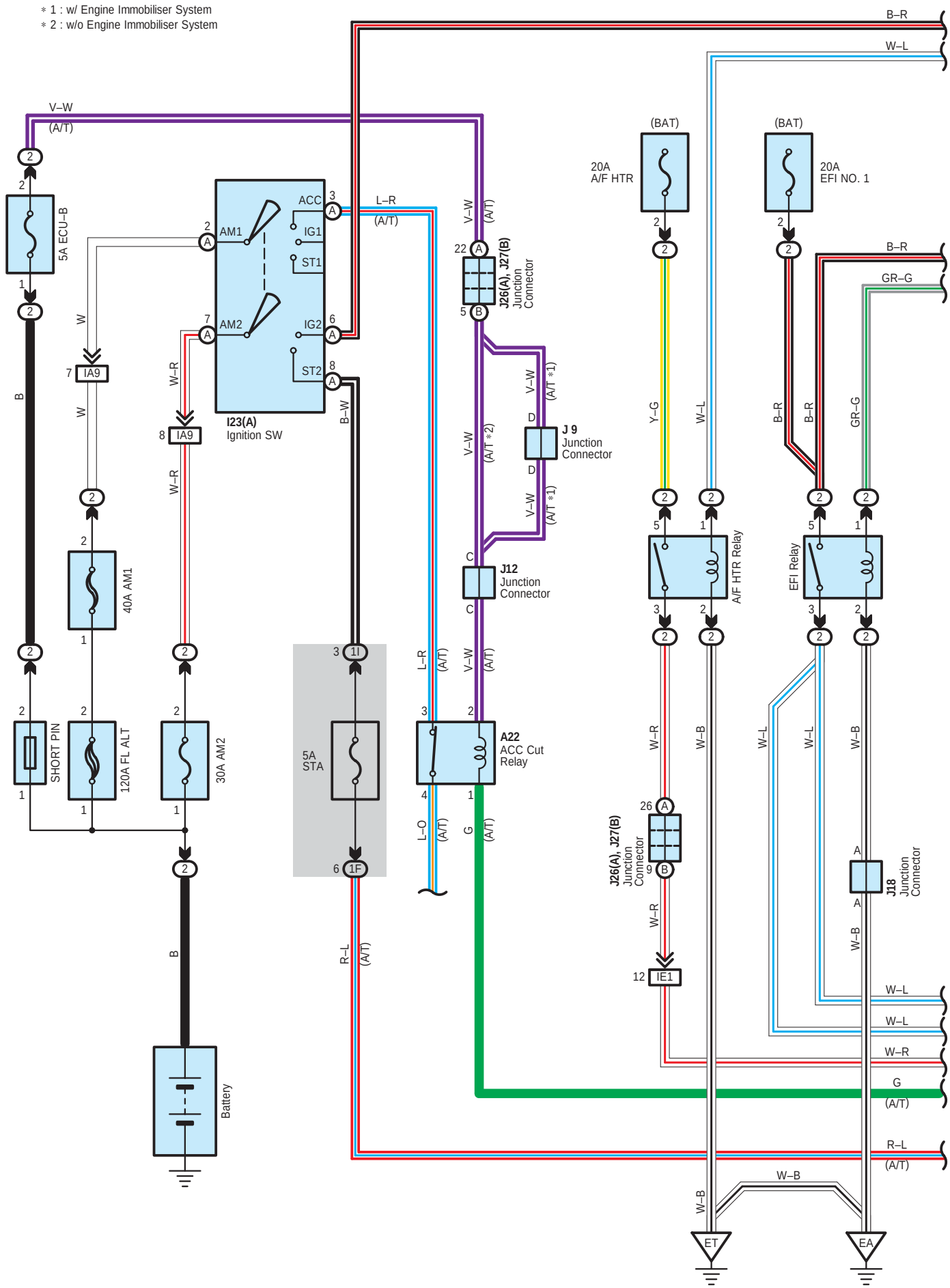
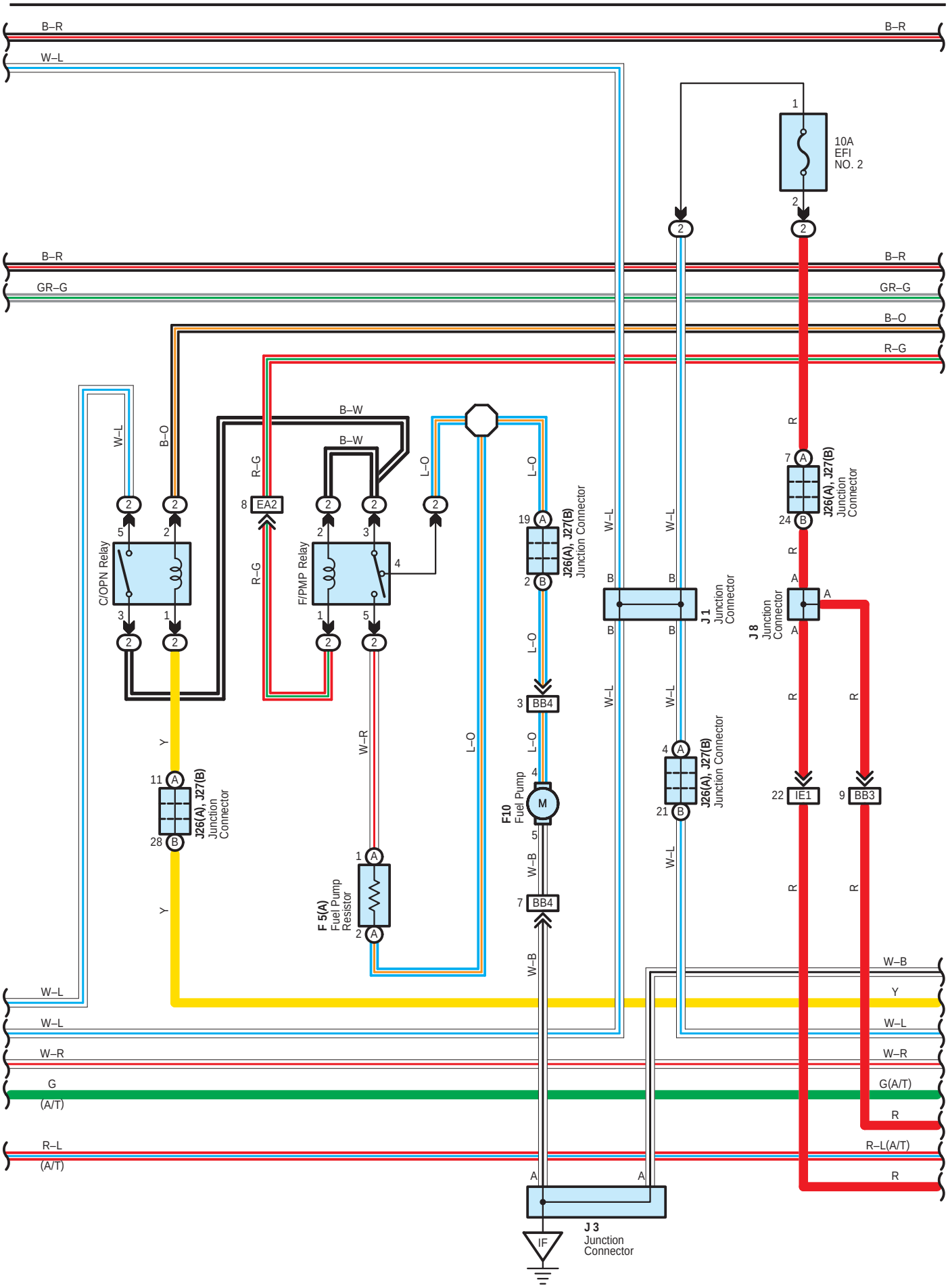
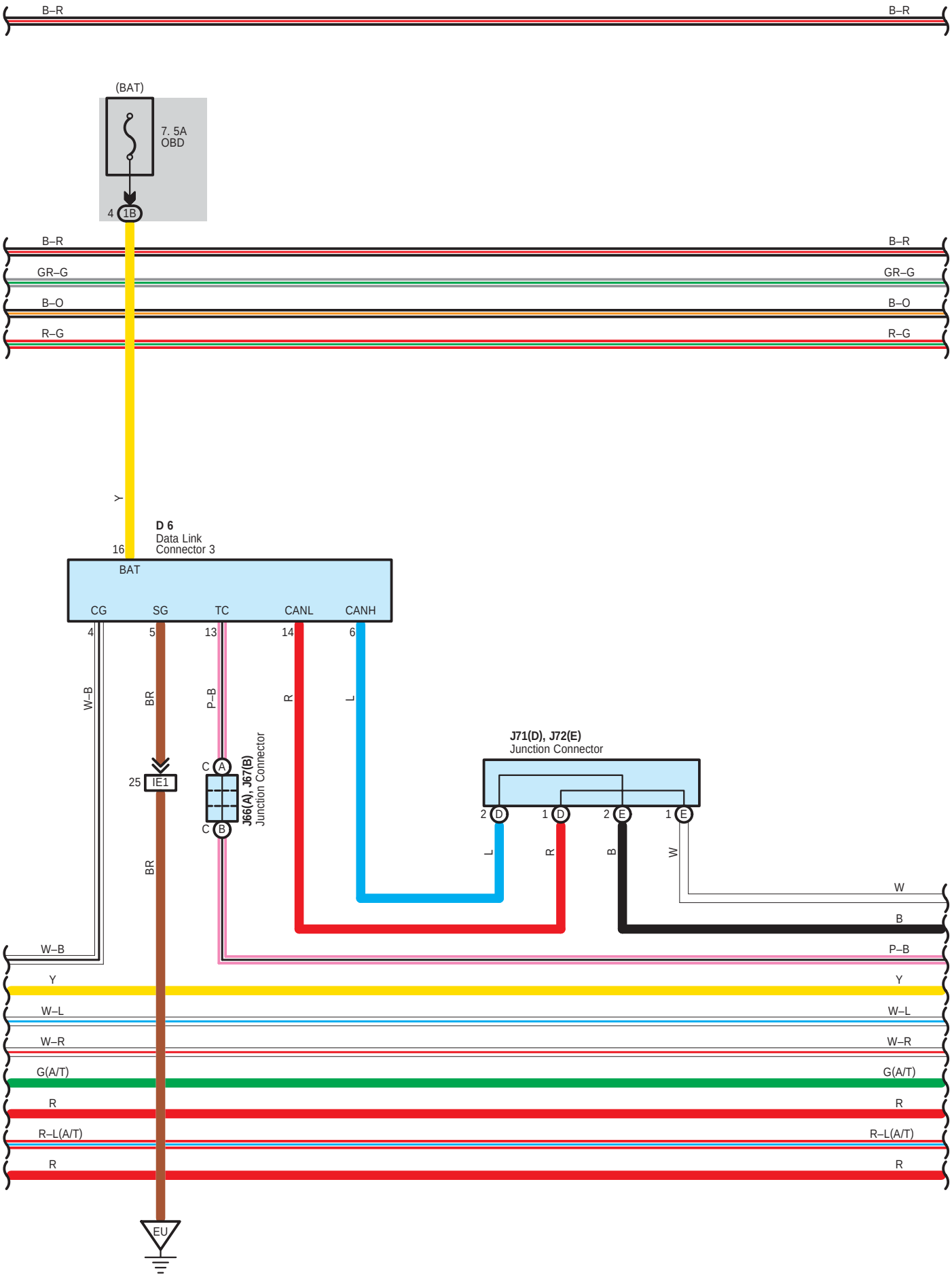
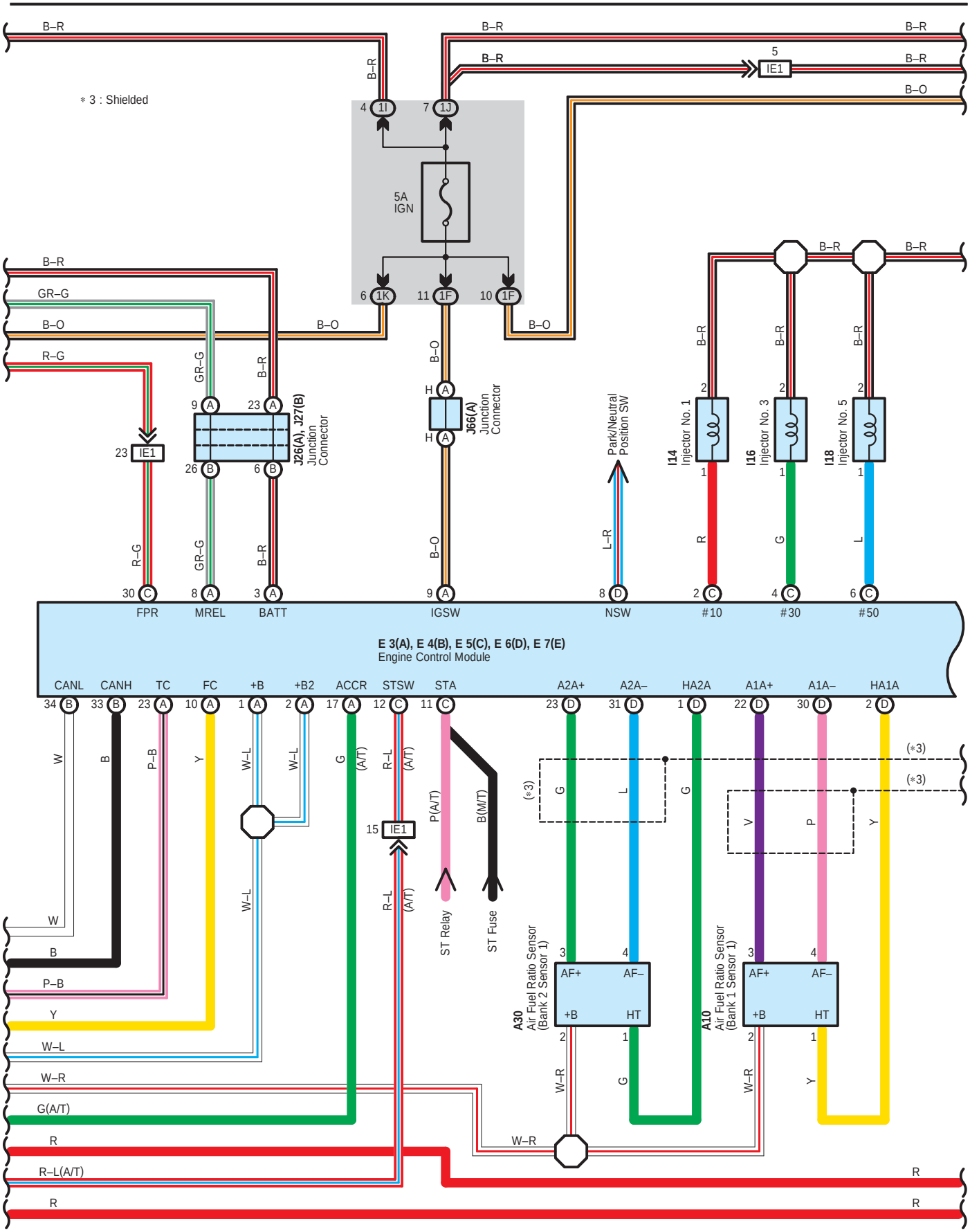
Engine Control for 1GR–FE (Access/Standard Cab)



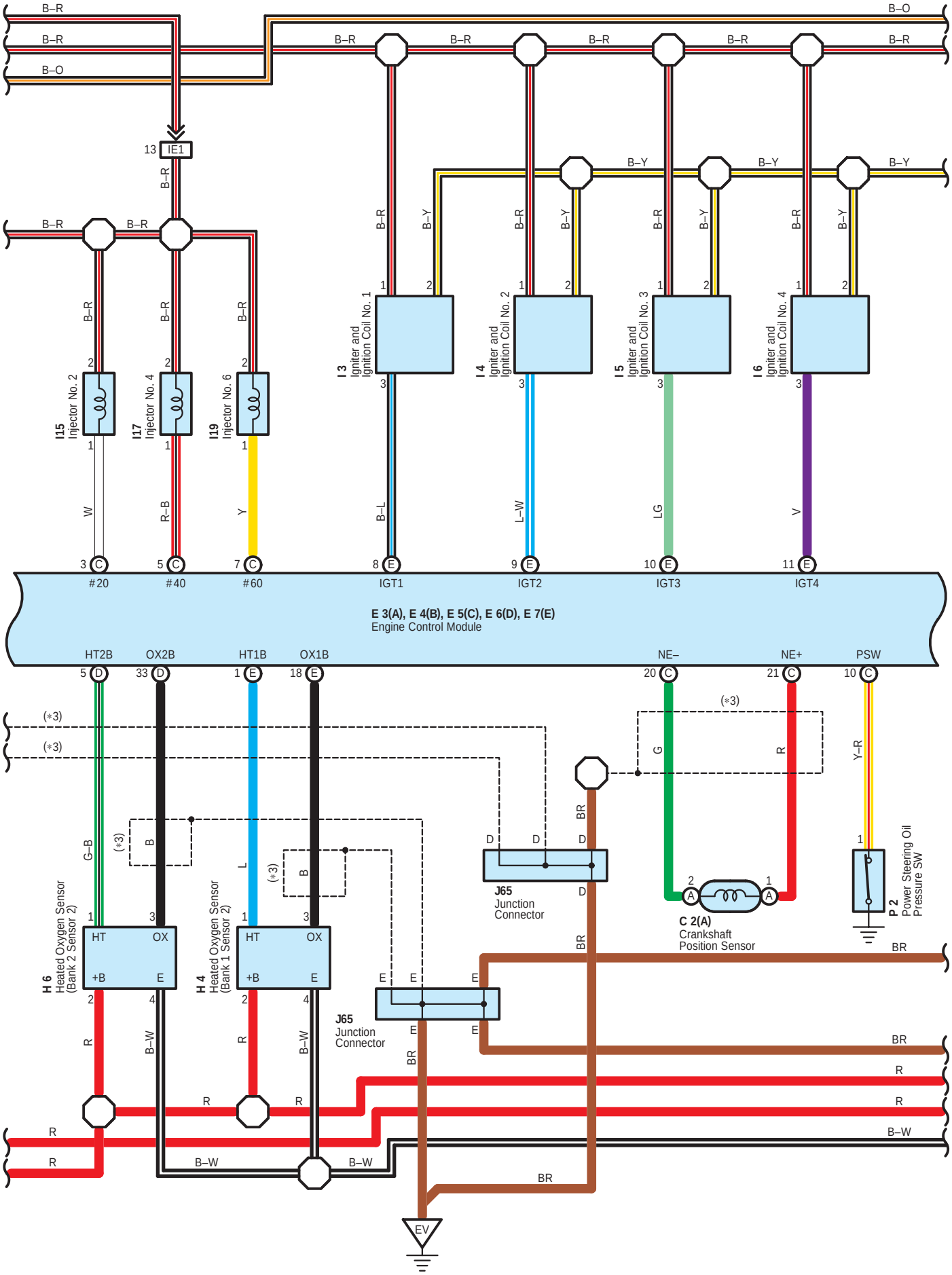

B–R
W–L
GR–G
B–O
R–G
B–W
L–O
W–R
W–B
R
Y
G
(A/T)
R–L
(A/T)
G(A/T)
R–L(A/T)
10A
EFI
NO. 2
C/OPN Relay
F/PMP Relay
EA2
J26(A), J27(B)
Junction Connector
J 1
Junction Connector
J 8
Junction Connector
F10
Fuel Pump
F 5(A)
Fuel Pump
Resistor
BB4
BB3
IE1
J 3
Junction
Connector
IF

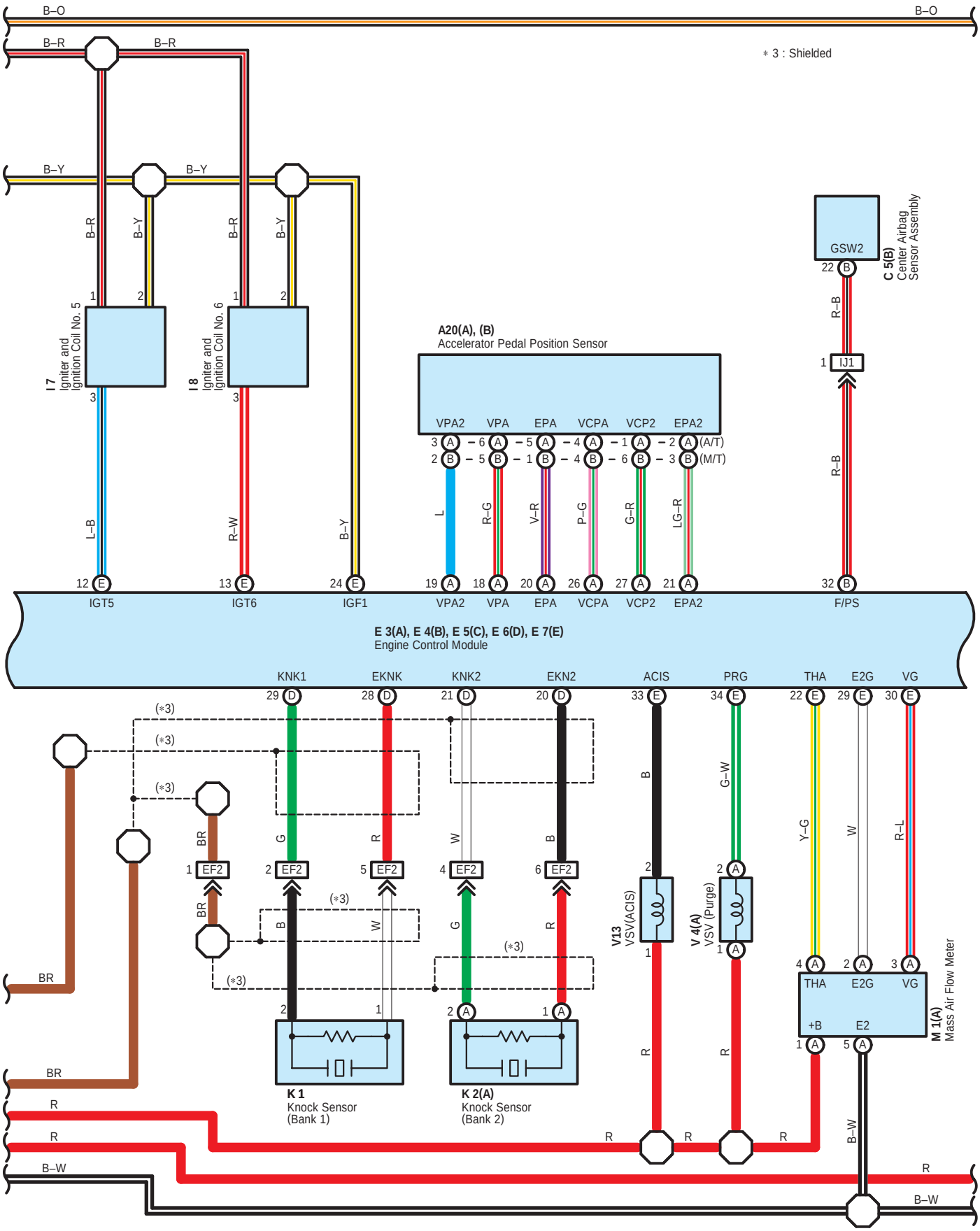
Engine Control for 1GR–FE (Access/Standard Cab)



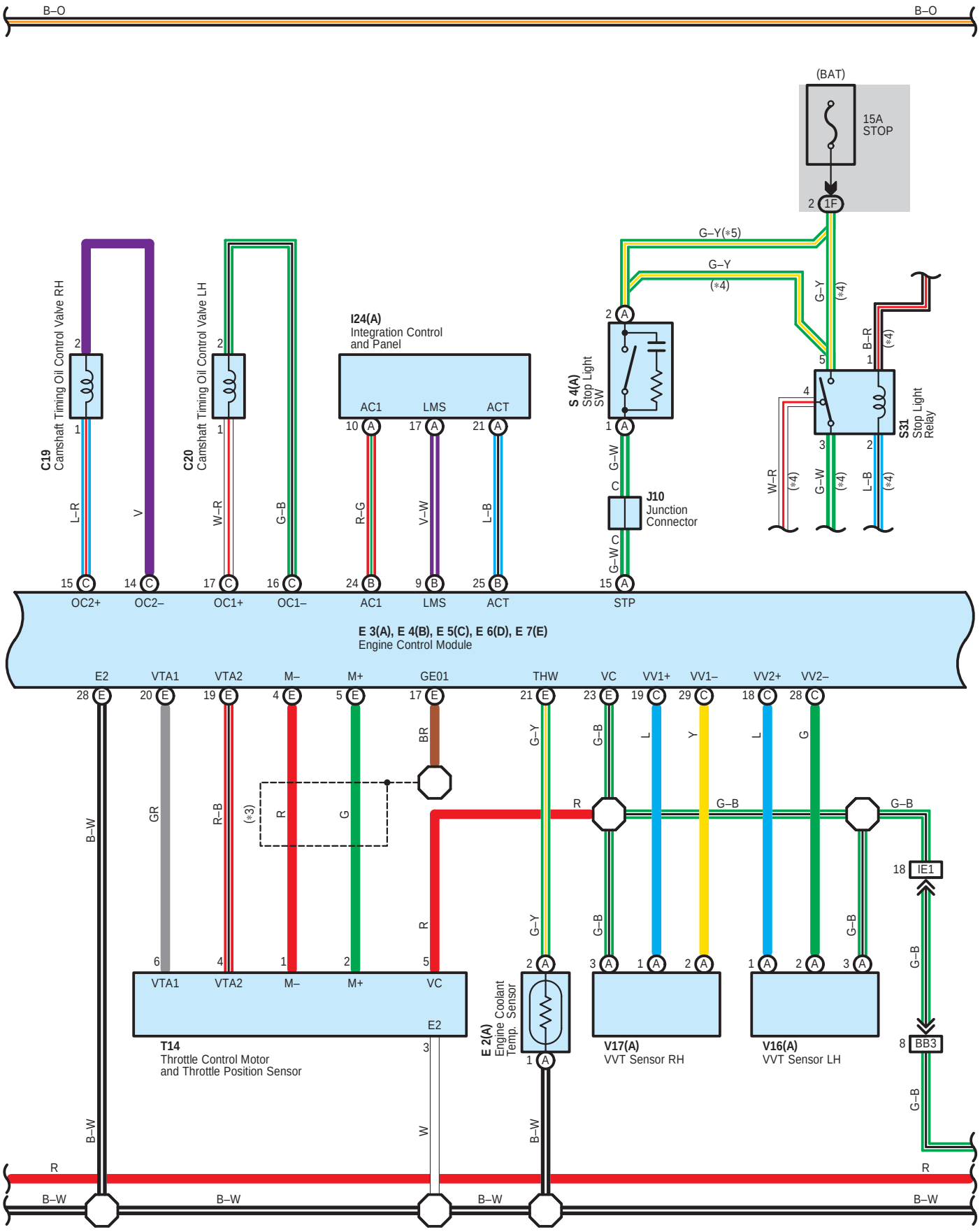

* 3 : Shielded
5A IGN
J26(A), J27(B) Junction Connector
J66(A) Junction Connector
Park/Neutral Position SW
I14 Injector No. 1
I16 Injector No. 3
I18 Injector No. 5
FPR
MREL
BATT
IGSW
NSW
#10
#30
#50
E 3(A), E 4(B), E 5(C), E 6(D), E 7(E)
Engine Control Module
CANL
CANH
TC
FC
+B
+B2
ACCR
STSW
STA
A2A+
A2A–
HA2A
A1A+
A1A–
HA1A
ST Relay
ST Fuse
A30 Air Fuel Ratio Sensor (Bank 2 Sensor 1)
A10 Air Fuel Ratio Sensor (Bank 1 Sensor 1)
AF+
AF–
+B
HT

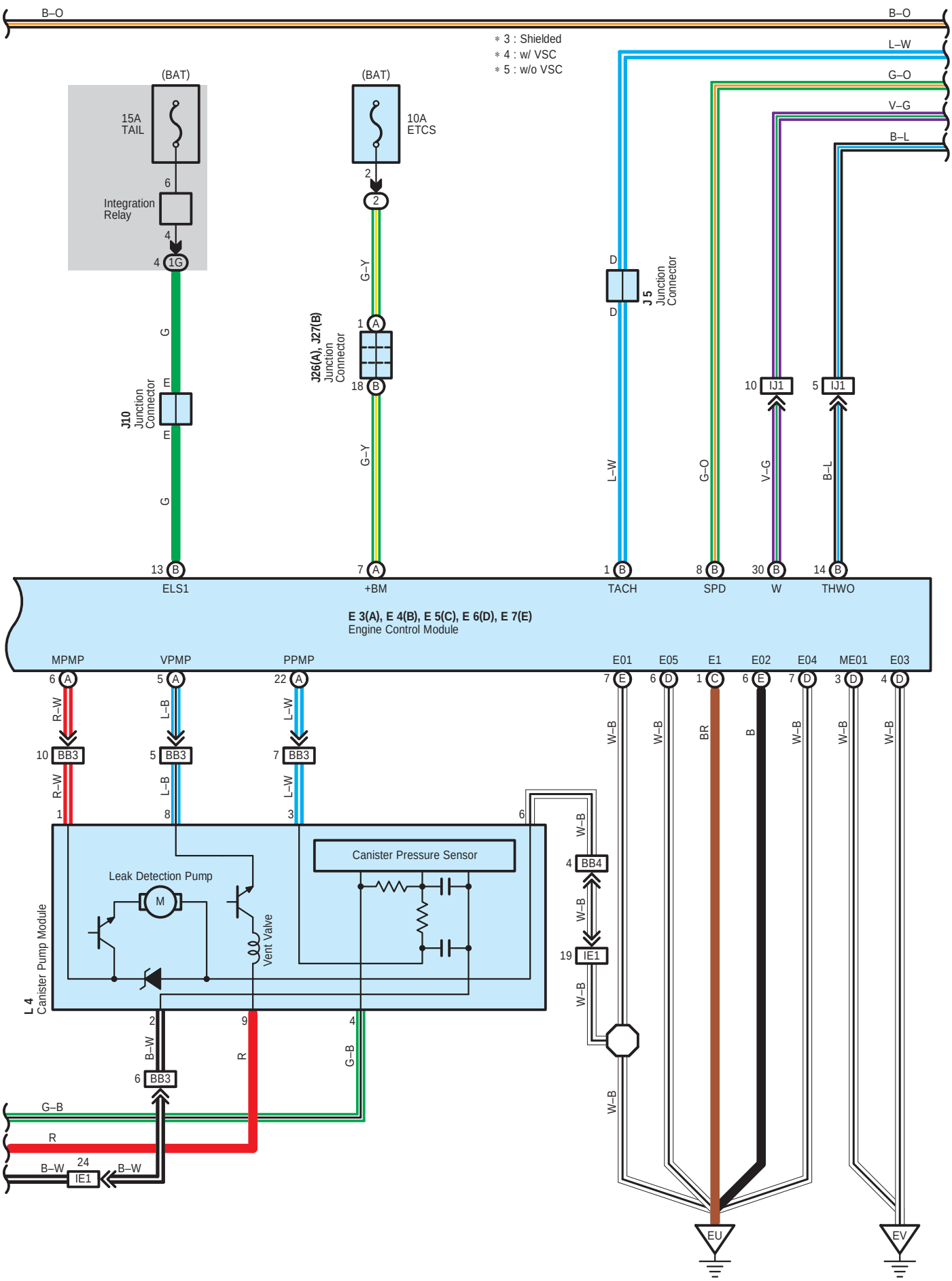
Engine Control for 1GR–FE (Access/Standard Cab)



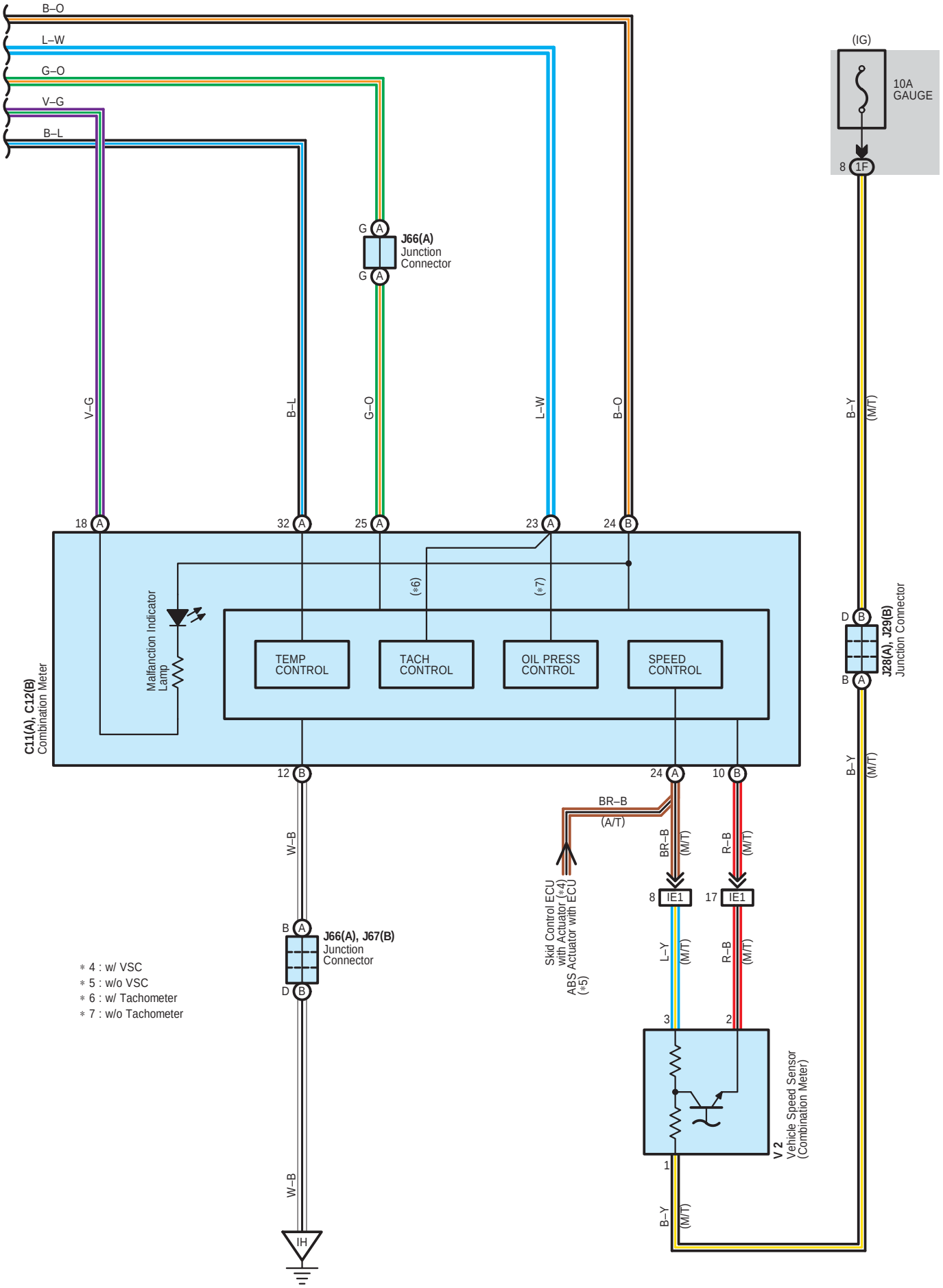

B–O
B–O
B–R
B–R
∗ 3 : Shielded
B–Y
B–Y
B–R
B–Y
B–R
B–Y
I 7
Igniter and Ignition Coil No. 5
I 8
Igniter and Ignition Coil No. 6
A20(A), (B)
Accelerator Pedal Position Sensor
VPA2 VPA EPA VCPA VCP2 EPA2
(A/T)
(M/T)
GSW2
C 5(B)
Center Airbag Sensor Assembly
R–B
IJ1
L–B
R–W
B–Y
L
R–G
V–R
P–G
G–R
LG–R
R–B
IGT5
IGT6
IGF1
VPA2
VPA
EPA
VCPA
VCP2
EPA2
F/PS
E 3(A), E 4(B), E 5(C), E 6(D), E 7(E)
Engine Control Module
KNK1
EKNK
KNK2
EKN2
ACIS
PRG
THA
E2G
VG
(∗3)
BR
G
R
W
B
G–W
Y–G
R–L
EF2
V13
VSV(ACIS)
V 4(A)
VSV (Purge)
THA
E2G
VG
+B
E2
M 1(A)
Mass Air Flow Meter
K 1
Knock Sensor
(Bank 1)
K 2(A)
Knock Sensor
(Bank 2)
BR
R
B–W

Engine Control for 1GR–FE (Access/Standard Cab)




B–O
B–O
＊3 : Shielded
＊4 : w/ VSC
＊5 : w/o VSC
L–W
G–O
V–G
B–L
(BAT)
15A
TAIL
6
Integration
Relay
4
4
1G
G
E
J10
Junction
Connector
E
G
13
B
ELS1
(BAT)
10A
ETCS
2
2
G–Y
1
A
J26(A), J27(B)
Junction
Connector
18
B
G–Y
7
A
+BM
D
D
J5
Junction
Connector
L–W
1
B
TACH
G–O
8
B
SPD
10
IJ1
V–G
30
B
W
5
IJ1
B–L
14
B
THWO
E 3(A), E 4(B), E 5(C), E 6(D), E 7(E)
Engine Control Module
MPMP
VPMP
PPMP
E01
E05
E1
E02
E04
ME01
E03
6
A
R–W
10
BB3
R–W
1
5
A
L–B
5
BB3
L–B
8
22
A
L–W
7
BB3
L–W
3
7
E
W–B
6
D
W–B
1
C
BR
6
E
B
7
D
W–B
3
D
W–B
4
D
W–B
6
W–B
4
BB4
W–B
19
IE1
W–B
L 4
Canister Pump Module
Leak Detection Pump
M
Vent Valve
Canister Pressure Sensor
2
B–W
6
BB3
9
R
4
G–B
G–B
R
B–W
24
IE1
B–W
EU
EV

Engine Control for 1GR–FE (Access/Standard Cab)



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, detects the vehicle speed and input to the speed sensor of the skid control ECU with actuator, from skid control ECU to TERMINAL SPD of the engine control module, via 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 IGN 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.

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 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 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 and 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 F/PMP relay.
* 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.

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.

: Parts Location

Code		See Page	Code		See Page	Code		See Page
A10		58 (1GR–FE)	I3		59 (1GR–FE)	J27	B	62
A20	A	60	I4		59 (1GR–FE)	J28	A	62
	B	60	I5		59 (1GR–FE)	J29	B	62
A22		60	I6		59 (1GR–FE)	J65		62
A30		58 (1GR–FE)	I7		59 (1GR–FE)	J66	A	62
C2	A	58 (1GR–FE)	I8		59 (1GR–FE)	J67	B	62
C5	B	60	I14		59 (1GR–FE)	J71	D	62
C11	A	60	I15		59 (1GR–FE)	J72	E	62
C12	B	60	I16		59 (1GR–FE)	K1		59 (1GR–FE)
C19		58 (1GR–FE)	I17		59 (1GR–FE)	K2	A	59 (1GR–FE)
C20		58 (1GR–FE)	I18		59 (1GR–FE)	L4		64 (*3)
D6		61	I19		59 (1GR–FE)			65 (*4)
E2	A	58 (1GR–FE)	I23	A	61	M1	A	59 (1GR–FE)
E3	A	61	I24	A	61	P2		59 (1GR–FE)
E4	B	61	J1		59 (1GR–FE)	S4	A	63
E5	C	61	J3		62	S31		63
E6	D	61	J5		62	T14		59 (1GR–FE)
E7	E	61	J8		62	V2		59 (1GR–FE)
F5	A	58 (1GR–FE)	J9		62	V4	A	59 (1GR–FE)
F10		64 (*3)	J10		62	V13		59 (1GR–FE)
		65 (*4)	J12		62	V16	A	59 (1GR–FE)
H4		58 (1GR–FE)	J18		59 (1GR–FE)	V17	A	59 (1GR–FE)
H6		58 (1GR–FE)	J26	A	62			

: Relay Blocks

Code	See Page	Relay Blocks (Relay Block Location)
2	24	Engine Room R/B (Engine Compartment Left)

: Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	26 (*1)	Cowl Wire and Driver Side J/B (Lower Finish Panel)
	30 (*2)	
1F	26 (*1)	
	30 (*2)	
1G	26 (*1)	
	30 (*2)	
1I	26 (*1)	
	30 (*2)	
1J	26 (*1)	
	30 (*2)	
1K	26 (*1)	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
	30 (*2)	

* 1 : w/o Daytime Running Light * 2 : w/ Daytime Running Light * 3 : Access Cab * 4 : Standard Cab * 5 : Access Cab Captain Seat
* 6 : Access Cab Separate Seat * 7 : Standard Cab Bench Seat

Engine Control for 1GR–FE (Access/Standard Cab)

: Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EA2	81 (1GR–FE)	Cowl Wire and Engine Room Main Wire (Right Fender)
EF2	81 (1GR–FE)	Engine Wire and Sensor Wire (Over the Cylinder Head)
IA9	82	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
IE1	83	Engine Wire and Cowl Wire (Right Side of Instrument Panel)
IJ1	83	Cowl Wire and Cowl Wire (Right Side of Instrument Panel)
BB3	84 (*3)	Frame Wire and Cowl Wire (Under the Driver's Seat)
	85 (*4)	
BB4	84 (*3)	
	85 (*4)	

: Ground Points

Code	See Page	Ground Points Location
EA	81 (1GR–FE)	Front Left Fender
ET	81 (1GR–FE)	Front Right Fender
EU	81 (1GR–FE)	Rear Bank of Right Cylinder Head
EV	81 (1GR–FE)	Rear Bank of Left Cylinder Head
IF	82	Left Kick Panel
IH	82	Right Kick Panel

* 1 : w/o Daytime Running Light * 2 : w/ Daytime Running Light * 3 : Access Cab * 4 : Standard Cab * 5 : Access Cab Captain Seat
* 6 : Access Cab Separate Seat * 7 : Standard Cab Bench Seat