SYSTEM OUTLINE

THE TCCS SYSTEM UTILIZES A MICROCOMPUTER AND MAINTAINS OVERALL CONTROL OF THE E/G, T/M, ETC. AN OUTLINE OF ENGINE CONTROL IS GIVEN HERE.

1. INPUT SIGNALS

(1) WATER TEMP. SIGNAL SYSTEM

THE WATER TEMP. SENSOR DETECTS THE E/G 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 TCCS ECU.

(2) INTAKE AIR TEMP. SIGNAL SYSTEM

THE INTAKE AIR TEMP. SENSOR IS INSTALLED INSIDE THE AIR FLOW METER AND DETECTS THE INTAKE AIR TEMP., WHICH IS INPUT AS A CONTROL SIGNAL TO **TERMINAL THA** OF THE ECU.

(3) OX SENSOR SIGNAL SYSTEM

THE OXYGEN DENSITY IN THE EXHAUST EMISSIONS IS DETECTED AND INPUT AS A CONTROL SIGNAL TO **TERMINAL OX1** OF THE ECU. TO MAINTAIN STABLE DETECTION PERFORMANCE BY THE OX SENSOR. A HEATER IS USED FOR WARMING THE SENSOR. THE HEATER IS ALSO CONTROLLED BY THE ECU (HT1).

(4) RPM SIGNAL SYSTEM

CRANKSHAFT POSITION AND E/G RPM ARE DETECTED BY THE PICK–UP COIL INSTALLED INSIDE THE DISTRIBUTOR. **CRANKSHAFT** POSITION IS INPUT AS A CONTROL SIGNAL TO **TERMINAL G1** OF THE ECU. AND RPM IS INPUT TO **TERMINAL NE**.

(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 ECU, OR WHEN THE VALVE IS FULLY CLOSED, TO **TERMINAL IDL**.

(6) VEHICLE SPEED SIGNAL SYSTEM

THE SPEED SENSOR, INSTALLED INSIDE THE COMBINATION METER, DETECTS THE VEHICLE SPEED AND INPUTS A CONTROL SIGNAL TO **TERMINAL SPD** OF THE ECU.

(7) A/C SW SIGNAL SYSTEM

THE OPERATING VOLTAGE OF THE A/C MAGNET CLUTCH IS DETECTED AND INPUT IN THE FORM OF A CONTROL SIGNAL TO **TERMINAL A/C** OF THE ECU.

(8) BATTERY SIGNAL SYSTEM

VOLTAGE IS CONSTANTLY APPLIED TO **TERMINAL BATT** OF THE 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 ECU.

(9) INTAKE AIR VOLUME SIGNAL SYSTEM

INTAKE AIR VOLUME IS DETECTED BY THE POTENTIOMETER INSTALLED INSIDE THE AIR FLOW METER AND IS INPUT AS A CONTROL SIGNAL TO **TERMINAL VS** OF THE ECU. INSIDE THE AIR FLOW METER THERE IS ALSO A SW FOR FUEL PUMP OPERATION. AND WHEN THE MEASURING PLATE OPENS (AIR INTAKE OCCURS), THIS SW TURNS ON AND CURRENT FLOWS TO THE FUEL PUMP TO OPERATE IT.

(10) STOP LIGHT SW SIGNAL SYSTEM

THE STOP LIGHT SW IS USED TO DETECT WHETHER OR NOT THE VEHICLE IS BRAKING AND THE INFORMATION IS INPUT AS A CONTROL SIGNAL TO **TERMINAL STP** OF THE ECU.

(11) STA SIGNAL SYSTEM

TO CONFIRM THAT THE E/G 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 ECU.

(12) 4WD SIGNAL SYSTEM

WHETHER OR NOT THE VEHICLE IS OPERATING IN 4WD MODE IS DETERMIND. AND A CONTROL SIGNAL IS INPUT TO **TERMINAL 4WD** OF THE ECU.

2. CONTROL SYSTEM

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

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

***** ESA (ELECTRONIC SPARK ADVANCE) SYSTEM

THE ESA SYSTEM MONITORS THE ENGINE REVOLUTIONS USING THE SIGNALS (INPUT SIGNALS (1, 4, 5 TO 7, 9, 11, 12)) INPUT TO THE ECU FROM EACH SENSOR. BASED ON THIS DATA AND THE PROGRAM MEMORIZED IN THE ECU, THE MOST APPROPRIATE IGNITION TIMING IS DECIDED AND CURRENT IS OUTPUT TO **TERMINAL IGT** OF THE ECU. THIS OUTPUT CONTROLS THE IGNITER TO PRODUCE THE MOST APPROPRIATE IGNITION TIMING FOR THE DRIVING CONDITIONS.

* FUEL PRESSURE CONTROL SYSTEM

  THE FUEL PRESSURE UP SYSTEM CAUSES THE VSV (FOR FUEL PRESSURE UP) TO COME ON FOR HIGH TEMP. STARTS AND IMMEDIATELY AFTER STARTING IN ORDER TO INCREASE THE FUEL PRESSURE, IMPROVE STARTABILITY AT HIGH TEMPERATURES AND PROVIDE STABLE IDLING. THE ECU EVALUATES THE INPUT SIGNALS FROM EACH SENSOR (1, 2, AND 4). OUTPUTS CURRENT TO **TERMINAL FPU** AND CONTROLS THE VSV.

* OX SENSOR HEATER CONTROL SYSTEM

  THE OX SENSOR HEATER CONTROL SYSTEM TURNS THE HEATER TO ON WHEN THE INTAKE AIR VOLUME IS LOW (TEMP. OF EXHAUST EMISSIONS LOW), AND WARMS UP THE OX SENSOR TO IMPROVE DETECTION PERFORMANCE OF THE SENSOR. THE ECU EVALUATES THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS (1, 4, 8, 9, 11)), CURRENT IS OUTPUT TO **TERMINAL HT1** AND CONTROLS THE HEATER.

* AI (AIR INJECTION) CONTROL SYSTEM

  THE AI CONTROL SYSTEM TURNS ON THE VSV (FOR AI) IN ACCORDANCE WITH THE ENGINE COOLANT TEMPERATURE AND THE DRIVING CONDITIONS IN ORDER TO REDUCE HC AND CO EMISSIONS.

* EGR CUT CONTROL SYSTEM

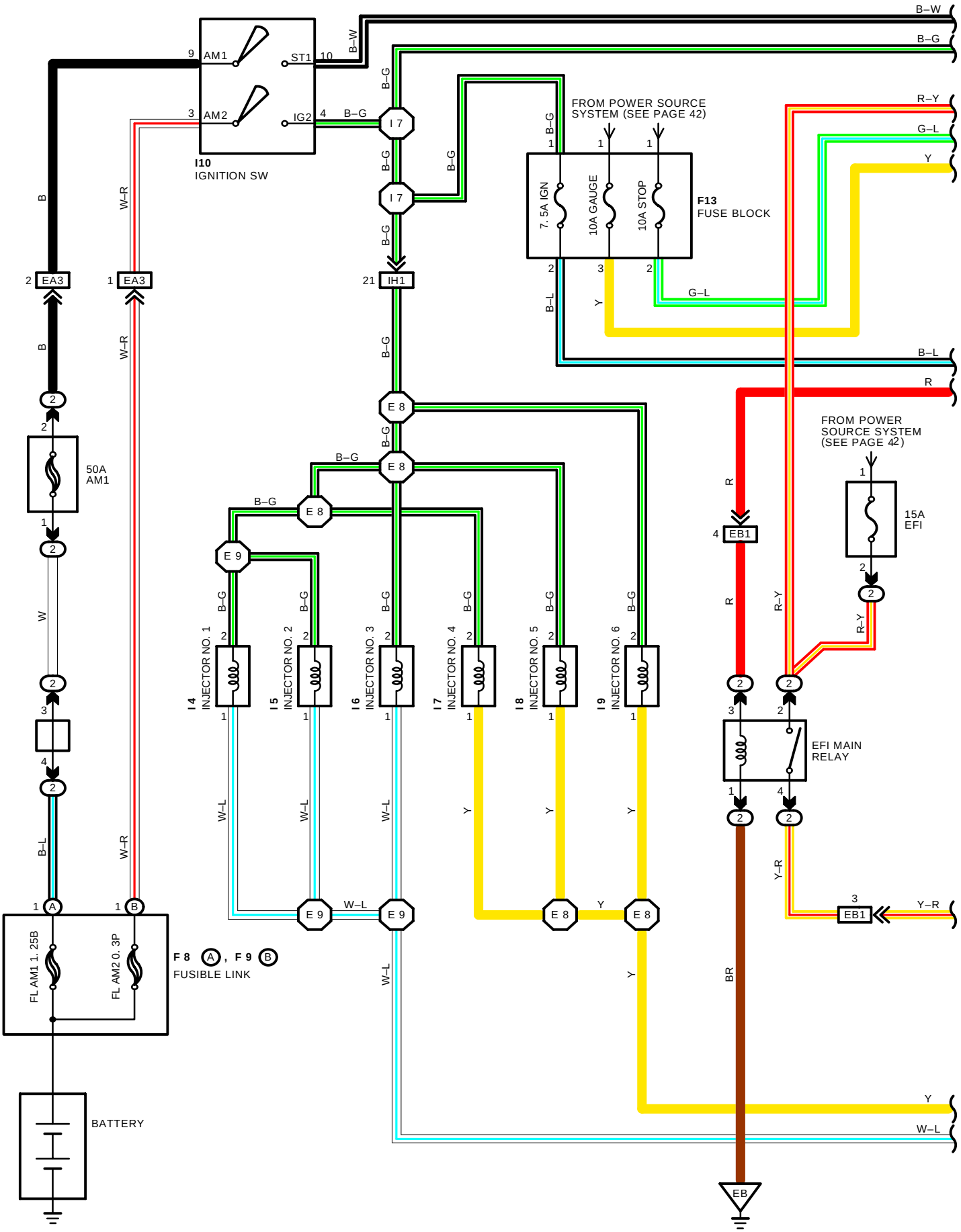
  THE EGR CUT CONTROL SYSTEM CONTROLS THE VSV (FOR EGR) BY EVALUATING THE SIGNALS FROM EACH SENSOR INPUT TO THE ECU (INPUT SIGNALS (1, 9)) AND BY SENDING OUTPUT TO **TERMINAL EGR** OF THE ECU.

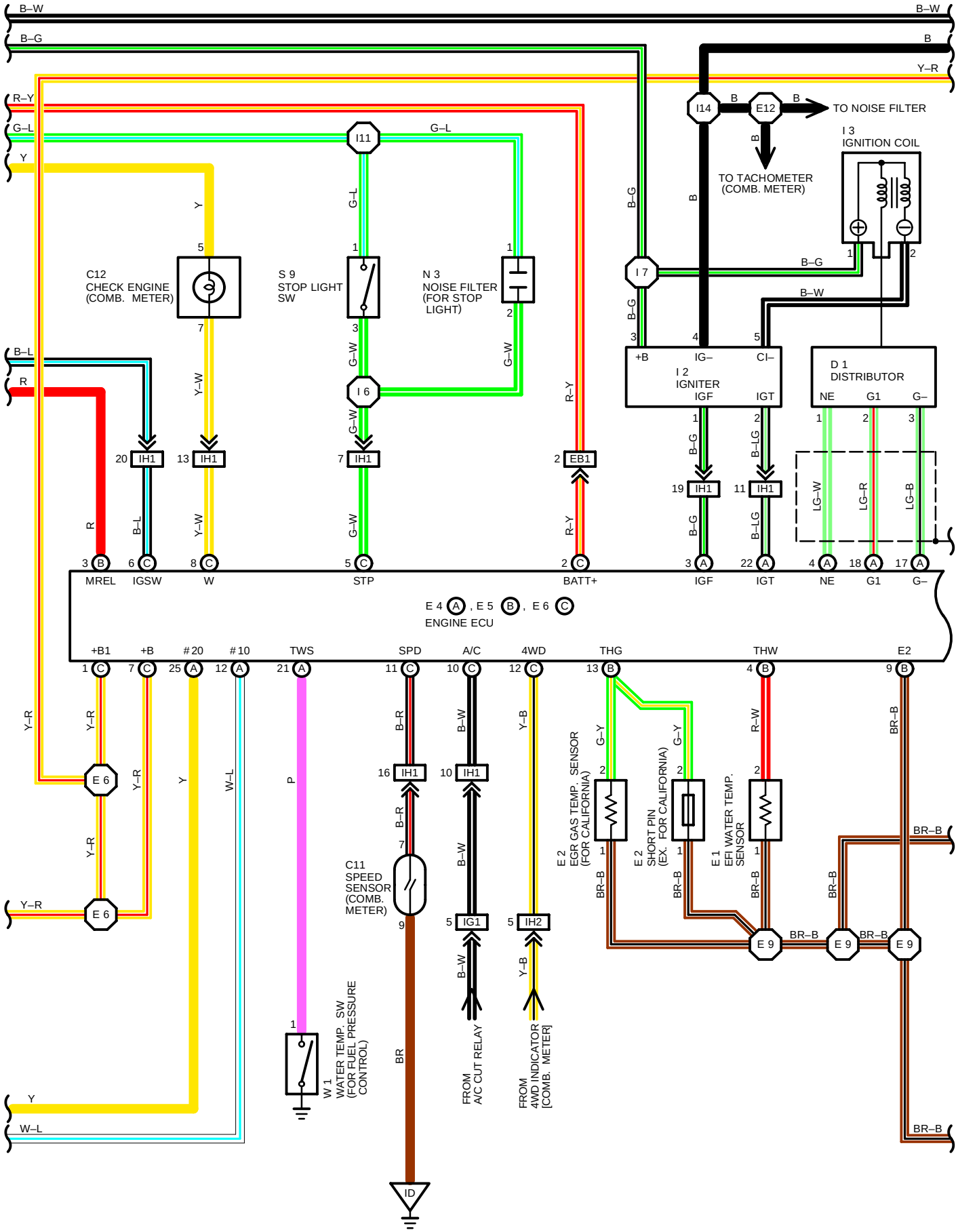
3. DIAGNOSIS SYSTEM

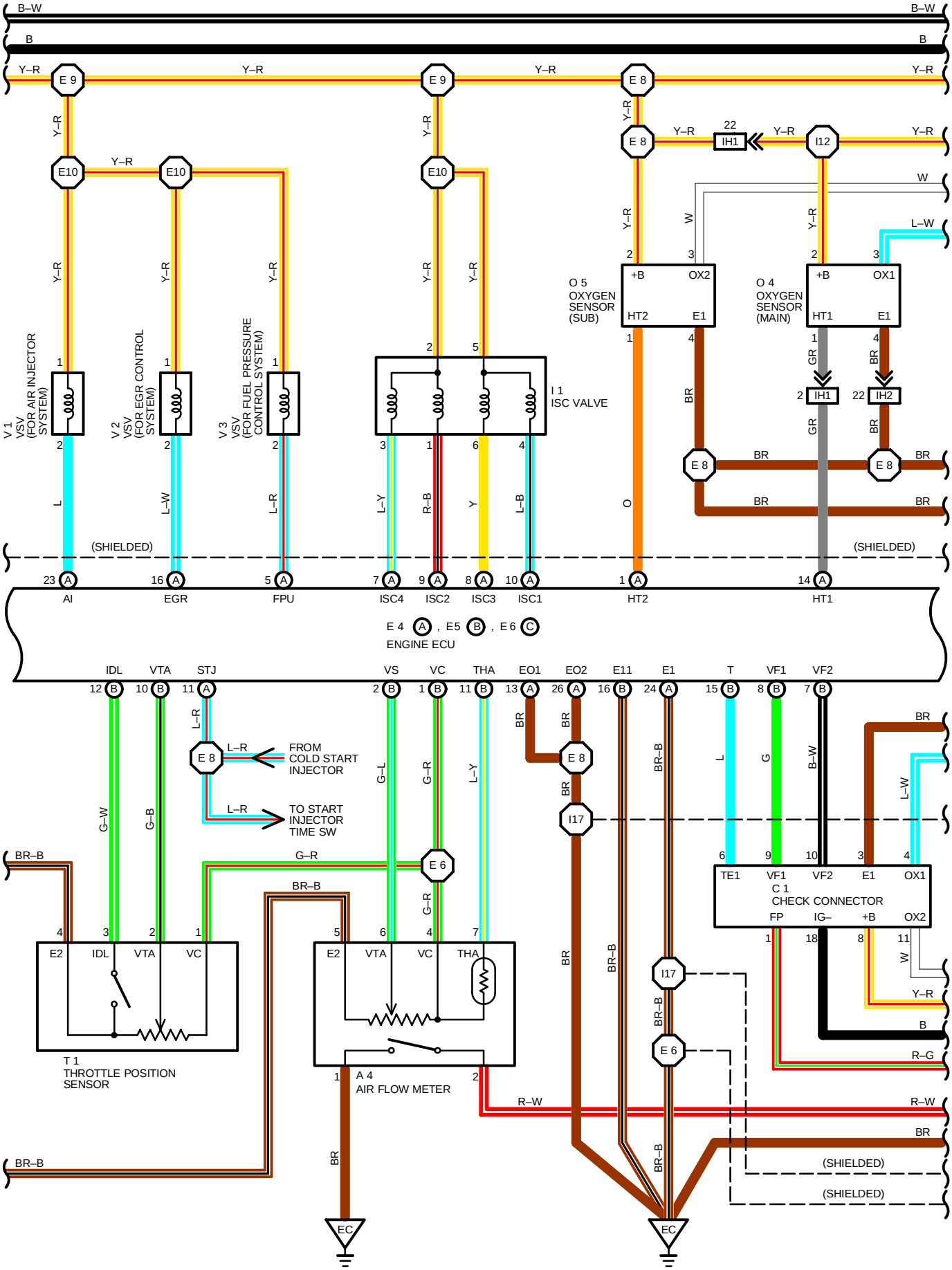
WITH THE DIAGNOSIS SYSTEM, WHEN THERE IS A MALFUNCTION IN THE ECU SIGNAL SYSTEM, THE MALFUNCTIONING SYSTEM IS RECORDED IN THE MEMORY. THE MALFUNCTIONING SYSTEM CAN THEN BE FOUND BY READING THE DISPLAY (CODE) OF THE CHECK ENGINE WARNING LIGHT.

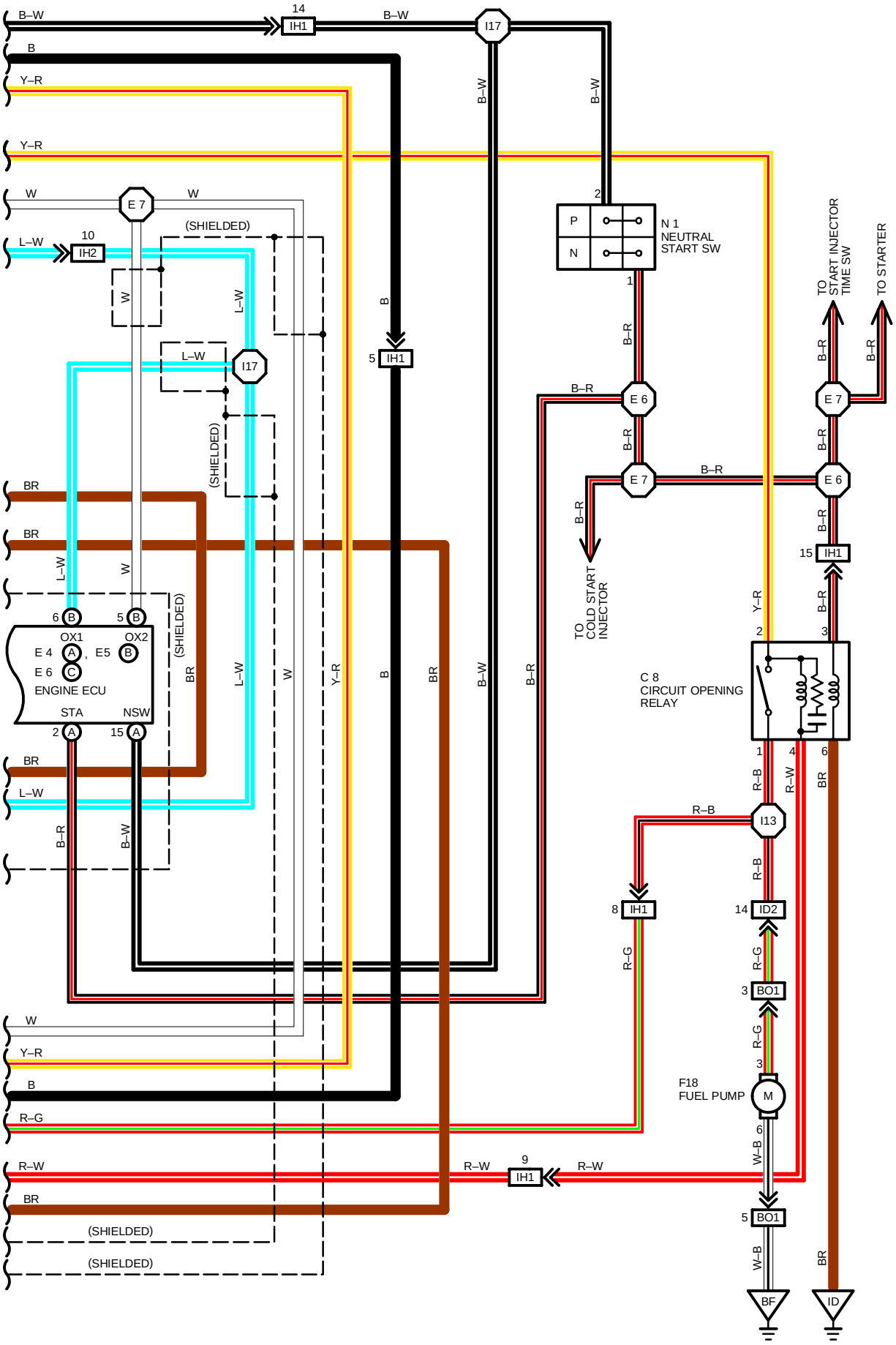
4. FAIL–SAFE SYSTEM

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 ECU MEMORY OR ELSE STOPS THE ENGINE.


I10
IGNITION SW
AM1
AM2
ST1
IG2
FROM POWER SOURCE SYSTEM (SEE PAGE 42)
F13
FUSE BLOCK
7. 5A IGN
10A GAUGE
10A STOP
G–L
B–L
B–W
B–G
R–Y
Y
R
W–R
B
W
W–L
BR
Y–R
50A
AM1
15A
EFI
EFI MAIN
RELAY
FROM POWER SOURCE SYSTEM (SEE PAGE 42)
I4
INJECTOR NO. 1
I5
INJECTOR NO. 2
I6
INJECTOR NO. 3
I7
INJECTOR NO. 4
I8
INJECTOR NO. 5
I9
INJECTOR NO. 6
F8 A , F9 B
FUSIBLE LINK
FL AM1 1. 25B
FL AM2 0. 3P
BATTERY
EA3
IH1
E8
E9
EB1
EB


B–W
B–G
R–Y
G–L
Y
B–L
R
B–W
B
Y–R
I14
E12
TO NOISE FILTER
TO TACHOMETER
(COMB. METER)
I 3
IGNITION COIL
I11
C12
CHECK ENGINE
(COMB. METER)
S 9
STOP LIGHT
SW
N 3
NOISE FILTER
(FOR STOP
LIGHT)
I 6
I 7
I 2
IGNITER
+B
IG–
CI–
IGF
IGT
D 1
DISTRIBUTOR
NE
G1
G–
IH1
EB1
MREL
IGSW
W
STP
BATT+
IGF
IGT
NE
G1
G–
E 4 A , E 5 B , E 6 C
ENGINE ECU
+B1
+B
20
10
TWS
SPD
A/C
4WD
THG
THW
E2
E 6
C11
SPEED
SENSOR
(COMB.
METER)
W 1
WATER TEMP. SW
(FOR FUEL PRESSURE
CONTROL)
IG1
IH2
FROM
A/C CUT RELAY
FROM
4WD INDICATOR
[COMB. METER]
E 2
EGR GAS TEMP. SENSOR
(FOR CALIFORNIA)
E 2
SHORT PIN
(EX. FOR CALIFORNIA)
E 1
EFI WATER TEMP.
SENSOR
E 9
ID


B–W
B
Y–R
E 9
E10
E 8
IH1
I12
22
W
L–W
+B
OX2
HT2
E1
O 5
OXYGEN
SENSOR
(SUB)
OX1
HT1
O 4
OXYGEN
SENSOR
(MAIN)
V 1
VSV
(FOR AIR INJECTOR
SYSTEM)
V 2
VSV
(FOR EGR CONTROL
SYSTEM)
V 3
VSV
(FOR FUEL PRESSURE
CONTROL SYSTEM)
I 1
ISC VALVE
GR
BR
O
L
L–W
L–R
L–Y
R–B
Y
L–B
(SHIELDED)
AI
EGR
FPU
ISC4
ISC2
ISC3
ISC1
E 4 A , E5 B , E 6 C
ENGINE ECU
IDL
VTA
STJ
VS
VC
THA
EO1
EO2
E11
E1
T
VF1
VF2
FROM
COLD START
INJECTOR
TO START
INJECTOR
TIME SW
G–W
G–B
G–L
G–R
BR–B
I17
E2
T 1
THROTTLE POSITION
SENSOR
A 4
AIR FLOW METER
TE1
C 1
CHECK CONNECTOR
FP
IG–
R–W
R–G
EC


B–W
14
IH1
B–W
I17
B
Y–R
Y–R
W
E 7
W
(SHIELDED)
L–W
10
IH2
W
L–W
L–W
I17
(SHIELDED)
B
5
IH1
BR
BR
L–W
W
6
B
5
B
OX1
OX2
E 4
A
E5
B
E 6
C
ENGINE ECU
STA
NSW
2
A
15
A
(SHIELDED)
BR
L–W
W
Y–R
B
BR
B–W
B–R
BR
L–W
B–R
B–W
W
Y–R
B
R–G
R–W
BR
(SHIELDED)
(SHIELDED)
2
P
N
N 1
NEUTRAL
START SW
1
B–R
B–R
E 6
B–R
E 7
B–R
B–R
E 7
B–R
E 6
B–R
TO
COLD START
INJECTOR
TO
START INJECTOR
TIME SW
TO STARTER
B–R
B–R
15
IH1
B–R
Y–R
2
3
C 8
CIRCUIT OPENING
RELAY
1
4
6
R–B
R–W
BR
R–B
I13
R–B
8
IH1
14
ID2
R–G
R–G
3
BO1
R–G
3
F18
FUEL PUMP
M
6
W–B
9
IH1
R–W
R–W
R–W
5
BO1
W–B
BR
BF
ID

SERVICE HINTS

E 4, E 5, E 6 ENGINE ECU

VOLTAGE AT ECU CONNECTOR

BATT – E1 (E11) : **10.0–14.0** VOLTS
+B – E1 (E11) : **10.0–14.0** VOLTS (IGNITIO SW ON)
+B1 – E1 (E11) : **10.0–14.0** VOLTS (IGNITIO SW ON)
IGSW –E1 (E11) : **10.0–14.0** VOLTS (IGNITIO SW ON)
MREL –E1 (E11) : **10.0–14.0** VOLTS (IGNITIO SW ON)
IDL –E2 : **4.0–6.0** VOLTS (IGNITION SW ON AND THROTTLE VALVE OPEN)
VTA –E2 : **0.1–1.0** VOLTS (IGNITION SW ON AND THROTTLE VALVE FULLY CLOSED)
4.0–5.0 VOLTS (IGNITION SW ON AND THROTTLE VALVE OPEN)
VC –E2 : **4.0–6.0** VOLTS (IGNITION SW ON)
VS –E2 : **4.0–5.0** VOLTS (IGNITION SW ON AND MEASURING PLATE FULLY CLOSED)
0.02–0.08 VOLTS (IGNITION SW ON AND MEASURING PLATE FULLY OPEN)
2.0–4.0 VOLTS (IDLING)
0.3–1.0 VOLTS (**3000** RPM)
THA – E2 : **1.0–3.0** VOLTS (IGNITION SW ON AND INTAKE AIR TEMP. **20**˚C (**68**˚F))
THW – E2 : **0.1–1.0** VOLTS (IGNITION SW ON AND COOLANT TEMP. **80**˚C (**176**˚F))
STA – E1 (E11) : **6.0–14.0** VOLTS (CRANKING)
#10, #20, –E01, E02 : **10.0–14.0** VOLTS (IGNITION SW ON)
IGT – E1 (E11) : **0.7 –1.0** VOLTS (CRANKING OR IDLING)
T – E1 (E11) : **4.0 –6.0** VOLTS WITH IGNITION SW ON AND CHECK CONNECTOR **TE1–E1** NOT CONNECT
0 VOLTS WITH IGNITION SW ON AND CHECK CONNECTOR **TE1–E1** CONNECT
A/C – E1 (E11) : **10.0–14.0** VOLTS WITH IGNITION SW ON AND A/C SWITCH ON
ISC1, ISC2, ISC3, ISC4 – E1 (E11) : **10.0–14.0** VOLTS (IGNITION SW ON)
W – E1 (E11) : **10.0–14.0** VOLTS (NO TROUBLE (CHECK ENGINE WARNING LIGHT OFF) AND ENGINE RUNNING)
NSW – E1 (E11) : **0** VOLTS (IGNITION SW ON AND SHIFT POSITION **P** OR **N** RANGE)
10.0–14.0 VOLTS (IGNITION SW ON AND EX. SHIFT POSITION **P** OR **N** RANGE)
4WD – E1 (E11) : **10.0–14.0** VOLTS (IGNITION SW ON AND CENTER DIFF LOCK SW ON)
0 VOLTS (IGNITION SW ON AND CENTER DIFF LOCK SW OFF)
STP – E1 (E11) : **10.0–14.0** VOLTS (IGNITION SW ON AND STOP LIGHT SW ON)
0 VOLTS (IGNITION SW ON AND STOP LIGHT SW OFF)

RESISTANCE AT ECU CONNECTORS

(DISCONNECT WIRING CONNECTOR FROM ECU)

IDL – E2 : INFINITY (THROTTLE VALVE OPEN)
LESS THAN **2.3** KΩ (THROTTLE VALVE FULLY CLOSED)
VTA – E2 : **3.5– 10.3** KΩ (THROTTLE VALVE OPEN)
0.3– 6.3 KΩ (THROTTLE VALVE FULLY CLOSED)
VC – E2 : **4.25– 8.25** KΩ (AIR FLOW METER CONNECTOR DISCONNECTED)
0.2– 0.4 KΩ (THROTTLE POSITION SENSOR CONNECTOR DISCONNECTED)
VS – E2 : **0.02– 0.6** KΩ (MEASURING PLATE FULLY CLOSED)
0.2– 3.0 KΩ (MEASURING PLATE FULLY OPEN)
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))
G1, NE – G :**0.14–0.18** KΩ
ISC1, ISC2, ISC3, ISC4 – +B: **10–30** Ω

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A 4	21	**F 9** B	21	**I10**	22
C 1	21	**F13**	22	**N 1**	21
C 8	22	**F18**	23	**N 3**	22
C 11	22	**I 1**	21	**O 4**	21
C 12	22	**I 2**	21	**O 5**	21
D 1	21	**I 3**	21	**S 9**	22
E 1	21	**I 4**	21	**T 1**	21
E 2	21	**I 5**	21	**V 1**	21
E 4 A	22	**I 6**	21	**V 2**	21
E 5 B	22	**I 7**	21	**V 3**	21
E 6 C	22	**I 8**	21	**W 1**	21
F 8 A	21	**I 9**	21		

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
2	18	R/B NO. 2 (FRONT SIDE OF LEFT FENDER)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EA3	24	COWL WIRE AND ENGINE ROOM MAIN WIRE (LEFT FENDER)
EB1	24	ENGINE ROOM MAIN WIRE AND ENGINE WIRE (NEAR THE R/B NO. 2)
ID2	26	COWL WIRE AND FLOOR NO. 1 WIRE (LEFT KICK PANEL)
IG1	26	COWL WIRE AND A/C SUB WIRE (BEHIND GLOVE BOX)
IH1	26	ENGINE WIRE AND COWL WIRE (BEHIND GLOVE BOX)
IH2		
BO1	28	FLOOR NO. 1 WIRE AND LUGGAGE ROOM NO. 2 WIRE (BESIDE THE FUEL TANK)

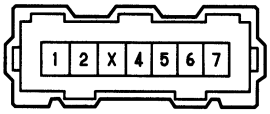
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EB	24	FRONT SIDE OF LEFT FENDER
EC	24	AIR INTAKE CHAMBER
ID	26	LEFT KICK PANEL
BF	28	UNDER THE CENTER CONSOLE BOX

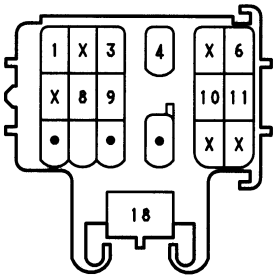
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 6	24	ENGINE WIRE	**I 7**	26	COWL WIRE
E 7			**I11**		
E 8			**I12**		
E 9			**I13**		
E10			**I14**		
E12	24	COWL WIRE	**I17**	26	ENGINE WIRE
I 6	26				

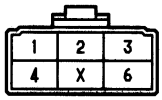
A 4 BLACK



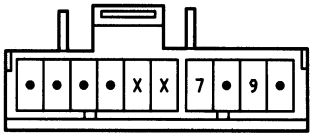
C 1 DARK GRAY



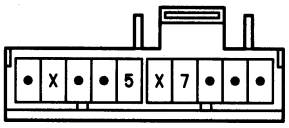
C 8 DARK GRAY



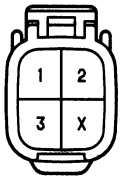
C11 GRAY



C12 BROWN



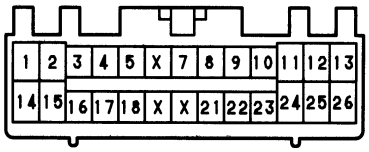
D 1 DARK GRAY



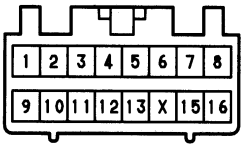
E 1 GREEN

E 2 DARK GRAY

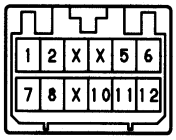
E 4 (A) DARK GRAY



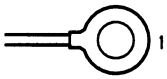
E 5 (B) DARK GRAY



E 6 (C) DARK GRAY



F 8 (A)

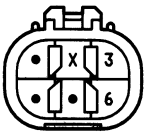


F 9 (B) GRAY

F13

(SEE PAGE 20)

F18 DARK GRAY



I 1 GRAY

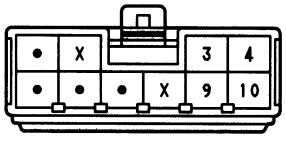
I 2 BLACK

I 3 BLACK

I 4, I 5, I 6 BROWN

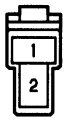
I 7, I 8, I 9 GRAY

I10 BLACK



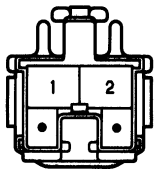
N 1 GRAY

N 3

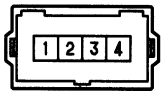


O 4, O 5 DARK GRAY

S 9



T 1 BLACK



V 1 GRAY

V 2 BLUE

V 3 BROWN

W 1 GRAY