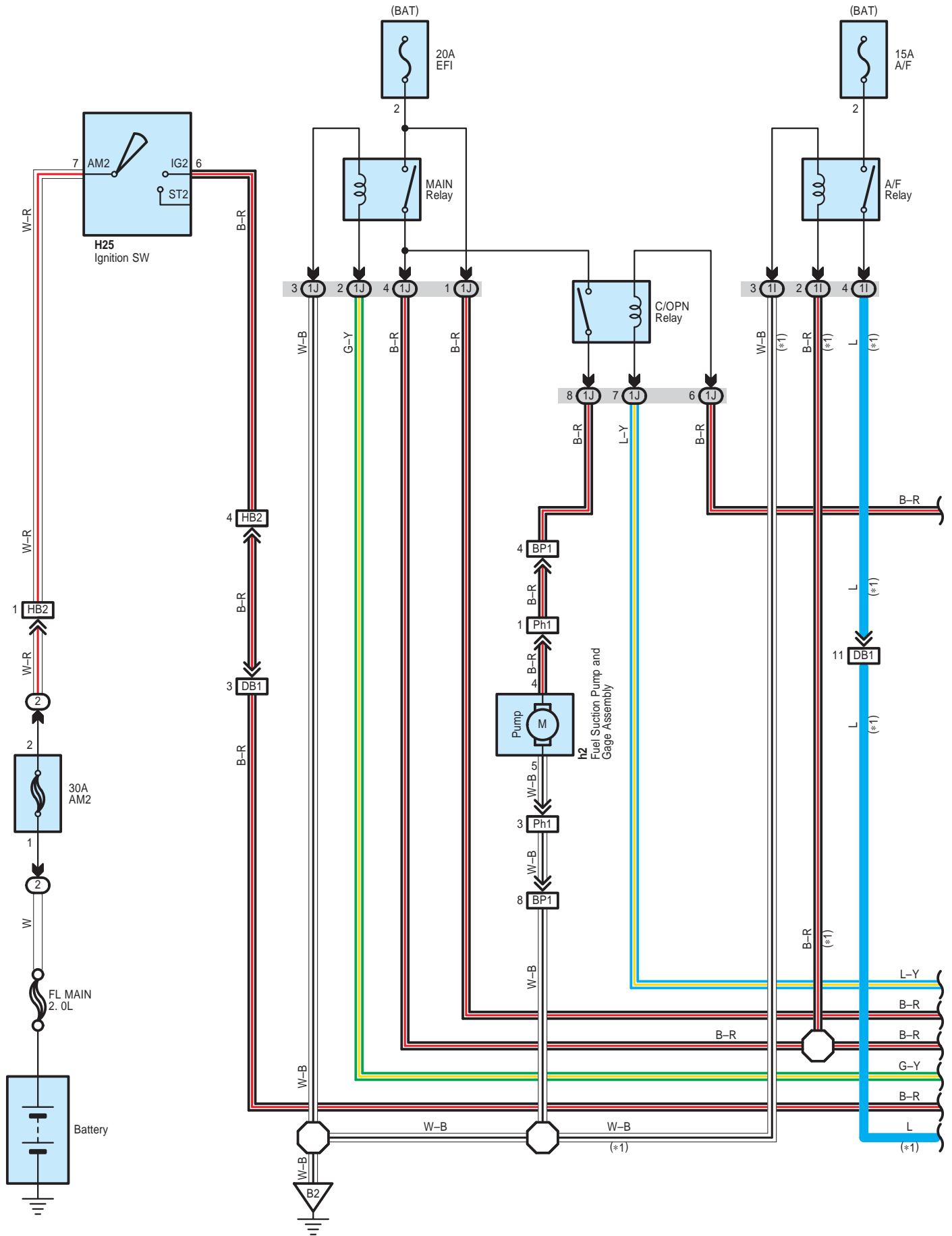
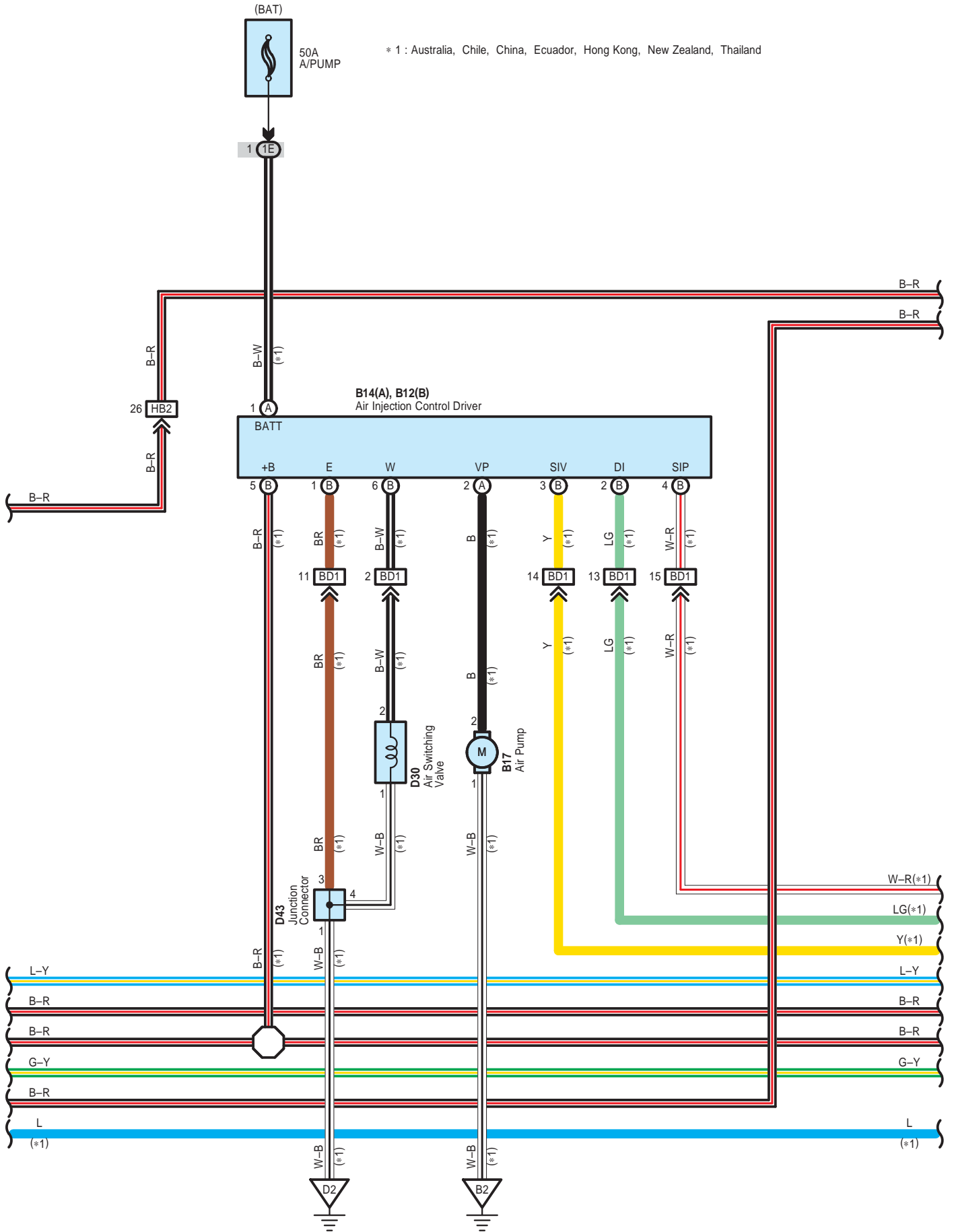


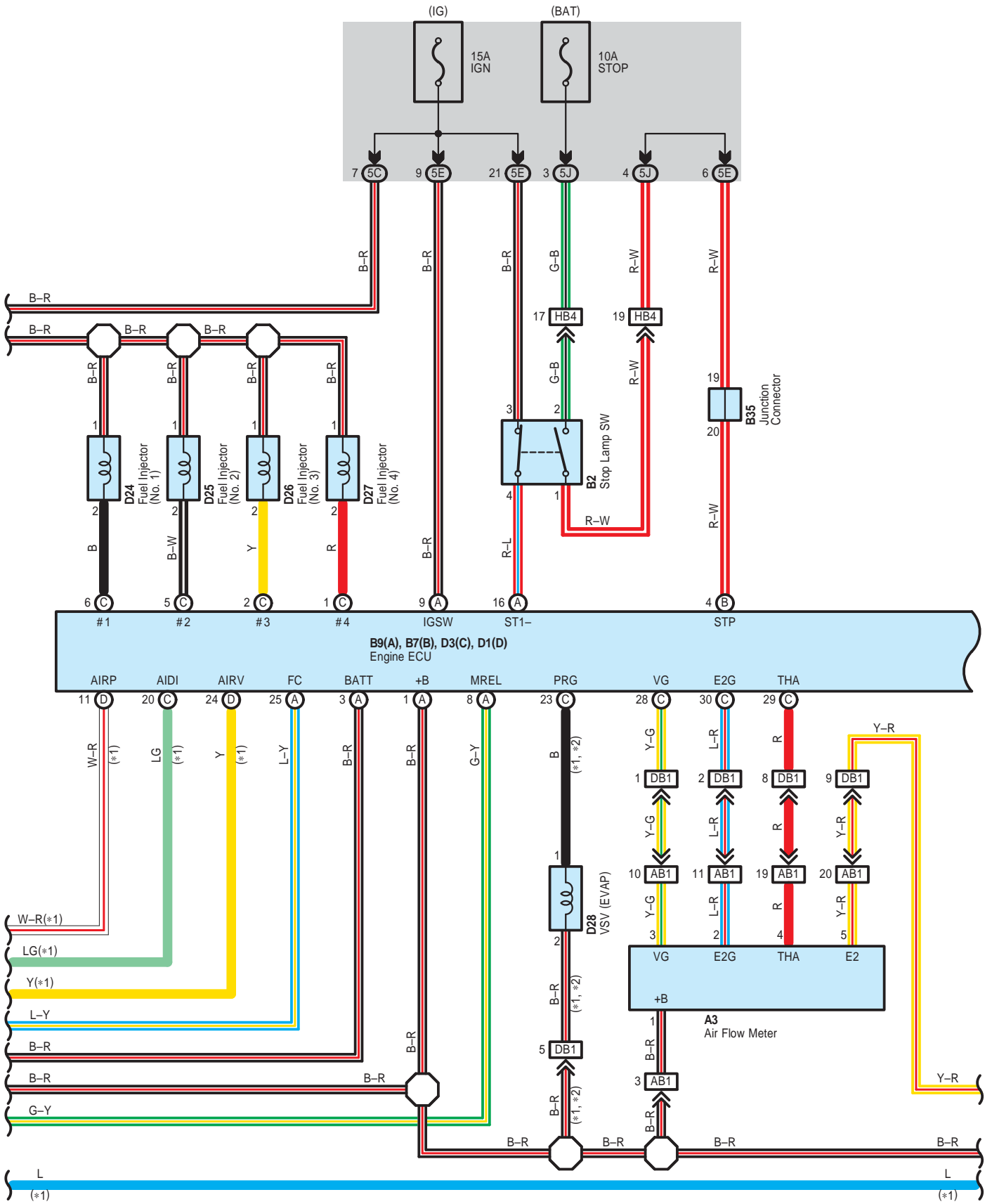
# Engine Control (2TR-FE)

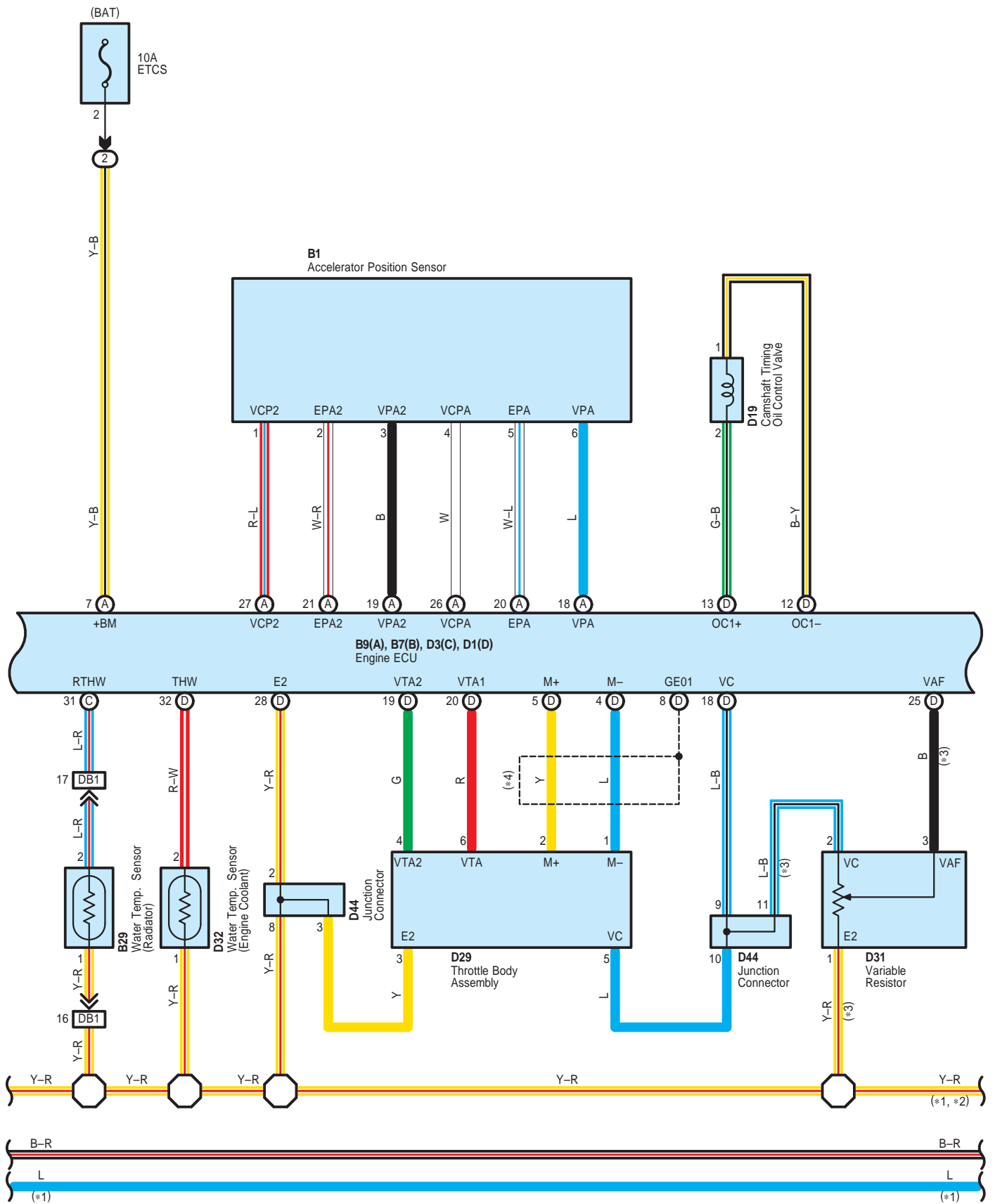


\* 1 : Australia, Chile, China, Ecuador, Hong Kong, New Zealand, Thailand



# Engine Control (2TR-FE)

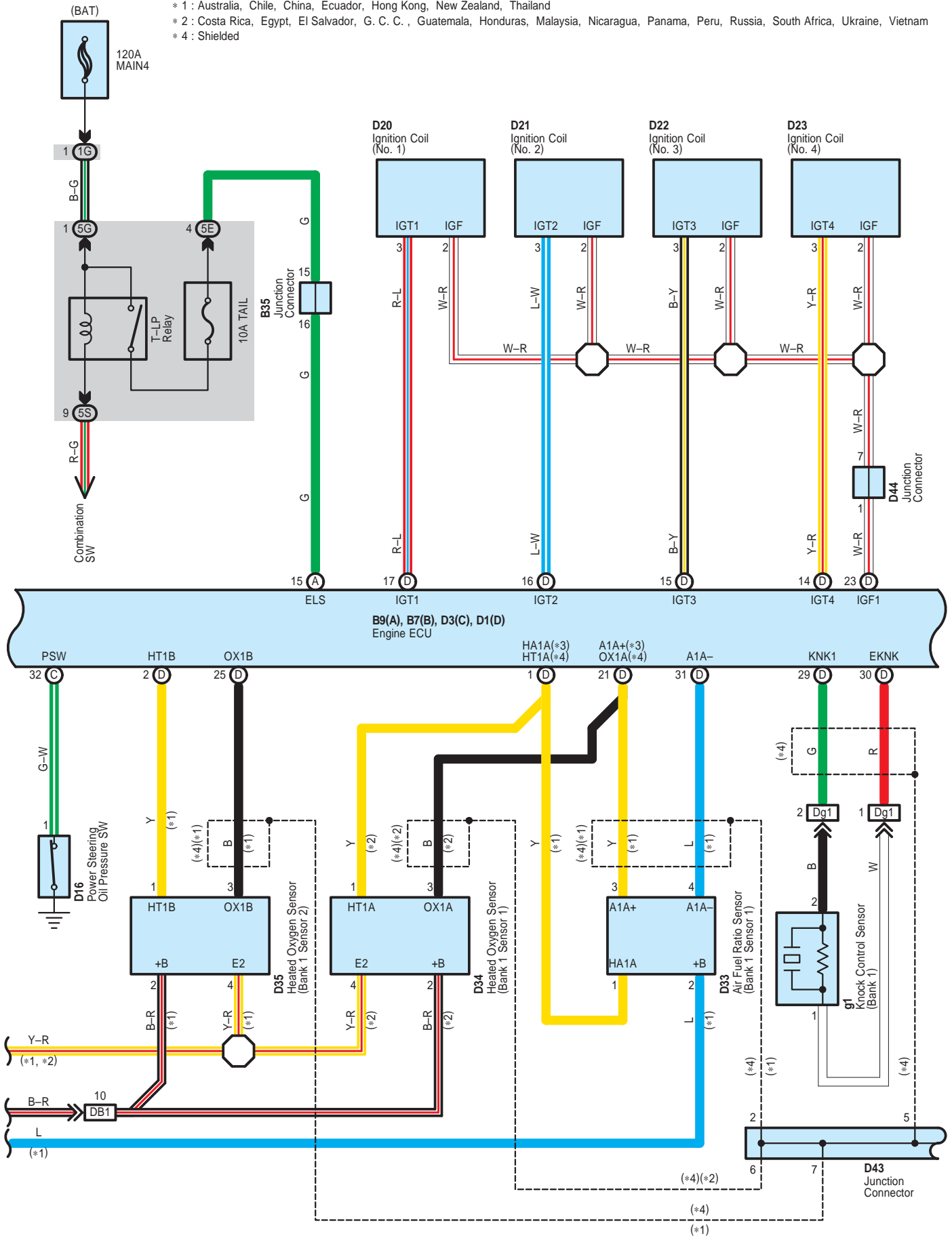


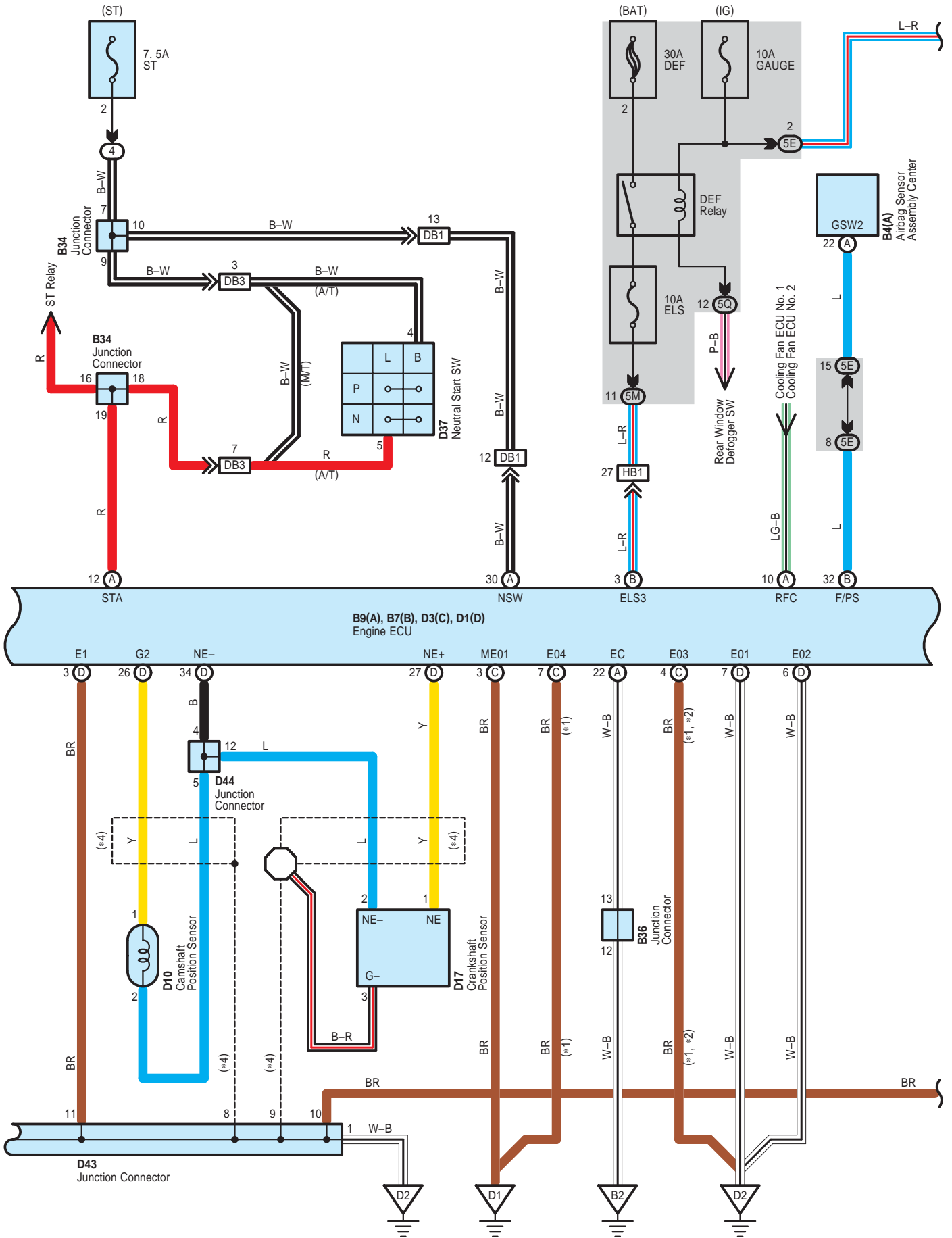


- \* 1 : Australia, Chile, China, Ecuador, Hong Kong, New Zealand, Thailand
- \* 2 : Costa Rica, Egypt, El Salvador, G. C. C. , Guatemala, Honduras, Malaysia, Nicaragua, Panama, Peru, Russia, South Africa, Ukraine, Vietnam
- \* 3 : Except \*1, Except \*2
- \* 4 : Shielded

# Engine Control (2TR-FE)

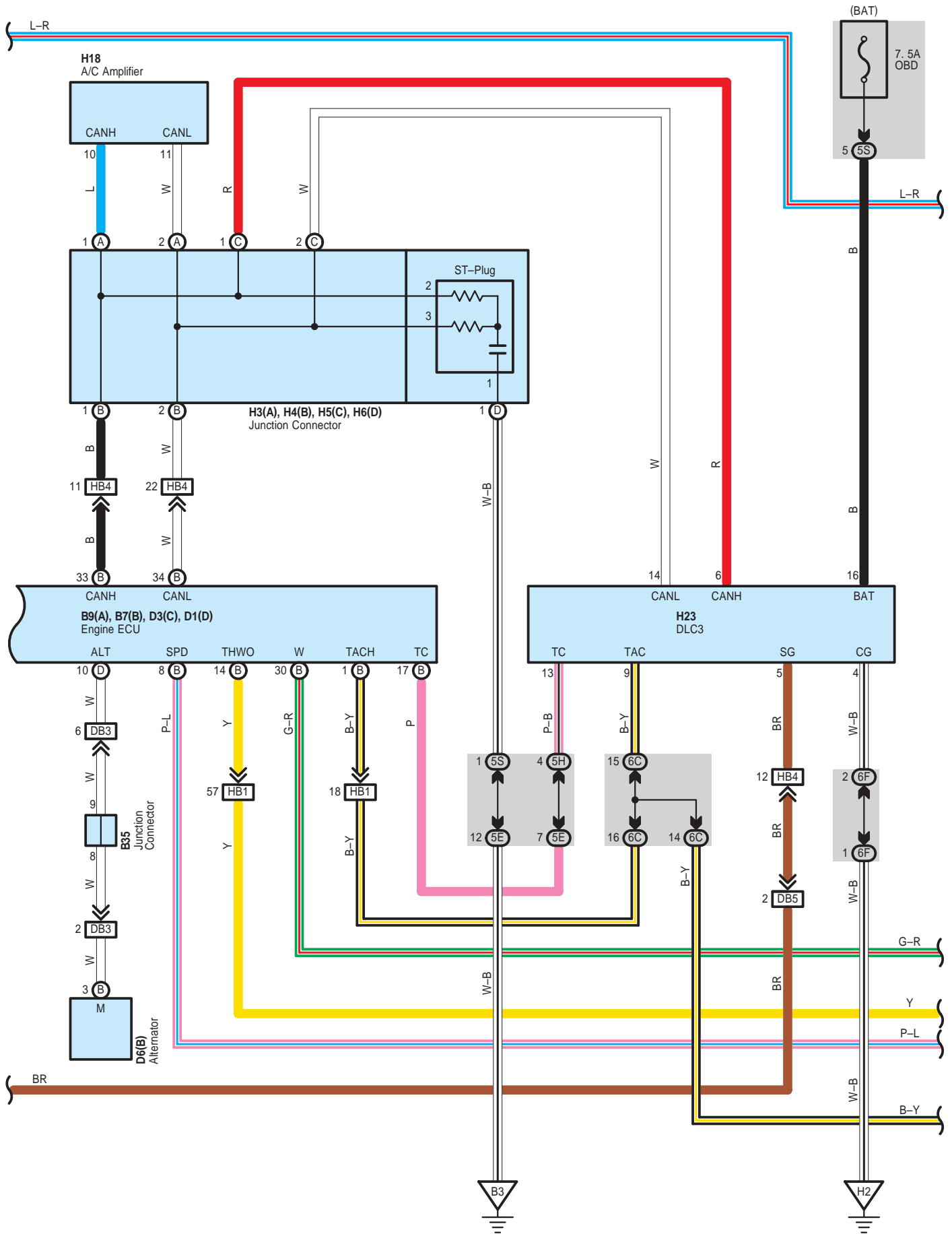
- \* 1 : Australia, Chile, China, Ecuador, Hong Kong, New Zealand, Thailand
- \* 2 : Costa Rica, Egypt, El Salvador, G. C. C. , Guatemala, Honduras, Malaysia, Nicaragua, Panama, Peru, Russia, South Africa, Ukraine, Vietnam
- \* 4 : Shielded

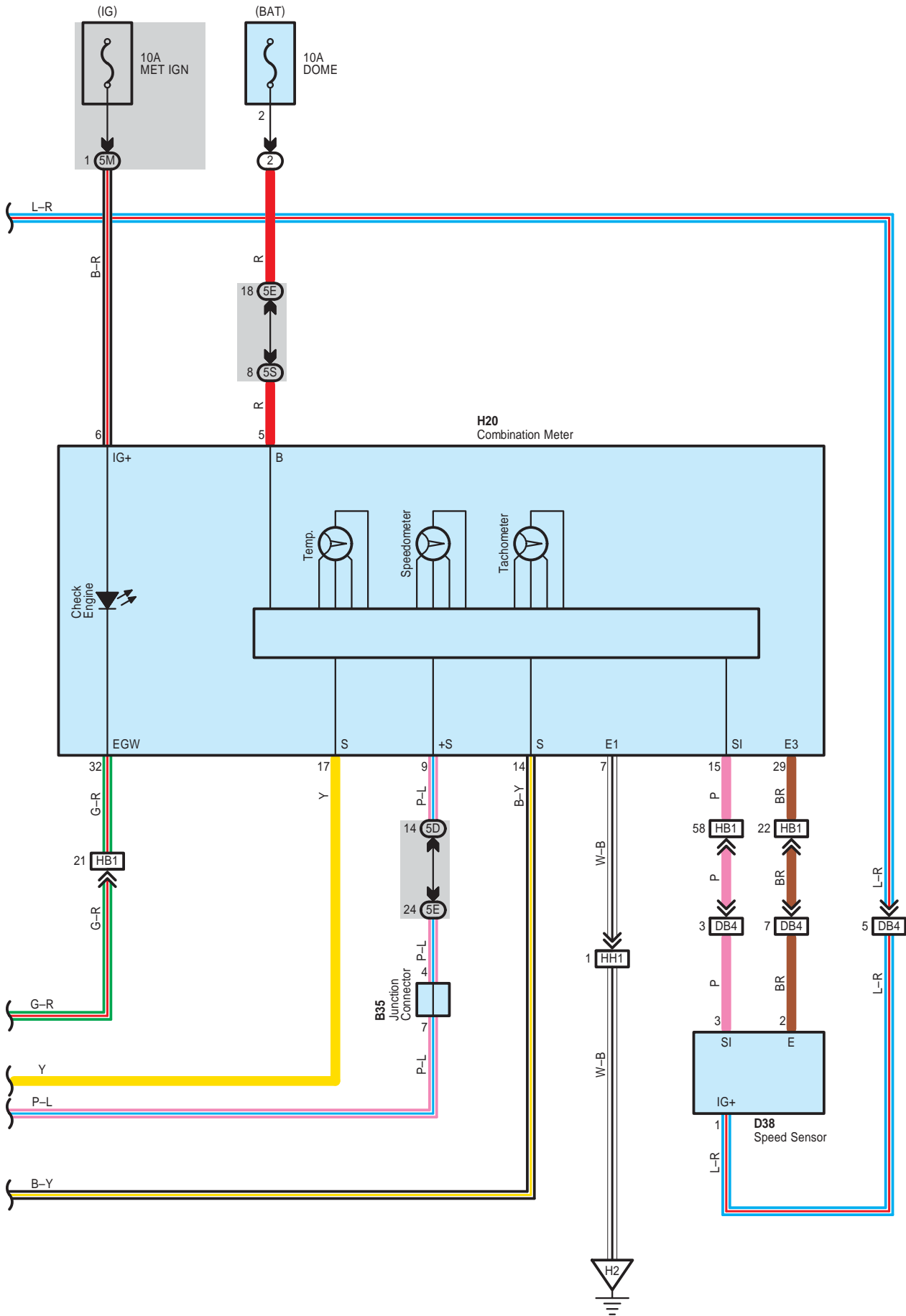




HIACE (EWD622E)

# Engine Control (2TR-FE)





# Engine Control (2TR-FE)

## System Outline

This system utilizes an engine ECU and maintains overall control of the engine, transmission and so on. An outline of the engine control is explained here.

### 1. Input Signals

#### (1) Water temp. signal circuit

The water temp. sensor (Engine coolant) detects the engine coolant temp. and has a built-in thermistor with a resistance which varies according to the engine coolant temp. thus the engine coolant temp. is input in the form of a control signal into TERMINAL THW of the engine ECU.

#### (2) Intake air temp. signal circuit

The intake air temp. sensor is installed in the air flow meter and detects the intake air temp., which is input as a control signal into TERMINAL THA of the engine ECU.

#### (3) RPM signal circuit

Camshaft position and crankshaft position are detected by the camshaft position sensor and crankshaft position sensor. Camshaft position is input as a control signal to TERMINAL G2 of the engine ECU, and engine RPM is input into TERMINAL NE+.

#### (4) Throttle signal circuit

The throttle body assembly detects the throttle valve opening angle, which is input as a control signal into TERMINALS VTA1 and VTA2 of the engine ECU.

#### (5) Vehicle speed signal circuit

The speed sensor detects the vehicle speed and inputs a control signal to TERMINAL SPD of the engine ECU via the combination meter.

#### (6) Battery signal circuit

Voltage is constantly applied to TERMINAL BATT of the engine ECU. When the ignition SW is turned on, the voltage for engine ECU operation is applied via the MAIN relay to TERMINAL +B of the engine ECU.

#### (7) Starter signal circuit

To confirm whether the engine is cranking, the voltage applied to the starter motor during cranking is detected and the signal is input into TERMINAL STA of the engine ECU as a control signal.

#### (8) Engine knock signal circuit

Engine knocking is detected by knock control sensor (Bank 1) and the signal is input into TERMINAL KNK1 of the engine ECU as a control signal.

### 2. Control System

#### \* EFI system

The EFI system monitors the engine condition through the signals, which are input from each sensor to the engine ECU. The best fuel injection volume is decided based on this data and the program memorized by the engine ECU, and the control signal is output to TERMINALS #1, #2, #3 and #4 of the engine ECU to operate the fuel injector (Inject the fuel). The EFI system produces control of fuel injection operation by the engine ECU in response to the driving conditions.

#### \* ESA system

The ESA system monitors the engine condition through the signals, which are input to the engine ECU from each sensor. The best ignition timing is detected according to this data and the memorized data in the engine ECU, and the control signal is output to TERMINALS IGT1, IGT2, IGT3 and IGT4. This signal controls the ignition coil to provide the best ignition timing for the driving conditions.

#### \* Fuel pump control system

The engine ECU operation outputs to TERMINAL FC and controls the C/OPN relay. Thus controls the fuel pump drive speed in response to conditions.

#### \* Air injection system

Air injection system sends air forcibly into the exhaust pipe with the air pump at the cold start. It activates the catalyst at early stage to promote to clean up exhaust emission. Air injection control driver runs the air pump and air switching valve with signal from the engine ECU.

### 3. Diagnosis System

With the diagnosis system, when there is a malfunctioning in the engine ECU signal system, the malfunction system is recorded in the memory. The malfunctioning system can be found by reading the display (Code) of the check engine warning light.

### 4. Fail-Safe System

When a malfunction occurs 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 engine ECU memory or else stops the engine.

○ : Parts Location

Code	See Page	Code	See Page	Code	See Page	
A3	48 (LHD)	D16	44 (*1)	D34	44 (*1)	
	56 (RHD)		52 (*4)		52 (*4)	
B1	48 (LHD)	D17	44 (*1)	D35	44 (*1)	
	56 (RHD)		52 (*4)		52 (*4)	
B2	48 (LHD)	D19	44 (*1)	D37	44 (*1)	
	56 (RHD)		52 (*4)		52 (*4)	
B4	48 (LHD)	D20	44 (*1)	D38	44 (*1)	
	56 (RHD)		52 (*4)		52 (*4)	
B7	44 (*1)	D21	44 (*1)	D43	44 (*1)	
	52 (*4)		52 (*4)		52 (*4)	
B9	44 (*1)	D22	44 (*1)	D44	44 (*1)	
	52 (*4)		52 (*4)		52 (*4)	
B12	44 (*1)	D23	44 (*1)	H3	A	42, 49 (LHD)
	52 (*4)		52 (*4)			42, 57 (RHD)
B14	44 (*1)	D24	44 (*1)	H4	B	42, 49 (LHD)
	52 (*4)		52 (*4)			42, 57 (RHD)
B17	44 (*1)	D25	44 (*1)	H5	C	42, 49 (LHD)
	52 (*4)		52 (*4)			42, 57 (RHD)
B29	44 (*1)	D26	44 (*1)	H6	D	42, 49 (LHD)
	52 (*4)		52 (*4)			42, 57 (RHD)
B34	48 (LHD)	D27	44 (*1)	H18	49 (LHD)	
	56 (RHD)		52 (*4)		57 (RHD)	
B35	44 (*1)	D28	44 (*1)	H20	49 (LHD)	
	52 (*4)		52 (*4)		57 (RHD)	
B36	44 (*1)	D29	44 (*1)	H23	49 (LHD)	
	52 (*4)		52 (*4)		57 (RHD)	
D1	44 (*1)	D30	44 (*1)	H25	49 (LHD)	
	52 (*4)		52 (*4)		57 (RHD)	
D3	44 (*1)	D31	44 (*1)	g1	44 (*1)	
	52 (*4)		52 (*4)		52 (*4)	
D6	44 (*1)	D32	44 (*1)	h2	51 (LHD)	
	52 (*4)		52 (*4)		59 (RHD)	
D10	44 (*1)	D33	44 (*1)			
	52 (*4)		52 (*4)			

○ : Relay Blocks

Code	See Page	Relay Blocks (Relay Block Location)
2	28	Engine Room R/B No.2 (Inside of Battery Room)
4	29	Instrument Panel R/B (Under the Glove Box)

\* 1 : LHD 2TR-FE   \* 2 : LHD 2KD-FTV   \* 3 : LHD 5L-E   \* 4 : RHD 2TR-FE   \* 5 : RHD 2KD-FTV   \* 6 : RHD 5L-E   \* 7 : 2TR-FE  
\* 8 : 2KD-FTV, 5L-E

## Engine Control (2TR-FE)

### : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1E	24	Engine Room Main Wire and Engine Room J/B No.1 (Engine Compartment Front)
1G		
1I	25	
1J		
5C	30	Instrument Panel Wire and Instrument Panel J/B (Left Side of Instrument Panel)
5D		
5E	30	Engine Room Main Wire and Instrument Panel J/B (Left Side of Instrument Panel)
5G		
5H	30	Instrument Panel Wire and Instrument Panel J/B (Left Side of Instrument Panel)
5J		
5M	31	
5Q		
5S		
6C		
	38 (RHD)	Instrument Panel Wire and Center J/B (Instrument Panel Reinforcement RH)
6F	38 (LHD)	Instrument Panel Wire and Center J/B (Instrument Panel Reinforcement LH)
	38 (RHD)	Instrument Panel Wire and Center J/B (Instrument Panel Reinforcement RH)

### : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
AB1	64 (LHD)	Cowl to Head Lamp Wire and Engine Room Main Wire (Left Side of the Instrument Panel J/B)
	72 (RHD)	
BD1	60 (*1)	Engine Room Main Wire and Engine Wire (Front Floor Panel Right)
	68 (*4)	
BP1	66 (LHD)	Engine Room Main Wire and Frame Wire (Under the Floor Panel)
	74 (RHD)	
DB1	60 (*1)	Engine Wire and Engine Room Main Wire (Front Side of Engine Room R/B No.1)
	68 (*4)	
DB3	60 (*1)	
	68 (*4)	
DB4	60 (*1)	
	68 (*4)	
DB5	60 (*1)	
	68 (*4)	
Dg1	60 (*1)	Engine Wire and Sensor Wire (Left Side of Cylinder Block)
	68 (*4)	
HB1	64 (LHD)	Instrument Panel Wire and Engine Room Main Wire (Under the Instrument Panel J/B)
	72 (RHD)	
HB2	64 (LHD)	
	72 (RHD)	
HB4	64 (LHD)	
	72 (RHD)	
HH1	64 (LHD)	Instrument Panel Wire and Instrument Panel Wire (Near the Steering Column)
	72 (RHD)	Instrument Panel Wire and Instrument Panel Wire (Instrument Panel Reinforcement RH)
Ph1	66 (LHD)	Frame Wire and Fuel Tank Wire (Near the Fuel Tank)
	74 (RHD)	

\* 1 : LHD 2TR-FE   \* 2 : LHD 2KD-FTV   \* 3 : LHD 5L-E   \* 4 : RHD 2TR-FE   \* 5 : RHD 2KD-FTV   \* 6 : RHD 5L-E   \* 7 : 2TR-FE  
 \* 8 : 2KD-FTV, 5L-E



**: Ground Points**

Code	See Page	Ground Points Location
B2	60 (*1)	Front Floor Panel Right
	68 (*4)	
B3	60 (*1)	Front Floor Panel Left
	68 (*4)	
D1	60 (*1)	Engine Block
	68 (*4)	
D2	60 (*1)	
	68 (*4)	
H2	64 (LHD)	Instrument Panel Reinforcement
	72 (RHD)	

\* 1 : LHD 2TR-FE   \* 2 : LHD 2KD-FTV   \* 3 : LHD 5L-E   \* 4 : RHD 2TR-FE   \* 5 : RHD 2KD-FTV   \* 6 : RHD 5L-E   \* 7 : 2TR-FE  
\* 8 : 2KD-FTV, 5L-E