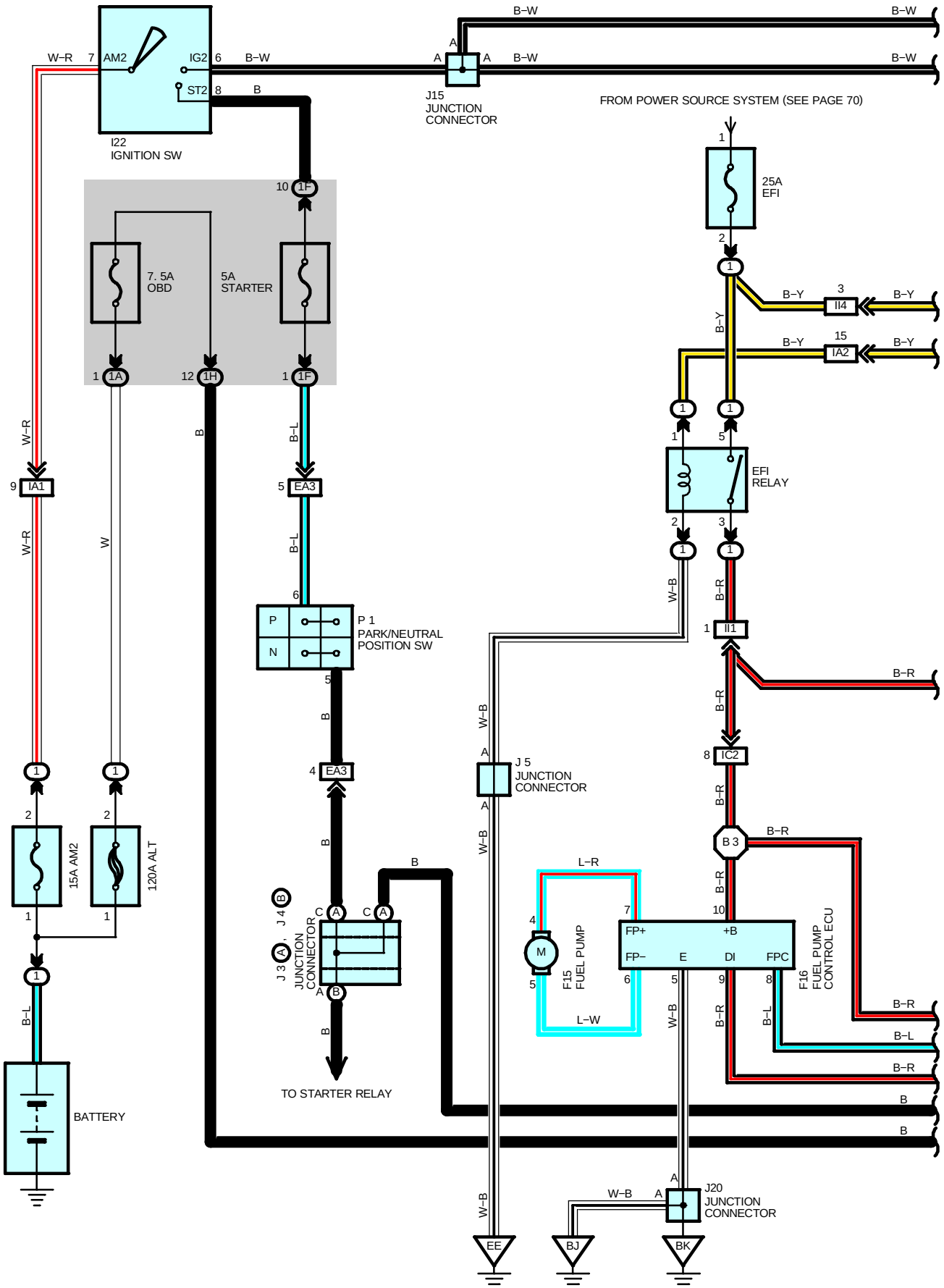
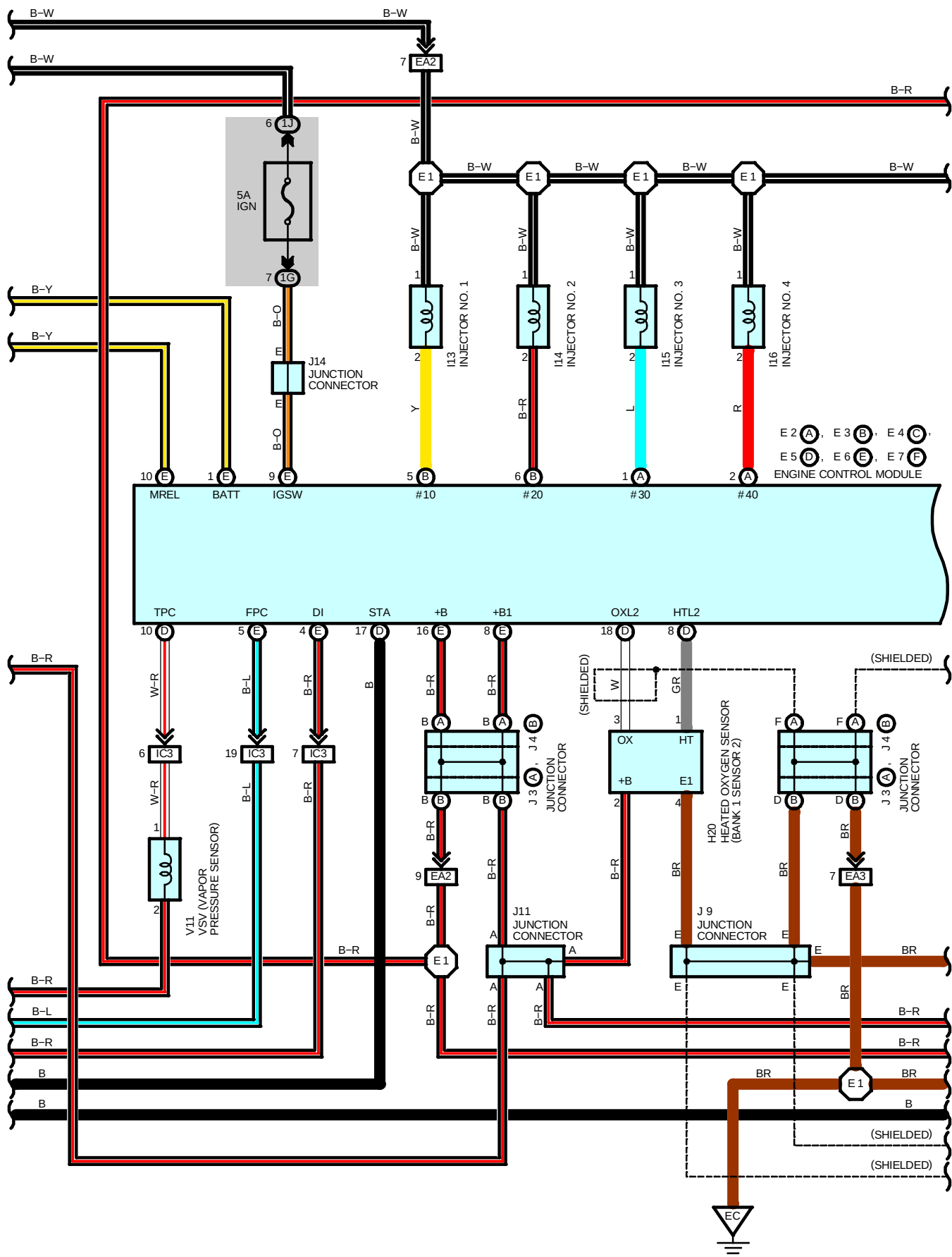
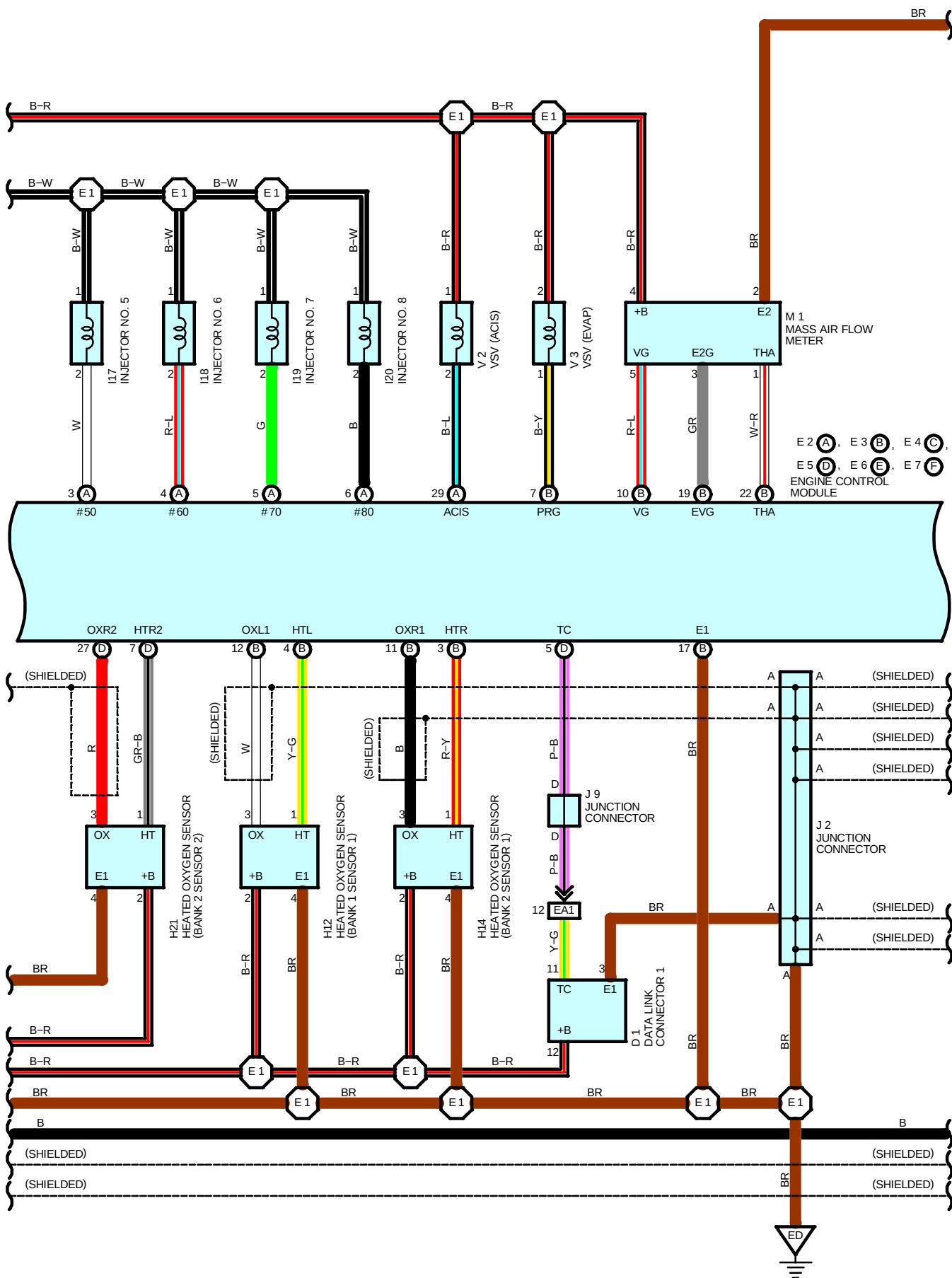


ENGINE CONTROL (1UZ-FE)

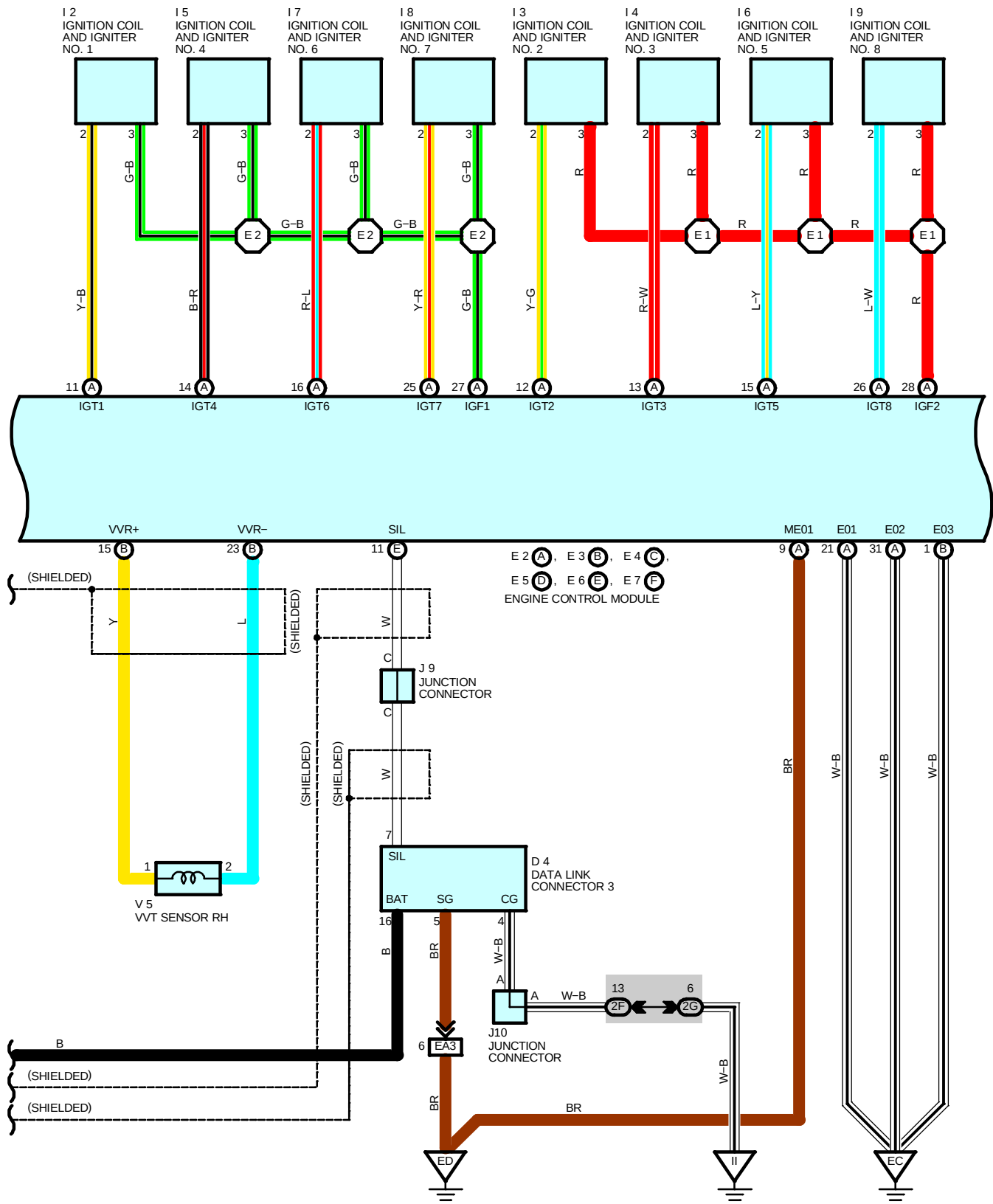


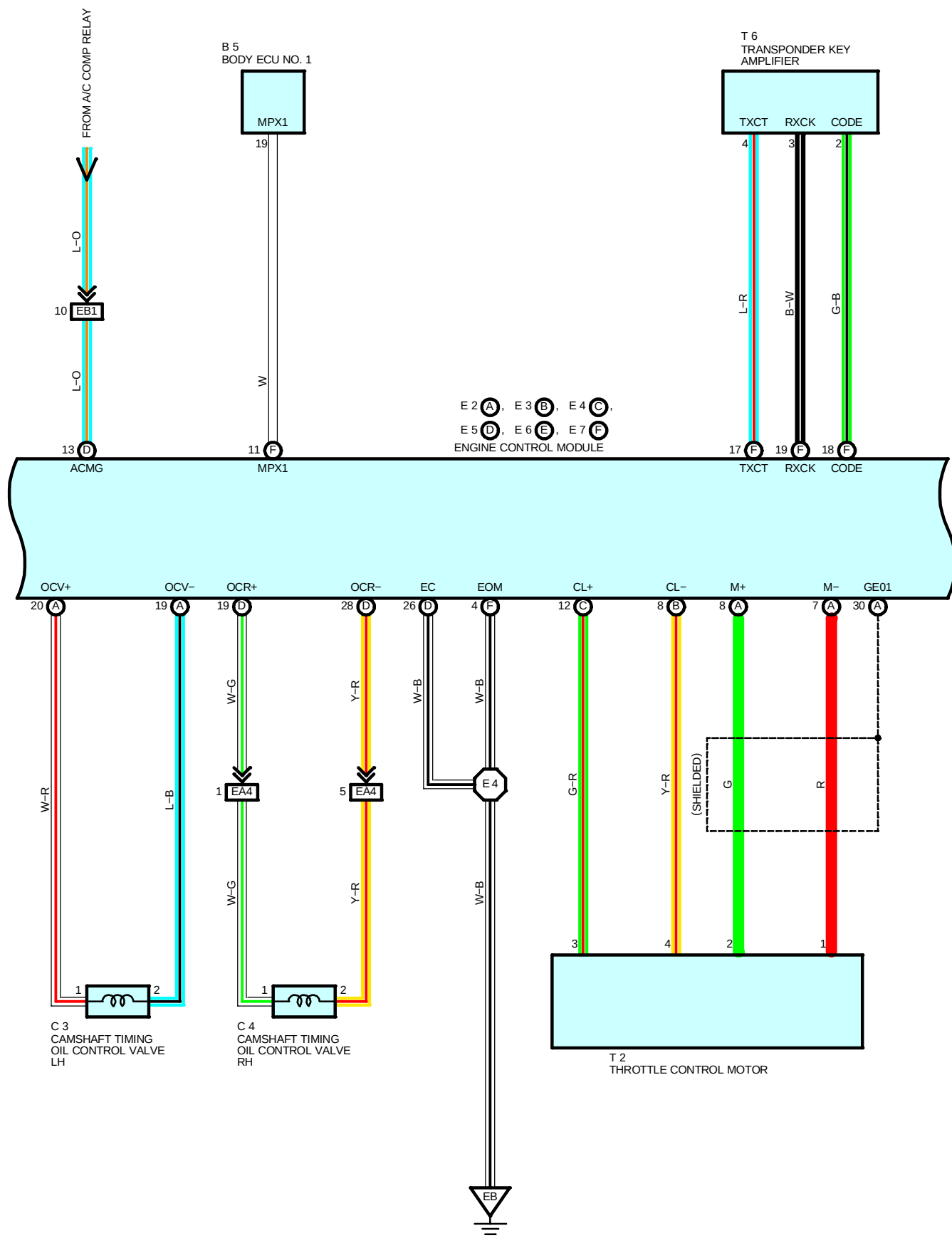


ENGINE CONTROL (1UZ-FE)

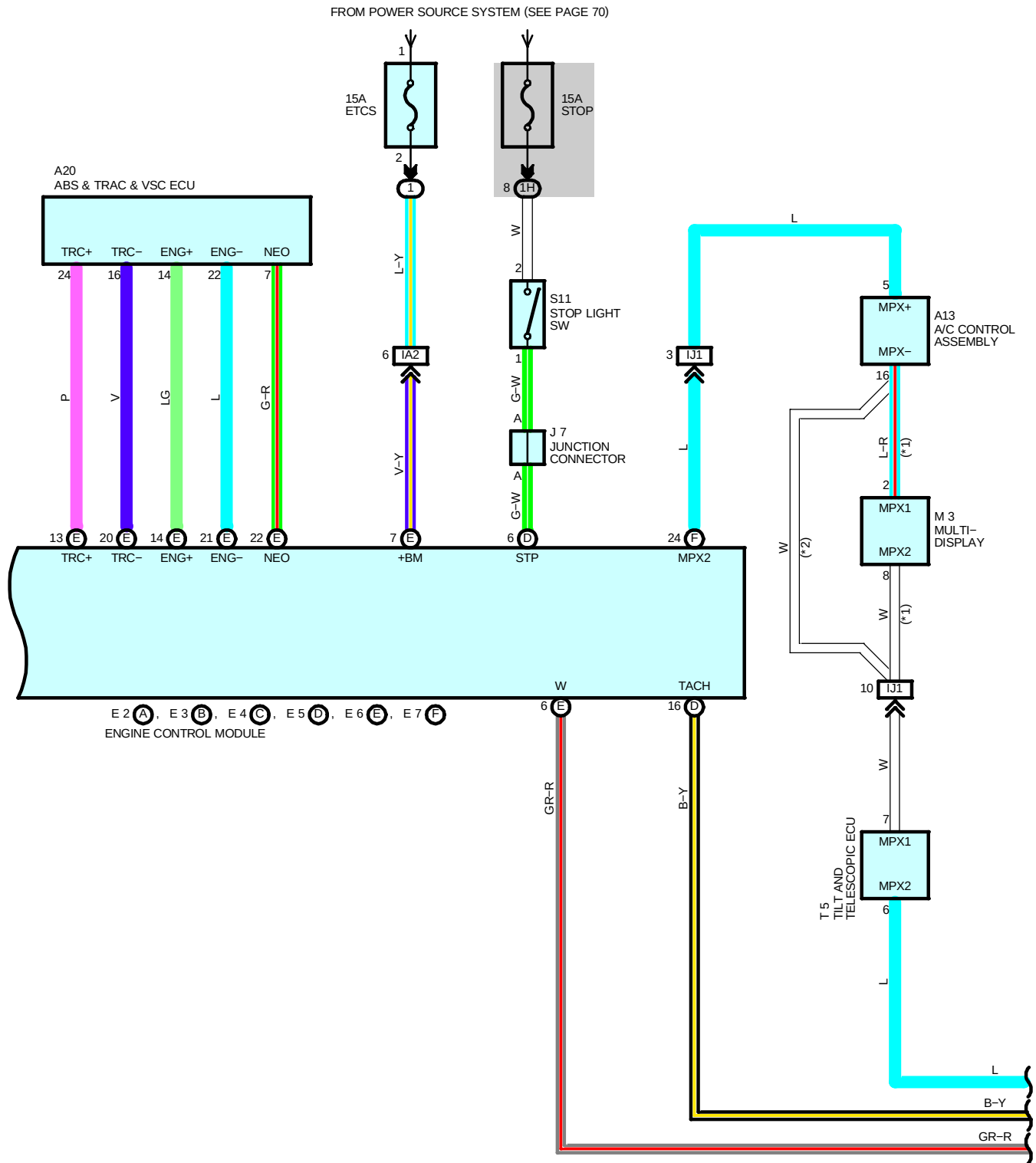


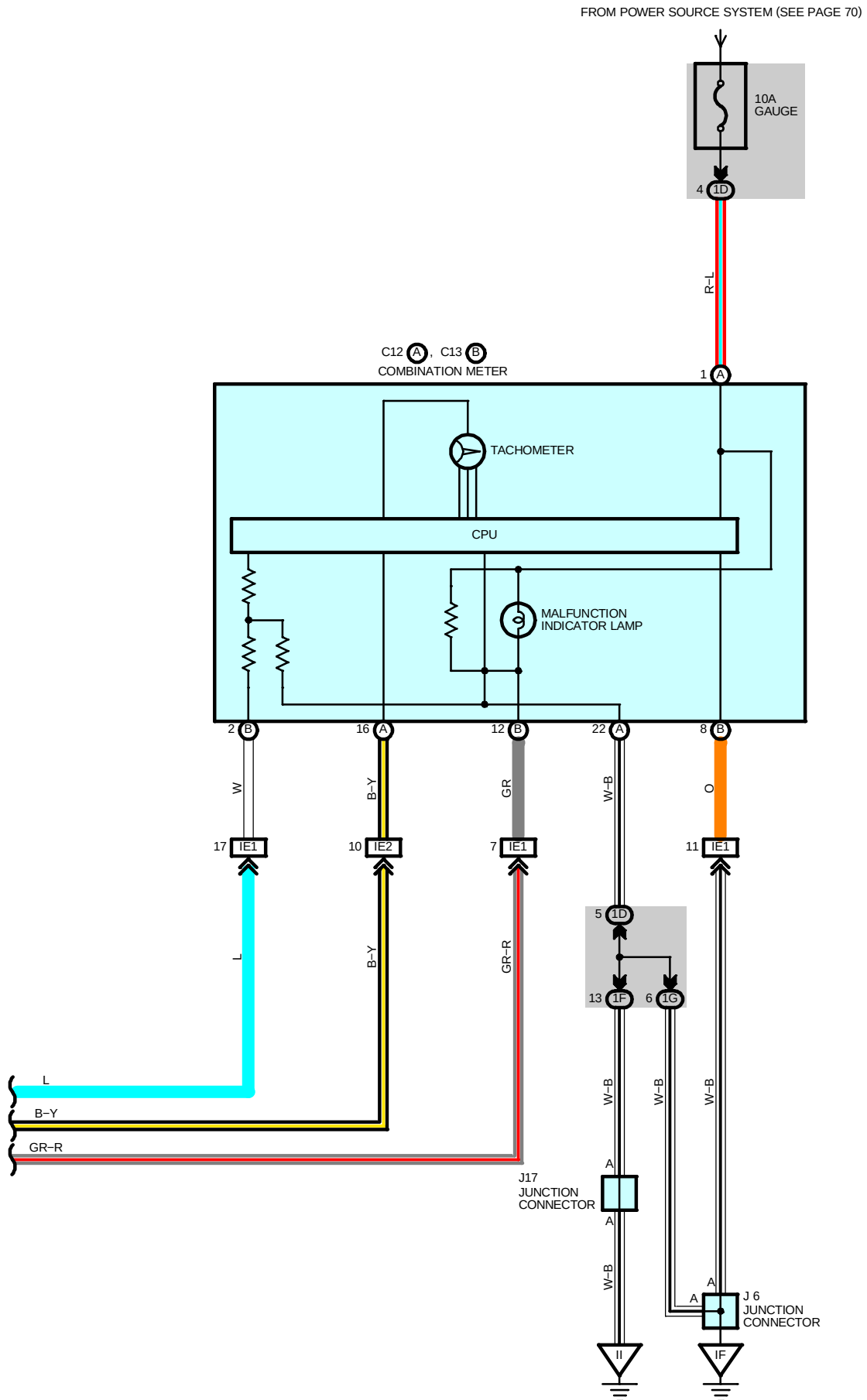
ENGINE CONTROL (1UZ-FE)





ENGINE CONTROL (1UZ-FE)





ENGINE CONTROL (1UZ-FE)

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

Signals detected by ABS speed sensors are input into the combination meter through ABS & TRAC & VSC ECU. Then it is delivered to the engine ECU through MPX communication.

(7) A/C SW signal circuit

The operating voltage of the A/C magnetic clutch is detected and the signal is input into **TERMINAL ACMG** of the engine control module as a control signal.

(8) Battery signal circuit

Voltage is constantly applied to **TERMINAL BATT** of the engine control module. With the ignition SW turned on, Voltage for engine control module start-up power supply is applied to **TERMINALS +B** and **+B1** of the engine control module via the EFI relay.

The current flowing through the **IGN** fuse to **TERMINAL IGSW** of the engine control module.

Voltage is constantly applied to **TERMINAL +BM** 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 1 and 2 and the signal is input into **TERMINALS KNKL** and **KNKR** as a control signal.

2. CONTROL SYSTEM

* SFI system

The SFI system monitors the engine condition through the signals input from each sensor (Input signals from (1) to (12) etc.) 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 #10, #20, #30, #40, #50, #60, #70 and #80** of the engine control module to operate the injector (Inject the fuel). The sequential multiport fuel injection (Electronic fuel injection) system controls the fuel injection operation by the engine control module in response to the driving conditions.

* ESA (Electronic Spark Advance) system

The ESA system monitors the engine condition through the signals input to the engine control module from each sensor (Input signals from (1), (2), (4) to (12) etc.). 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 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 (Input signals from (1), (2), (4), (8) to (10) etc.), 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 ((4), (5)) from each sensor and outputs signals to the **TERMINAL ACIS** to control the VSV (ACIS).

* Fuel pump control

The engine control module outputs current to **TERMINAL FPC** and controls the fuel pump control ECU and fuel pump drive speed in response to driving conditions.

* 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 body ECU of the multiplex communication system

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.

ENGINE CONTROL (1UZ-FE)

SERVICE HINTS

EFI RELAY

5-3 : Closed with ignition SW at **ON** or **ST** position

E8 ENGINE COOLANT TEMP. SENSOR

1-2 : Approx. **15.0 kΩ** (**-20°C**, **-4°F**)

Approx. **2.45 kΩ** (**20°C**, **68°F**)

Approx. **0.32 kΩ** (**80°C**, **176°F**)

Approx. **0.14 kΩ** (**110°C**, **230°F**)

E2 (A), E3 (B), E5 (D), E6 (E) ENGINE CONTROL MODULE

BATT-GROUND : Always approx. **12** volts

+BM-GROUND : Always approx. **12** volts

IGSW-GROUND : Approx. **12** volts with ignition SW at **ON** or **ST** position

+B, +B1-GROUND : Approx. **12** volts with ignition SW at **ON** or **ST** position

VC-GROUND : **4.5-5.5** volts with ignition SW on

VTA2-GROUND : **2.0-2.9** volts with ignition SW on and throttle valve fully closed

4.6-5.0 volts with ignition SW on and throttle valve fully opened

VTA-GROUND : **0.4-1.0** volts with ignition SW on and throttle valve fully closed

3.2-4.8 volts with ignition SW on and throttle valve fully opened

VPA-GROUND : **0.25-0.9** volts with ignition SW at on and accelerator fully closed

3.2-4.8 volts with ignition SW at on and accelerator fully opened

VPA2-GROUND : **1.8-2.7** volts with ignition SW at on and accelerator fully closed

4.7-5.0 volts with ignition SW at on and accelerator fully opened

THA-GROUND : **0.5-3.4** volts with idling, intake air temp. **20°C (68°F)**

THW-GROUND : **0.2-1.0** volts with idling, coolant temp. **80°C (176°F)**

STA-GROUND : **6.0** volts or more with cranking

TC-GROUND : **9.0-14.0** volts with ignition SW on

W-GROUND : **9.0-14.0** volts with idling

0-3.0 volts with ignition SW on

ACMG-GROUND : **0-1.5** volts with A/C SW on (at idling)

7.5-14.0 volts with A/C SW off and throttle valve fully open

#10, #20, #30, #40, #50, #60, #70, #80-GROUND : **9.0-14.0** volts with ignition SW on pulse generation with idling

I13, I14, I15, I16, I17, I18, I19, I20 INJECTOR NO. 1, NO. 2, NO. 3, NO. 4, NO. 5, NO. 6, NO. 7, NO. 8

1-2 : **13.4-14.2 Ω**

○ : PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
A10	36 (1UZ-FE)	H21	40	J9	41
A13	40	I2	37 (1UZ-FE)	J10	41
A20	40	I3	37 (1UZ-FE)	J11	41
B5	40	I4	37 (1UZ-FE)	J14	41
C1	36 (1UZ-FE)	I5	37 (1UZ-FE)	J15	41
C3	36 (1UZ-FE)	I6	37 (1UZ-FE)	J17	41
C4	36 (1UZ-FE)	I7	37 (1UZ-FE)	J20	42
C5	36 (1UZ-FE)	I8	37 (1UZ-FE)	K1	37 (1UZ-FE)
C12	A 40	I9	37 (1UZ-FE)	K2	37 (1UZ-FE)
C13	B 40	I13	37 (1UZ-FE)	M1	37 (1UZ-FE)
D1	36 (1UZ-FE)	I14	37 (1UZ-FE)	M3	41
D4	40	I15	37 (1UZ-FE)	P1	37 (1UZ-FE)
E2	A 36 (1UZ-FE)	I16	37 (1UZ-FE)	S11	41
E3	B 36 (1UZ-FE)	I17	37 (1UZ-FE)	T2	37 (1UZ-FE)
E4	C 36 (1UZ-FE)	I18	37 (1UZ-FE)	T3	37 (1UZ-FE)
E5	D 36 (1UZ-FE)	I19	37 (1UZ-FE)	T5	41
E6	E 36 (1UZ-FE)	I20	37 (1UZ-FE)	T6	41
E7	F 36 (1UZ-FE)	I22	41	V2	37 (1UZ-FE)
E8	36 (1UZ-FE)	J2	37 (1UZ-FE)	V3	37 (1UZ-FE)
F15	42	J3	A 37 (1UZ-FE)	V4	37 (1UZ-FE)
F16	42	J4	B 37 (1UZ-FE)	V5	37 (1UZ-FE)
H12	36 (1UZ-FE)	J5	37 (1UZ-FE)	V10	43
H14	36 (1UZ-FE)	J6	41	V11	43
H20	40	J7	41		

○ : RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
1	22	Engine Room No.1 R/B (Engine Compartment Right)

○ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	26	Engine Room Main Wire and Driver Side J/B (Left Kick Panel)
1D	26	Instrument Panel Wire and Driver Side J/B (Left Kick Panel)
1F	26	Cowl Wire and Driver Side J/B (Left Kick Panel)
1G	27	
1H		
1J		
2F	28	
2G	29	

ENGINE CONTROL (1UZ-FE)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EA1	46 (1UZ-FE)	Engine Wire and Cowl Wire (Inside of the ECU Box)
EA2		
EA3		
EA4		
EB1	46 (1UZ-FE)	Cowl Wire and Relay Block Wire (Inside of the Engine Room No.3 R/B)
EC1	46 (1UZ-FE)	Engine No.2 Wire and Engine Wire (Near the Starter)
IA1	50	Engine Room Main Wire and Cowl Wire (Near the Driver Side J/B)
IA2		
IC2	50	Floor No.2 Wire and Cowl Wire (Left Kick Panel)
IC3		
IE1	50	Instrument Panel Wire and Cowl Wire (Left Side of the Steering Column)
IE2		
II1	52	Engine Room Main Wire and Cowl Wire (Near the Passenger Side R/B)
II4		
IJ1	52	Instrument Panel Wire and Cowl Wire (Left Side of the Blower Unit)

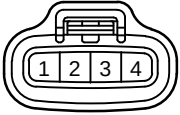
: GROUND POINTS

Code	See Page	Ground Points Location
EB	46 (1UZ-FE)	Left Fender
EC	46 (1UZ-FE)	RH Bank of the Cylinder Head
ED	46 (1UZ-FE)	LH Bank of the Cylinder Head
EE	46 (1UZ-FE)	Under the ABS & TRAC & VSC Actuator
IF	50	Left Kick Panel
II	50	Right Side of the Cowl Panel
BJ	54	Rear Floor Partition Panel LH
BK	54	Quarter Panel LH

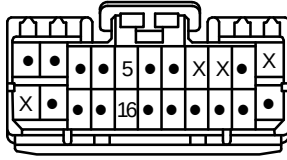
: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E1	46 (1UZ-FE)	Engine Wire	E4	46 (1UZ-FE)	Cowl Wire
E2			B3	54	Floor No.2 Wire
E3					

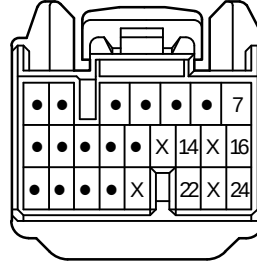
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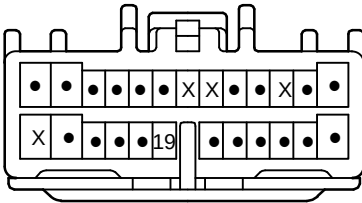
A13



A20



B5



C1 DARK GRAY



C3 BLACK



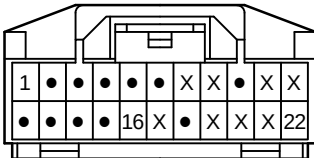
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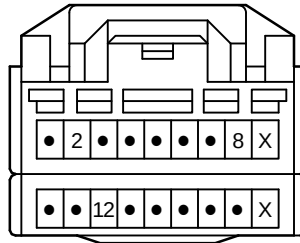
C5 DARK GRAY



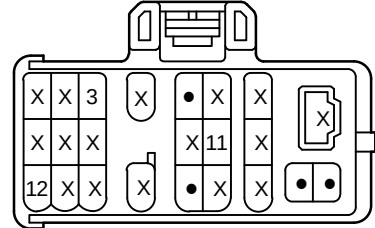
C12 (A)



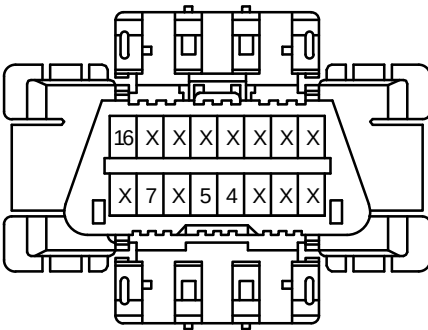
C13 (B)



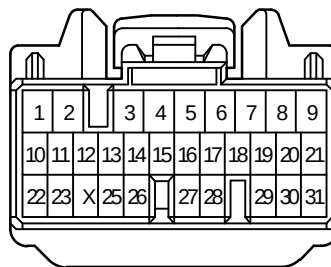
D1 BLACK



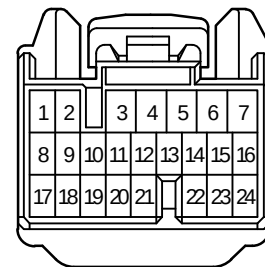
D4



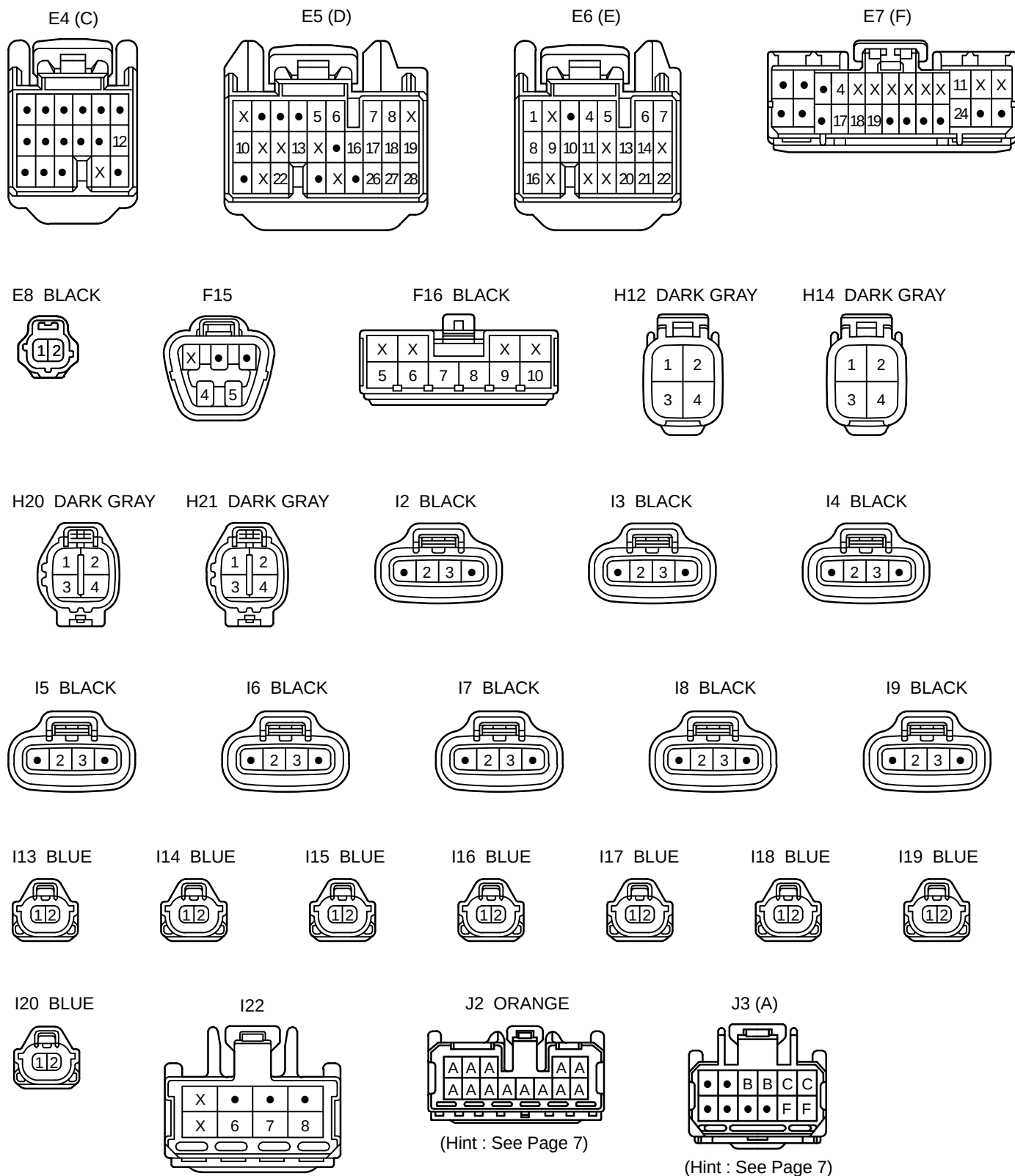
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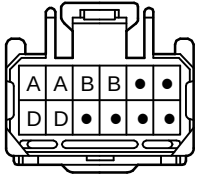
E3 (B)



ENGINE CONTROL (1UZ-FE)



J4 (B)



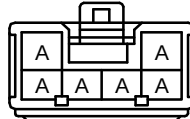
(Hint : See Page 7)

J5 BLUE



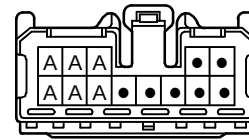
(Hint : See Page 7)

J6



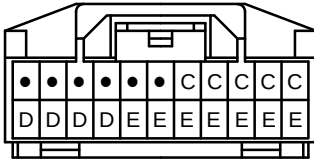
(Hint : See Page 7)

J7 GRAY



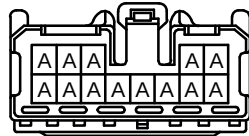
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J9



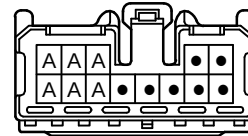
(Hint : See Page 7)

J10 ORANGE



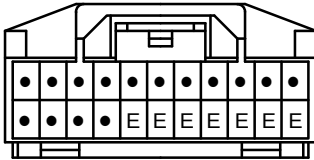
(Hint : See Page 7)

J11 GRAY



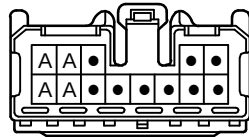
(Hint : See Page 7)

J14



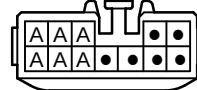
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J15



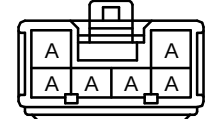
(Hint : See Page 7)

J17



(Hint : See Page 7)

J20



(Hint : See Page 7)

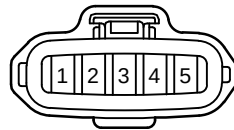
K1 DARK GRAY



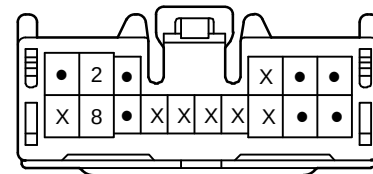
K2 DARK GRAY



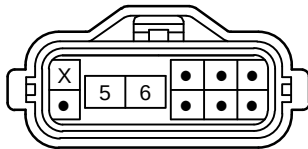
M1 BLACK



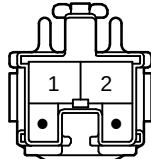
M3 BLUE



P1 GRAY



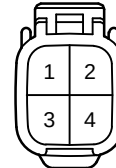
S11 BLUE



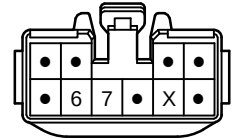
T2 GRAY



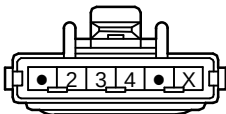
T3 GRAY



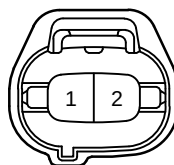
T5 GRAY



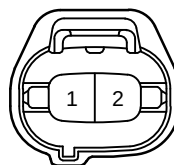
T6 BLACK



V2 BLACK



V3 BLACK



V4 DARK GRAY



V5 DARK GRAY



V10 BLACK



V11 BLUE

