



## SYSTEM OUTLINE

THE ENGINE CONTROL SYSTEM UTILIZES A MICROCOMPUTER AND MAINTAINS OVERALL CONTROL OF THE ENGINE, TRANSMISSION, ETC. AN OUTLINE OF ENGINE CONTROL IS GIVEN HERE.

### 3. INPUT SIGNALS

#### (1) ENGINE COOLANT TEMP. SIGNAL SYSTEM

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. THUS THE ENGINE COOLANT TEMP. IS INPUT IN THE FORM OF A CONTROL SIGNAL TO **TERMINAL THW** OF THE ENGINE CONTROL MODULE.

#### (2) INTAKE AIR TEMP. SIGNAL SYSTEM

THE INTAKE AIR TEMP. SENSOR 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 EMISSIONS IS DETECTED AND INPUT AS A CONTROL SIGNAL TO **TERMINALS OX1** AND **OX2** OF THE ENGINE CONTROL MODULE.

#### (4) RPM SIGNAL SYSTEM

CRANKSHAFT POSITION AND ENGINE RPM ARE DETECTED BY THE COIL INSTALLED INSIDE THE DISTRIBUTOR. CRANKSHAFT POSITION IS INPUT AS A CONTROL SIGNAL TO **TERMINAL NE+** OF THE ENGINE CONTROL MODULE, AND ENGINE RPM IS INPUT TO **TERMINAL G**.

#### (5) THROTTLE SIGNAL SYSTEM

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

#### (6) VEHICLE SPEED SIGNAL SYSTEM

THE VEHICLE SPEED SENSOR DETECTS THE VEHICLE SPEED AND INPUTS A CONTROL SIGNAL TO **TERMINAL SPD** OF THE ENGINE CONTROL MODULE VIA THE COMBINATION METER.

#### (7) PARK/NEUTRAL POSITION SW SIGNAL SYSTEM

THE PARK/NEUTRAL POSITION SW DETECTS WHETHER THE SHIFT POSITION IS IN NEUTRAL OR NOT, AND INPUTS A CONTROL SIGNAL TO **TERMINAL NSW** OF THE ENGINE CONTROL MODULE.

#### (8) A/C SW SIGNAL SYSTEM

THE OPERATING VOLTAGE OF THE A/C MAGNETIC CLUTCH IS DETECTED AND IS INPUT IN THE FORM OF A CONTROL SIGNAL TO **TERMINAL ACT** OF THE ENGINE CONTROL MODULE, AND OPERATION A/C IDLE-UP VSV IS DETECTED AND IS INPUT IN THE FORM OF A CONTROL SIGNAL TO **TERMINAL AC1** OF THE ENGINE CONTROL MODULE.

#### (9) BATTERY SIGNAL SYSTEM

VOLTAGE IS CONSTANTLY APPLIED TO **TERMINAL BATT** OF THE ENGINE CONTROL MODULE. WHEN THE IGNITION SW IS TURNED TO ON, VOLTAGE FOR ENGINE CONTROL MODULE OPERATION IS APPLIED VIA THE EFI RELAY TO **TERMINAL +B** OF THE ENGINE CONTROL MODULE.

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

INTAKE AIR VOLUME IS DETECTED BY THE MANIFOLD ABSOLUTE PRESSURE SENSOR AND IS INPUT AS A CONTROL SIGNAL TO **TERMINAL PIM** OF THE ENGINE CONTROL MODULE.

#### (11) STA SIGNAL SYSTEM

TO CONFIRM THAT THE ENGINE IS CRANKING, VOLTAGE APPLIED TO THE STARTER MOTOR DURING CRANKING IS DETECTED AND IS INPUT AS A CONTROL SIGNAL TO **TERMINAL STA** OF THE ENGINE CONTROL MODULE.

#### (12) ELECTRICAL LOAD SIGNAL SYSTEM

THE SIGNAL, WHEN SYSTEMS SUCH AS THE REAR WINDOW DEFOGGER, HEADLIGHT, ETC. WHICH CAUSE A HIGH ELECTRICAL BURDEN ARE ON, IS INPUT TO **TERMINAL ELS** AS A CONTROL SIGNAL.

#### 4. CONTROL SYSTEM

##### \* SFI SYSTEM

THE SFI SYSTEM MONITORS THE ENGINE CONDITION THROUGH THE SIGNALS, WHICH ARE INPUT FROM EACH SENSOR (INPUT SIGNALS FROM (1) TO (12) ETC.). THE BEST FUEL INJECTION VOLUME 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, AND #40** OF THE ENGINE CONTROL MODULE TO OPERATE THE INJECTOR (INJECT THE FUEL). THE SFI SYSTEM PRODUCES CONTROL OF FUEL INJECTION OPERATION BY THE ENGINE CONTROL MODULE IN RESPONSE TO THE DRIVING CONDITIONS.

DURING ENGINE CRANKING (SIGNAL INPUT TO **TERMINAL STA**) OR FOR APPROX. 2 SECONDS AFTER NE SIGNAL INPUT, ENGINE CONTROL MODULE OPERATION ENERGIZES (POINT CLOSED) THE FUEL PUMP CIRCUIT INSIDE THE CIRCUIT OPENING RELAY, CAUSING THE FUEL PUMP TO OPERATE.

##### \* ESA SYSTEM

THE ESA SYSTEM MONITORS THE ENGINE CONDITIONS USING THE SIGNALS (INPUT SIGNALS (1 TO 5, 9, 10)) INPUT TO THE ENGINE CONTROL MODULE FROM EACH SENSOR. BASED ON THIS DATA AND THE PROGRAM MEMORIZED IN THE ENGINE CONTROL MODULE, THE MOST APPROPRIATE IGNITION TIMING IS DECIDED AND CURRENT IS OUTPUT TO **TERMINAL IGT** OF THE ENGINE CONTROL MODULE. THIS OUTPUT CONTROLS THE IGNITER TO PRODUCE THE MOST APPROPRIATE IGNITION TIMING FOR THE DRIVING CONDITIONS.

##### \* IDLE AIR CONTROL SYSTEM

THE IDLE AIR CONTROL SYSTEM (ROTARY SOLENOID TYPE) INCREASES THE RPM AND PROVIDES IDLING STABILITY FOR FAST IDLE-UP WHEN THE ENGINE IS COLD AND WHEN THE IDLE SPEED HAS DROPPED DUE TO ELECTRICAL LOAD, ETC. THE ENGINE CONTROL MODULE EVALUATES THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS (1 TO 3, 5, 8, 10, 12)), OUTPUTS CURRENT TO **TERMINALS ISCC** AND **ISCO**, AND CONTROLS THE IDLE AIR CONTROL VALVE.

##### \* EGR CUT CONTROL SYSTEM

THE EGR CUT CONTROL SYSTEM CONTROLS THE VSV (EGR) BY EVALUATING THE SIGNALS FROM EACH SENSOR INPUT TO THE ENGINE CONTROL MODULE (INPUT SIGNALS (1 TO 6, 10)) AND BY SENDING OUTPUT TO **TERMINAL EGR** OF THE ENGINE CONTROL MODULE.

##### \* A/C CUT CONTROL SYSTEM

WHEN THE VEHICLE SUDDENLY ACCELERATES FROM LOW ENGINE SPEED, THIS SYSTEM CUTS OFF AIR CONDITIONING OPERATION FOR A FIXED PERIOD OF TIME IN RESPONSE TO THE VEHICLE SPEED, THROTTLE VALVE OPENING ANGLE AND INTAKE MANIFOLD PRESSURE IN ORDER TO MAINTAIN ACCELERATION PERFORMANCE.

THE ENGINE CONTROL MODULE RECEIVES INPUT SIGNALS (4 TO 6, 8), AND OUTPUTS SIGNALS TO **TERMINAL ACT**.

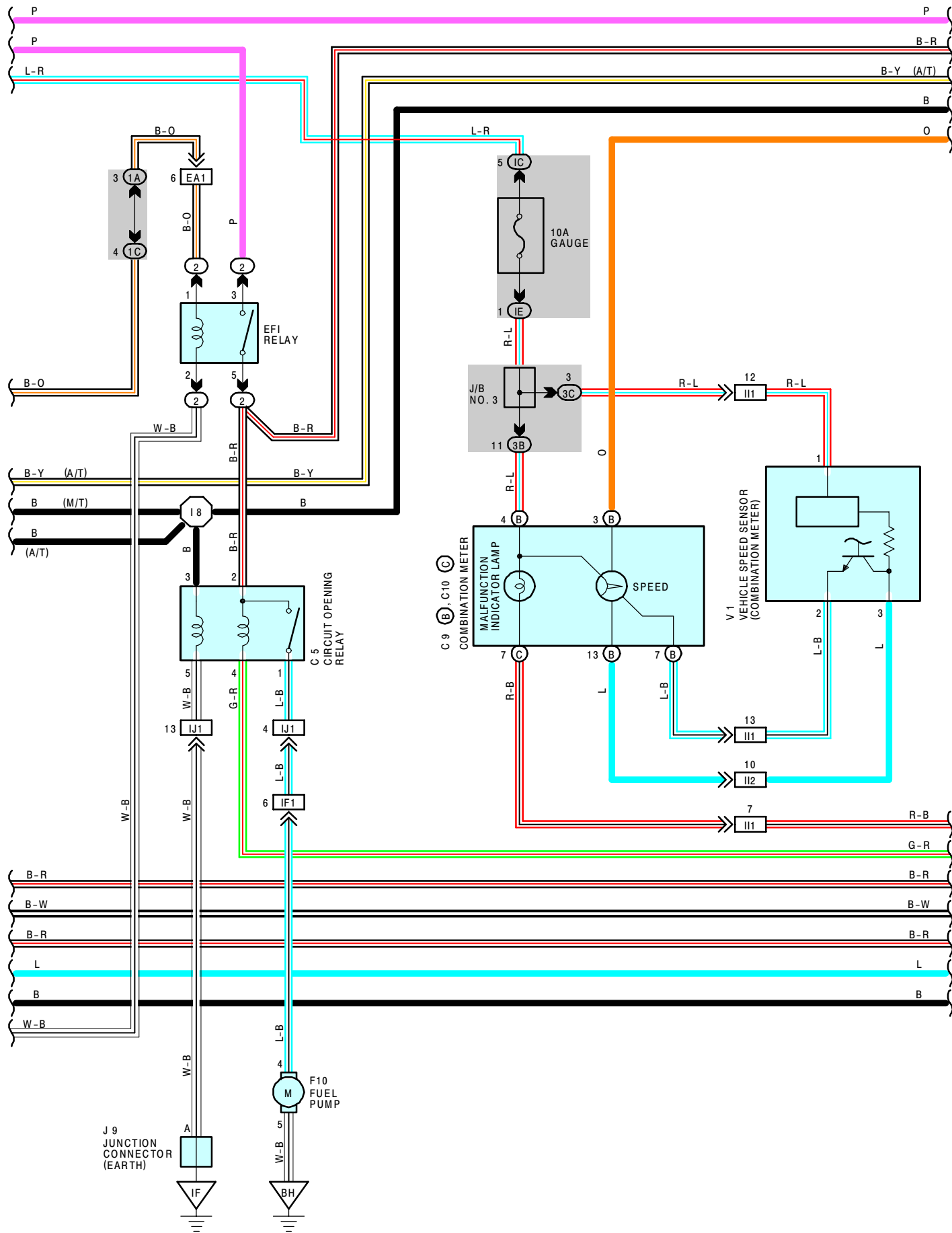
#### 5. DIAGNOSIS SYSTEM

WITH THE DIAGNOSIS SYSTEM, WHEN THERE IS A MALFUNCTIONING IN THE ENGINE CONTROL MODULE SIGNAL SYSTEM, THE MALFUNCTION SYSTEM IS RECORDED IN THE MEMORY. THE MALFUNCTIONING SYSTEM CAN THEN BE FOUND BY READING THE DISPLAY (CODE) OF THE MALFUNCTION INDICATOR LAMP.

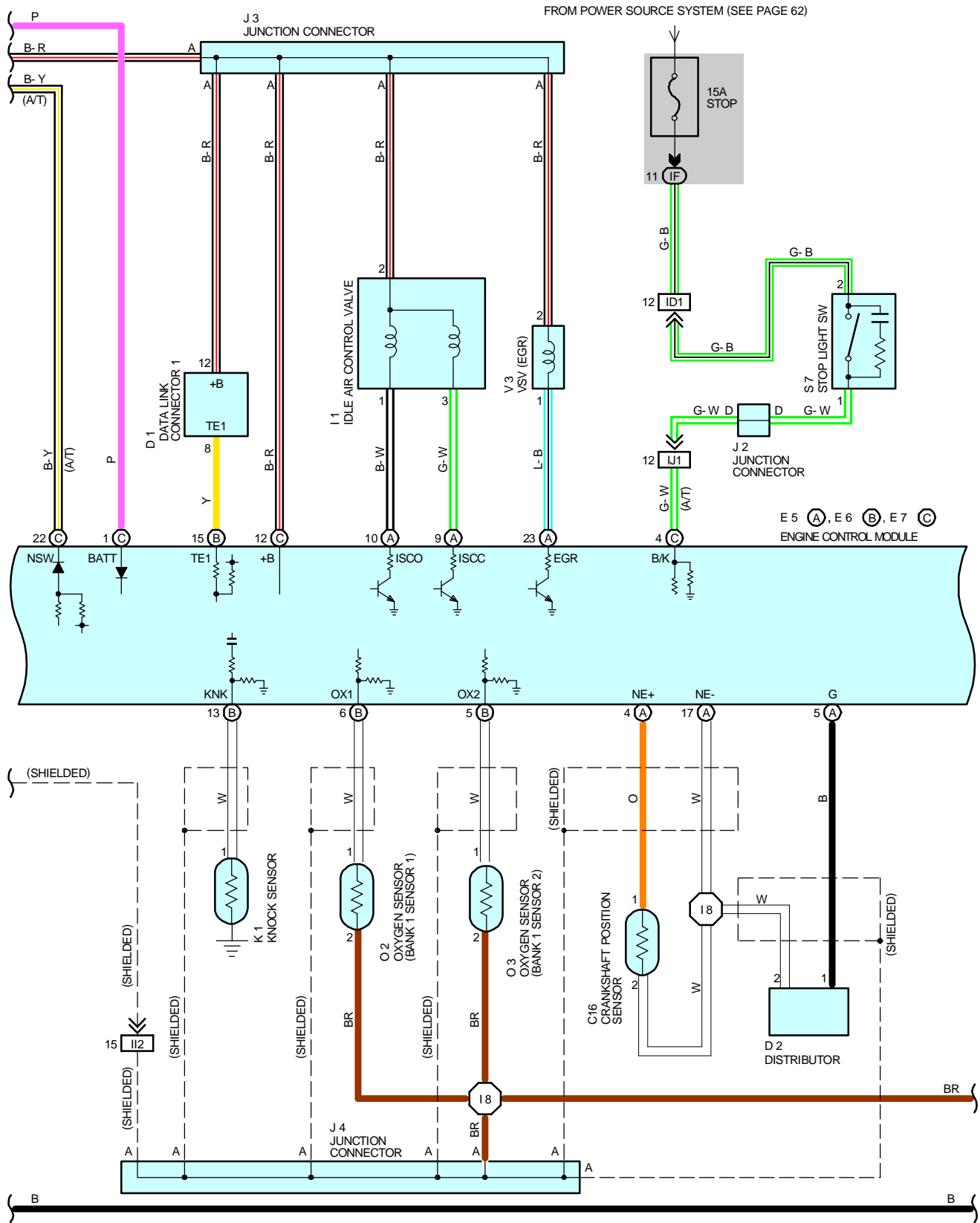
#### 6. FAIL-SAFE SYSTEM

WHEN A MALFUNCTION OCCURS 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.





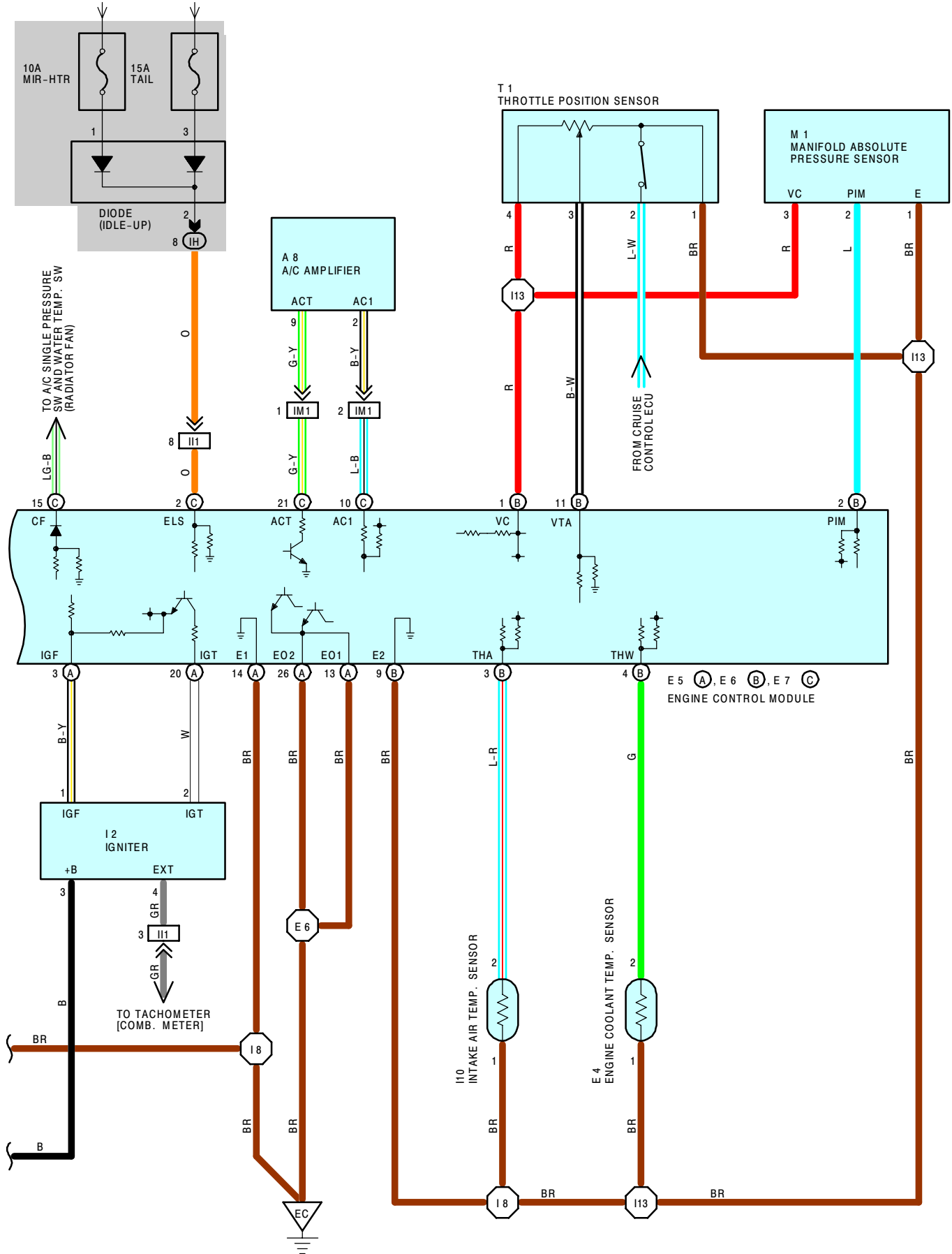






# ENGINE CONTROL (5S-FE)

FROM POWER SOURCE SYSTEM (SEE PAGE 62)



## SERVICE HINTS

### E 5 (A), E 6 (B), E 7 (C) ENGINE CONTROL MODULE

BATT	-E1	: ALWAYS 9.0-14.0 VOLTS
+B	-E1	: 9.0-14.0 VOLTS (IGNITION SW AT ON POSITION)
VC	-E2	: 4.5-5.5 VOLTS (IGNITION SW AT ON POSITION)
VTA	-E2	: 0.3-0.8 VOLTS (IGNITION SW ON AND THROTTLE VALVE FULLY CLOSED) 3.2-4.9 VOLTS (IGNITION SW ON AND THROTTLE VALVE OPEN)
PIM	-E2	: 3.3-3.9 VOLTS (IGNITION SW AT ON POSITION)
#10, #20, #30, #40-E01, E02		: 9.0-14.0 VOLTS (IGNITION SW AT ON POSITION)
THA	-E2	: 0.5-3.4 VOLTS (IGNITION SW ON AND INTAKE AIR TEMP. 20° C (68° F))
THW	-E2	: 0.2-1.0 VOLTS (IGNITION SW ON AND COOLANT TEMP. 80° C (176° F))
STA	-E1	: 6.0-14.0 VOLTS (ENGINE CRANKING)
IGT	-E1	: 0.8-1.2 VOLTS (ENGINE CRANKING OR IDLING)
W	-E1	: 9.0-14.0 VOLTS (NO TROUBLE AND ENGINE RUNNING)
ACT	-E1	: 4.5-5.5 VOLTS (IGNITION SW ON AND AIR CONDITIONING ON)
AC1	-E1	: 0-3.0 VOLTS (IGNITION SW ON AND AIR CONDITIONING ON)
ISCC, ISCO	-E1	: 9.0 -14.0 VOLTS (IGNITION SW AT ON POSITION)
TE1	-E1	: 9.0-14.0 VOLTS (IGNITION SW ON AND DATA LINK CONNECTOR 1 TE1-E1 NOT CONNECTED) 0-3.0 VOLTS (IGNITION SW ON AND DATA LINK CONNECTOR 1 TE1-E1 CONNECTED)
NSW	-E1	: 0-3.0 VOLTS (IGNITION SW ON AND PARK/NEUTRAL POSITION SW AT P OR N POSITION) 9.0-14.0 VOLTS (IGNITION SW ON AND PARK/NEUTRAL POSITION SW AT EXCEPT P AND N POSITION)
B/K	-E1	: 9.0-14.0 VOLTS (BRAKE PEDAL DEPRESSED)

### RESISTANCE OF ECU WIRING CONNECTORS

(DISCONNECT WIRING CONNECTOR)

VTA	-E2	: 3.3- 10.0 KΩ (THROTTLE VALVE FULLY OPEN) 0.2- 0.8 KΩ (THROTTLE VALVE FULLY CLOSED)
VC	-E2	: 3.0- 7.0 KΩ
THA	-E2	: 2.0- 3.0 KΩ (INTAKE AIR TEMP. 20° C (68° F))
THW	-E2	: 0.2- 0.4 KΩ (COOLANT TEMP. 80° C (176° F))
ISCC, ISCO	-+B	: 19.3-22.3 Ω

### C 5 CIRCUIT OPENING RELAY

1-2 : CLOSED WITH THE STARTER CRANKING AND ENGINE RUNNING

### EFI RELAY

(2) 3- (2) 5 : CLOSED WITH THE IGNITION SW AT ON OR ST POSITION

### E 4 ENGINE COOLANT TEMP. SENSOR

1-2	: 10.0- 20.0 KΩ (-20° C, -4° F) 4.0- 7.0 KΩ (0° C, 32° F) 2.0- 3.0 KΩ (20° C, 68° F) 0.9- 1.3 KΩ (40° C, 104° F) 0.4- 0.7 KΩ (60° C, 140° F) 0.2- 0.4 KΩ (80° C, 176° F)
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### I 6, I 7, I 8, I 9 INJECTOR

1-2 : APPROX. 13.8 Ω

### T 1 THROTTLE POSITION SENSOR

3-1	: 0.2- 5.7 KΩ WITH CLEARANCE BETWEEN THE LEVER AND THE STOP SCREW 0 MM (0 IN.)
2-1	: LESS THAN 2.3 KΩ WITH CLEARANCE BETWEEN THE LEVER AND THE STOP SCREW 0.5 MM (0.02 IN.) WITH CLEARANCE BETWEEN THE LEVER AND THE STOP SCREW 0.7 MM (0.028 IN.)
3-1	: 2.0- 10.2 KΩ WITH THE THROTTLE VALVE FULLY OPEN

## ○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A 8	32	F10	34 (L/B), 35 (C/P)	J 7	33
C 5	32		36 (CONVERTIBLE)	J 9	33
C 7	32	I 1	29	K 1	29
C 9	B 32	I 2	29	M 1	29
C10	C 32	I 6	29	O 2	29
C16	28	I 7	29	O 3	29
D 1	28	I 8	29	P 1	29
D 2	28	I 9	29	S 7	33
D15	32	I10	29	T 1	29
E 4	28	I12	33	V 1	29
E 5	A 32	J 2	33	V 3	29
E 6	B 32	J 3	33		
E 7	C 32	J 4	33		





# ENGINE CONTROL (5S-FE)

## ○ : RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
2	26	ENGINE COMPARTMENT LEFT
4	25	RIGHT KICK PANEL

## ○ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
IA	20	ENGINE ROOM MAIN WIRE AND INPANE J/B (LEFT KICK PANEL)
IB		
IC		
ID		
IE	20	INSTRUMENT PANEL WIRE AND INPANE J/B (LEFT KICK PANEL)
IF		
IH		
I1A		
1A	22	ENGINE ROOM MAIN WIRE AND J/B NO.1 (LEFT KICK PANEL)
1C	22	INSTRUMENT PANEL WIRE AND J/B NO.1 (LEFT KICK PANEL)
2A	26	ENGINE ROOM MAIN WIRE AND J/B NO.2 (ENGINE COMPARTMENT LEFT)
2B		
3B	24	INSTRUMENT PANEL WIRE AND J/B NO.3 (BEHIND THE INSTRUMENT PANEL CENTER)
3C		

## □ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EA1	38 (5S-FE)	ENGINE WIRE AND ENGINE ROOM MAIN WIRE (INSIDE OF R/B NO.2)
ID1	42	INSTRUMENT PANEL WIRE AND COWL WIRE (LEFT KICK PANEL)
ID2		
IF1	42	COWL WIRE AND FLOOR WIRE (LEFT KICK PANEL)
I11	44	ENGINE WIRE AND INSTRUMENT PANEL WIRE (NEAR THE ENGINE CONTROL MODULE)
I12		
IJ1	44	ENGINE WIRE AND COWL WIRE (INSTRUMENT PANEL CENTER)
IM1	44	ENGINE WIRE AND A/C SUB WIRE (NEAR THE BLOWER MOTOR)

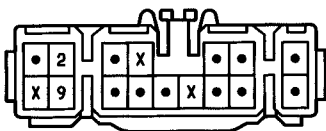
## ▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EB	38 (5S-FE)	FRONT SIDE OF LEFT FENDER
EC	38 (5S-FE)	INTAKE MANIFOLD
IE	42	INSTRUMENT PANEL BRACE LH
IF	42	R/B NO.4 SET BOLT
BH	46 (L/B)	UNDER THE LEFT CENTER PILLAR
	48 (C/P)	
	50 (CONVERTIBLE)	

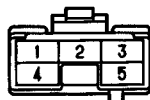
## ○ : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 6	38 (5S-FE)	ENGINE WIRE	I13	44	ENGINE WIRE
I 8	44				

A 8 BLACK



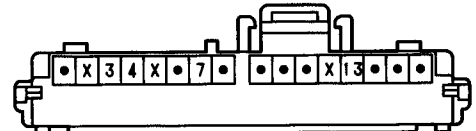
C 5 DARK GRAY



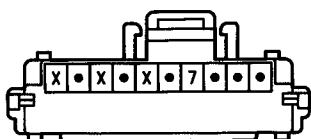
C 7



C 9 B



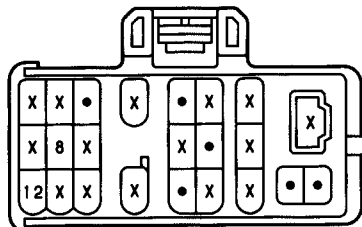
C10 C GRAY



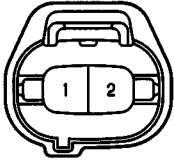
C16 DARK GRAY



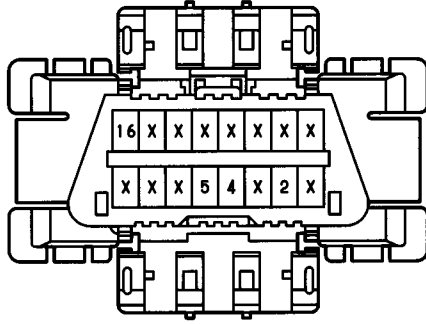
D 1 BLACK



D 2 BLACK



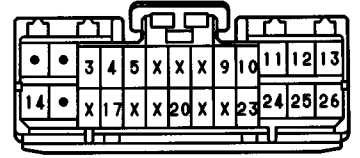
D15



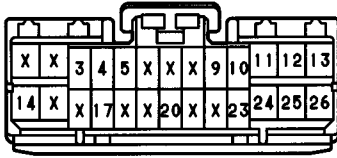
E 4 DARK GRAY



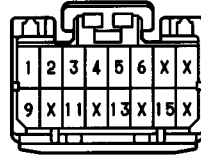
(A/T) E 5 (A) DARK GRAY



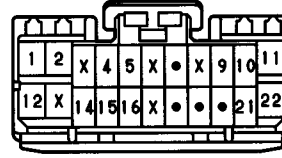
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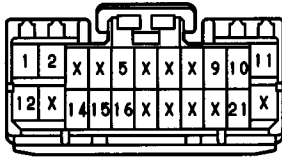
E 6 (B) DARK GRAY



(A/T) E 7 (C) DARK GRAY



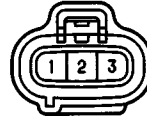
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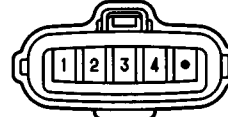
F10 DARK GRAY



I 1 GRAY



I 2 BLACK



I 6, I 8 BROWN



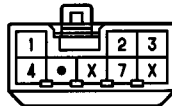
I 7, I 9 GRAY



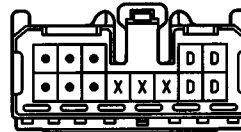
I10 BLACK



I12



J 2



J 3



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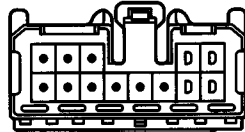
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J 4



(HINT:SEE PAGE 7)

J 7



(HINT:SEE PAGE 7)

J 9



(HINT:SEE PAGE 7)

K 1 DARK GRAY



M 1 BLACK



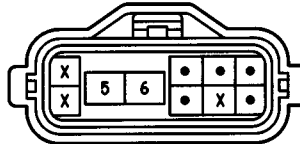
O 2 DARK GRAY



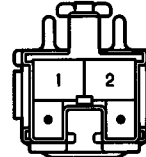
O 3 DARK GRAY



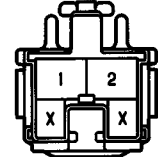
P 1 GRAY



(W/ CRUISE S 7 CONTROL)



(W/O CRUISE S 7 CONTROL)



T 1 BLACK



V 1 BLACK



V 3 GRAY

