



# ENGINE CONTROL (2JZ-GE)

## 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. 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 SYSTEM

THE OXYGEN DENSITY IN THE EXHAUST GASES IS DETECTED AND INPUT AS A CONTROL SIGNAL INTO **TERMINALS OX, OX2** AND **OXL2** OF THE ENGINE CONTROL MODULE. TO MAINTAIN STABLE DETECTION PERFORMANCE BY THE HEATED OXYGEN SENSOR, A HEATER IS USED FOR WARMING THE SENSOR. THE HEATER IS ALSO CONTROLLED BY THE ENGINE CONTROL MODULE (**HT, HT2** AND **HTL2**).

#### (4) RPM SIGNAL CIRCUIT

CRANKSHAFT POSITION IS DETECTED BY THE THE PICK-UP COIL INSTALLED INSIDE THE DISTRIBUTOR. CRANKSHAFT POSITION IS INPUT AS A CONTROL SIGNAL TO **TERMINALS G1** AND **G2** OF THE ENGINE CONTROL MODULE, AND THE ENGINE SPEED IS INPUT TO **TERMINAL NE**.

#### (5) THROTTLE POSITION SIGNAL CIRCUIT

THE THROTTLE POSITION SENSOR DETECTS THE THROTTLE VALVE OPENING ANGLE AS A CONTROL SIGNAL, WHICH IS INPUT INTO **TERMINAL VTA** OF THE ENGINE CONTROL MODULE. WHEN THE VALVE IS COMPLETELY CLOSED, THE CONTROL SIGNAL IS INPUT INTO **TERMINAL IDL**.

#### (6) VEHICLE SPEED CIRCUIT

THE VEHICLE SPEED IS DETECTED BY THE VEHICLE SPEED SENSOR NO. 1 INSTALLED IN THE TRANSMISSION AND THE SIGNAL IS INPUT TO **TERMINAL SPD** OF THE ENGINE CONTROL MODULE VIA THE COMBINATION METER.

#### (7) NEUTRAL POSITION SIGNAL CIRCUIT

THE PARK/NEUTRAL POSITION SW DETECTS WHETHER THE SHIFT POSITION IS IN "N" AND "P" OR NOT, AND THE SIGNAL IS INPUT INTO **TERMINAL NSW** OF THE ENGINE CONTROL MODULE.

#### (8) 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.

#### (9) BATTERY SIGNAL CIRCUIT

VOLTAGE IS CONSTANTLY APPLIED TO **TERMINAL BATT** OF THE ENGINE CONTROL MODULE. WITH THE IGNITION SW TURNED ON, THE VOLTAGE FOR ENGINE CONTROL MODULE START-UP POWER SUPPLY IS APPLIED TO **TERMINAL +B** OF THE ENGINE CONTROL MODULE VIA THE EFI MAIN RELAY.

THE CURRENT FLOWING THROUGH THE **IGN** FUSE FLOWS TO **TERMINAL IGSW** OF THE ENGINE CONTROL MODULE.

#### (10) INTAKE AIR VOLUME SIGNAL CIRCUIT

INTAKE AIR VOLUME IS DETECTED BY THE MASS AIR FLOW METER AND THE SIGNAL IS INPUT INTO **TERMINAL VG** OF THE ENGINE CONTROL MODULE AS A CONTROL SIGNAL.

#### (11) 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.

#### (12) 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.

#### (13) ENGINE KNOCK SIGNAL CIRCUIT

ENGINE KNOCKING IS DETECTED BY THE KNOCK SENSOR NO. 1 AND NO. 2, AND THE SIGNAL IS INPUT INTO **TERMINALS KNK1** AND **KNK2** AS A CONTROL SIGNAL.

## SYSTEM OUTLINE

### 2. CONTROL SYSTEM

#### \* SEQUENTIAL MULTIPOINT FUEL INJECTION SYSTEM

THE SEQUENTIAL MULTIPOINT FUEL INJECTION SYSTEM MONITORS THE ENGINE CONDITION THROUGH THE SIGNALS INPUT FROM EACH SENSOR (INPUT SIGNALS (1) TO (13)) 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 AND #60** OF THE ENGINE CONTROL MODULE TO OPERATE THE INJECTOR. (INJECT THE FUEL). THE SEQUENTIAL MULTIPOINT FUEL INJECTION SYSTEM PRODUCES CONTROL OF 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 (1), (2), (4) TO (13)). 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 IGT** 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 HEATED 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 SENSOR TO IMPROVE DETECTION PERFORMANCE OF THE SENSOR.

THE ENGINE CONTROL MODULE EVALUATES THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS (1), (2), (4), (9) TO (11)), AND OUTPUTS CURRENT TO **TERMINALS HT, HT2 AND HTL2**, CONTROLLING THE HEATER.

#### \* IDLE AIR CONTROL SYSTEM

THE IDLE AIR CONTROL SYSTEM (STEP MOTOR TYPE) INCREASES THE ENGINE SPEED AND PROVIDES IDLING STABILITY FOR FAST IDLE-UP WHEN THE ENGINE IS COLD, AND WHEN THE IDLE SPEED HAS DROPPED DUE TO ELECTRICAL LOAD AND SO ON. THE ENGINE CONTROL MODULE EVALUATES THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS (1), (4), (5), (8), (9), (11)), OUTPUTS CURRENT TO **TERMINALS ISC, ISC2, ISC3 AND ISC4** TO CONTROL THE IDLE AIR CONTROL VALVE.

#### \* EGR CONTROL SYSTEM

THE EGR CONTROL SYSTEM DETECTS THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS (1), (4), (9), (10)), AND OUTPUTS CURRENT TO **TERMINAL EGR** TO CONTROL THE EGR VALVE.

#### \* FUEL PUMP CONTROL SYSTEM

THE ENGINE CONTROL MODULE OUTPUTS CURRENT TO **TERMINAL FPC** AND CONTROLS THE FUEL PUMP ECU AND FUEL PUMP DRIVE SPEED IN RESPONSE TO CONDITIONS.

#### \* ACIS (ACOUSTIC CONTROL INDUCTION SYSTEM)

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 VEHICLE SPEED BY THE SIGNALS ((4), (5)) FROM EACH SENSOR AND OUTPUTS SIGNALS TO THE **TERMINAL ACIS** TO CONTROL THE VSV (INTAKE CONTROL VALVE).

### 3. DIAGNOSIS SYSTEM

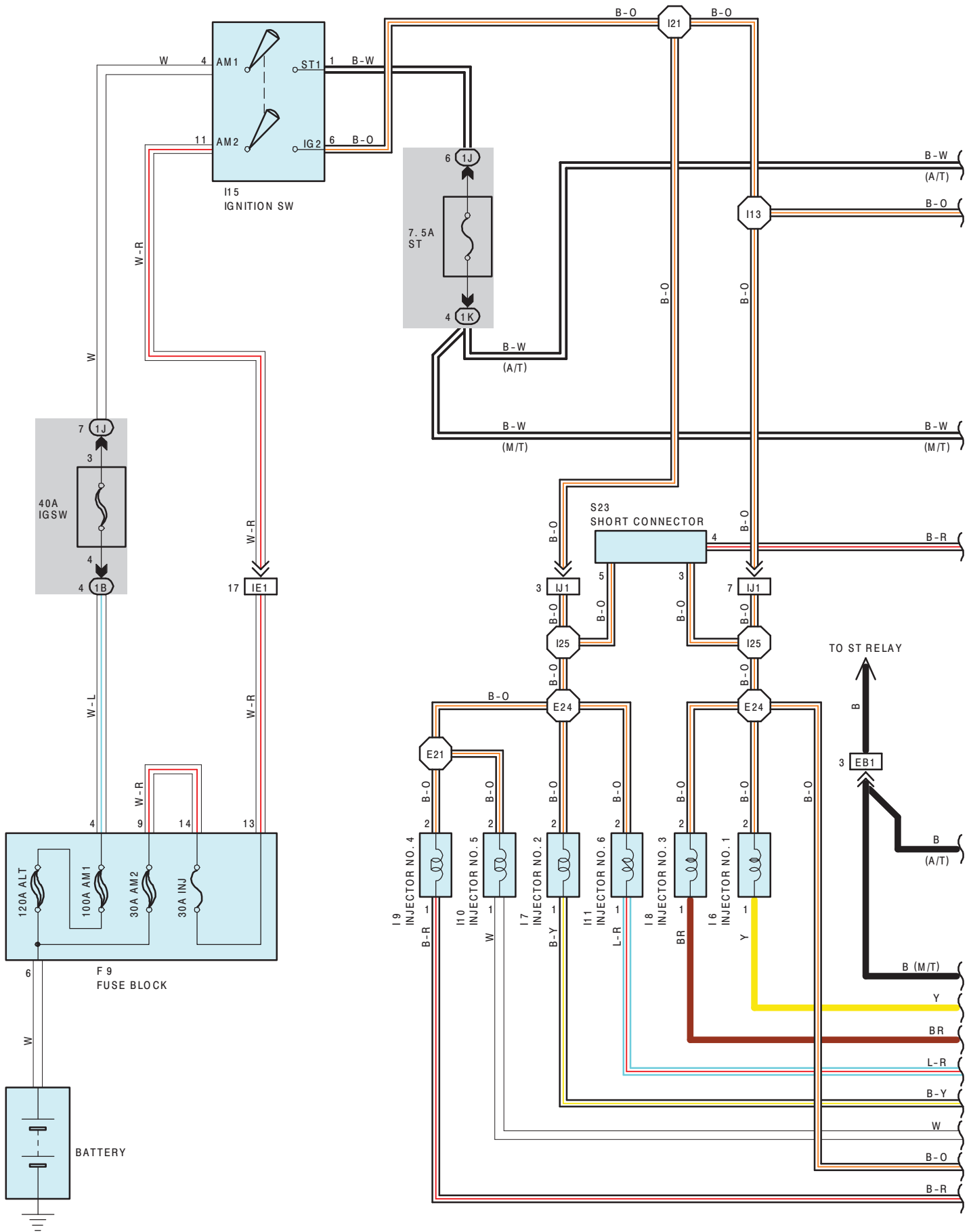
WITH THE DIAGNOSIS SYSTEMS, WHEN THERE IS A MALFUNCTION IN THE ENGINE CONTROL MODULE SIGNAL SYSTEM, THE MALFUNCTIONING SYSTEM IS RECORDED IN THE MEMORY. THE MALFUNCTIONING SYSTEM CAN BE FOUND BY READING THE CODE DISPLAYED BY THE MALFUNCTION INDICATOR LAMP.

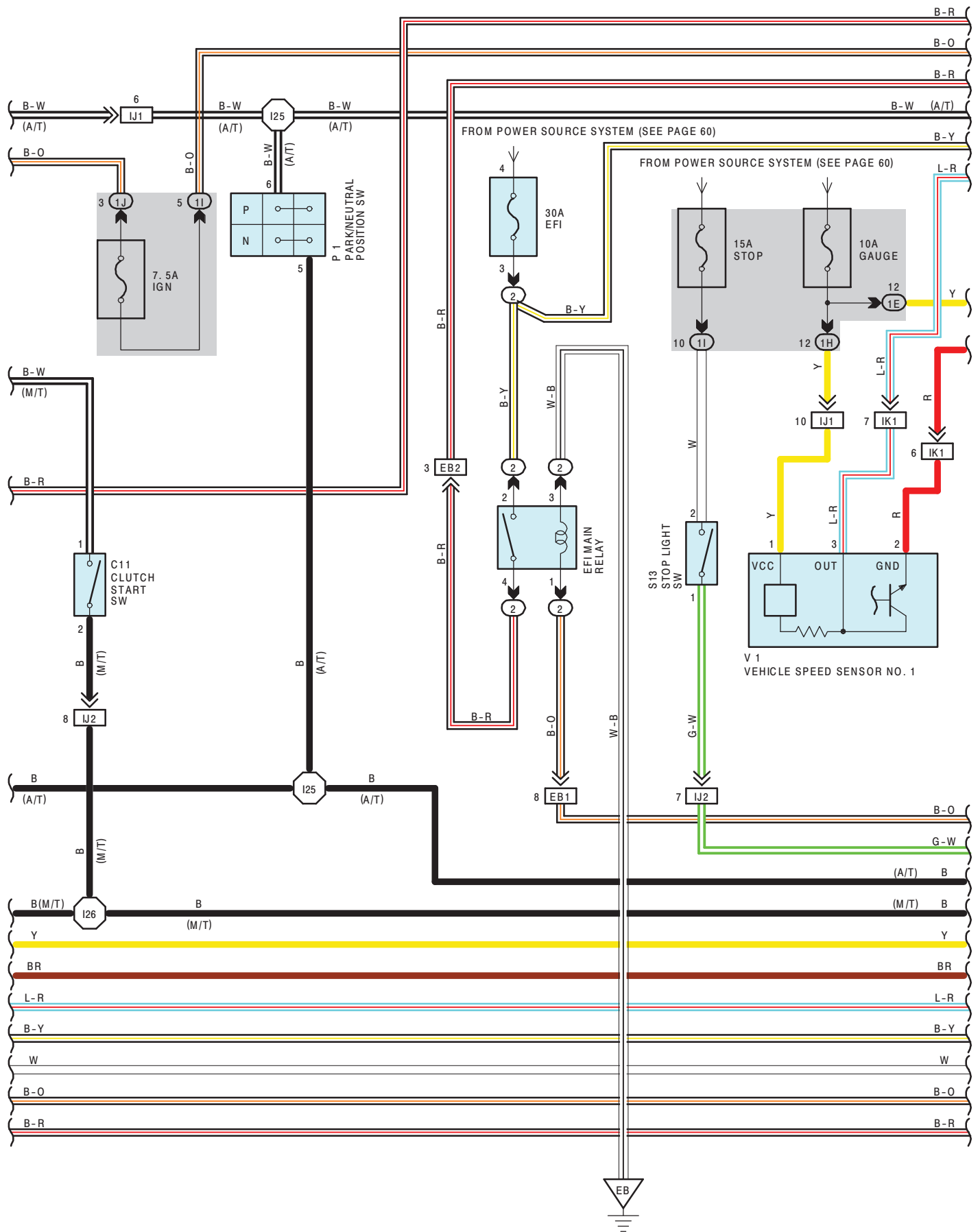
### 4. FAIL-SAFE SYSTEM

WHEN A MALFUNCTION HAS OCCURRED IN ANY SYSTEMS, 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.



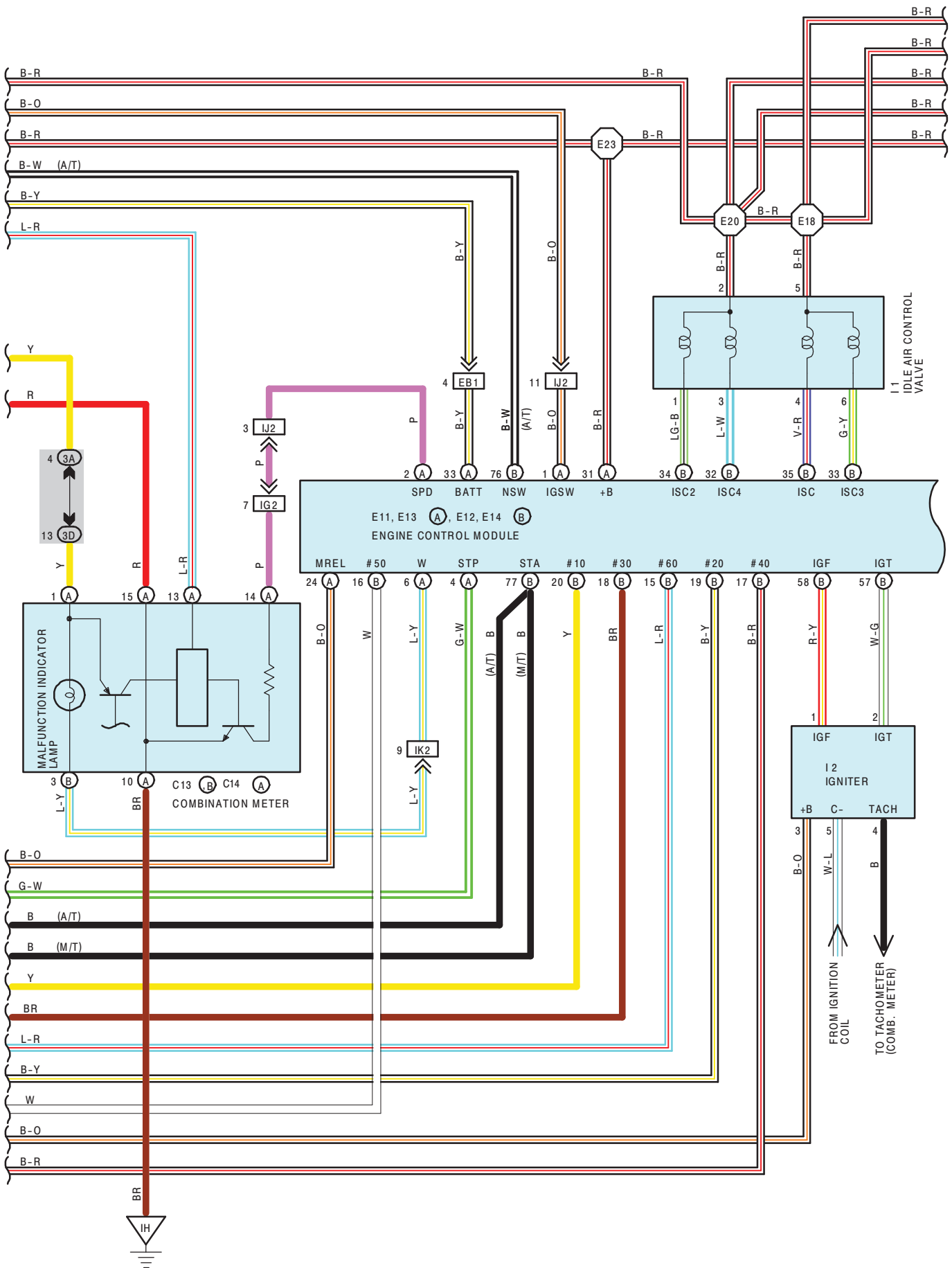
# ENGINE CONTROL (2JZ-GE)

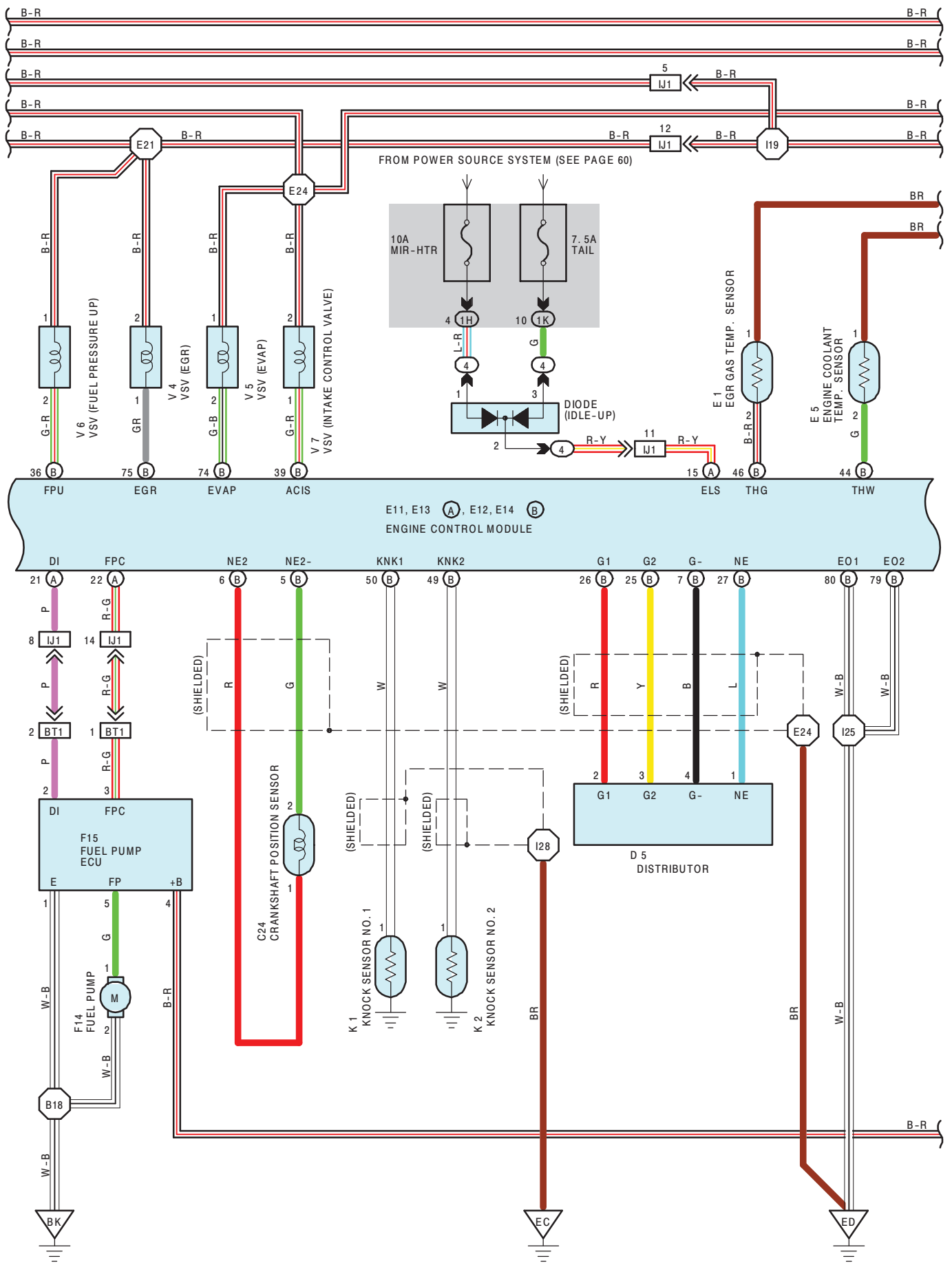






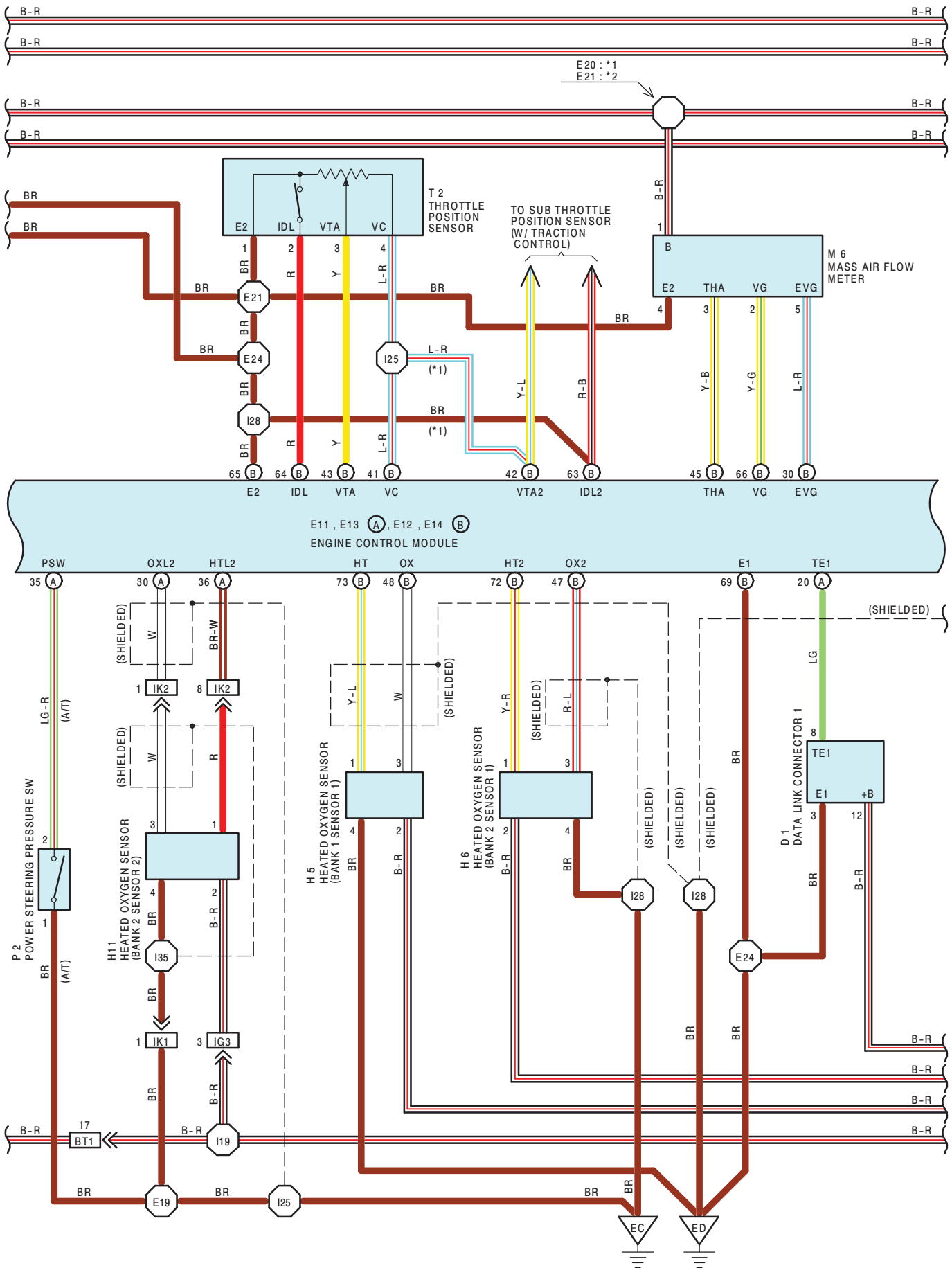
# ENGINE CONTROL (2JZ-GE)

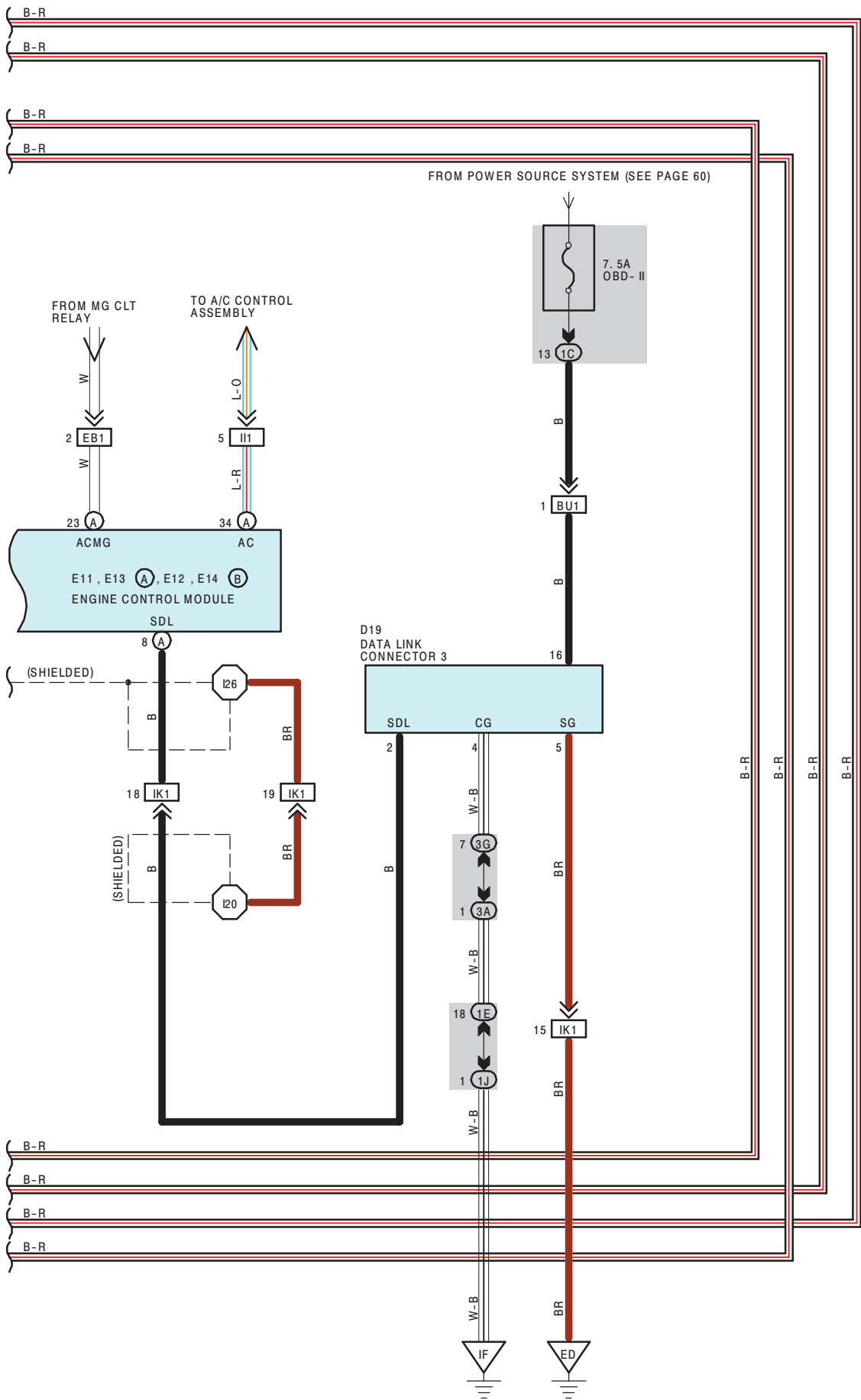






# ENGINE CONTROL (2JZ-GE)





\*1 : W/O TRACTION CONTROL  
 \*2 : W/ TRACTION CONTROL





# ENGINE CONTROL (2JZ-GE)

## SERVICE HINTS

### EFI MAIN RELAY

2-4 : CLOSED WITH IGNITION SW AT ON OR ST POSITION

### E 5 ENGINE COOLANT TEMP. SENSOR

1-2 : APPROX. 16 K $\Omega$  (-20°C, -4°F)  
 : APPROX. 2.5 K $\Omega$  (20°C, 68°F)  
 : APPROX. 0.3 K $\Omega$  (80°C, 176°F)

### E 1 EGR GAS TEMP. SENSOR

1-2 : 69 K $\Omega$ -89 K $\Omega$  (50°C, 122°F)  
 12 K $\Omega$ -15 K $\Omega$  (100°C, 212°F)  
 2 K $\Omega$ -4 K $\Omega$  (150°C, 302°F)

### E11, E12, E13, E14 ENGINE CONTROL MODULE

VOLTAGE AT ENGINE CONTROL MODULE WIRING CONNECTORS

BATT -E1 : ALWAYS 9-14 VOLTS  
 IGSW, +B -E1 : 9-14 VOLTS WITH IGNITION SW ON  
 VC -E2 : 4.5-5.5 VOLTS WITH IGNITION SW ON  
 IDL, IDL2 -E2 : 0-3 VOLTS WITH IGNITION SW ON AND THROTTLE VALVE FULLY CLOSED  
 : 9-14 VOLTS WITH IGNITION SW ON AND THROTTLE VALVE FULLY OPEN  
 VTA, VTA2 -E2 : 0.3-0.8 VOLTS WITH IGNITION SW ON AND THROTTLE VALVE FULLY CLOSED  
 : 3.2-4.9 VOLTS WITH IGNITION SW ON AND THROTTLE VALVE FULLY OPEN  
 THA -E2 : 0.5-3.4 VOLTS WITH IDLING, INTAKE AIR TEMP. 20°C (68°F)  
 THW -E2 : 0.2-1.0 VOLTS WITH IDLING, WATER TEMP. 80°C (176°F)  
 STA -E1 : 6.0 VOLTS OR MORE WITH CRANKING  
 #10, #20, #30-E01 : 9-14 VOLTS WITH IGNITION SW ON  
 : PULSE GENERATION WITH IDLING  
 #40, #50, #60-E01 : 9-14 VOLTS WITH IGNITION SW ON  
 : PULSE GENERATION WITH IDLING  
 IGF -E1 : BELOW 1 VOLT WITH IGNITION SW ON  
 : PULSE GENERATION WITH IDLING  
 MREL -E1 : 9-14 VOLTS WITH IGNITION SW ON  
 DI -E1 : 7.5 VOLTS OR MORE WITH IDLING  
 ACIS -E01 : 9-14 VOLTS WITH IGNITION SW ON  
 EVAP -E01 : 9-14 VOLTS WITH IGNITION SW ON  
 ISC, ISC2, ISC3, ISC4-E01 : 9-14 VOLTS WITH IGNITION SW ON  
 EGR -E1 : 9-14 VOLTS WITH ENGINE SPEED AT 3500 RPM  
 NSW -E1 : 0-3 VOLTS WITH IGNITION SW ON AND SHIFT LEVER "P" OR "N" POSITION  
 : 9-14 VOLTS WITH IGNITION SW ON AND OTHER SHIFT LEVER "P" OR "N" POSITION  
 TE1 -E1 : 9-14 VOLTS WITH IGNITION SW ON  
 W -E1 : 9-14 VOLTS WITH IDLING  
 : 0-3 VOLTS WITH IGNITION SW ON  
 AC -E1 : 0-1.5 VOLTS WITH A/C SW ON (AT IDLING)  
 : 7.5-14 VOLTS WITH A/C SW OFF  
 ACMG -E1 : 0-3 VOLTS WITH A/C SW ON (AT IDLING)

### I 1 IDLE AIR CONTROL VALVE

5-4, 6 : 10  $\Omega$ -30  $\Omega$   
 2-1, 3 : 10  $\Omega$ -30  $\Omega$

### I 6, I 7, I 8, I 9, I 10, I 11 INJECTOR

1-2 : 13.4  $\Omega$ -14.2  $\Omega$

### T 2 THROTTLE POSITION SENSOR

1-4 : 3.1 K $\Omega$ -7.2 K $\Omega$   
 1-3 : 2.4 K $\Omega$ -11.2 K $\Omega$  WITH THROTTLE VALVE FULLY OPEN  
 0.34 K $\Omega$ -6.3 K $\Omega$  WITH THROTTLE VALVE FULLY CLOSED  
 1-2 : INFINITY WITH CLEARANCE BETWEEN LEVER AND STOP SCREW 0.55 MM (0.022 IN.)  
 0.5 K $\Omega$  OR LESS WITH CLEARANCE BETWEEN LEVER AND STOP SCREW 0.45 MM (0.018 IN.)

## ○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C11	30	F14	32	K 1	29
C13	B 30	F15	32	K 2	29
C14	A 30	H 5	28	M 6	29
C24	28	H 6	28	P 1	29
D 1	28	H11	31	P 2	29
D 5	28	I 1	29	S13	31
D19	28	I 2	29	S23	31
E 1	28	I 6	29	T 2	29
E 5	28	I 7	29	V 1	29
E11	A 30	I 8	29	V 4	29
E12	B 30	I 9	29	V 5	29
E13	A 30	I10	29	V 6	29
E14	B 30	I11	29	V 7	29
F 9	28	I15	31		

 : RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
2	19	R/B NO. 2
4	23	R/B NO. 4

 : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	20	ENGINE ROOM MAIN WIRE AND J/B NO. 1 (LEFT KICK PANEL)
1C	20	FLOOR MAIN WIRE AND J/B NO. 1 (LEFT KICK PANEL)
1E	20	INSTRUMENT PANEL WIRE AND J/B NO. 1 (LEFT KICK PANEL)
1H	20	COWL WIRE AND J/B NO. 1 (LEFT KICK PANEL)
1I		
1J		
1K		
3A	22	INSTRUMENT PANEL WIRE AND J/B NO. 3 (BEHIND THE INSTRUMENT PANEL CENTER)
3D		
3G		

 : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EB1	38 (2JZ-GE)	ENGINE WIRE AND ENGINE ROOM MAIN WIRE (FRONT SIDE OF R/B NO. 2)
EB2		
IE1	40	ENGINE ROOM MAIN WIRE AND COWL WIRE (R/B NO. 4)
IG2	40	INSTRUMENT PANEL WIRE AND COWL WIRE (R/B NO. 5)
IG3	40	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT KICK PANEL)
II1	40	ENGINE WIRE AND A/C SUB WIRE (BEHIND GLOVE BOX)
IJ1	40	ENGINE WIRE AND COWL WIRE (RIGHT KICK PANEL)
IJ2		
IK1	40	ENGINE WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IK2		
BT1	44	FLOOR MAIN WIRE AND COWL WIRE (LEFT KICK PANEL)
BU1	44	INSTRUMENT PANEL WIRE AND FLOOR MAIN WIRE (LEFT KICK PANEL)

 : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EB	38 (2JZ-GE)	FRONT SIDE OF LEFT FENDER
EC	38 (2JZ-GE)	FRONT SIDE OF INTAKE MANIFOLD
ED	38 (2JZ-GE)	REAR SIDE OF CYLINDER HEAD RH
IF	40	LEFT KICK PANEL
IH	40	UNDER THE ASHTRAY LH
BK	44	UNDER THE CENTER PILLAR LH

 : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E18	38 (2JZ-GE)	ENGINE WIRE	I20	42	INSTRUMENT PANEL WIRE
E19			I21	42	COWL WIRE
E20			I25	42	ENGINE WIRE
E21					
E23					
E24			I35	42	INSTRUMENT PANEL WIRE
I13					
I19	42	COWL WIRE			
			B18	44	FLOOR MAIN WIRE

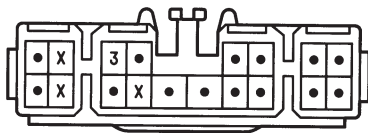


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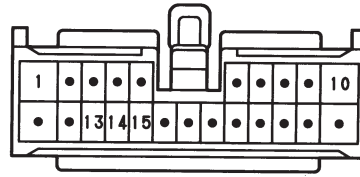
C11



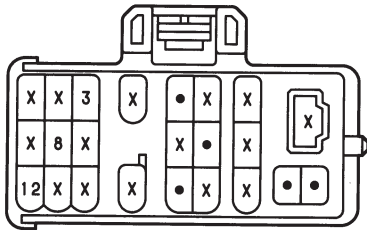
C13 (B)



C14 (A)



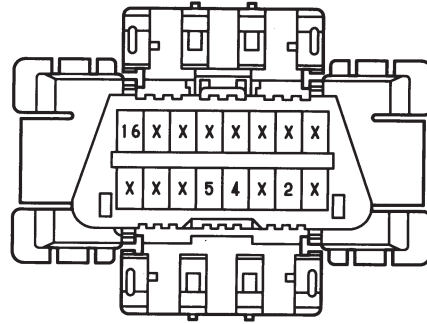
D 1 BLACK



D 5 BLACK



D19



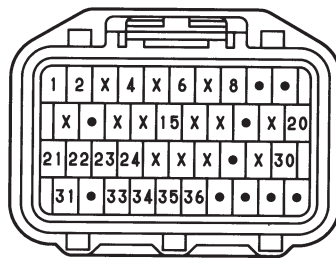
E 1 DARK GRAY



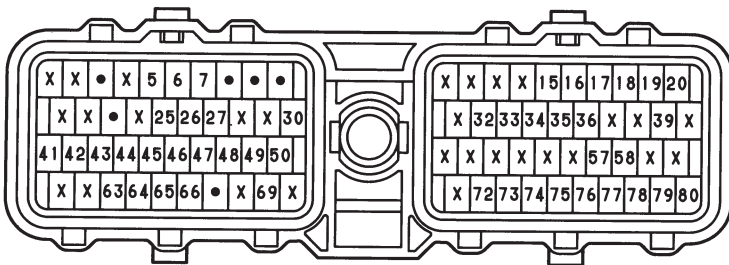
E 5 GREEN



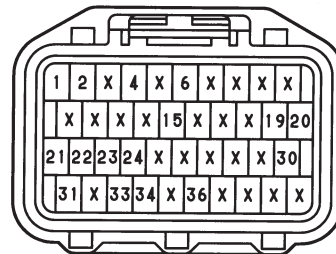
(A/T) E11 (A) DARK GRAY



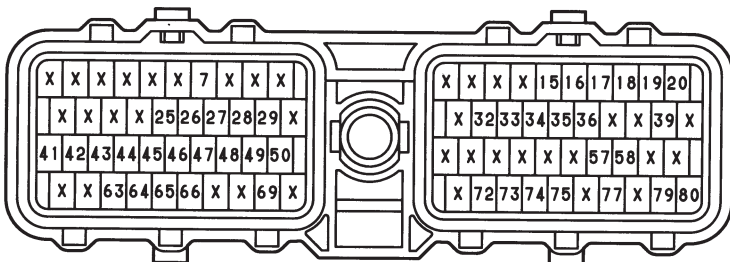
(A/T) E12 (B) DARK GRAY



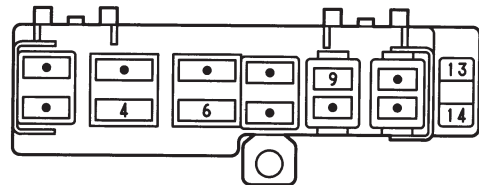
(M/T) E13 (A) DARK GRAY



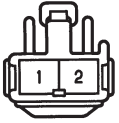
(M/T) E14 (B) DARK GRAY



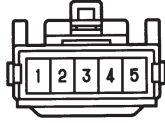
F 9



F14 DARK GRAY



F15 BLACK



H 5, H 6, H11 DARK GRAY



I 1 DARK GRAY



I 2 BLACK



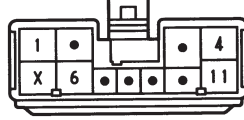
I 6, I 8, I10 DARK GRAY



I 7, I 9, I11 BROWN



I15



K 1, K 2 DARK GRAY



M 6 BLACK



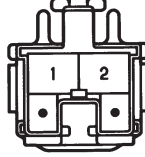
P 1 GRAY



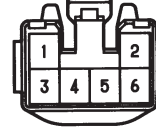
P 2 DARK GRAY



S13



S23



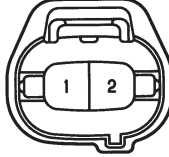
T 2 BLACK



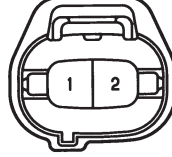
V 1 GRAY



V 4 BLACK



V 5, V 6 BLUE



V 7 BROWN

