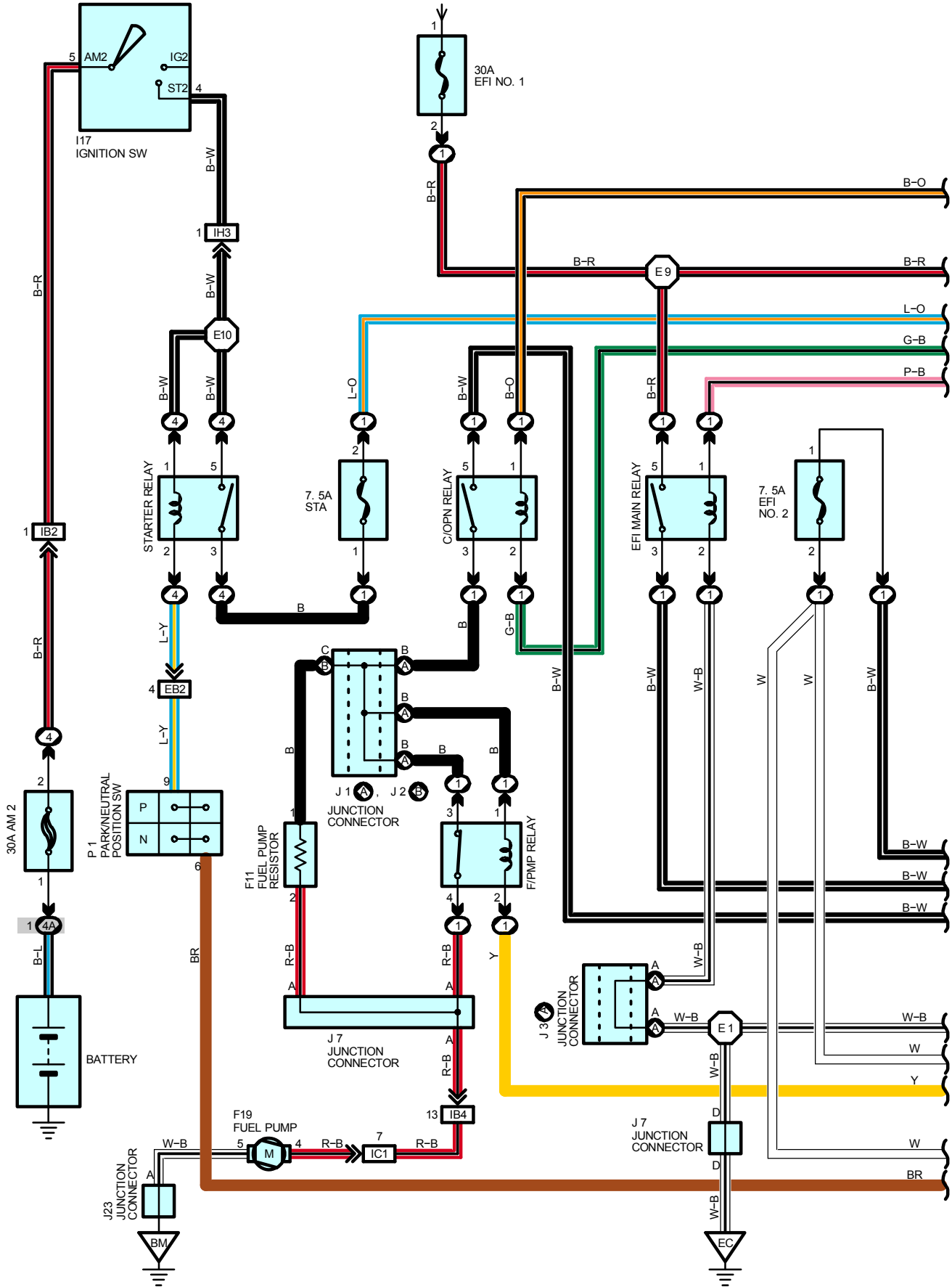
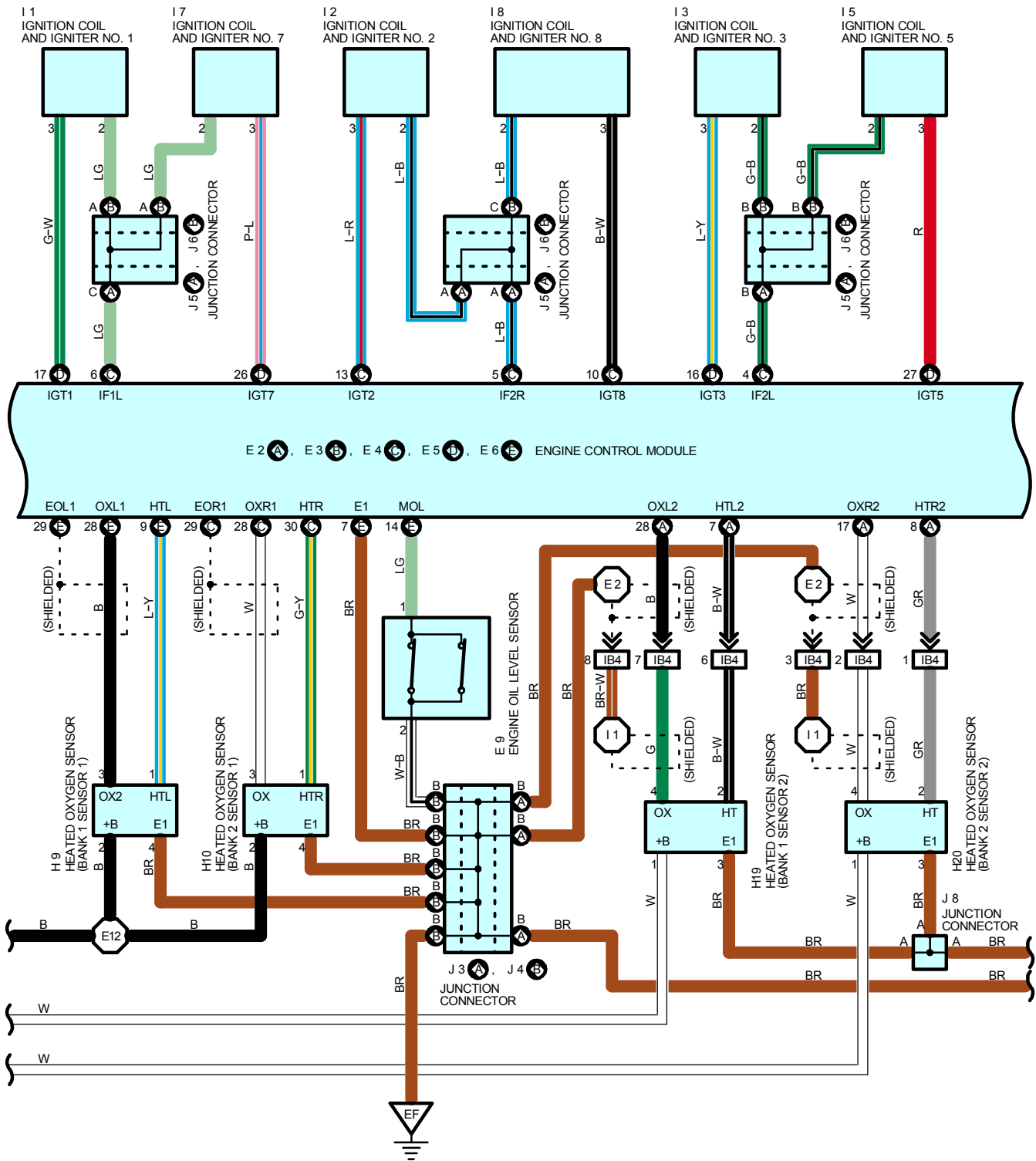


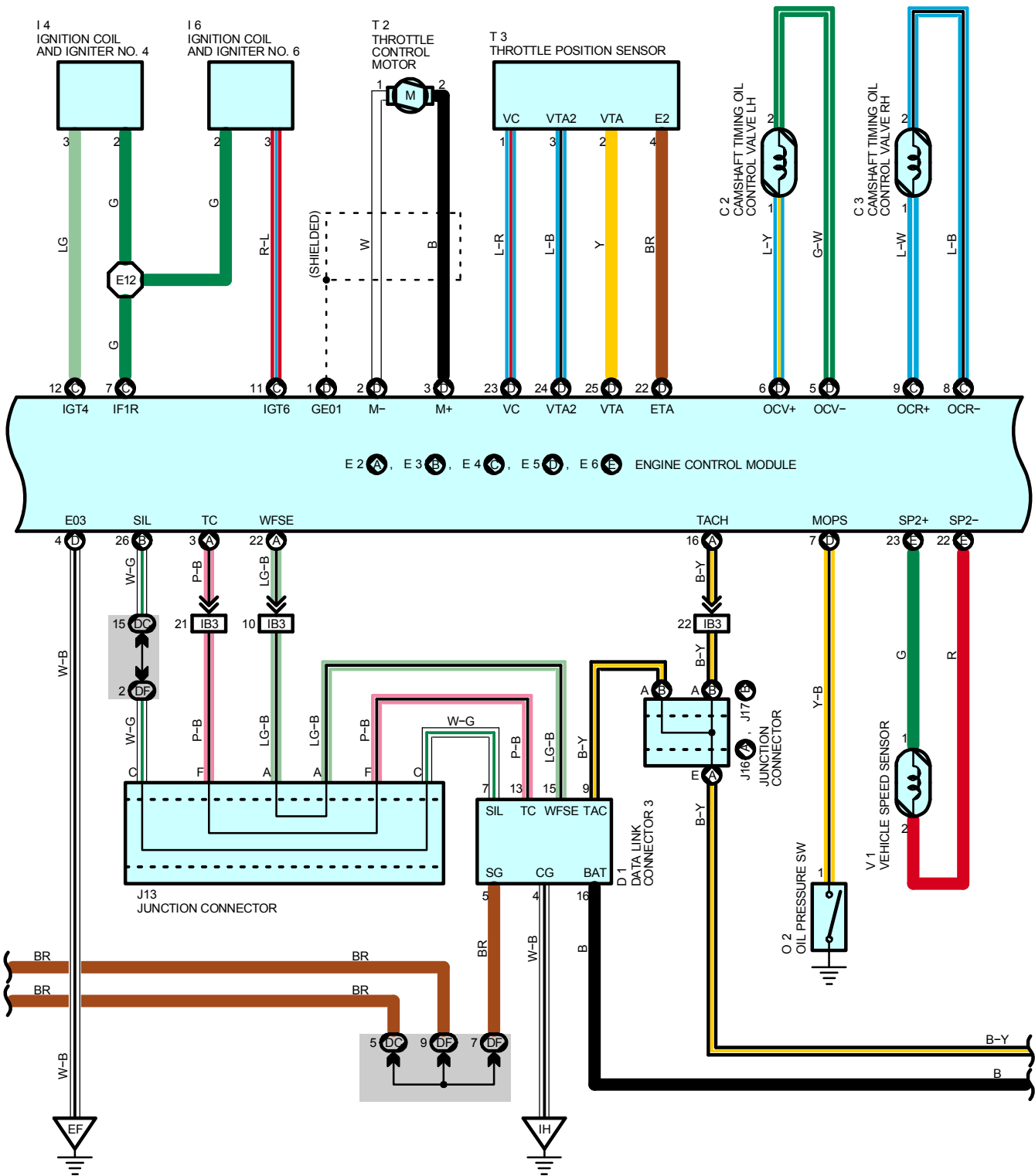
ENGINE CONTROL

FROM POWER SOURCE SYSTEM (SEE PAGE 70)



ENGINE CONTROL

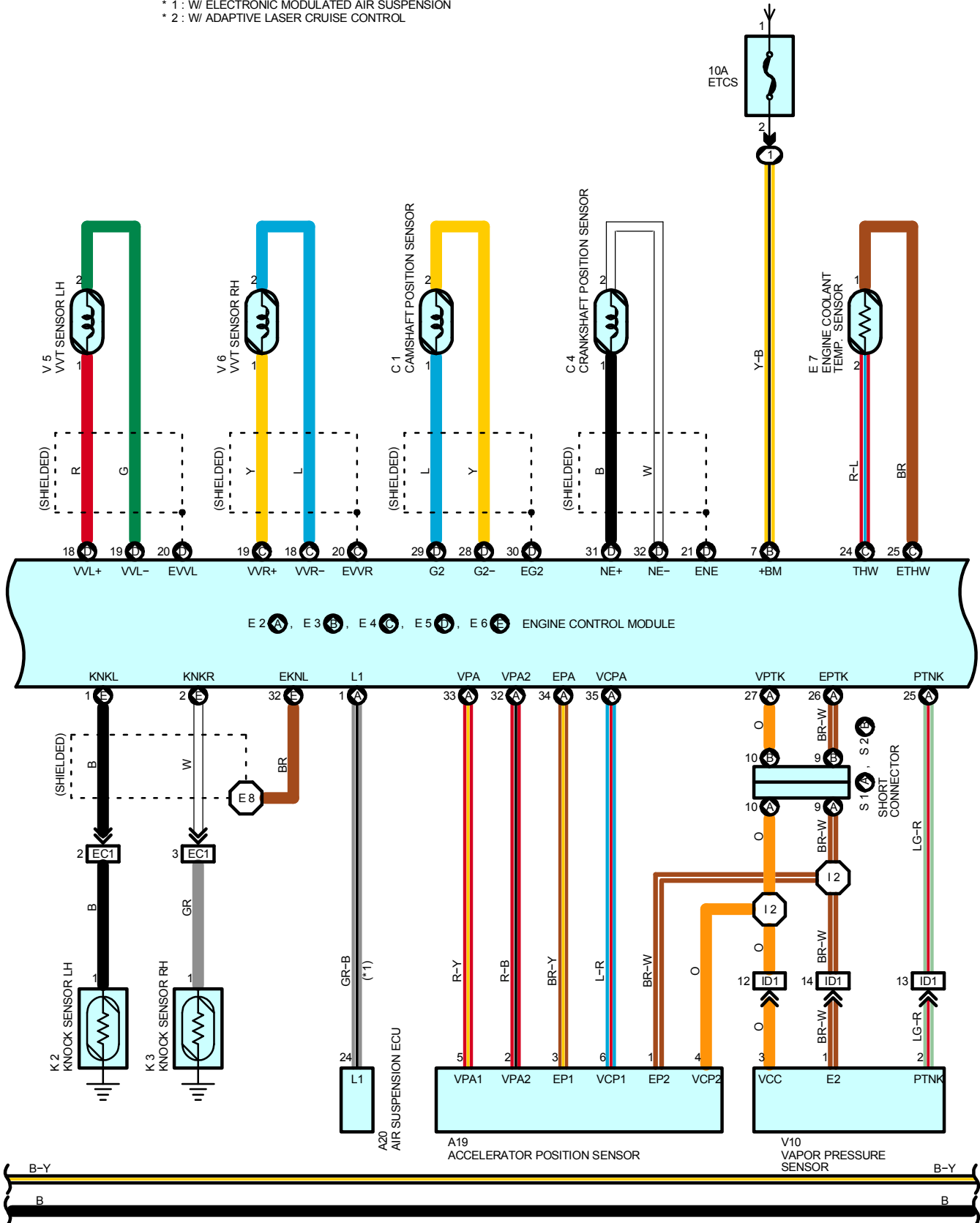




ENGINE CONTROL

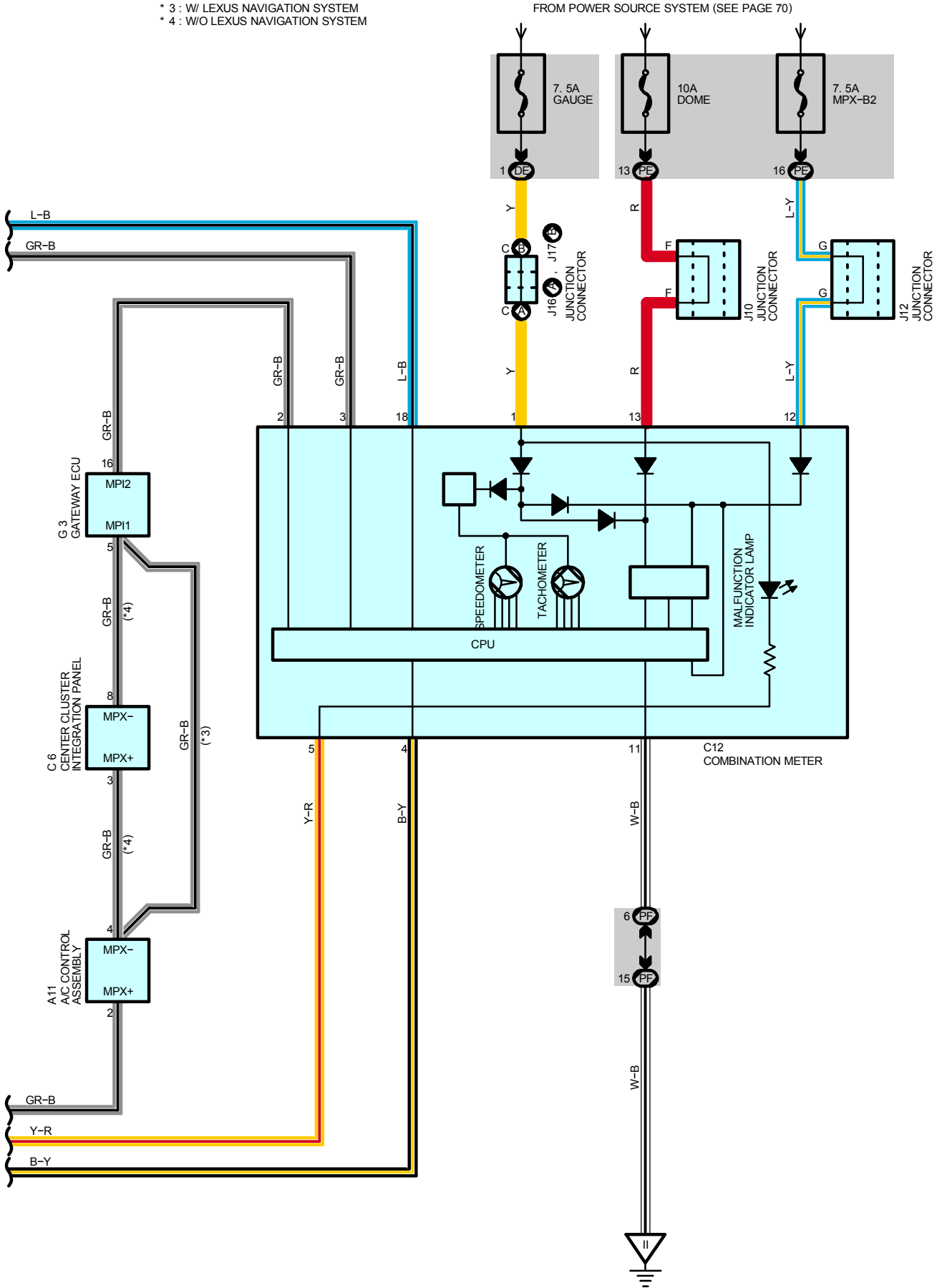
- * 1 : W/ ELECTRONIC MODULATED AIR SUSPENSION
- * 2 : W/ ADAPTIVE LASER CRUISE CONTROL

FROM POWER SOURCE SYSTEM (SEE PAGE 70)



ENGINE CONTROL

- * 3 : W/ LEXUS NAVIGATION SYSTEM
- * 4 : W/O LEXUS NAVIGATION SYSTEM



SYSTEM OUTLINE

This system utilizes an engine control module and maintains overall control of the engine, transmission and so on. An outline of the engine control is explained 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 (Bank 1 sensor 1, bank 2 sensor 1, bank 1 sensor 2 and bank 2 sensor 2) to TERMINALS OXL1, OXR1, OXL2 and OXR2 of the engine control module.
To stabilize detection performance by the heated oxygen sensors, the heated oxygen sensors are warmed. This heater is also controlled by the engine control module (HTL, HTR, HTL2 and HTR2).
- (4) RPM signal circuit
Camshaft position is detected by the camshaft position sensor and its signal is input to TERMINAL G2 of the engine control module as a control signal. Also, the engine RPM is detected by the crankshaft position sensor installed in the cylinder block and the signal is input into TERMINAL NE+ of the engine control module as a control signal.
- (5) Throttle signal circuit
The throttle position sensor detects the throttle valve opening angle as a control signal, which is input into TERMINALS VTA and VTA2 of the engine control module.
- (6) Vehicle speed circuit
The vehicle speed sensor detects the vehicle speed and inputs a control signal to TERMINAL SP2+ of the engine control module.
- (7) Accelerator signal circuit
The Accelerator position sensor detects the accelerator pedal opening degree. And the control signal is input in the TERMINAL VPA and VPA2 of the engine control module.
- (8) Battery signal circuit
Voltage is constantly applied to the battery terminal of the engine control module. When the ignition SW is turned to ON, voltage for engine control module operation is applied via the EFI MAIN relay to TERMINALS +B and +B1 of the engine control module.
- (9) 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 engine control module as a control signal.
- (10) Stop light SW signal circuit
The stop light SW is used to detect whether or not the vehicle is braking and the signal is input into TERMINAL STP of the engine control module as a control signal.
- (11) 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 control module as a control signal.
- (12) Engine knock signal circuit
Engine knocking is detected by knock sensor LH and RH and the signal is input into TERMINALS KNKL and KNKR as a control signal.
- (13) VVT-I signal circuit
The VVT sensor LH, RH detects the real valve timing. And the control signal is input in TERMINAL VVL+ and VVR+ of the engine control module.

ENGINE CONTROL

2. CONTROL SYSTEM

* SFI system

The SFI system monitors the engine condition through the signals input from each sensor to the engine control module. The best fuel injection timing is decided based on this data and the program memorized by the engine control module, and the control signal is output to TERMINALS #1, #2, #3, #4, #5, #6, #7 and #8 of the engine control module to operate the injector (Inject the fuel). The SFI system controls the fuel injection operation by the engine control module in response to the driving conditions.

* ESA system

The ESA system monitors the engine condition through the signals input to the engine control module from each sensor. The best ignition timing is decided according to this data and the memorized data in the engine control module, and the control signal is output to TERMINAL IGT1, IGT2, IGT3, IGT4, IGT5, IGT6, IGT7 and IGT8. This signal controls the ignition coil and igniter to provide the best ignition timing for the driving conditions.

* 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 emissions is low), and warms up the heated oxygen sensors (Bank 1 sensor 1, bank 2 sensor 1, bank 1 sensor 2 and bank 2 sensor 2) to improve detection performance of the sensors.

The engine control module evaluates the signals from each sensor, and outputs current to TERMINALS HTL, HTR, HTL2 and HTR2 to control the heater.

* ACIS

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.

The engine control module judges the engine speed by the signals from each sensor and outputs signals to the TERMINAL ACIS to control the VSV (ACIS).

* ETCS-i

The ETCS-i controls the engine output at its optimal level corresponding to the opening of the accel. pedal under all driving conditions.

* MPX

The MPX communicates with the combination meter, A/C control assembly, as well as J/B ECU of the multiplex communication system

* Fuel pump control

The engine control module outputs current to TERMINAL FPR and controls the F/PMP relay and fuel pump drive speed in response to driving conditions.

3. DIAGNOSIS SYSTEM

With the 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 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 engine control module memory or else stops the engine.

SERVICE HINTS

E3 (B), E4 (C), E5 (D), E6 (E) ENGINE CONTROL MODULE

(B) 4, (B) 7-GROUND : Always approx. 12 volts

(B) 17-GROUND : Approx. 12 volts with ignition SW at **ON** or **ST** position

(B) 2, (C) 1, (C) 2, (C) 3, (D) 4, (E) 7-GROUND : Always continuity

○ : PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
A11	46	I1	44	J16	A 47
A19	46	I2	44	J17	B 47
A20	46	I3	44	J23	51
A24	46	I4	44	K2	44
C1	42	I5	44	K3	44
C2	42	I6	44	M1	44
C3	42	I7	44	O2	45
C4	42	I8	44	P1	45
C6	46	I9	44	P4	A 48
C12	46	I10	44	S1	A 45
D1	47	I11	44	S2	B 45
D2	47	I12	44	S10	A 49
D3	47	I13	44	S11	B 49
E2	A 42	I14	44	S12	C 49
E3	B 42	I15	44	S13	D 49
E4	C 42	I16	44	S19	49
E5	D 42	I17	47	T2	45
E6	E 42	J1	A 44	T3	45
E7	42	J2	B 44	T9	49
E9	42	J3	A 44	V1	45
F11	43	J4	B 44	V2	45
F19	50	J5	A 44	V3	45
G2	43	J6	B 44	V4	45
G3	47	J7	44	V5	45
H9	43	J8	47	V6	45
H10	43	J10	47	V10	53
H19	47	J12	47	V11	53
H20	47	J13	47		

○ : RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
1	24	Engine Room No.1 R/B (Engine Compartment Left)
4	27	Fusible Link Block (Engine Compartment Right)

○ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
4A	27	Engine Room Main Wire and Fusible Kink Block (Engine Compartment Right)
DC	30	Engine Room Main Wire and Driver Side J/B (Left Kick Panel)
DE	29	Instrument Panel Wire and Driver Side J/B (Left Kick Panel)
DF		
DH		
DI	31	Floor No.2 Wire and Driver Side J/B (Left Kick Panel)
PE	36	Instrument Panel Wire and Passenger Side J/B (Right Kick Panel)
PF		
PH		

ENGINE CONTROL

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EB1	56	Engine Wire and Engine Room Main Wire (Inside of ECU Box)
EB2		
EC1	56	Engine No.2 Wire and Engine Wire (Behind the Intake Manifold)
IB2	58	Instrument Panel Wire and Engine Room Main Wire (Cowl Side Panel LH)
IB3		
IB4		
IC1	58	Instrument Panel Wire and Floor No.2 Wire (Cowl Side Panel LH)
ID1	58	Engine Room Main Wire and Floor No.2 Wire (Cowl Side Panel LH)
IH2	60	Instrument Panel Wire and Engine Room Main Wire (Cowl Side Panel RH)
IH3		

: GROUND POINTS

Code	See Page	Ground Points Location
EC	56	Radiator Side Support LH
EE	56	RH Side of Cylinder Head
EF	56	LH Side of Cylinder Head
IH	58	Right Side of Shift Lever
II		
BM	62	Quarter Panel LH

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E1	56	Engine Room Main Wire	E12	56	Engine Wire
E2			E13		
E8	56	Engine Wire	I1	60	Instrument Panel Wire
E9	56	Engine Room Main Wire	I2	60	Engine Room Main Wire
E10					

