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.

1. PTIS (INPUT SIGNALS)

(1) WATER TEMP. SIGNAL SYSTEM

THE ECTS (WATER TEMP. SENSOR) DETECTS THE ENGINE COOLANT TEMP. AND HAS A BUILT–IN THERMISTOR WITH A RESISTANCE WHICH VARIES ACCORDING TO THE WATER TEMP. THUS THE WATER TEMP. IS INPUT IN THE FORM OF A CONTROL SIGNAL TO **TERMINAL THW** OF THE PCME (ECU).

(2) INTAKE AIR TEMP. SIGNAL SYSTEM

THE IATS (INTAKE AIR TEMP. SENSOR) IS DETECTS THE INTAKE AIR TEMP., WHICH IS INPUT AS A CONTROL SIGNAL TO **TERMINAL THA** OF THE PCME (ECU).

(3) OXYGEN DENSITY SIGNAL SYSTEM

THE OXYGEN DENSITY IN THE EXHAUST EMISSIONS IS DETECTED AND INPUT AS A CONTROL SIGNAL TO **TERMINAL OX1** AND **OX2** (CALIFORNIA) OF THE PCME (ECU).

(4) CRANKSHAFT POSITION SIGNAL SYSTEM

CRANKSHAFT POSITION AND ENGINE SPEED ARE DETECTED BY THE PICK–UP COIL INSTALLED INSIDE THE DISTRIBUTOR. CRANKSHAFT POSITION IS INPUT AS A CONTROL SIGNAL TO **TERMINAL G+**, OF THE PCME (ECU), AND ENGINE SPEED SIGNAL IS INPUT TO **TERMINAL NE+**.

(5) THROTTLE POSITION SIGNAL SYSTEM

THE THROTTLE POSITION SENSOR DETECTS THE THROTTLE VALVE OPENING ANGLE, WHICH IS INPUT AS A CONTROL SIGNAL TO **TERMINAL VTA** OF THE PCME (ECU), OR WHEN THE VALVE IS FULLY CLOSED, TO **TERMINAL IDL**.

(6) VEHICLE SPEED SIGNAL SYSTEM

THE SPEED METER INSIDE THE COMBINATION METER SENDS A VEHICLE SPEED SIGNAL TO **TERMINAL SPD** OF THE PCME (ECU) AS A CONTROL SIGNAL.

(7) NEUTRAL POSITION SIGNAL SYSTEM (A/T)

THE PNS (NEUTRAL START SW) DETECTS WHETHER THE SHIFT POSITION IS IN NEUTRAL AND PARKING OR NOT, AND INPUTS A CONTROL SIGNAL TO **TERMINAL NSW** OF THE PCME (ECU).

(8) A/C SW SIGNAL SYSTEM

THE A/C AMPLIFIER INPUTS THE A/C OPERATIONS TO **TARMINAL ACA** OF THE PCME (ECU) AS A CONTROL SIGNAL.

(9) BATTERY SIGNAL SYSTEM

VOLTAGE IS CONSTANTLY APPLIED TO **TERMINAL BATT** OF THE PCME (ECU). WHEN THE IGNITION SW IS TURNED TO ON, VOLTAGE FOR ECU OPERATION IS APPLIED VIA THE EFI MAIN RELAY TO **TERMINALS +B** AND **+B1** OF THE PCME (ECU).

(10) INTAKE AIR VOLUME SIGNAL SYSTEM

INTAKE AIR VOLUME IS DETECTED BY THE MAP (VACUUM SENSOR) AND IS INPUT AS A CONTROL SIGNAL TO **TERMINAL PIM** OF THE PCME (ECU).

(11) STA SIGNAL SYSTEM

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

(12) ELECTRICAL LOAD SIGNAL SYSTEM

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

2. CONTROL SYSTEM

***** MPI (EFI, ELECTRONIC FUEL INJECTION) SYSTEM

THE MPI (EFI) SYSTEM MONITORS THE ENGINE REVOLUTIONS THROUGH THE SIGNALS EACH SENSOR (INPUT SIGNALS (1) TO (12)) INPUTS TO THE PCME (ECU). BASED ON THIS DATA AND THE PROGRAM MEMORIZED IN THE PCME (ECU), THE MOST APPROPRIATE FUEL INJECTION TIMING IS DECIDED AND CURRENT IS OUTPUT TO **TERMINALS #10** AND **#20** OF THE PCME (ECU), CAUSING THE INJECTORS TO OPERATE IT (TO INJECT FUEL). IT IS THIS SYSTEM WHICH, THROUGH THE WORK OF THE PCME (ECU), FINELY CONTROLS FUEL INJECTION IN RESPONSE TO DRIVING CONDITIONS.

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

* EI (ESA, ELECTRONIC FUEL ADVANCE)

  THE EI (ESA) SYSTEM MONITORS THE ENGINE REVOLUTIONS USING THE SIGNALS (INPUT SIGNALS (1, 4, 5, 10, 11)) INPUT TO THE PCME (ECU) FROM EACH SENSOR. BASED ON THIS DATA AND THE PROGRAM MEMORIZED IN THE PCME (ECU), THE MOST APPROPRIATE IGNITION TIMING IS DECIDED AND CURRENT IS OUTPUT TO **TERMINAL IGT** OF THE PCME ECU. THIS OUTPUT CONTROLS THE IGNITER TO PRODUCE THE MOST APPROPRIATE IGNITION TIMING FOR THE DRIVING CONDITIONS.

* ISC (IDLE SPEED CONTROL) SYSTEM

  THE ISC SYSTEM INCREASES 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, ETC. THE PCME (ECU) EVALUATES THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS (1, 4 TO 8, 11, 12)), OUTPUTS CURRENT TO **TERMINALS ISCO** AND **ISCC,** AND CONTROLS THE ISC VALVE.

* EGR CONTROL SYSTEM

  THE EGR CUT CONTROL SYSTEM CONTROLS THE VSV (FOR EGR) BY EVALUATING THE SIGNALS FROM EACH SENSOR INPUT TO THE PCME (ECU) (INPUT SIGNALS (1, 4, 10)) AND BY SENDING OUTPUT TO **TERMINAL EGR** OF THE PCME (ECU).

* A/C CUT CONTROL SYSTEM

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

  THE PCME (ECU) RECEIVES INPUT SIGNALS (5, 6), AND OUTPUTS SIGNALS TO **TERMINAL ACT**.

* FUEL PRESSURE CONTROL SYSTEM

  THE FUEL PRESSURE UP SYSTEM CAUSES THE VSV (FOR FUEL PRESSURE UP) TO COME ON FOR HIGH TEMP. STARTS IN ORDER TO INCREASE THE FUEL PRESSURE, IMPROVE STARTABILITY AT HIGH TEMPERATURES AND PROVIDE STABLE IDLING.

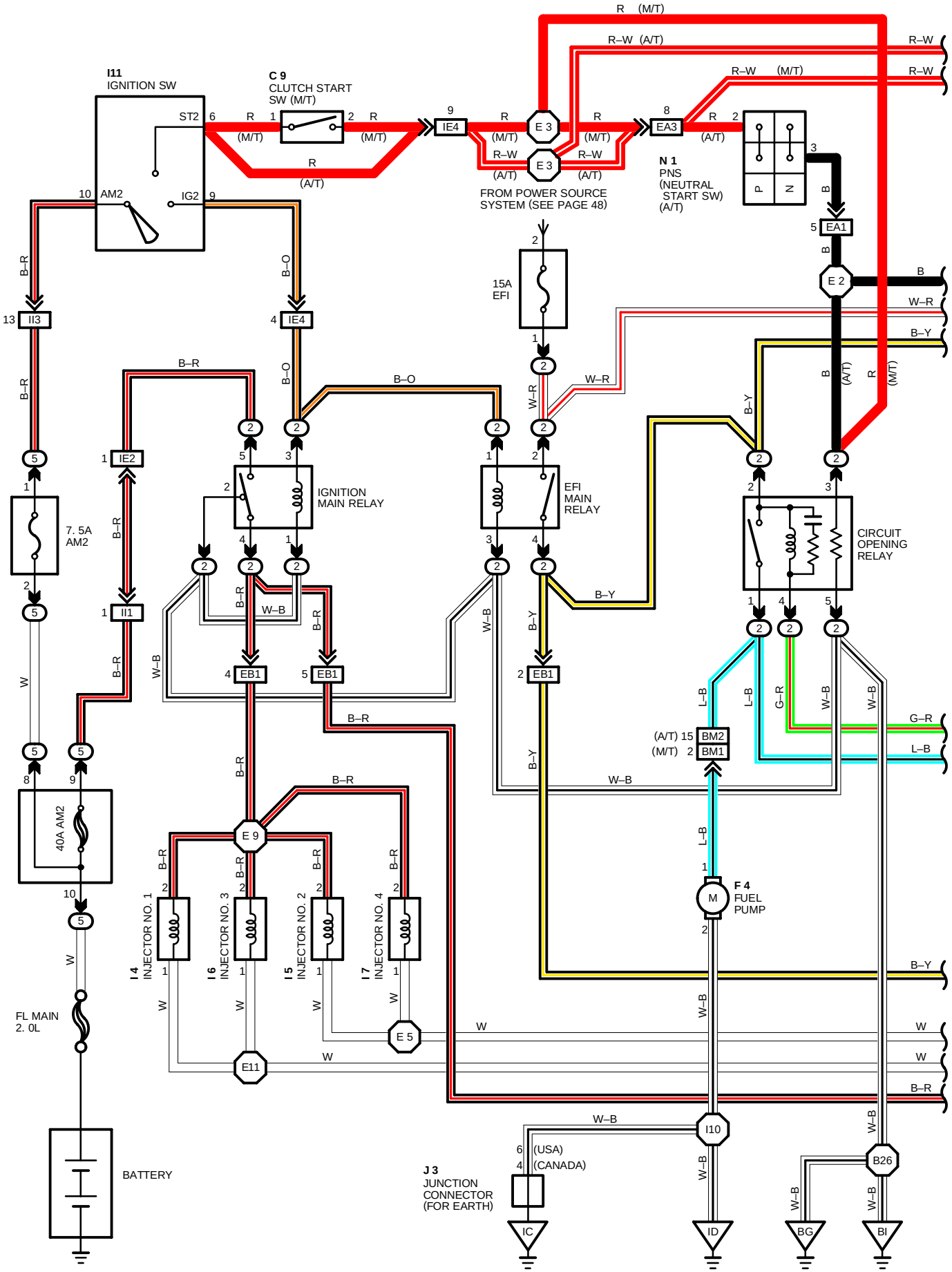
  THE PCME (ECU) EVALUATES THE INPUT SIGNALS FROM EACH SENSOR (1, 2, 5, 11), OUTPUT CURRENT TO **TERMINAL FPU** AND CONTROLS THE VSV.

3. DIAGNOSIS SYSTEM

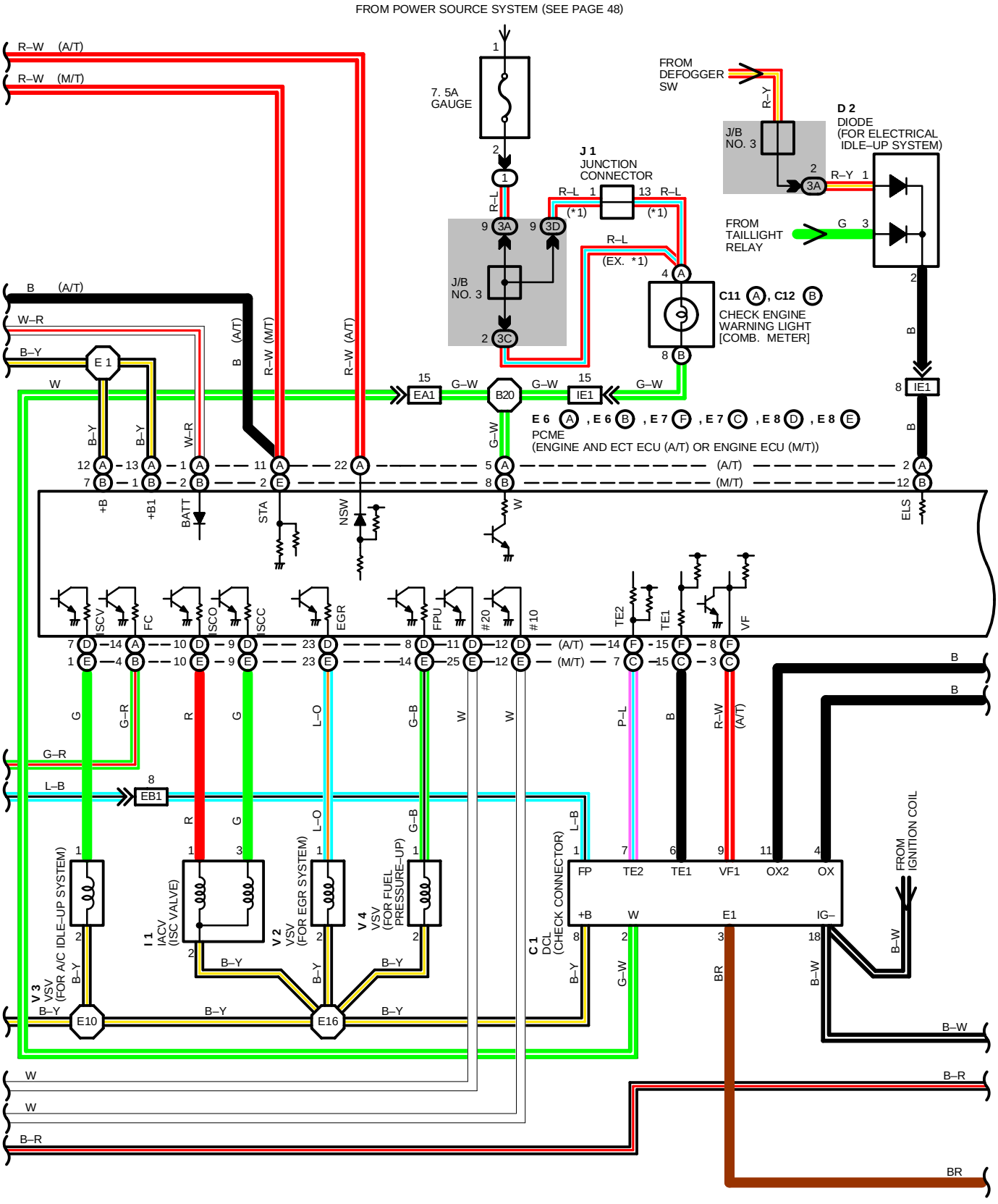
WITH THE DIAGNOSIS SYSTEM, WHEN THERE IS A MALFUNCTION IN THE PCME (ECU) SIGNAL SYSTEM, THE MALFUNCTION SYSTEM IS RECORDED IN THE MEMORY. THE MALFUNCTIONING SYSTEM CAN THEN BE FOUND BY READING THE DISPLAY (CODE) OF THE CHECK ENGINE WARNING LIGHT.

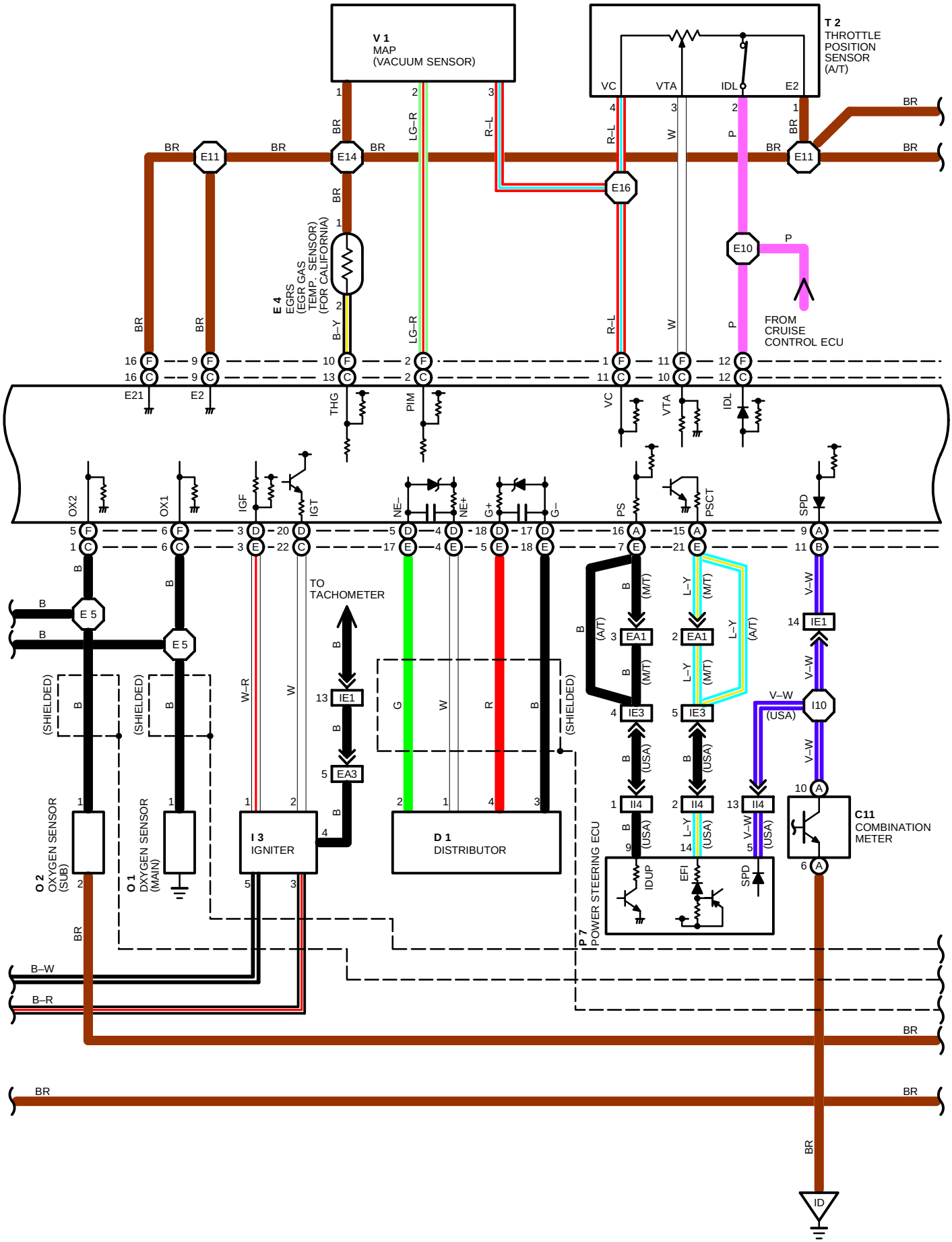
4. FAIL–SAFE SYSTEM

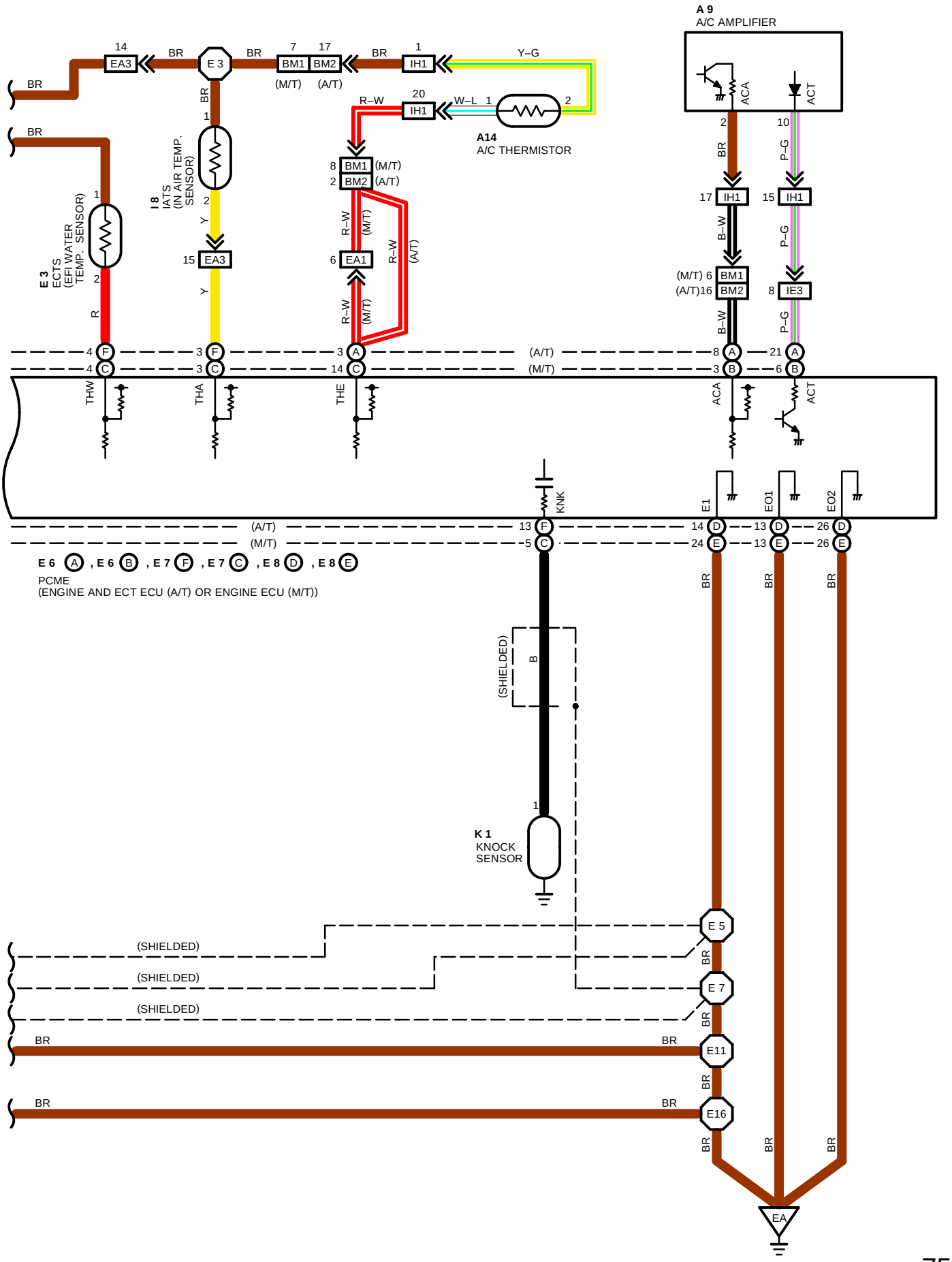
WHEN A MALFUNCTION OCCURS IN ANY SYSTEM, IF THERE IS A POSSIBILITY OF ENGINE TROUBLE BEING CAUSED BY CONTINUED CONTROL BASED ON THE SIGNALS FROM THAT SYSTEM, THE FAIL–SAFE SYSTEM EITHER CONTROLS THE SYSTEM BY USING DATA (STANDARD VALUES) RECORDED IN THE PCME (ECU) MEMORY OR ELSE STOPS THE ENGINE.


I11
IGNITION SW
C 9
CLUTCH START SW (M/T)
ST2
AM2
IG2
IE4
E 3
EA3
N 1
PNS (NEUTRAL START SW) (A/T)
P
N
EA1
E 2
FROM POWER SOURCE SYSTEM (SEE PAGE 48)
15A EFI
II3
IE2
II1
7. 5A AM2
IGNITION MAIN RELAY
EFI MAIN RELAY
CIRCUIT OPENING RELAY
EB1
40A AM2
E 9
E 5
E11
I 4 INJECTOR NO. 1
I 6 INJECTOR NO. 3
I 5 INJECTOR NO. 2
I 7 INJECTOR NO. 4
F 4 FUEL PUMP
BM2
BM1
I10
J 3 JUNCTION CONNECTOR (FOR EARTH)
(USA)
(CANADA)
IC
ID
BG
BI
B26
FL MAIN 2. 0L
BATTERY
R (M/T)
R–W (A/T)
R–W (M/T)
B–R
B–O
B–Y
W–R
W–B
L–B
G–R
W
B

*1 : CANADA
USA (A/T)
USA (M/T) WITH CRUISE CONTROL, ABS, POWER WINDOW OR WOOFER SPEAKER




V 1
MAP
(VACUUM SENSOR)
T 2
THROTTLE
POSITION
SENSOR
(A/T)
VC
VTA
IDL
E2
E11
E14
E16
E10
E 4
EGRS
(EGR GAS
TEMP. SENSOR)
(FOR CALIFORNIA)
FROM
CRUISE
CONTROL ECU
E21
E2
THG
PIM
OX2
OX1
IGF
IGT
NE–
NE+
G+
G–
PS
PSCT
SPD
E 5
TO
TACHOMETER
I 3
IGNITER
D 1
DISTRIBUTOR
O 2
OXYGEN SENSOR
(SUB)
O 1
OXYGEN SENSOR
(MAIN)
(SHIELDED)
P 7
POWER STEERING ECU
IDUP
EFI
SPD
C11
COMBINATION
METER
(USA)
(M/T)
(A/T)
ID


A 9
A/C AMPLIFIER
ACA
ACT
A14
A/C THERMISTOR
E 3
ECTS
(EFI WATER
TEMP. SENSOR)
I 8
IATS
(IN AIR TEMP.
SENSOR)
EA3
E 3
BM1
BM2
IH1
IE3
EA1
(M/T)
(A/T)
BR
Y–G
R–W
W–L
B–W
P–G
R
Y
THW
THA
THE
KNK
E1
EO1
EO2
E6 A , E6 B , E7 F , E7 C , E8 D , E8 E
PCME
(ENGINE AND ECT ECU (A/T) OR ENGINE ECU (M/T))
K 1
KNOCK
SENSOR
(SHIELDED)
E 5
E 7
E11
E16
EA

SERVICE HINTS

E 6, E 7, E 8 PCME (ENGINE ECU (M/T) OR ENGINE AND ECT ECU (A/T))

VOLTAGE AT PCME (ECU) WIRING CONNECTORS

BATT –E1 : ALWAYS **9.0–14.0** VOLTS
+B –E1 : **9.0–14.0** VOLTS (IGNITION SW AT **ON** POSITION)
+B1 –E1 : **9.0–14.0** VOLTS (IGNITION SW AT **ON** POSITION)
IDL –E2 : **9.0–14.0** VOLTS (IGNITION SW ON AND THROTTLE VALVE OPEN)
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 – 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)
ACA –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 DLC (CHECK CONNECTOR) **TE1–E1** NOT CONNECTED)
0–3.0 VOLTS (IGNITION SW ON AND DLC (CHECK CONNECTOR) **TE1–E1** CONNECTED)
NSW –E1 : **0–3.0** VOLTS (IGNITION SW ON AND PNS (NEUTRAL START SW) POSITION **P** OR **N** RANGE)
9.0–14.0 VOLTS (IGNITION SW ON AND PNS (NEUTRAL START SW) EX. POSITION **P** OR **N** RANGE)

RESISTANCE AT PCME (ECU) WIRING CONNECTORS

(DISCONNECT WIRING CONNECTOR)

IDL –E2 : INFINITY (THROTTLE VALVE OPEN)
2.3 KΩ OR LESS (THROTTLE VALVE FULLY CLOSED)
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)
G+ – G– : **0.17–0.21** KΩ
ISCC, ISCO–+B, +B1: **19.3–22.3** Ω

○ : PARTS LOCATION

CODE		SEE PAGE	CODE		SEE PAGE	CODE		SEE PAGE
A 9		26	**E 7**	C	24 (5S–FE)	**J 1**		26
A14		26		F	24 (5S–FE)	**J 3**		26
C 1		24 (5S–FE)	**E 8**	D	24 (5S–FE)	**K 1**		24 (5S–FE)
C 9		26		E	24 (5S–FE)	**N 1**		24 (5S–FE)
C10	C	26	**F 4**		26	**O 1**		24 (5S–FE)
C11	A	26	**I 1**		24 (5S–FE)	**O 2**		24 (5S–FE)
C12	B	26	**I 3**		24 (5S–FE)	**P 7**		27
D 1		24 (5S–FE)	**I 4**		24 (5S–FE)	**T 2**	A	24 (5S–FE)
D 2		26	**I 5**		24 (5S–FE)		B	24 (5S–FE)
E 3		24 (5S–FE)	**I 6**		24 (5S–FE)	**V 1**		24 (5S–FE)
E 4		24 (5S–FE)	**I 7**		24 (5S–FE)	**V 2**		24 (5S–FE)
E 6	A	24 (5S–FE)	**I 8**		24 (5S–FE)	**V 3**		24 (5S–FE)
	B	24 (5S–FE)	**I11**		26	**V 4**		24 (5S–FE)

▭ : RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
1	20	R/B NO. 1 (LEFT KICK PANEL)
2	21	R/B NO. 2 (ENGINE COMPARTMENT LEFT)
5	21	R/B NO. 5 (FRONT LUGGAGE COMPARTMENT RIGHT)

▭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
3A	22	COWL WIRE AND J/B NO. 3 (BEHIND COMBINATION METER)
3C		
3D		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EA1	28 (5S–FE)	ENGINE ROOM MAIN WIRE AND ENGINE WIRE (REAR LUGGAGE COMPARTMENT LEFT)
EA3	28 (5S–FE)	ENGINE WIRE AND ENGINE ROOM MAIN WIRE (R/B NO. 2 INNER)
EB1	28 (5S–FE)	ENGINE WIRE AND R/B NO. 2 (R/B NO. 2 INNER)
IE1	32	ENGINE ROOM MAIN WIRE AND COWL WIRE (LEFT KICK PANEL)
IE2		
IE3		
IE4		
IH1	32	COWL WIRE AND A/C SUB WIRE (INSTRUMENT PANEL RIGHT)
II1	34	LUGGAGE ROOM WIRE AND COWL WIRE (RIGHT KICK PANEL)
II3	34	COWL WIRE AND LUGGAGE ROOM WIRE (RIGHT KICK PANEL)
II4		
BM1	36	ENGINE ROOM MAIN WIRE AND COWL WIRE (ROOM PARTITION BOARD LEFT)
BM2	36	COWL WIRE AND ENGINE ROOM MAIN WIRE (ROOM PARTITION BOARD LEFT)

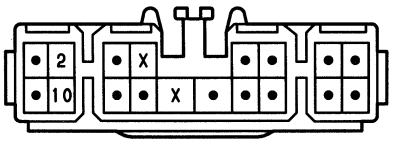
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	28 (5S–FE)	INTAKE MANIFOLD
IC	32	INSTRUMENT PANEL BRACE LH
ID	32	RIGHT KICK PANEL
BG	36	UNDER THE LEFT CENTER PILLAR
BI	36	BACK PANEL CENTER

: SPLICE POINTS

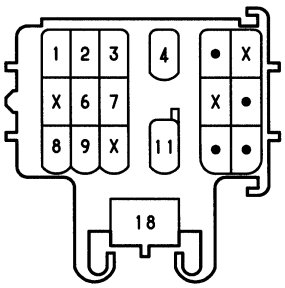
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 1	28 (5S–FE)	ENGINE ROOM MAIN WIRE	**E11**	28 (5S–FE)	ENGINE WIRE
E 2			**E14**		
E 3			**E15**		
E 5	28 (5S–FE)	ENGINE WIRE	**E16**		
E 7			**I10**	34	COWL WIRE
E 9			**B20**	36	ENGINE ROOM MAIN WIRE
E10			**B26**		

A 9 BLACK

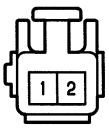


A14

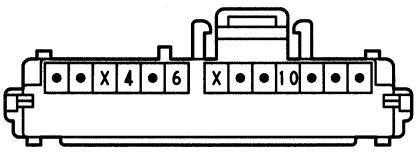
C 1 DARK GRAY



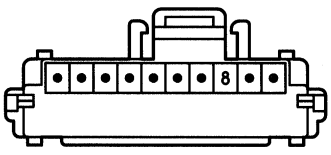
C 9



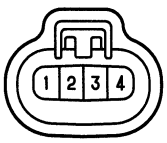
C11 (A) BLUE



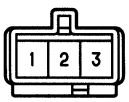
C12 (B) GRAY



D 1 BLACK



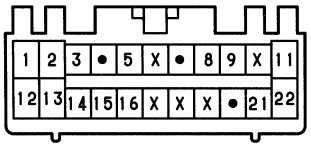
D 2 ORANGE



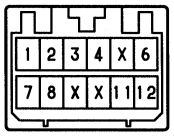
E 3 GREEN

E 4 DARK GRAY

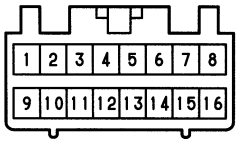
(A/T) E 6 (A) DARK GRAY



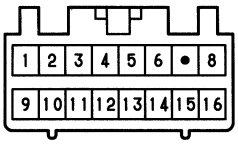
(M/T) E 6 (B) DARK GRAY



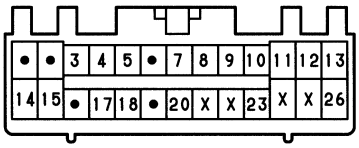
(M/T) E 7 (C) DARK GRAY



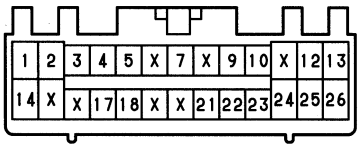
(A/T) E 7 (F) DARK GRAY



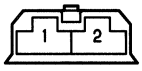
(A/T) E 8 (D) DARK GRAY



(M/T) E 8 (E) DARK GRAY



F 4 DARK GRAY



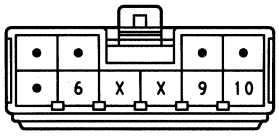
I 1 GRAY

I 3 BLACK

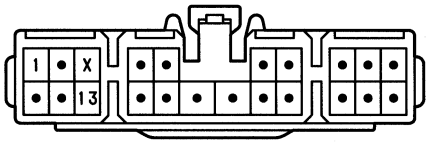
I 4, I 5, I 6, I 7 GRAY

I 8 DARK GRAY

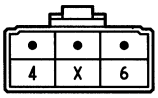
I11 BLACK



J 1

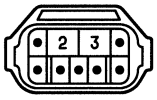


J 3



K 1 DARK GRAY

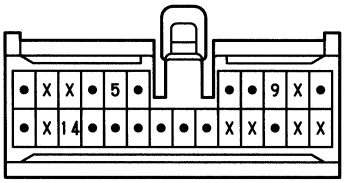
N 1 GRAY



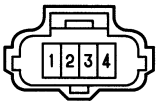
O 1 DARK GRAY

O 2 DARK GRAY

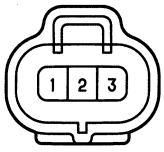
P 7



T 2 BLACK

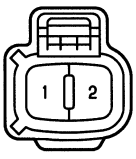


V 1 BLACK



V 2 BLUE

V 3 BLACK



V 4 BROWN