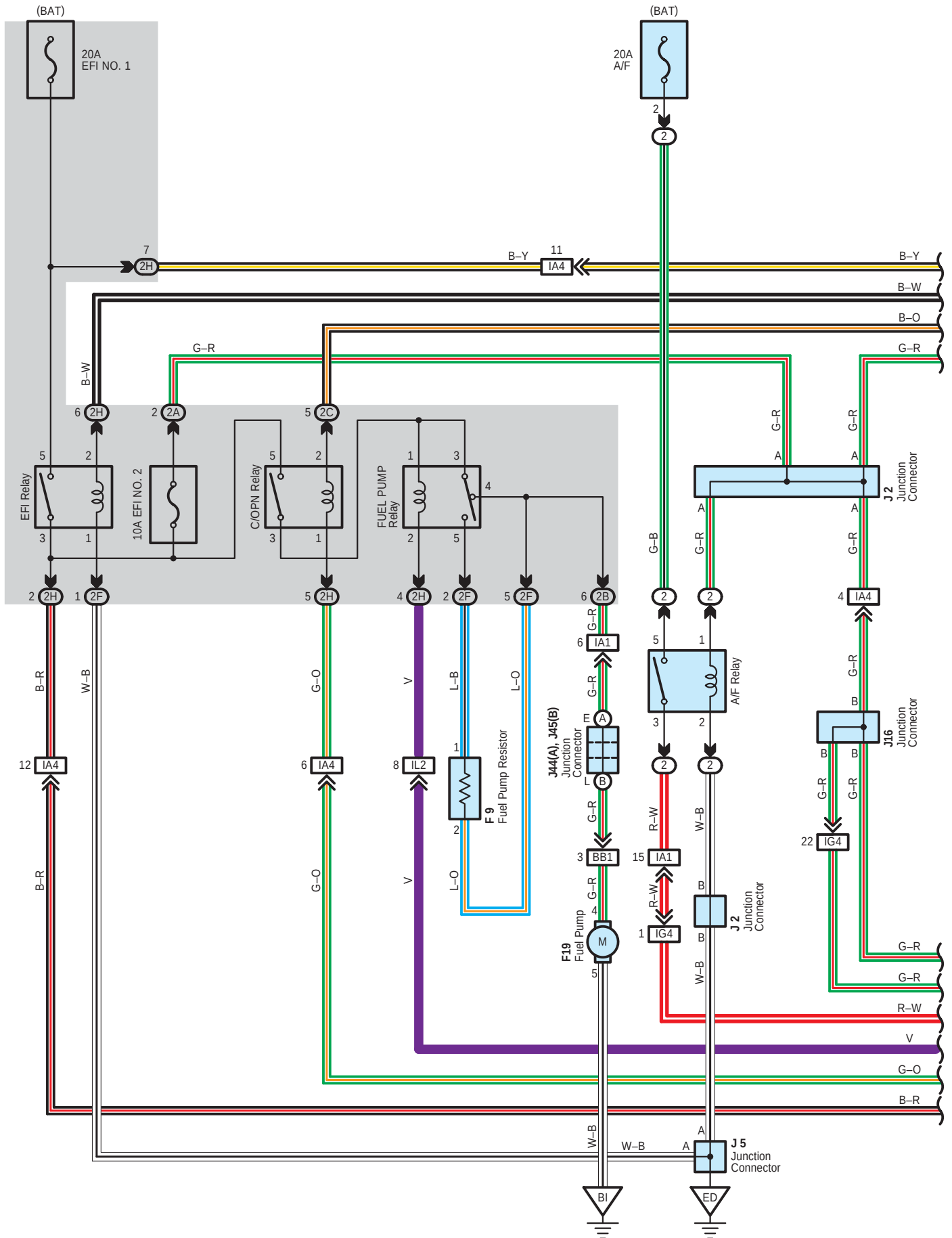
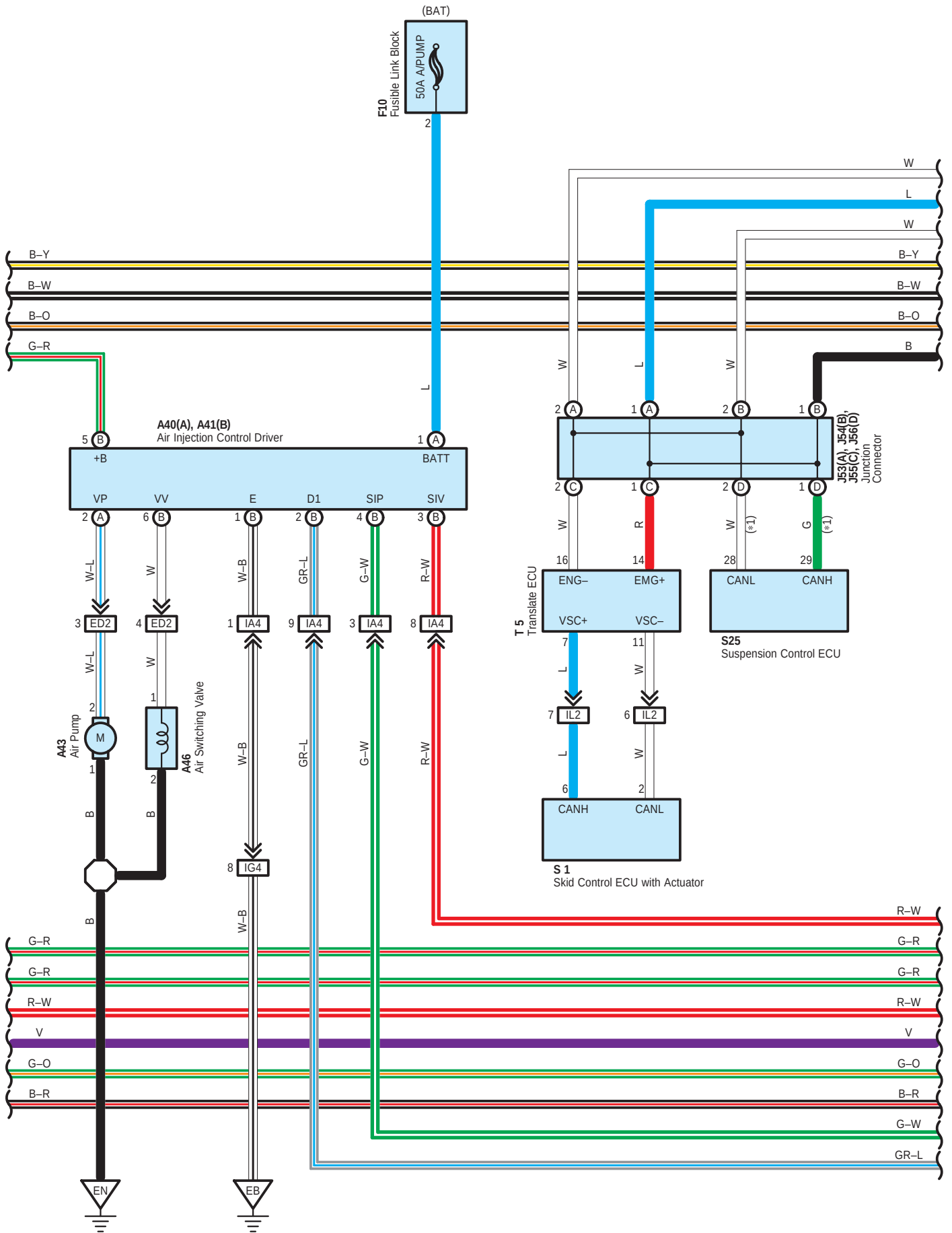
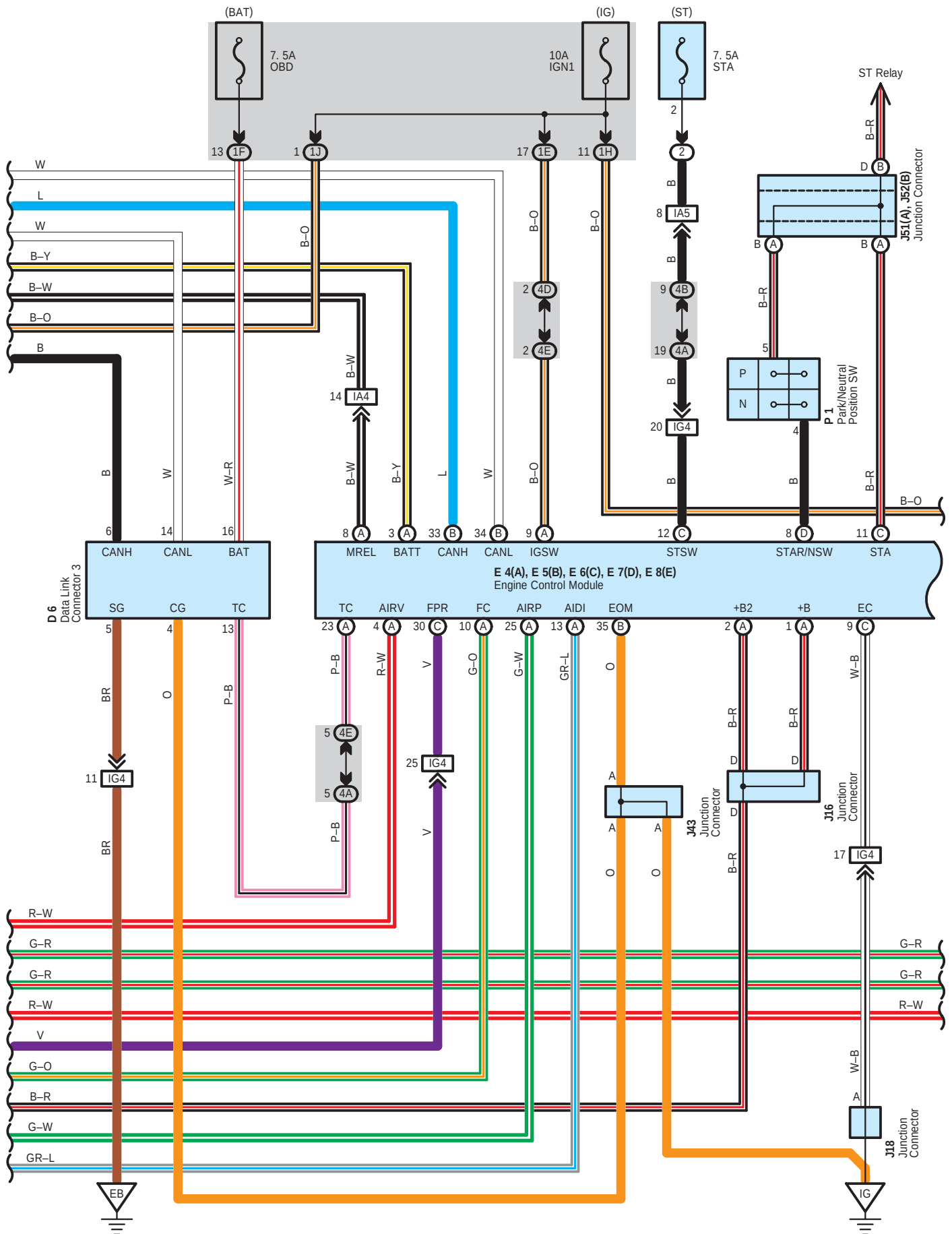


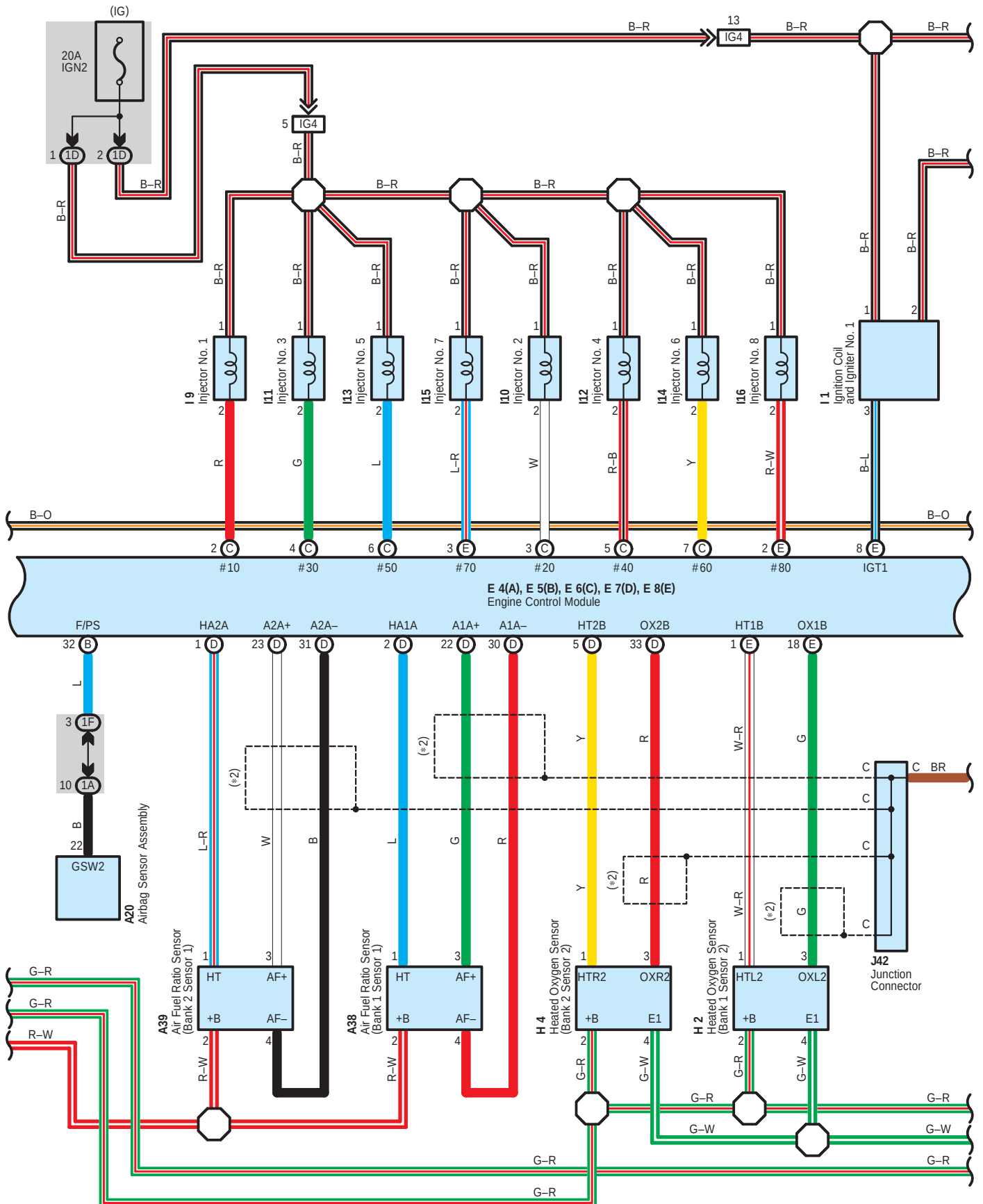
Engine Control



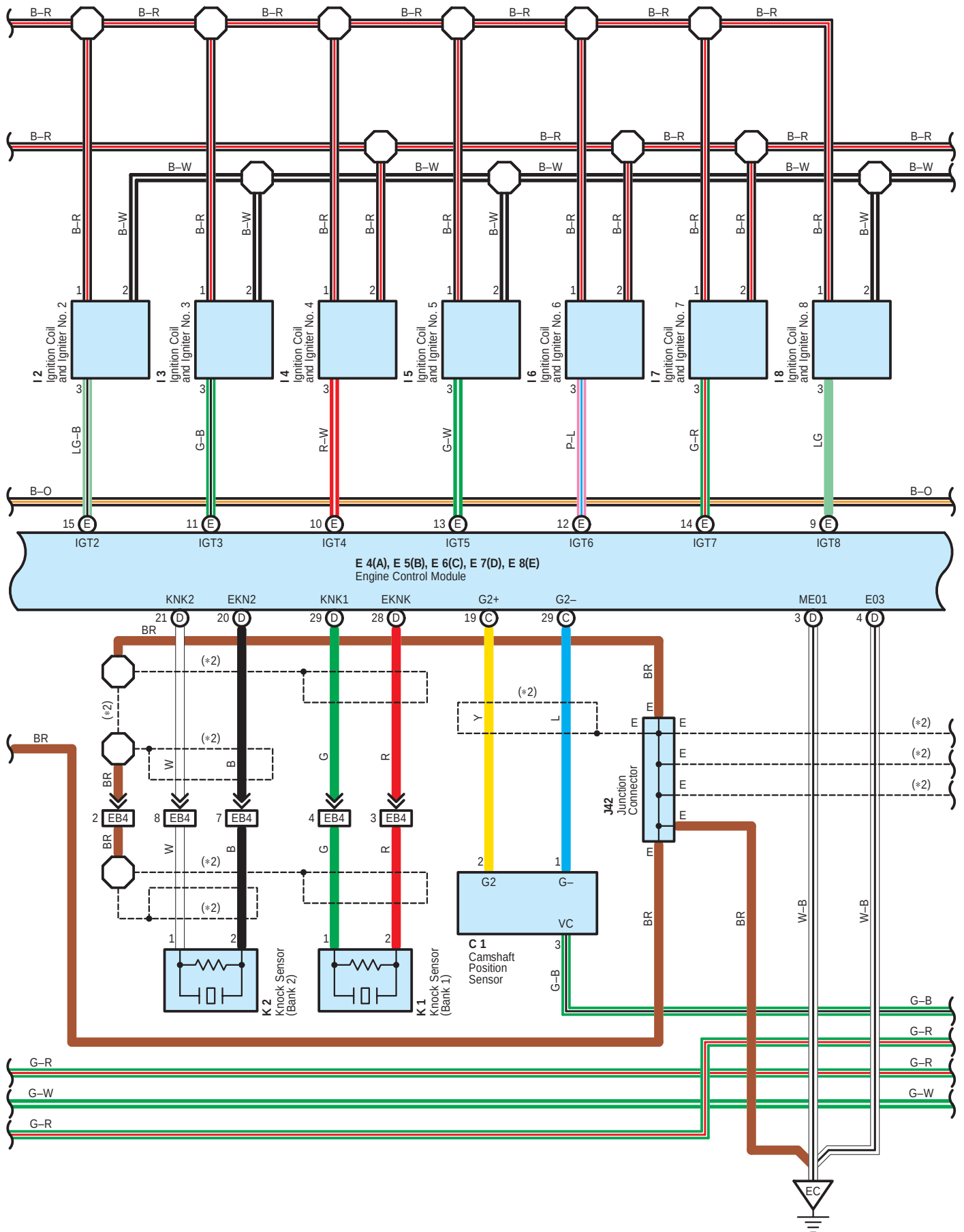


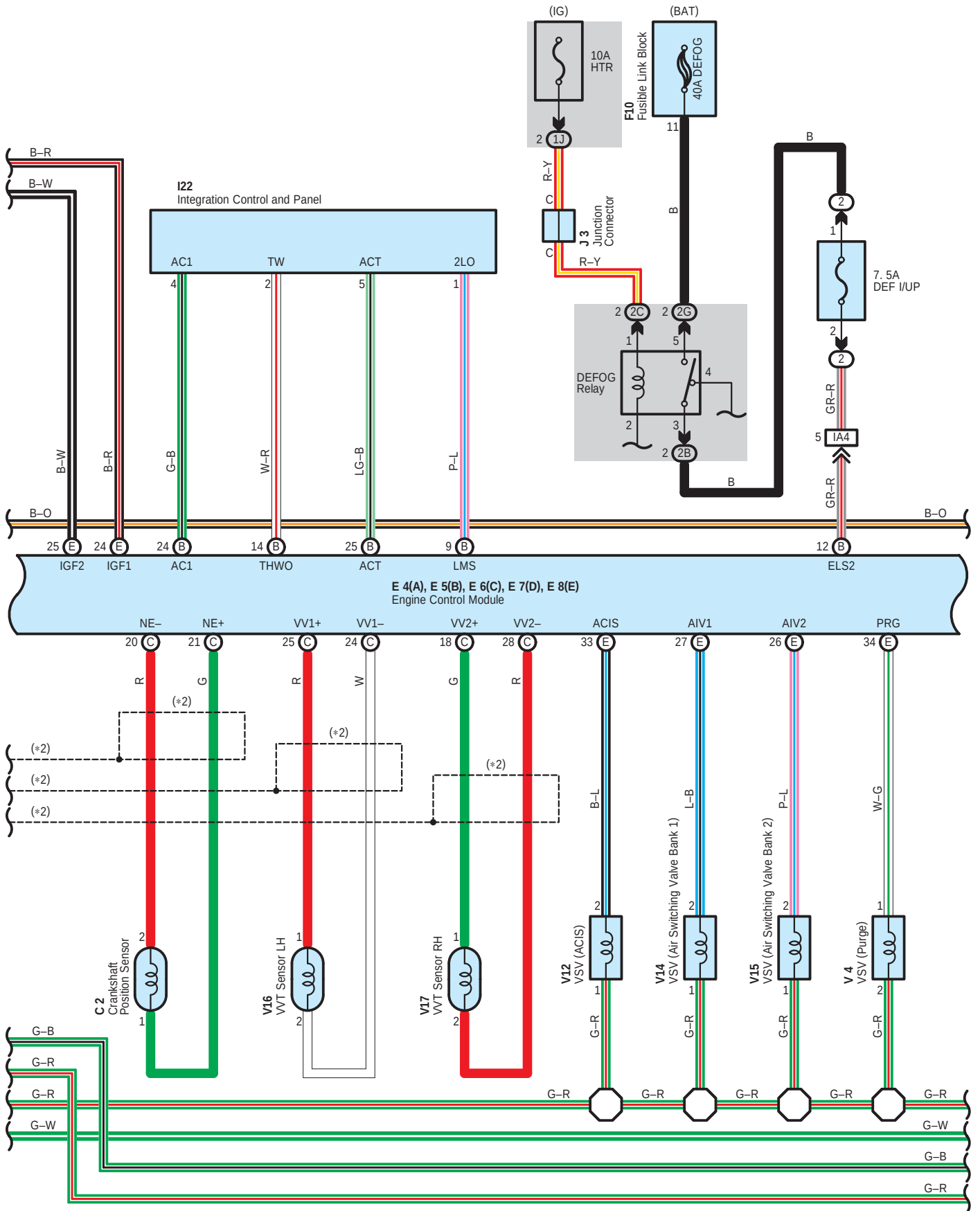
Engine Control



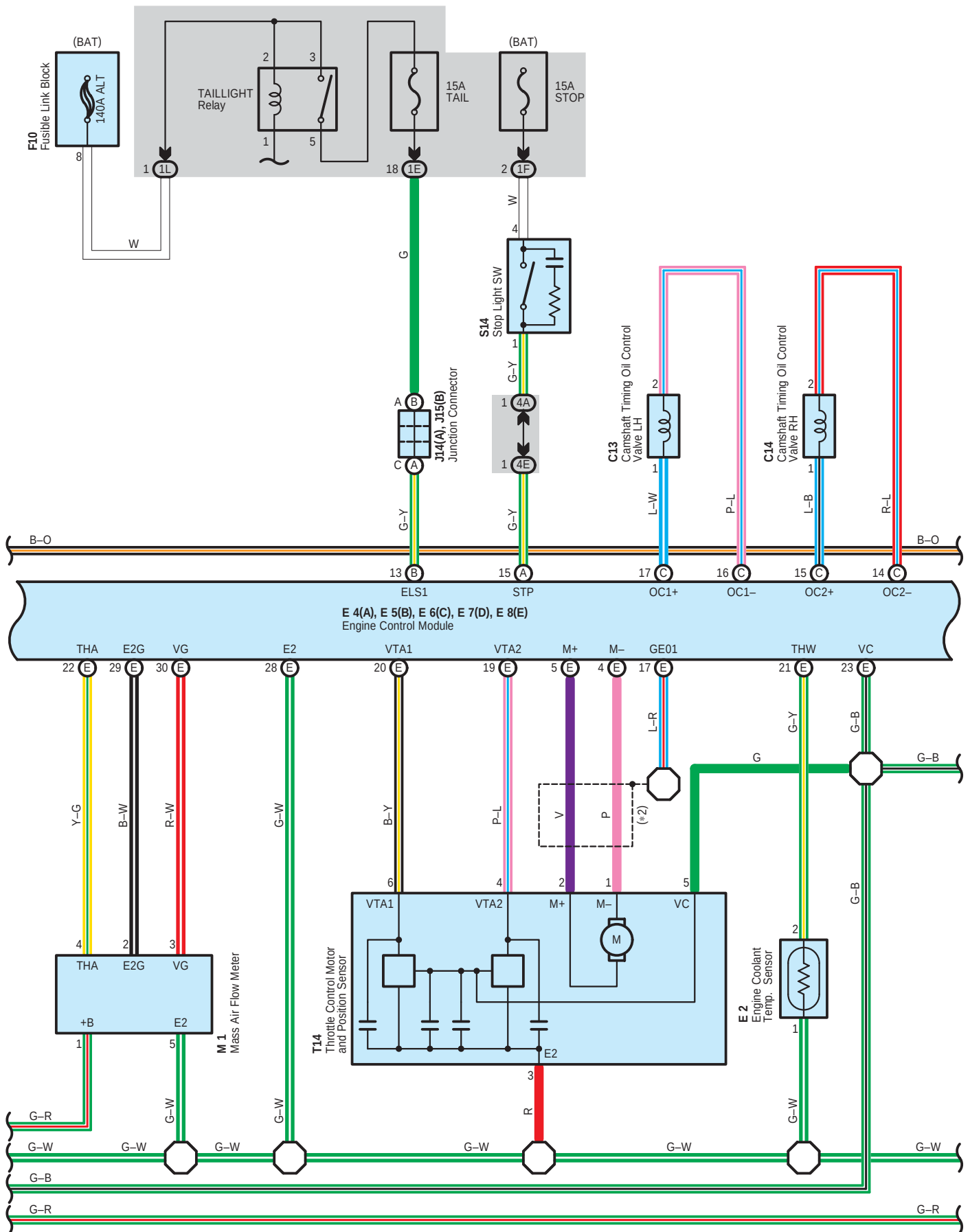


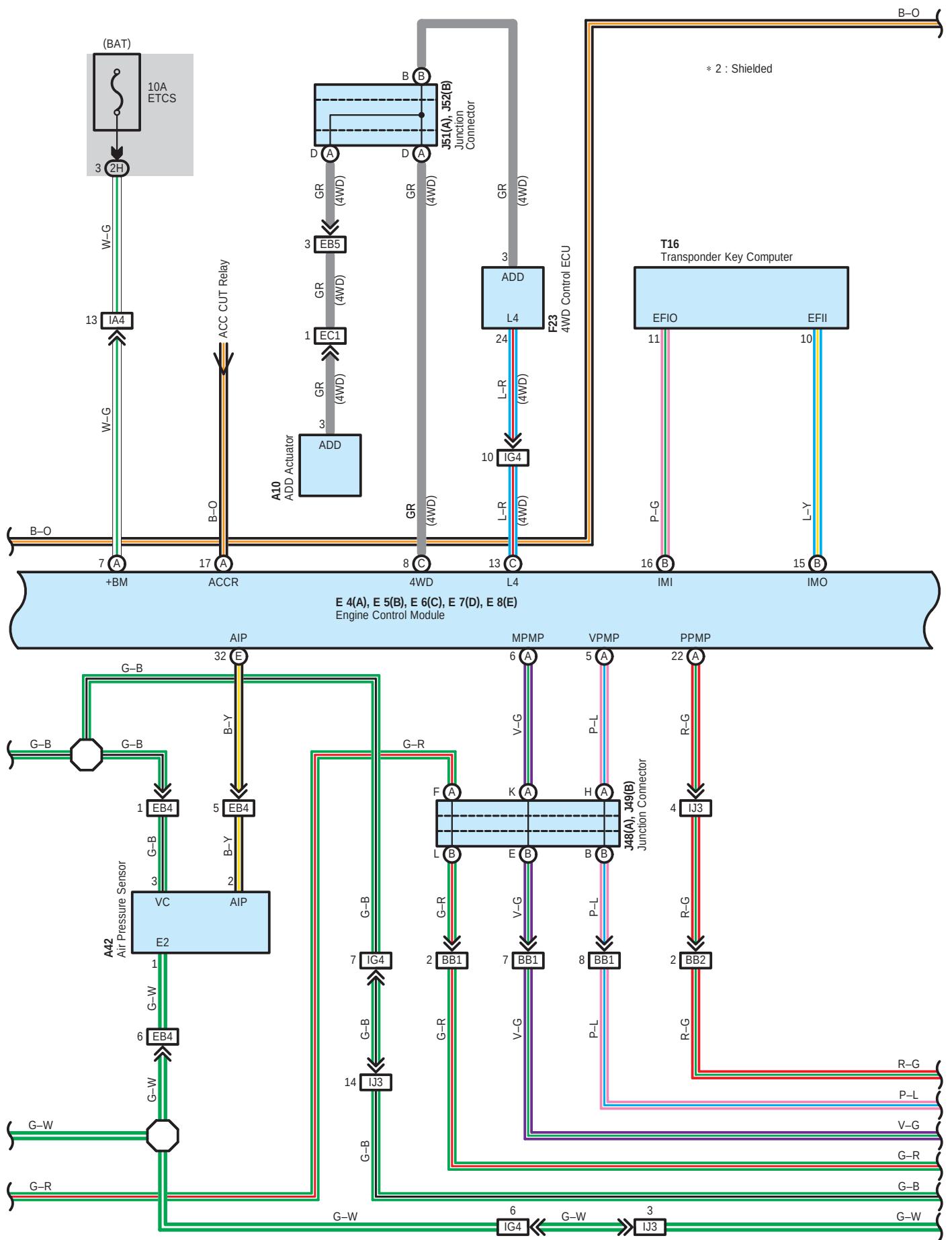
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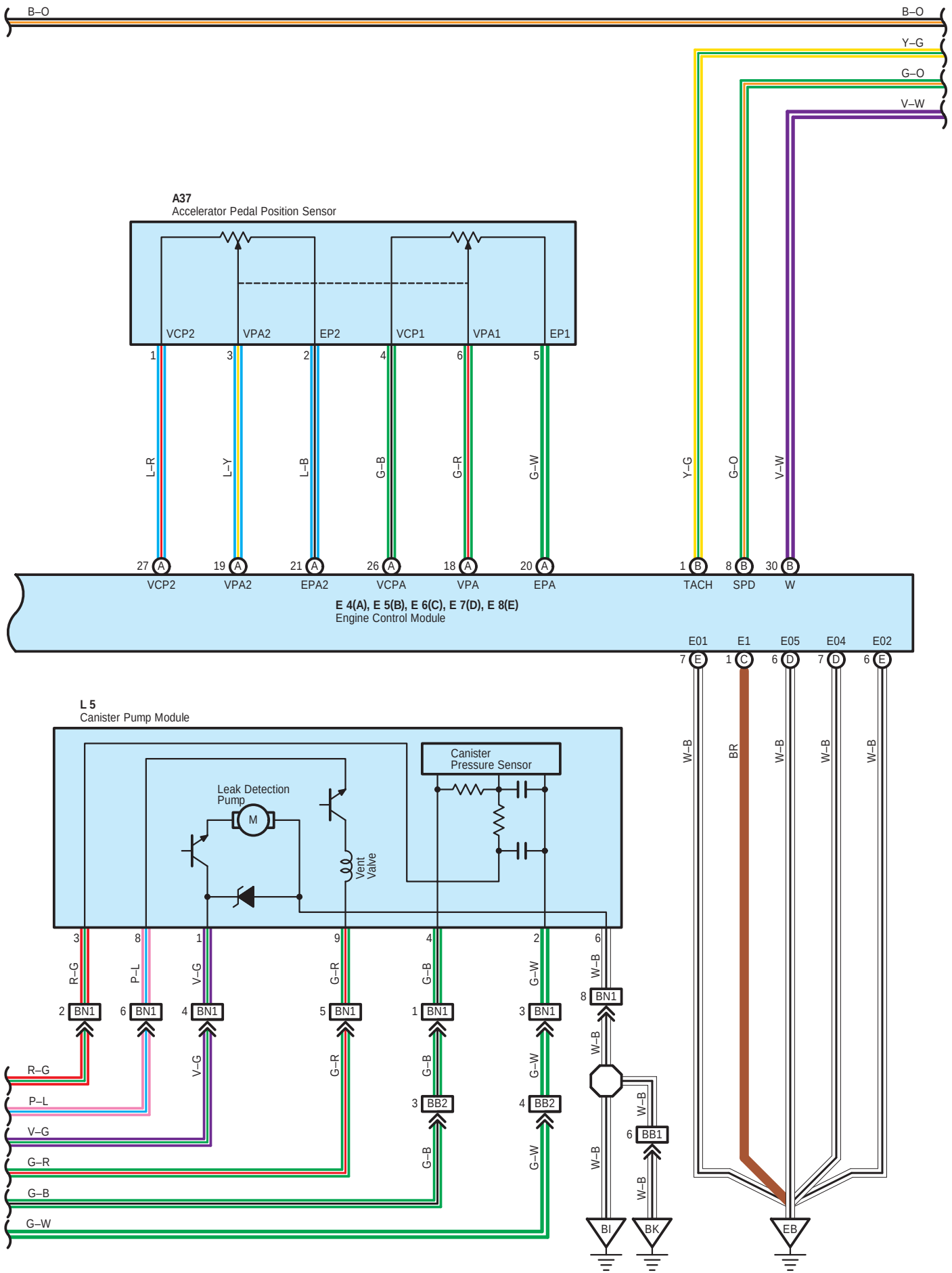


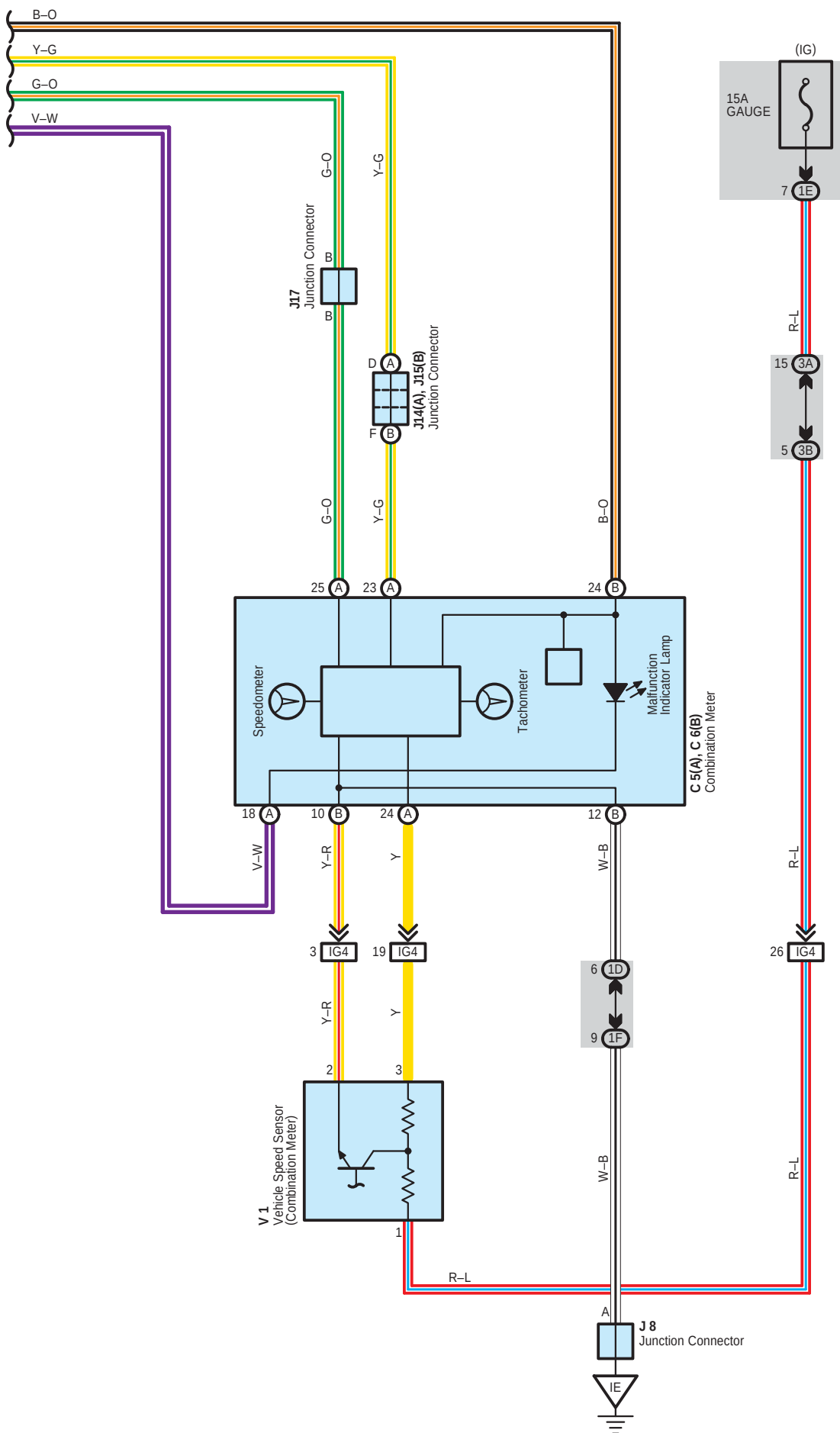
Engine Control





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. is input into TERMINAL THW of the engine control module 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 engine control module.

(3) Oxygen sensor signal circuit

The oxygen density in the exhaust emission is detected and is input as a control signal from the heated oxygen sensors to TERMINALS OX1B, OX2B of the engine control module.

(4) RPM signal circuit

The camshaft position is detected by the camshaft position sensor and is input into TERMINAL G2+ of the engine control module as a control signal. Also, the engine RPM is detected by the crankshaft position sensor and the signal is input into TERMINAL NE+ of the engine control module.

(5) Throttle position sensor signal circuit

The throttle position sensor detects the throttle valve opening angle as a control signal, which is input into TERMINALS VTA1, VTA2 of the engine control module.

(6) Vehicle speed circuit

The vehicle speed sensor (Combination meter) detects the vehicle speed, and the signal is input into TERMINAL SPD of the engine control module via the combination meter.

(7) Battery signal circuit

Voltage is constantly applied to TERMINAL BATT of the engine control module. When the ignition SW is turned on, the voltage for engine control module start up power supply is applied through the EFI relay, to TERMINALS +B, +B2 of the engine control module. The current from the IGN1 fuse flows to TERMINAL IGSW of the engine control module, and voltage is constantly applied to TERMINAL +BM.

(8) Intake air volume signal circuit

The intake air volume is detected by the mass air flow meter, and is input as a control signal to TERMINAL VG of the engine control module.

(9) 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 engine control module as a control signal.

(10) Starter signal circuit

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

(11) Engine knock signal circuit

Engine knocking is detected by the knock sensors, and is input into TERMINALS KNK1, KNK2 of the engine control module as a control signal.

(12) A/C SW signal system

The operating voltage of the A/C magnetic clutch is detected and input in the form of a control signal to TERMINAL AC1 of the engine control module.

(13) Air fuel ratio signal system

The air fuel ratio is detected by air fuel ratio sensor and input as a control signal into TERMINALS A1A+, A2A+ of engine control module.

2. Control System

* SFI system

The SFI system monitors the engine condition through the signals input from each sensors to the engine control module. The control signal is sent to the engine control module TERMINALS #10, #20, #30, #40, #50, #60, #70 and #80 to operate the injector (Fuel injection). The SFI system controls the fuel injection by the engine control module in response to the driving conditions.

* ESA system

The ESA system monitors the engine condition through the signals input from each sensors to the engine control module. The best ignition timing is decided according to this data and the data memorized in the engine control module. The control signal is output to TERMINALS IGT1, IGT2, IGT3, IGT4, IGT5, IGT6, IGT7, IGT8, and these signals control the igniter to provide the best ignition timing.

* Heated oxygen sensor heater control system

The heated oxygen sensor heater control system turns the heater on when the intake air volume is low (Temp. of exhaust emission is low), and warms up the heated oxygen sensors to improve their detection performance. The engine control module evaluates the signals from each sensors, and outputs current to TERMINALS HT1B or HT2B to control the heater.

* Air fuel ratio sensor heater control system

The air fuel ratio sensor heater control system turns the heater on when the intake air volume is low (Temp. of exhaust emission is low), and warms up the air fuel ratio sensor to improve detection performance of the sensor.

The engine control module evaluates the signals from each sensor, current is output to TERMINALS HA1A and HA2A, controlling the heater.

* Fuel pump control system

The engine control module supplies current to TERMINAL FPR, and controls the operation speed of the fuel pump with the FUEL PUMP relay.

* ACIS

The ACIS includes a valve in the bulkhead separating the surge tank into two parts. This valve is opened and closed in accordance with the driving conditions to control the intake manifold length in two stages, for increased engine output in all ranges from low to high speeds.

* ETCS-i

The ETCS-i controls the engine output at its optimal level in accordance with the opening of the accelerator pedal, under all driving conditions.

* Engine start control system

The engine control module allows power to be supplied from the TERMINAL STAR/NSW to the STA relay via park/neutral position SW until complete combustion is confirmed by engine RPM after the detection of ignition SW ST signal by the TERMINAL STSW.

With this arrangement, engine can be started without holding the ignition key in the ST position. At the same time, the TERMINAL ACCR is controlled so that the engine control module turns off ACC CUT relay, shutting off power to the accessories.

* VVT-i

Controls the intake camshaft to an optimal valve timing in accordance with the engine condition.

* Air Injection System

It is the system to improve exhaust control performance by activating catalyst at early stage, which is realized when air is pressed and sent into the exhaust pipe forcibly by the air injection pump at starting engine in cold condition.

3. Diagnosis System

When there is a malfunction in the engine control module signal system, the malfunctioning system is recorded in the memory. The malfunctioning system can be found by reading the code displayed on the malfunction indicator lamp.

4. Fail-Safe System

When a malfunction has occurred in any system, there is a possibility of causing engine trouble due to continued control based on that system. In that case, the fail-safe system either controls the system using the data (Standard values) recorded in the engine control module memory, or else stops the engine.

Engine Control

○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
A10	40	I1	41	J45	B 44
A20	42	I2	41	J48	A 44
A37	42	I3	41	J49	B 44
A38	40	I4	41	J51	A 44
A39	40	I5	41	J52	B 44
A40	A 40	I6	41	J53	A 44
A41	B 40	I7	41	J54	B 44
A42	40	I8	41	J55	C 44
A43	40	I9	41	J56	D 44
A46	40	I10	41	K1	41
C1	40	I11	41	K2	41
C2	40	I12	41	L5	47
C5	A 42	I13	41	M1	41
C6	B 42	I14	41	P1	41
C13	40	I15	41	S1	41
C14	40	I16	41	S14	45
D6	43	I22	43	S25	45
E2	40	J2	41	T5	45
E4	A 43	J3	41	T14	41
E5	B 43	J5	41	T16	45
E6	C 43	J8	44	V1	41
E7	D 43	J14	A 44	V4	41
E8	E 43	J15	B 44	V12	41
F9	40	J16	44	V14	41
F10	22, 40	J17	44	V15	41
F19	46	J18	44	V16	41
F23	43	J42	44	V17	41
H2	40	J43	44		
H4	40	J44	A 44		

○ : Relay Blocks

Code	See Page	Relay Blocks (Relay Block Location)
2	26	Engine Room R/B No.2 (Engine Compartment Left)

**: Junction Block and Wire Harness Connector**

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	33	Cowl Wire and Instrument Panel J/B (Lower Finish Panel)
1D		
1E		
1F		
1H		
1J	33	Engine Room Main Wire and Instrument Panel J/B (Lower Finish Panel)
1L		
2A	29	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
2B		
2C		
2F		
2G		
2H		
3A	36	Cowl Wire and Sub J/B No.3 (Upper the Accelerator Pedal)
3B		
4A	38	Cowl Wire and Sub J/B No.4 (Upper the Accelerator Pedal)
4B		
4D		
4E		

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

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EB4	50	Engine No.2 Wire and Engine Wire (Near the Starter)
EB5		
EC1	50	Engine No.2 Wire and Differential Wire (Near the Transmission)
ED2	50	Engine No.2 Wire and Engine Room Main Wire (Under the Engine Room J/B)
IA1	51	Engine Room Main Wire and Cowl Wire (Cowl Side Panel LH)
IA4		
IA5		
IG4	51	Engine Wire and Cowl Wire (Right Side of Instrument Panel)
IJ3	51	Floor No.1 Wire and Cowl Wire (Right Kick Panel)
IL2	51	Engine Room Main Wire and Cowl Wire (Cowl Side Panel RH)
BB1	52	Frame Wire and Floor No.1 Wire (Under the Front Passenger's Seat)
BB2		
BN1	52	Frame No.2 Wire and Frame Wire (Left Side of No.6 Crossmember)

**: Ground Points**

Code	See Page	Ground Points Location
EB	50	Rear Left Side of Cylinder Head
EC	50	Front Left Side of Cylinder Head
ED	50	Front Fender Apron LH
EN	50	Left Side of Cylinder Block
IE	51	Cowl Side Panel LH
IG	51	Cowl Side Panel RH
BI	52	Rear Side No.4 Crossmember of Side Rail LH
BK	52	Center Pillar RH