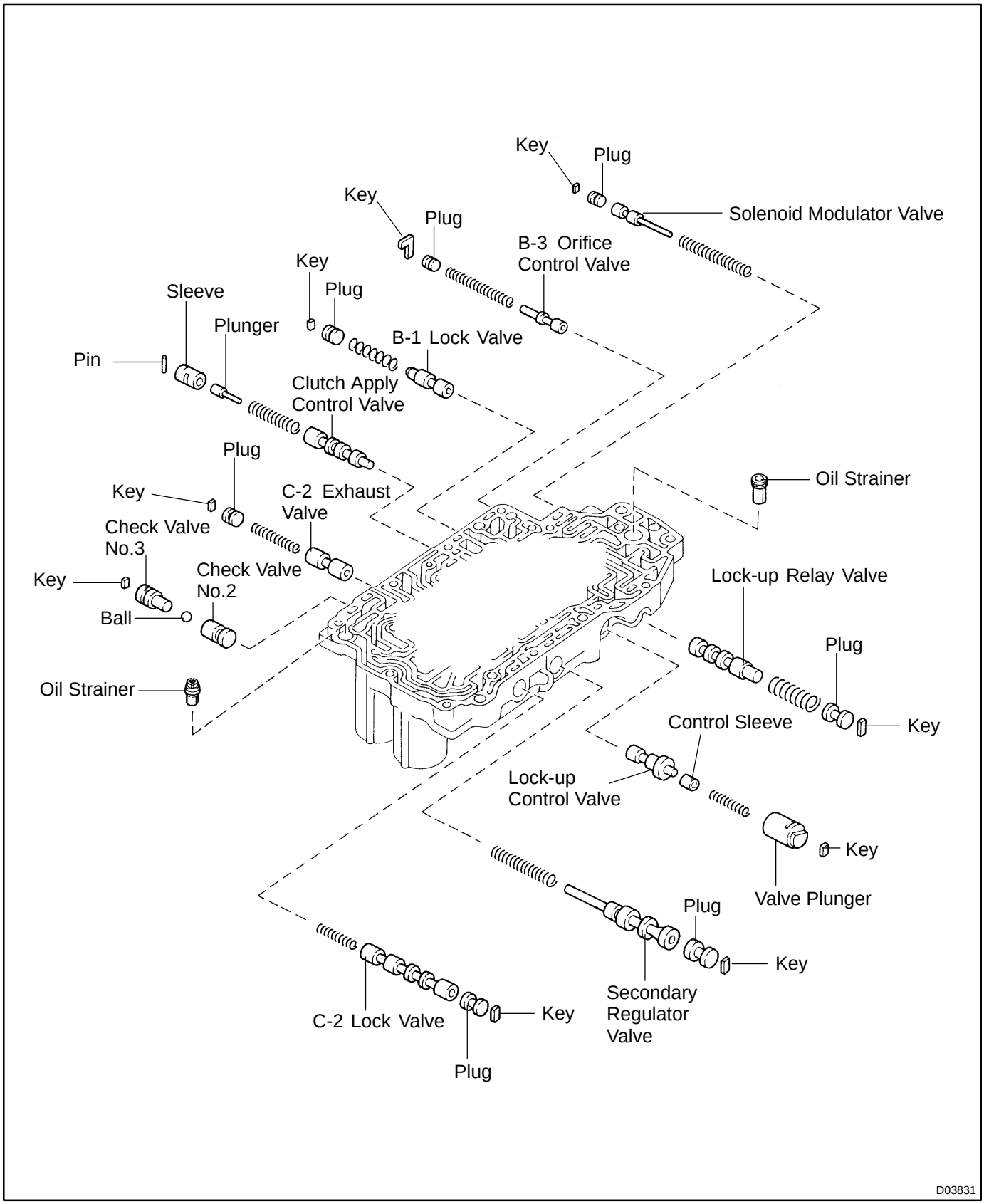
4. CHECK PRIMARY REGULATOR VALVE POSITION
Make sure that the primary regulator valve is positioned in the same place where it was removed.

UPPER VALVE BODY

AX0BA-01

LOCATION

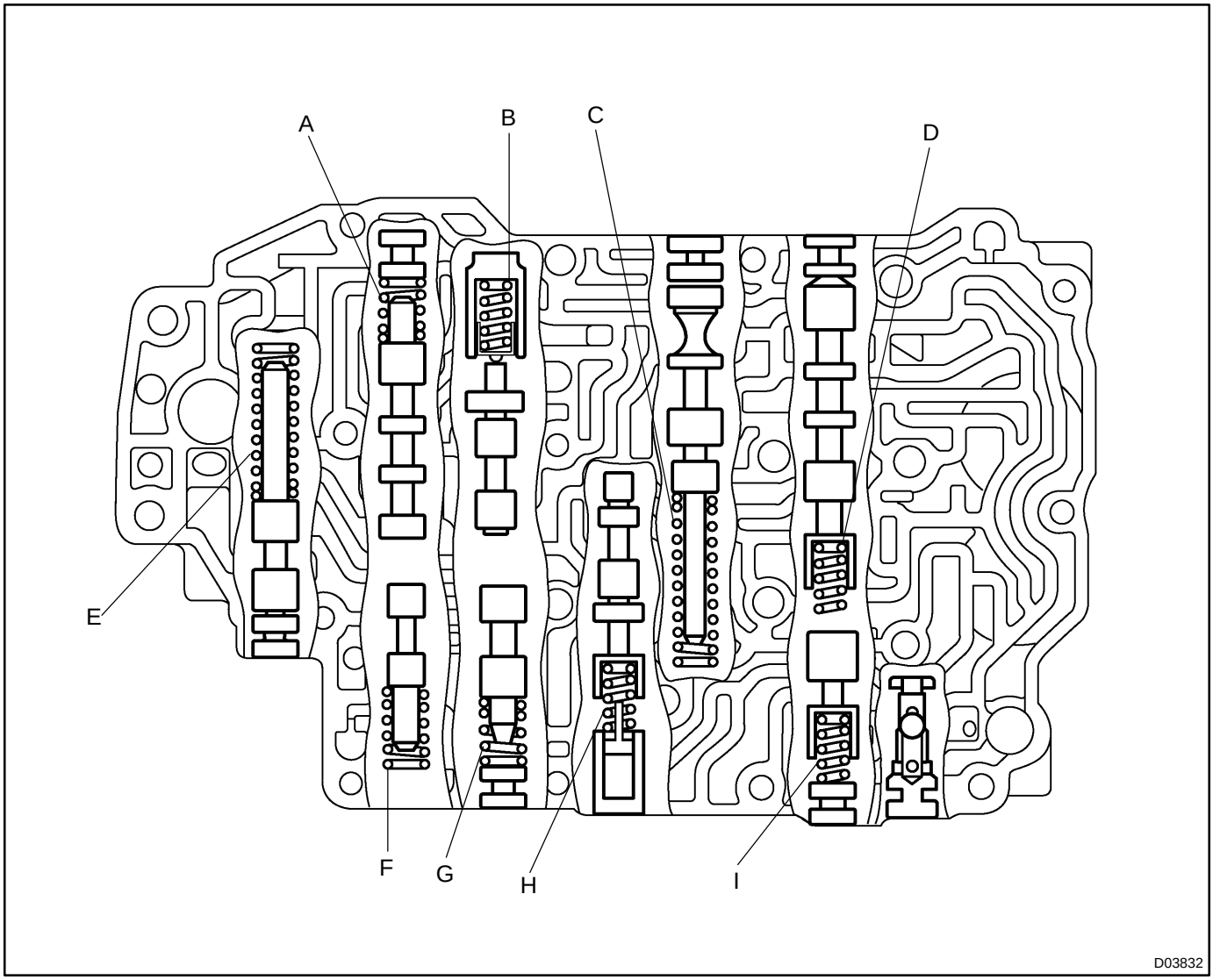
1. COMPONENTS



2. SPRING

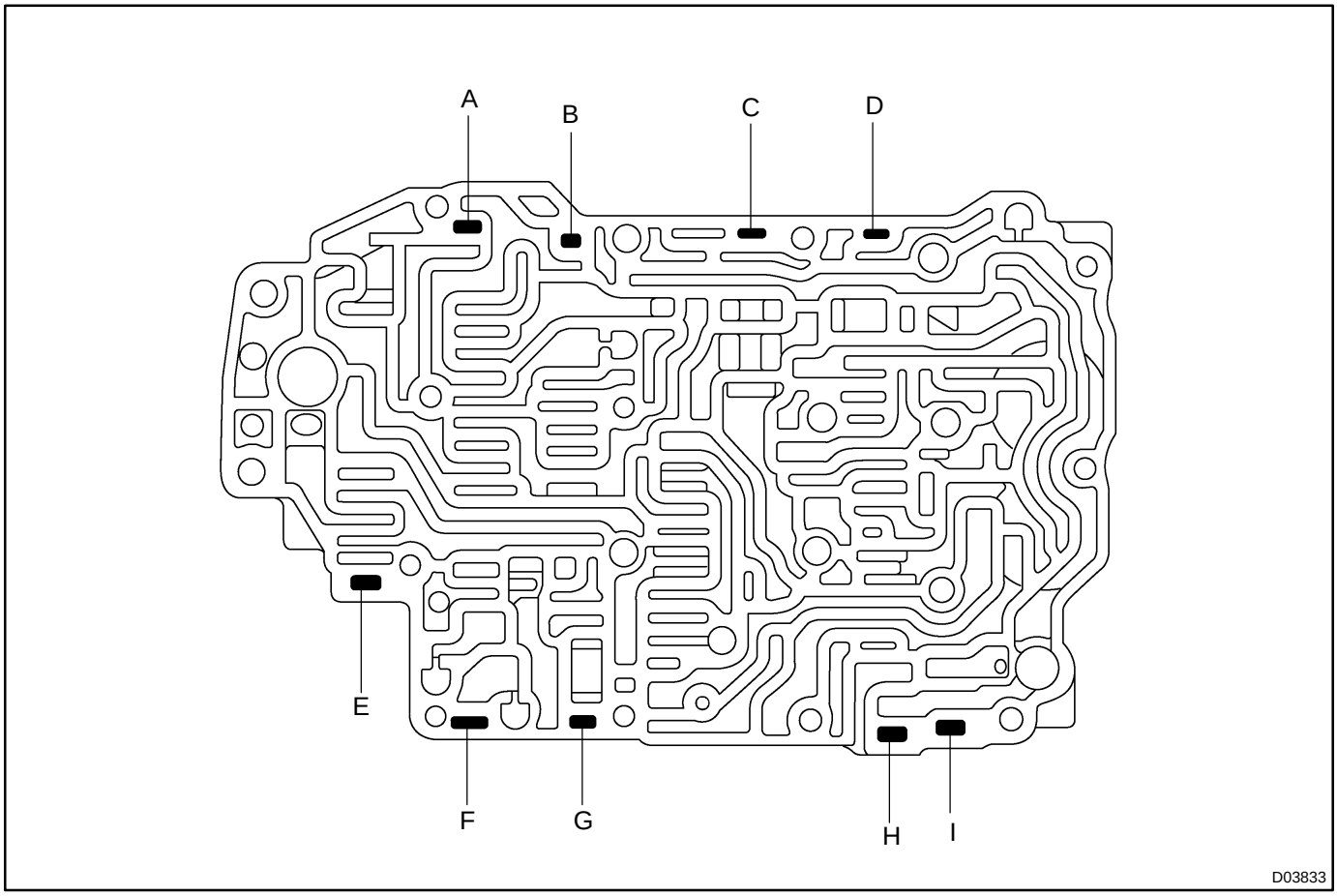
HINT:

During reassembly please refer to the spring specifications below to help you to discriminate between the different springs.



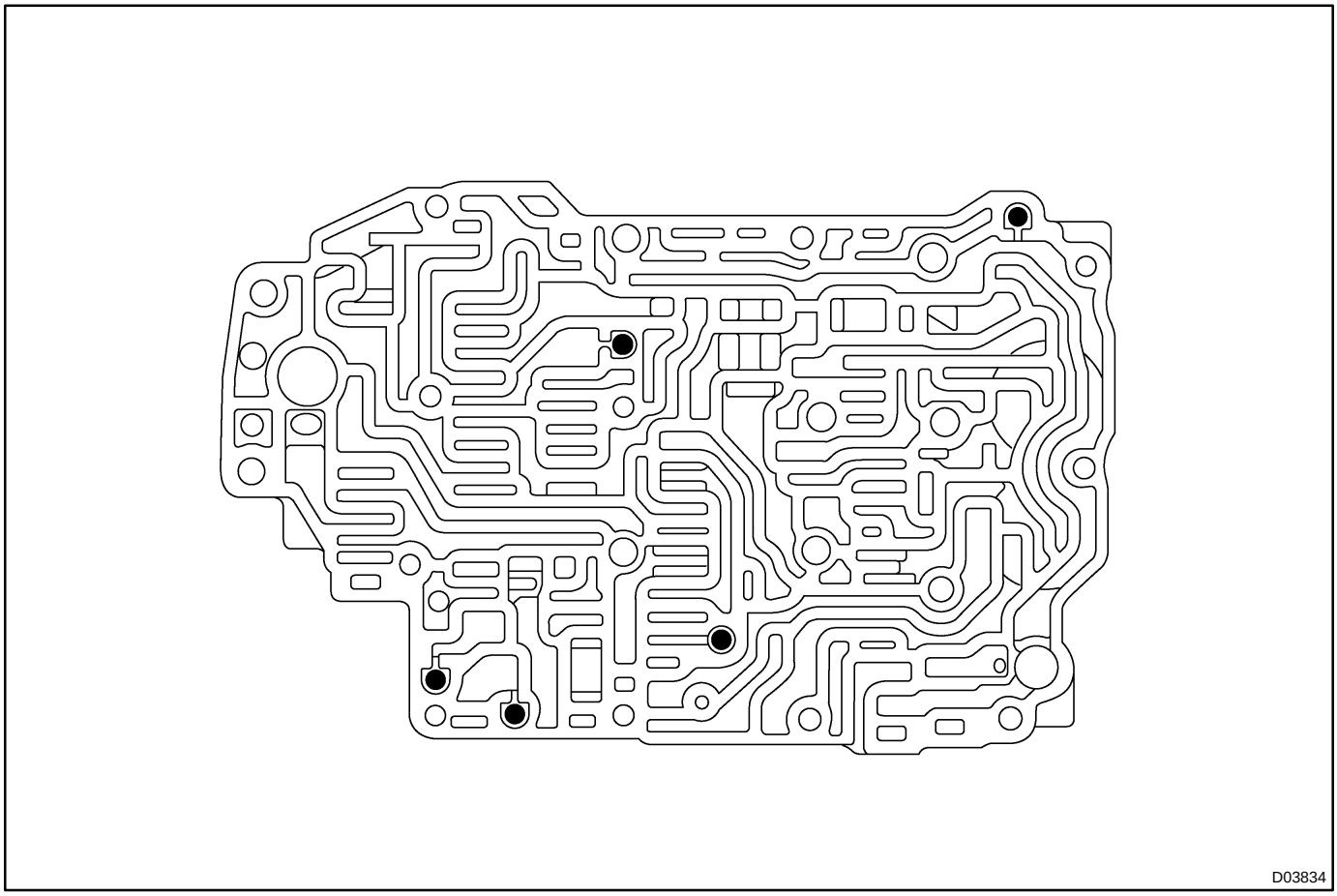
Mark	Name (Color)	Free length / Outer diameter mm (in.)	Total number of coils
A	Rock-up relay valve (None)	29.25 (1.1516) / 9.7 0.382)	10.50
B	Rock-up control valve (Green)	23.95 (0.9429) / 5.4 (0.213)	14.94
C	Secondary regulator valve (Blue)	58.35 (2.2972) / 8.7 (0.343)	20.58
D	C-2 lock valve (Yellow)	33.65 (1.3247) / 7.4 (0.291)	11.82
E	Solenoid modulator valve (Red)	62.40 (2.4567) / 9.8 (0.386)	22.31
F	B-3 orifice control valve (Grey)	62.65 (2.4665) / 7.8 (0.307)	19.60
G	B-1 lock valve (White)	37.40 (1.4724) / 9.8 (0.386)	8.84
H	Clutch apply control valve (Purple)	40.25 (1.5816) / 9.0 (0.354)	13.00
I	C-2 exhaust check valve (Orange)	40.25 (1.5816) / 7.4 (0.291)	17.10

3. KEY



Mark	Retainer	Height / Width / Thickness mm (in.)
A	Lock-up relay valve	10.0 (0.394) / 5.0 (0.197) / 3.2 (0.126)
B	Lock-up control valve	10.0 (0.394) / 5.0 (0.197) / 3.2 (0.126)
C	Secondary regulator valve	8.0 (0.315) / 5.0 (0.197) / 3.2 (0.126)
D	C-2 lock valve	10.0 (0.394) / 5.0 (0.197) / 3.2 (0.126)
E	Solenoid modulator valve	8.0 (0.315) / 5.0 (0.197) / 3.2 (0.126)
F	B-3 orifice control valve	18.5 (0.728) / - / 2.3 (0.091)
G	B-1 lock valve	8.0 (0.315) / 5.0 (0.197) / 3.2 (0.126)
H	C-2 exhaust check valve	8.0 (0.315) / 5.0 (0.197) / 3.2 (0.126)
I	3-way check valve	8.0 (0.315) / 5.0 (0.197) / 3.2 (0.126)

4. CHECK BALL



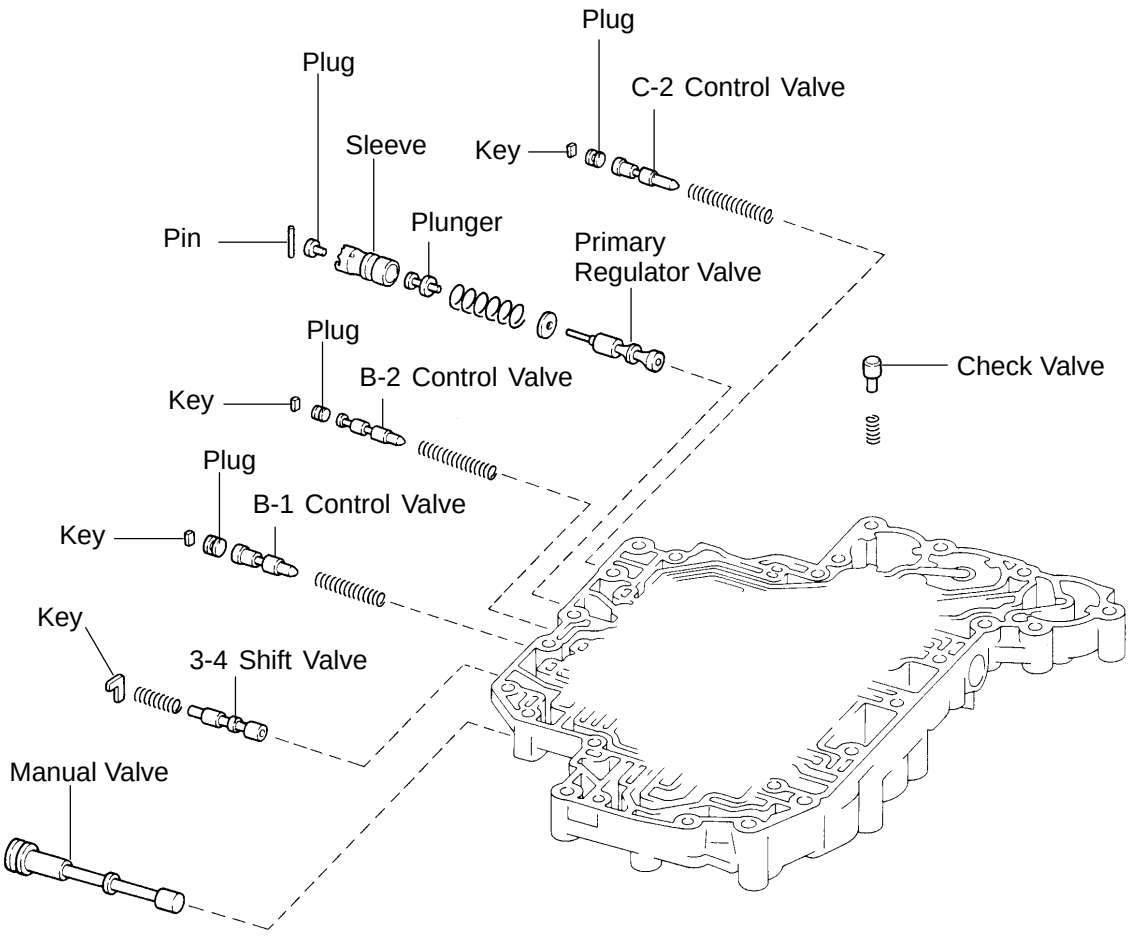
Check ball	mm (in.)	5.5 (0.217)

LOWER VALVE BODY

AX0BB-01

LOCATION

1. COMPONENTS

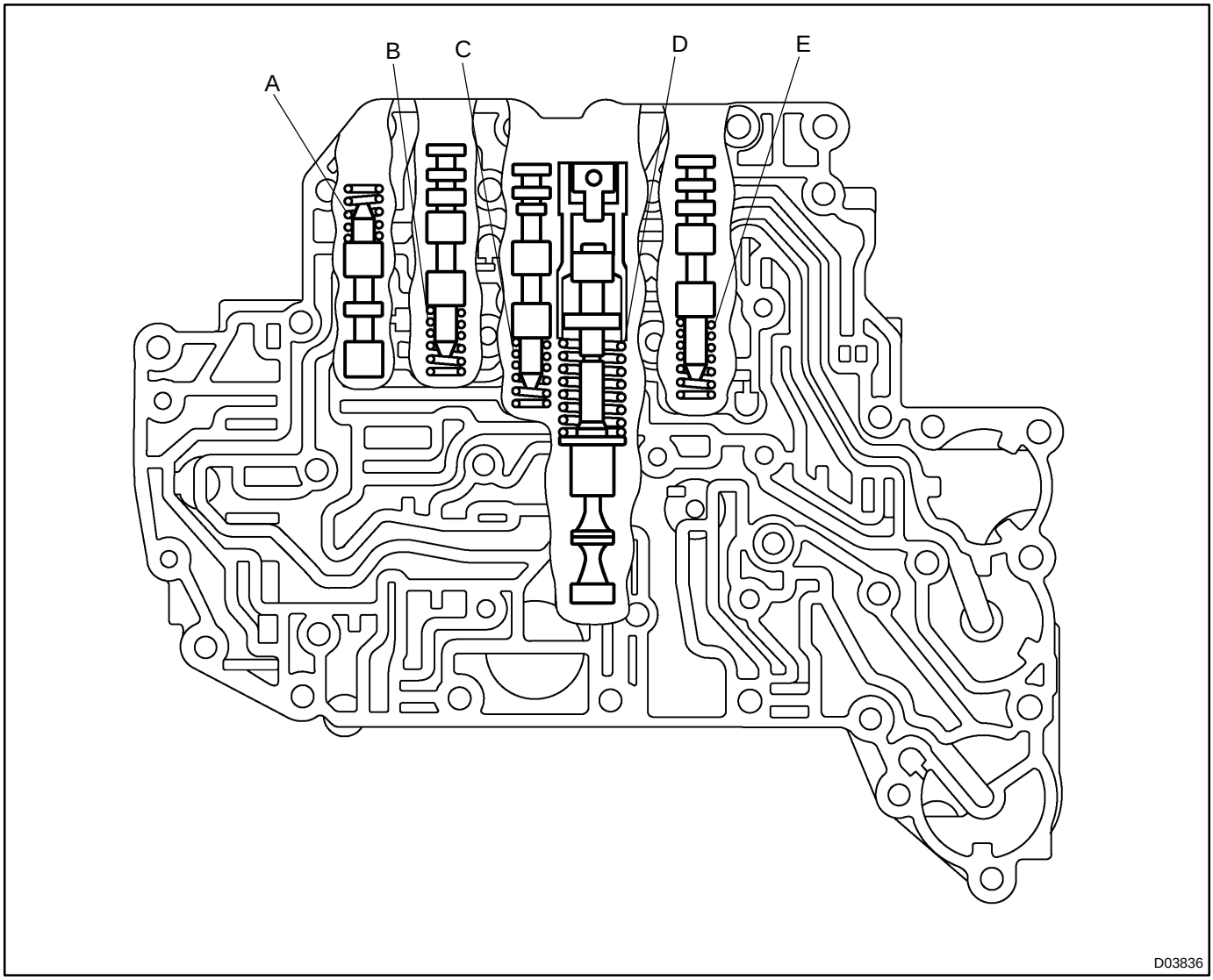


D03835

2. SPRING

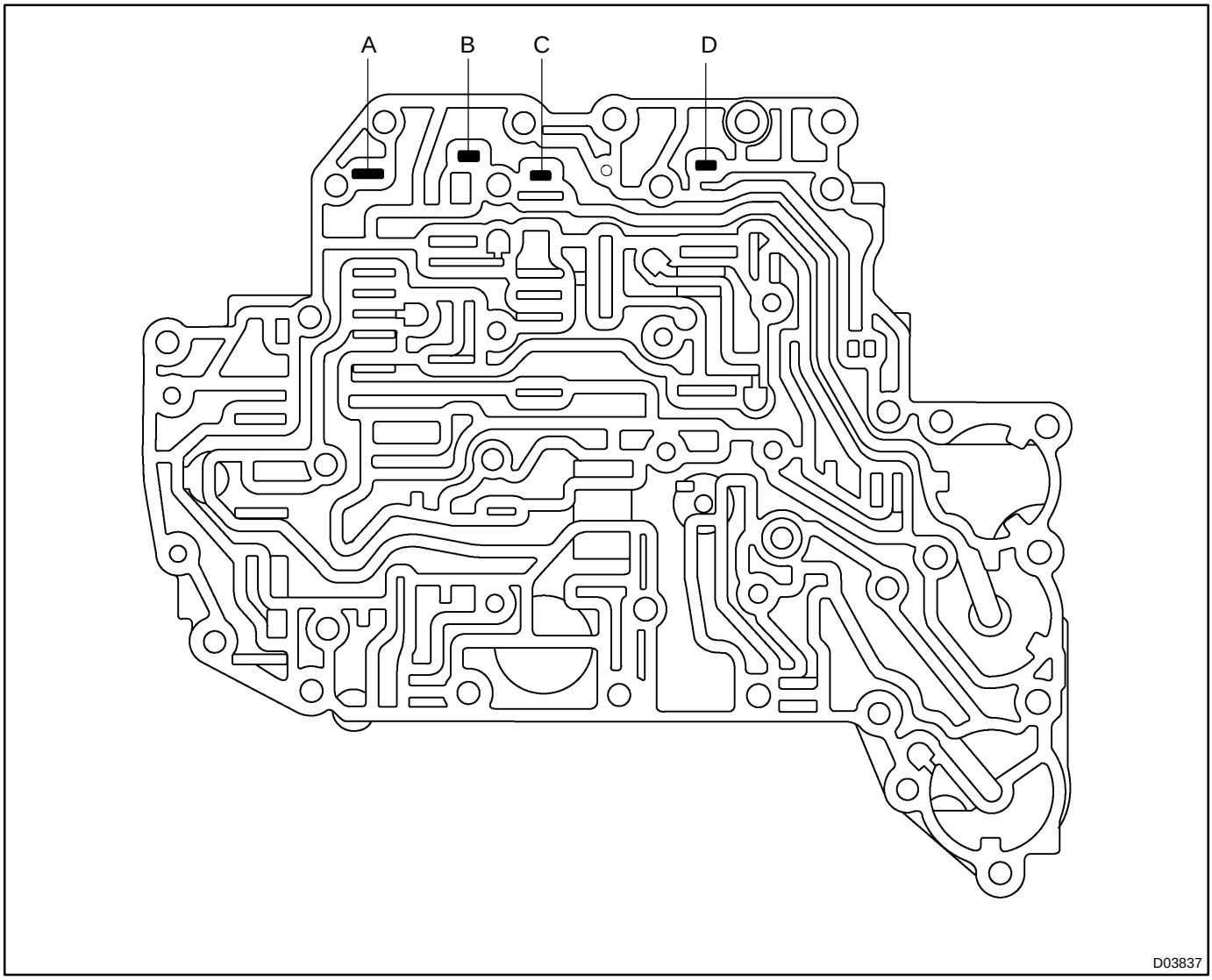
HINT:

During re-assembly please refer to the spring specifications below to help you to discriminate between the different springs:



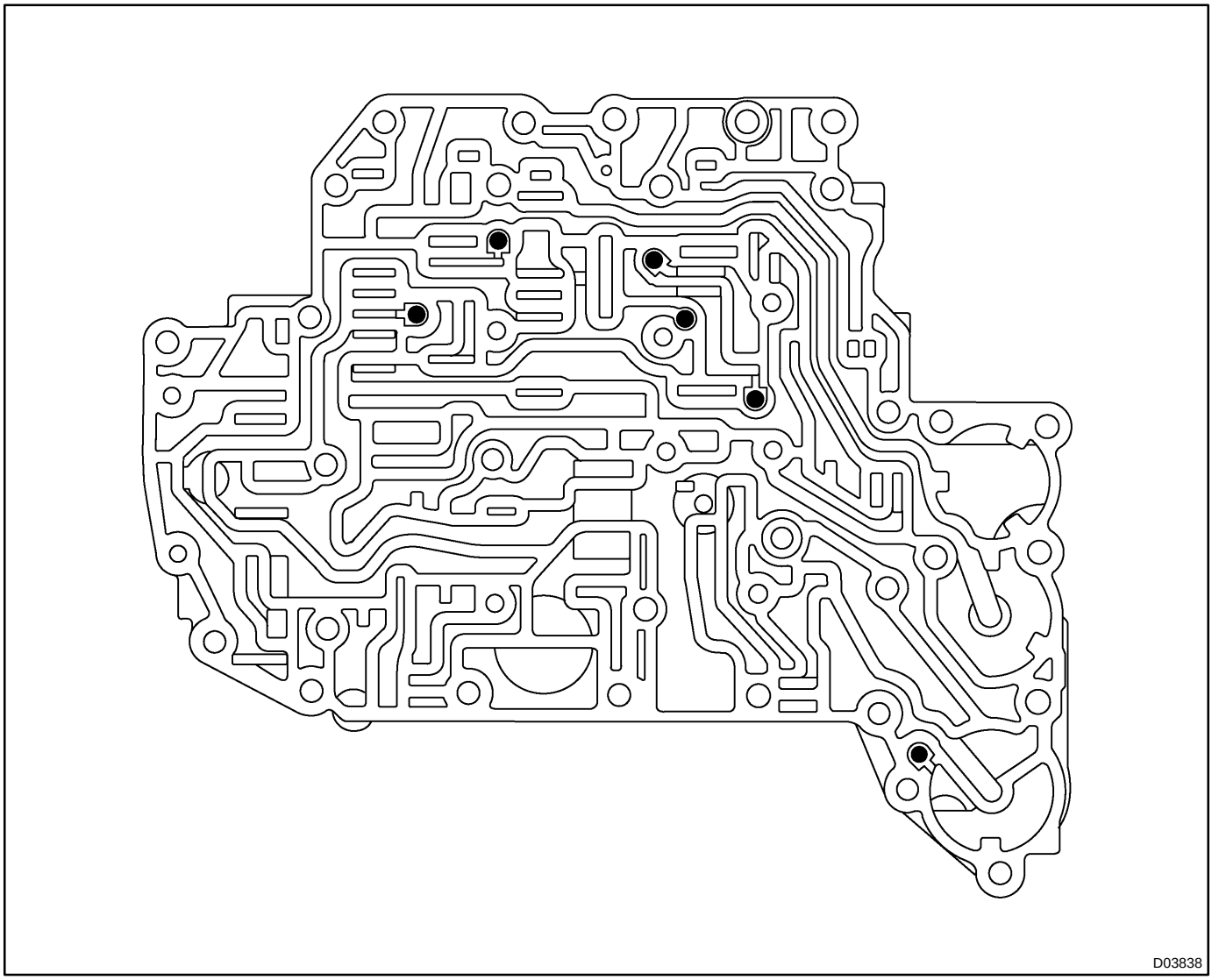
Mark	Name (Color)	Free length / Outer diameter mm (in.)	Total number of coils
A	3-4 shift valve (None)	29.25 (1.1516) / 9.7 (0.382)	10.5
B	B-1 control valve (Green)	48.55 (1.9114) / 9.8 (0.386)	13.43
C	B-2 control valve (Pink)	57.05 (2.2461) / 9.8 (0.386)	15.34
D	Primary regulator valve (Orange)	57.55 (2.2657) / 19.9 (0.783)	7.87
E	C-2 control valve (Brown)	34.20 (1.3465) / 9.9 (0.390)	8.79

3. KEY



Mark	Retainer	Height / Width / Thickness mm (in.)
A	3-4 shift valve	25.5 (1.004) / - / 2.3 (0.091)
B	B-1 control valve	14.5 (0.571) / 5.0 (0.197) / 3.2 (0.126)
C	B-2 control valve	14.5 (0.571) / 5.0 (0.197) / 3.2 (0.126)
E	C-2 control valve	14.5 (0.571) / 5.0 (0.197) / 3.2 (0.126)

4. Check ball

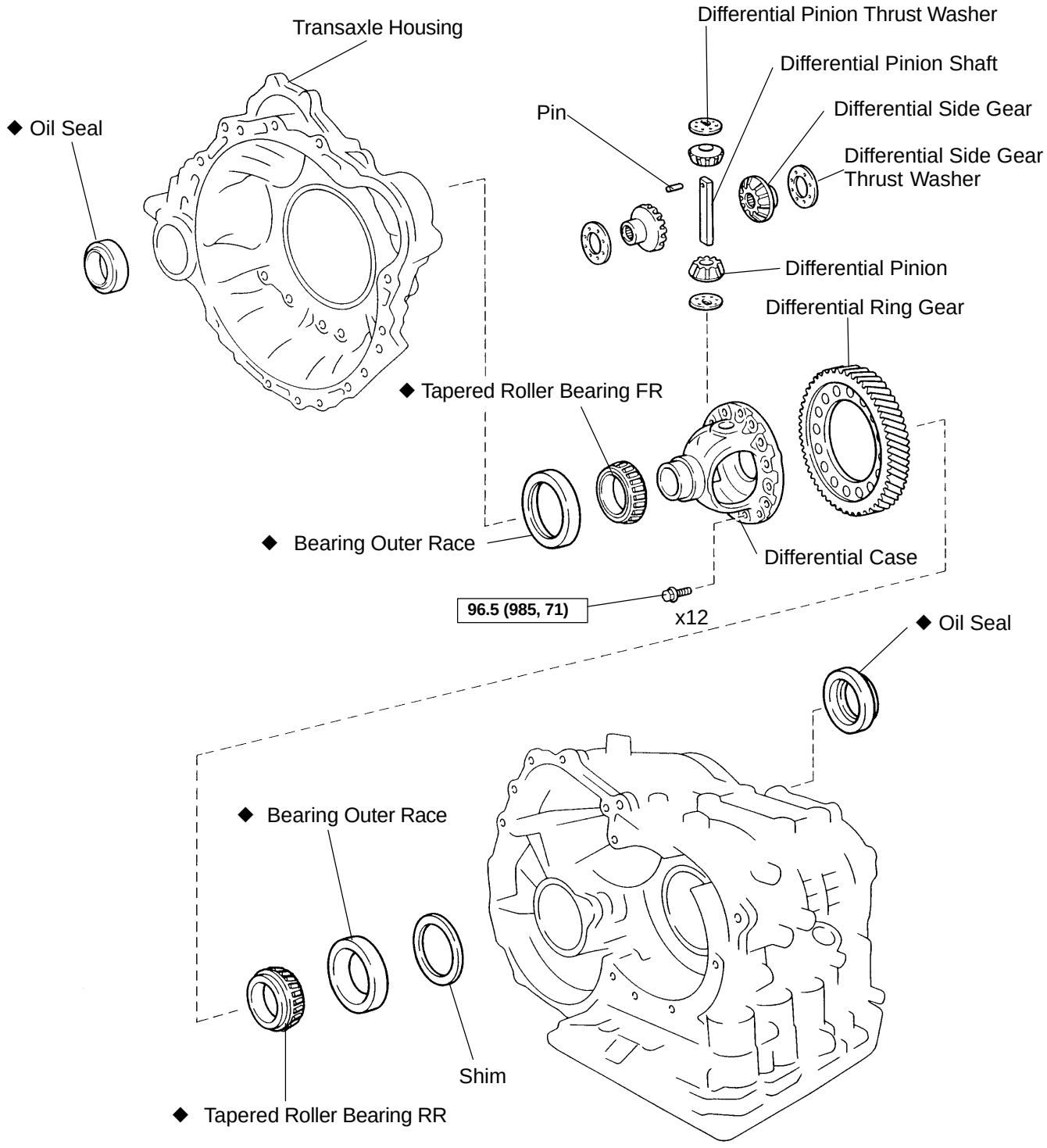


Check ball	mm (in.)	5.5 (0.217)

DIFFERENTIAL CASE

COMPONENTS

AX0BJ-01



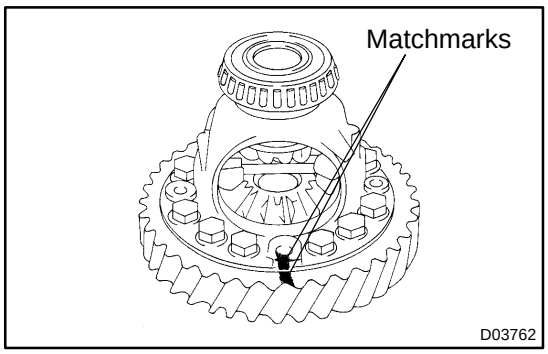
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

D03761

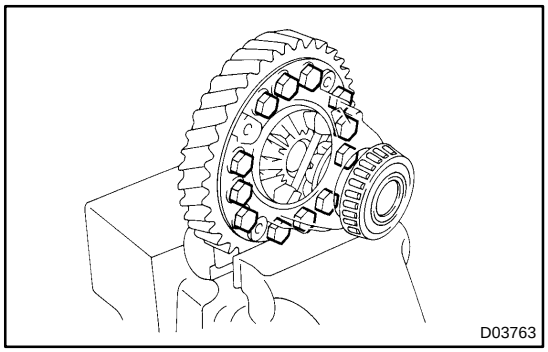
AX0BK-01

DISASSEMBLY

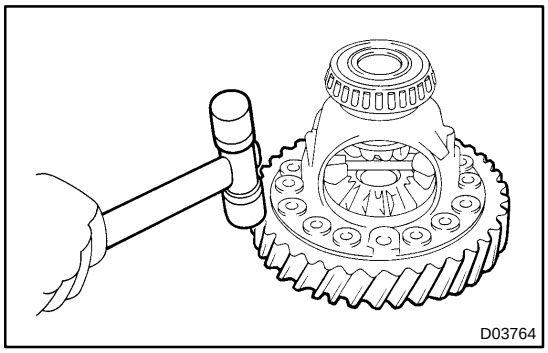


1. REMOVE RING GEAR

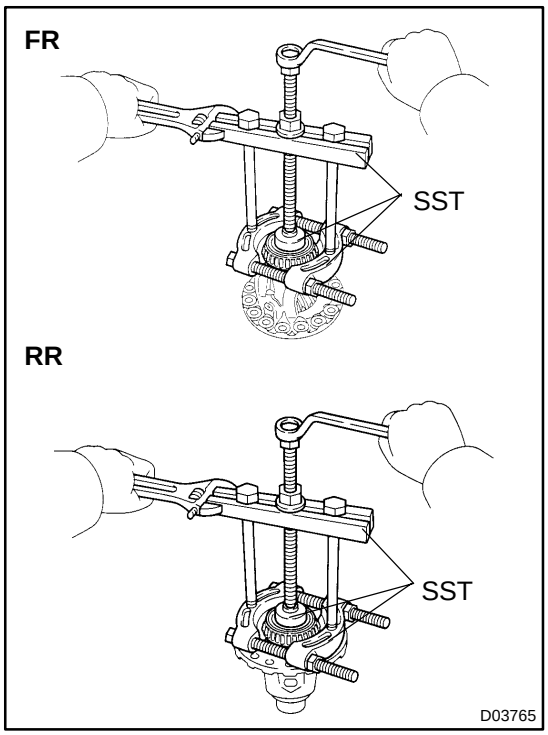
(a) Place the matchmarks on the ring gear and differential case.



(b) Remove the 12 bolts.



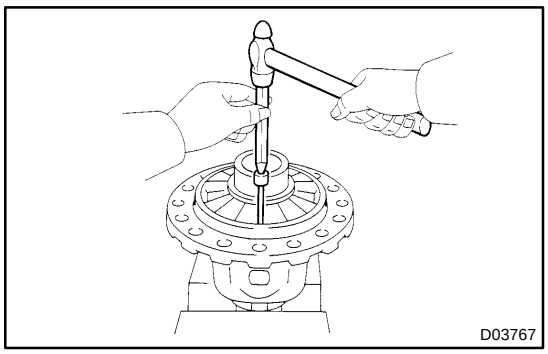
(c) Using a plastic hammer, tap on the ring gear to remove it from the case.



2. REMOVE TAPERED ROLLER BEARING

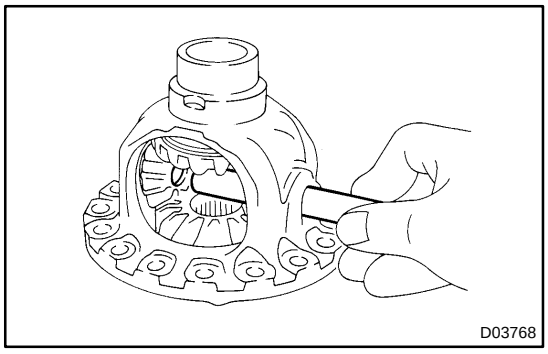
Using SST and a press, remove the tapered roller bearing FR and RR.

SST 09950-00020, 09950-00030, 09950-60011 (09951-00480, 09951-00500)

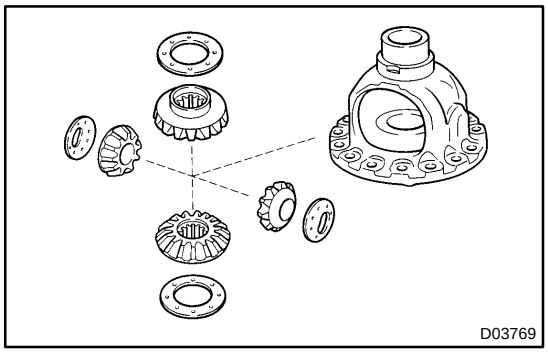


3. DISASSEMBLY DIFFERENTIAL CASE

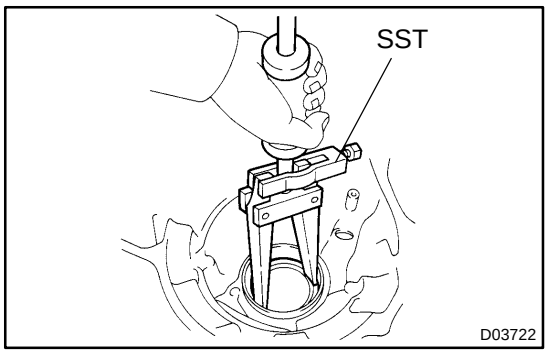
(a) Using a pin punch and hammer, drive out the pin from the ring gear side.



(b) Remove the differential pinion shaft from the case.



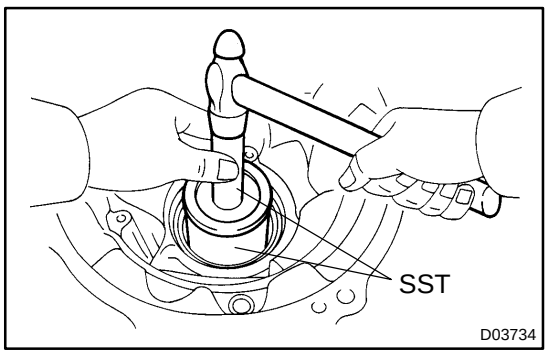
(c) Remove the 2 differential pinions, 2 differential side gears, 2 differential pinion thrust washers and 2 differential side gear thrust washers.



4. REMOVE SIDE BEARING OUTER RACE OF TRANSAXLE HOUSING

Using SST, remove outer race and adjust shim.

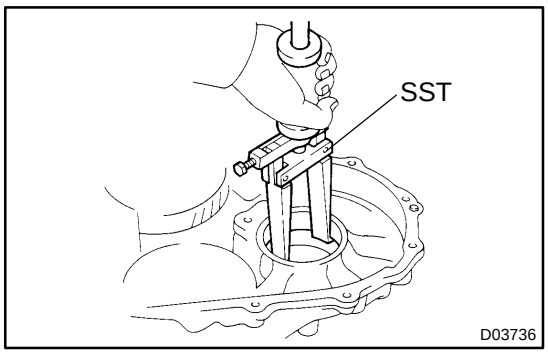
SST 09308-00010



5. REMOVE OIL SEAL OF TRANSAXLE HOUSING

Using SST and a hammer, drive out the oil seal.

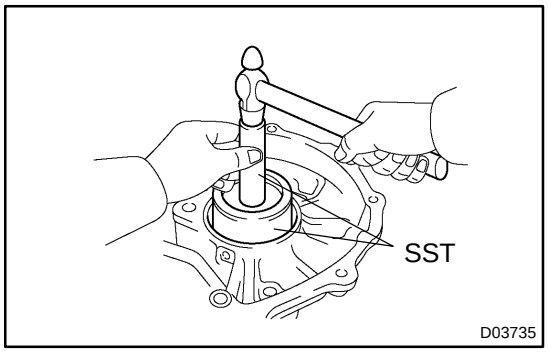
SST 09649-17010, 09950-70010 (09951-07100)



6. REMOVE SIDE BEARING OUTER RACE OF TRANSAXLE CASE

Using SST, remove the outer race and shim.

SST 09308-00010



7. REMOVE OIL SEAL OF TRANSAXLE CASE

Using SST and a hammer, drive out the oil seal.

SST 09649-17010, 09950-70010 (09951-07100)