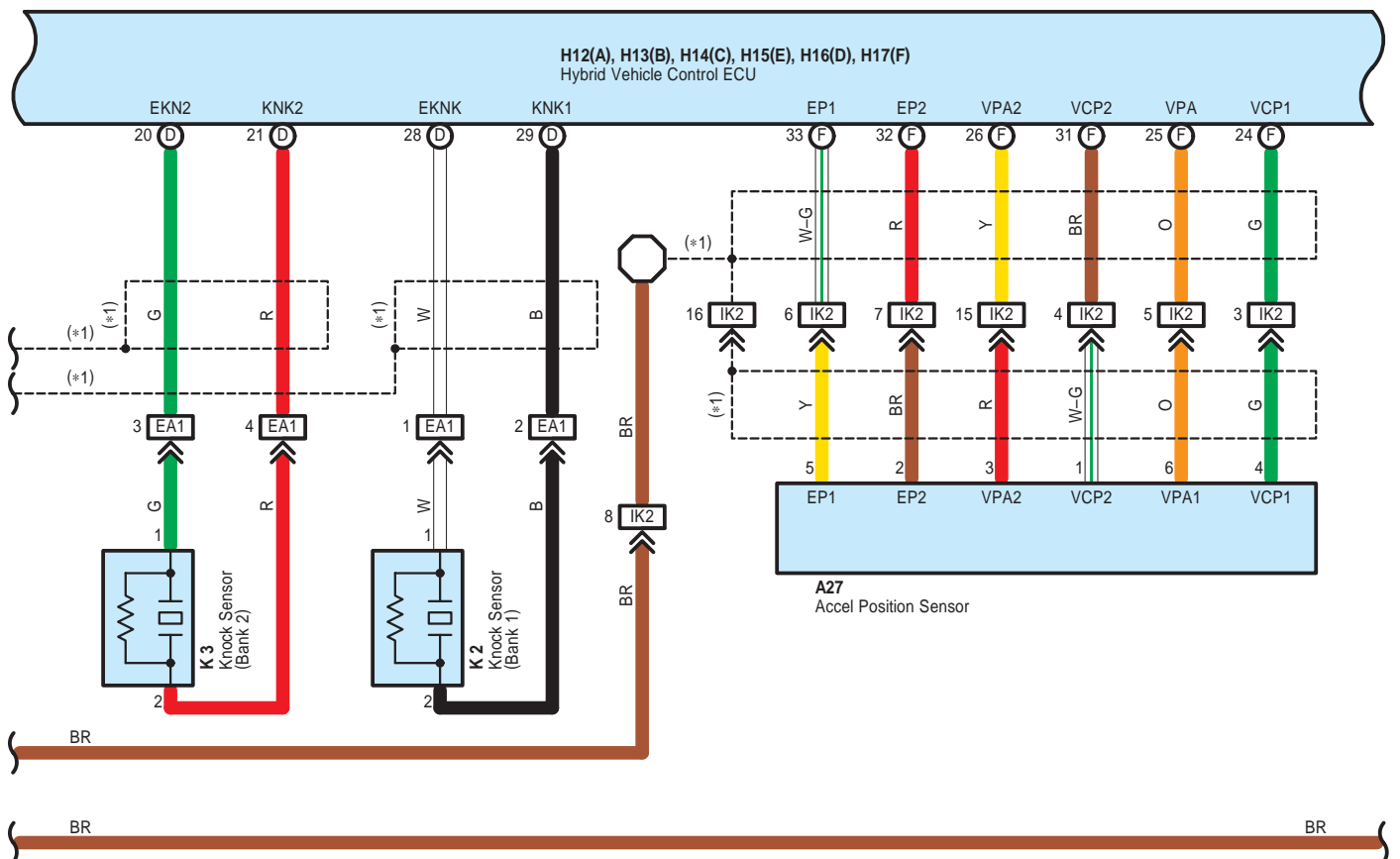
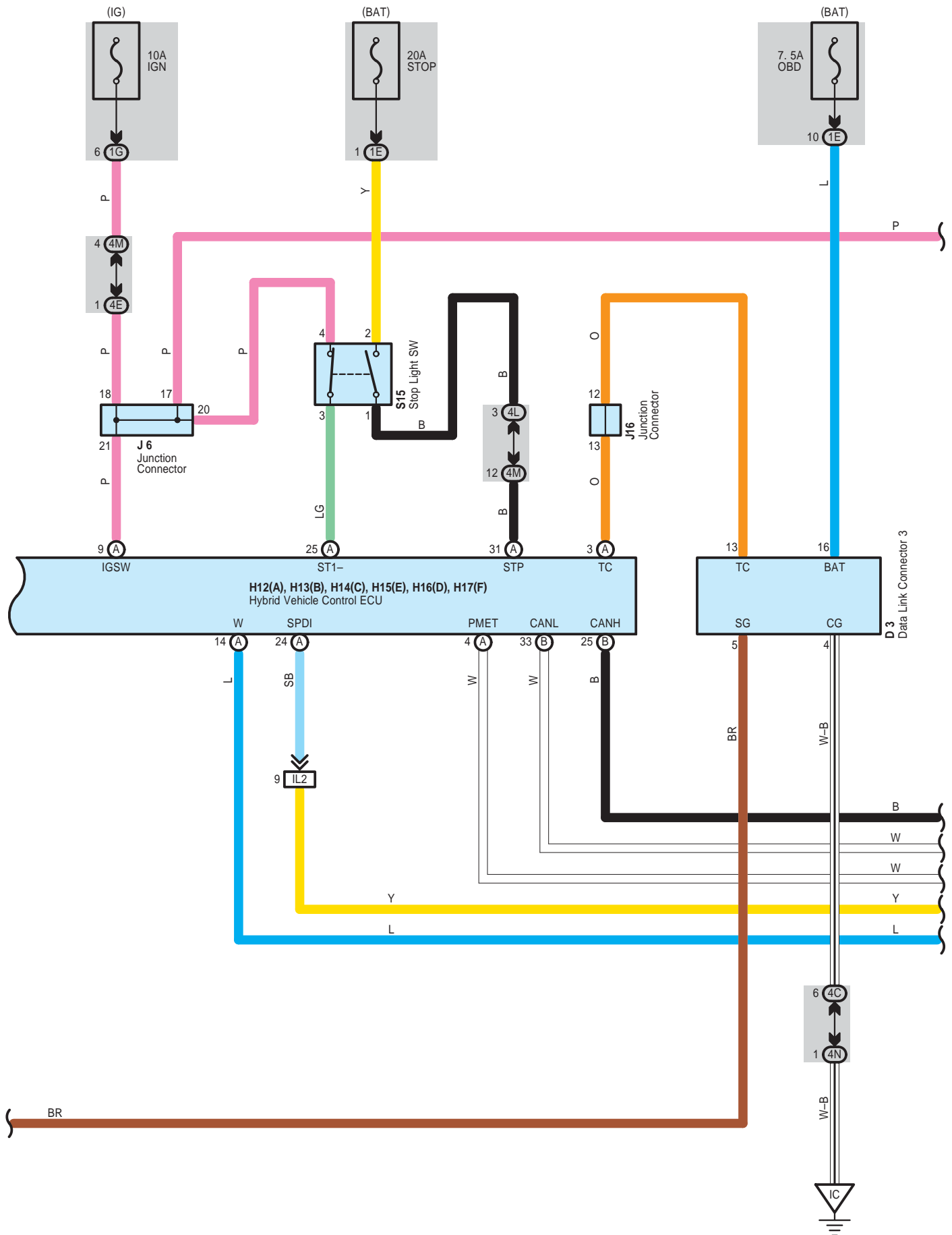
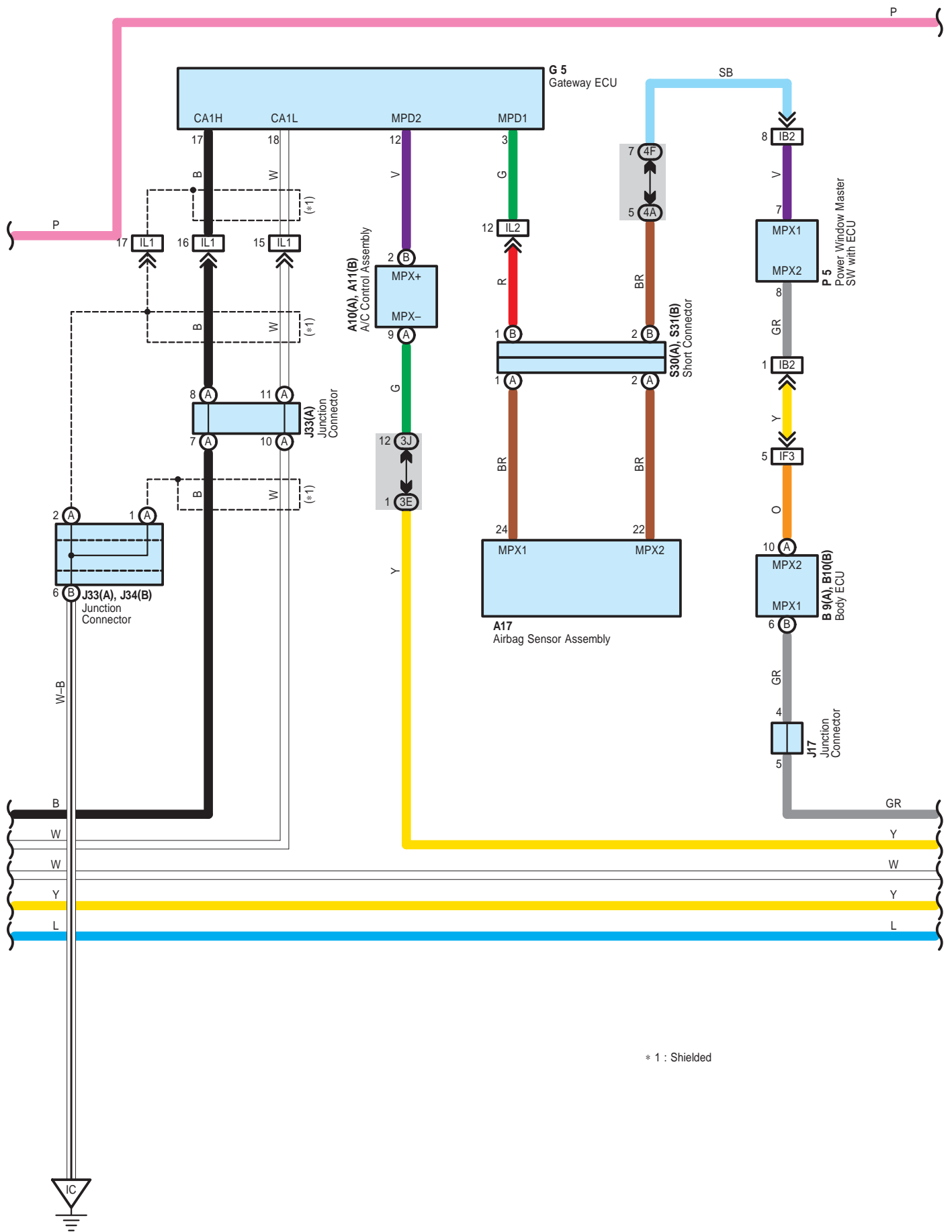


* 1 : Shielded



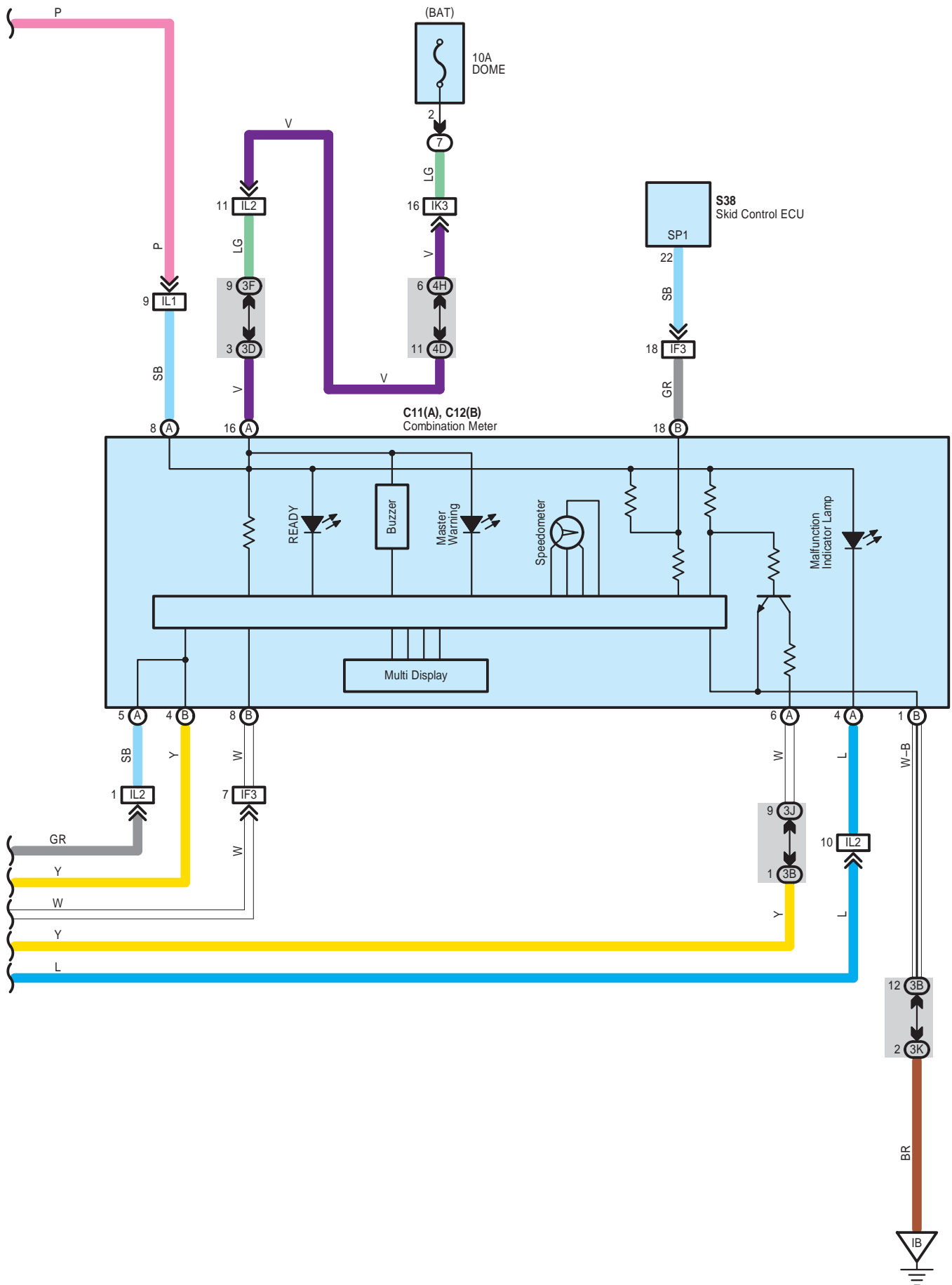
Engine Control





* 1 : Shielded

Engine Control



System Outline

The engine control system utilizes a microcomputer and maintains overall control of the engine, transmission etc. An outline of the engine control is given here.

1. Input Signals

- (1) Engine coolant temp. signal circuit
The engine coolant temp. sensor detects the engine coolant temp. and has a built-in thermistor with a resistance, which varies according to the engine coolant temp. The engine coolant temp. which is input into TERMINAL THW of the hybrid vehicle control ECU as a control signal.
- (2) Intake air temp. signal circuit
The intake air temp. sensor is installed in the mass air flow meter and detects the intake air temp. which is input as a control signal to TERMINAL THA of the hybrid vehicle control ECU.
- (3) Vehicle speed signal circuit
The vehicle speed signal is input from the ABS speed sensor to skid control ECU, and are sent to the hybrid vehicle control ECU through communication control.
- (4) RPM signal circuit
Camshaft position is detected by the VVT sensors and its signal is input to TERMINALS VV1+ and VV2+ of the hybrid vehicle control ECU as a control signal. Also, engine RPM is detected by the crankshaft position sensor and is input as a control signal to TERMINAL NE+.
- (5) Throttle position signal circuit
The throttle control motor and sensor detects the throttle valve opening angle as a control signal, which is input into TERMINALS VTA1 and VTA2 of the hybrid vehicle control ECU.
- (6) Battery signal circuit
Voltage is constantly applied to TERMINAL BATT of the hybrid vehicle control ECU. With the ignition SW turned on, the voltage for hybrid vehicle control ECU start-up power supply is applied to TERMINALS +B1 and +B2 of the hybrid vehicle control ECU through the IGCT NO.2 fuse.
- (7) Intake air volume signal circuit
Intake air volume is detected by the mass air flow meter and the signal is input to TERMINAL VG of the hybrid vehicle control ECU as a control signal.
- (8) Stop light SW signal circuit
The stop light SW is used to detect whether the vehicle is braking or not and the signal is input into TERMINAL STP of the hybrid vehicle control ECU as a control signal.
- (9) Engine knock signal circuit
Engine knocking is detected by knock sensors and the signal is input into TERMINALS KNK1 and KNK2 as a control signal.
- (10) Air fuel ration signal circuit
The air fuel ration is detected and input as a control signal into TERMINALS A1A+ and A2A+ of the hybrid vehicle control ECU.
- (11) Oxygen sensor signal circuit
The oxygen density in the exhaust gases is detected and input as a control signal into TERMINALS OX1B and OX2B of the hybrid vehicle control ECU.
To maintain stable detection performance by the heated oxygen sensor, a heater is used for warming the sensor. The heater is also controlled by the hybrid vehicle control ECU (HT1B and HT2B).
- (12) Fuel cut in a collision
The system receives the collision signal from airbag sensor assembly in the vehicle has a collision and stops the fuel pump operation on the side of the hybrid vehicle control ECU.

Engine Control

2. Control System

* SFI system

The SFI system monitors the engine condition through the signals input from each sensor (Input signals from (1) to (11) etc.) to the hybrid vehicle control ECU. And the control signal is output to TERMINALS #10, #20, #30, #40, #50 and #60 of the hybrid vehicle control ECU to operate the injector (Inject the fuel). The SFI system controls the fuel injection operation by the hybrid vehicle control ECU in response to the driving conditions.

* ESA system

The ESA system monitors the engine condition through the signals input to the hybrid vehicle control ECU from each sensor (Input signals from (1) to (11) etc.). The best ignition timing is decided according to this data and the memorized data in the hybrid vehicle control ECU and the control signal is output to TERMINALS IGT1, IGT2, IGT3, IGT4, IGT5 and IGT6. This signal controls the igniter to provide the best ignition timing for the driving conditions.

3. Diagnosis System

With the diagnosis system, when there is a malfunction in the hybrid vehicle control ECU signal system, the malfunctioning system is recorded in the memory. The malfunctioning system can be found by reading the code displayed by the malfunction indicator lamp.

4. Fail-Safe System

When a malfunction has occurred in any system, if there is a possibility of engine trouble being caused by continued control based on the signals from that system, the fail-safe system either controls the system by using data (Standard values) recorded in the hybrid vehicle control ECU memory or else stops the engine.

○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
A1	42	H15	E 44	K2	43
A6	42	H16	D 44	K3	43
A7	42	H17	F 44	L2	46
A10	A 44	H20	42	M1	43
A11	B 44	I8	43	O1	43
A17	44	I9	43	P5	46
A27	44	I10	43	S15	45
B9	A 44	I11	43	S28	A 45
B10	B 44	I12	43	S29	B 45
C3	42	I13	43	S30	A 45
C4	42	I15	44	S31	B 45
C7	42	J2	43	S34	43
C11	A 44	J6	45	S38	45
C12	B 44	J13	46	T13	43
D3	44	J16	45	T14	45
E2	42	J17	45	V4	43
F12	46	J26	45	V6	43
G5	44	J33	A 45	V7	43
H10	44	J34	B 45	V11	47
H12	A 44	J35	45	V16	47
H13	B 44	J36	A 45		
H14	C 44	J37	B 45		

○ : Relay Blocks

Code	See Page	Relay Blocks (Relay Block Location)
2	25	R/B No.2 (Engine Compartment Left)
3	26	R/B No.3 (Engine Compartment Left)
4	27	R/B No.4 (Engine Compartment Left)
7	24	Fusible Link Block (Engine Compartment Left)

**: Junction Block and Wire Harness Connector**

Code	See Page	Junction Block and Wire Harness (Connector Location)
1E	31	Cowl Wire and Instrument Panel J/B (Lower Finish Panel)
1G		
3B	34	Instrument Panel Wire and J/B No.3 (Behind the Instrument Panel Center)
3D		
3E		
3F		
3J	35	
3K		
4A	39	Cowl Wire and J/B No.4 (Right Side of Glove Box)
4C		
4D		
4E		
4F		
4H		
4L	38	
4M		
4N		

**: Connector Joining Wire Harness and Wire Harness**

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EA1	52	Engine Wire and Sensor Wire (Right Side of Cylinder Head)
EB1	52	Engine Wire and Engine Room Main Wire (Front Side of Engine Room R/B No.4)
EB2		
IA2	54	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IB2	54	Front Door LH Wire and Cowl Wire (Left Kick Panel)
IC1	54	Engine Room Main Wire and Cowl Wire (Left Cowl Side Panel)
IC3		
IC4		
IC5		
IF3	54	Instrument Panel Wire and Cowl Wire (Right Side of Instrument Panel J/B)
IK2	55	Engine Room Main Wire and Cowl Wire (Right Cowl Side Panel)
IK3		
IL1	55	Instrument Panel Wire and Cowl Wire (Right Cowl Side Panel)
IL2		
IM1	55	Engine Wire and Cowl Wire (Right Kick Panel)
IN1	55	Front Door RH Wire and Cowl Wire (Right Kick Panel)
IS1	55	Floor No.2 Wire and Cowl Wire (Left Kick Panel)
IT1	55	Floor No.2 Wire and Cowl Wire (Under the Shift Lever)
BN1	56	Fuel Tank Wire and Floor No.2 Wire (Front Side of Rear Quarter Wheel House LH)
BO1	56	Floor No.2 Wire and Fuel Tank Wire (Front Side of Rear Quarter Wheel House LH)

**: Ground Points**

Code	See Page	Ground Points Location
EH	52	Under the Left Headlight
EJ	52	Right Side of the Cylinder Head
EN	52	Left Side of the Cylinder Head
IB	54	Right Instrument Panel Brace
IC	54	Right Cowl Side Panel
BC	56	Left Side of Rear Cross Member