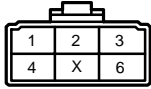
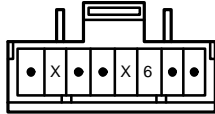


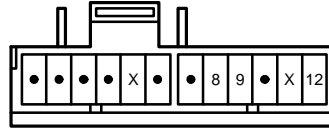
C 4 DARK GRAY



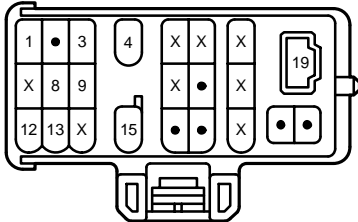
C 9 (A)



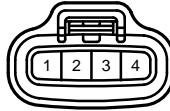
C11 (B)



D 1 DARK GRAY



D 7 BLACK



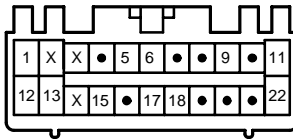
E 1 DARK GRAY



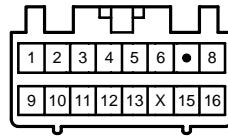
E 3 DARK GRAY



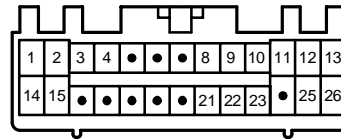
E 4 (A) DARK GRAY



E 5 (B) DARK GRAY



E 6 (C) DARK GRAY



F 6 DARK GRAY



H 8 (A), H 9 (B) DARK GRAY



I 1 BLACK



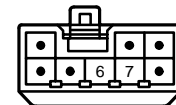
I 2 BLACK



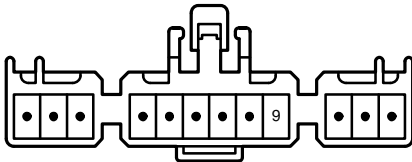
I 3, I 4, I 5, I 6, I 7, I 8 GRAY



I10 BLACK



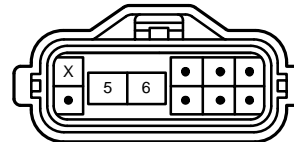
I11



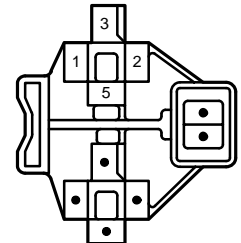
K 1 DARK GRAY



P 1 GRAY



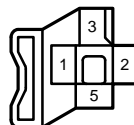
(USA W/ POWER WINDOW, CANADA) R10



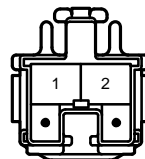
S 1



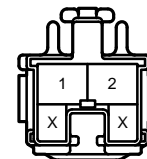
(USA W/O POWER WINDOW) S 7



(W/ CRUISE CONTROL) S10



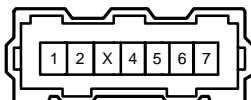
(W/O CRUISE CONTROL) S10 BLACK



T 1 BLACK



V 3 BLACK



V 6 BLUE



V 7 GRAY



V 8 GREEN



V 9 BROWN



ENGINE CONTROL

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. INPUT SIGNAL

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

THE ENGINE COOLANT TEMP. (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 ENGINE CONTROL MODULE (ENGINE AND ELECTRONIC CONTROLLED TRANSMISSION ECU (A/T), ENGINE ECU (M/T)).

(2) INTAKE AIR TEMP. SIGNAL SYSTEM

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

(3) HEATED OXYGEN SENSOR (OXYGEN SENSOR) SIGNAL SYSTEM

THE OXYGEN DENSITY IN THE EXHAUST EMISSIONS IS DETECTED AND INPUT AS A CONTROL SIGNAL TO **TERMINAL OX1** OR **OX2** OF THE ENGINE CONTROL MODULE (ECU). TO MAINTAIN STABLE DETECTION PERFORMANCE BY THE HEATED OXYGEN SENSOR (OXYGEN SENSOR), A HEATER IS USED FOR WARMING THE SENSOR. THE HEATER IS ALSO CONTROLLED BY THE ENGINE CONTROL MODULE (ECU) (HT1 OR HT2).

(4) RPM SIGNAL SYSTEM

CAMSHAFT POSITION AND ENGINE RPM ARE DETECTED BY THE PICK-UP COIL INSTALLED INSIDE THE DISTRIBUTOR. CRANKSHAFT POSITION IS INPUT AS CONTROL SIGNAL TO **TERMINALS G1** AND **G2** OF THE ENGINE CONTROL MODULE (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 ENGINE CONTROL MODULE (ECU), OR WHEN THE VALVE IS FULLY CLOSED, TO **TERMINAL IDL**.

(6) VEHICLE SPEED SIGNAL SYSTEM

THE VEHICLE SPEED SENSOR (SPEED SENSOR), INSTALLED INSIDE THE COMBINATION METER, DETECTS THE VEHICLE SPEED AND INPUT A CONTROL SIGNAL TO **TERMINAL SPD** OF THE ENGINE CONTROL MODULE (ECU).

(7) A/C SW SIGNAL SYSTEM

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

(8) BATTERY SIGNAL SYSTEM

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

(9) INTAKE AIR VOLUME SIGNAL SYSTEM

INTAKE AIR VOLUME IS DETECTED BY THE POTENTIOMETER INSTALLED INSIDE THE VOLUME AIR FLOW (AIR FLOW METER) AND IS INPUT AS A CONTROL SIGNAL TO **TERMINAL VS** OF THE ENGINE CONTROL MODULE (ECU). INSIDE THE VOLUME AIR FLOW (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 ENGINE CONTROL MODULE (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 ENGINE CONTROL MODULE (ECU).

(12) ENGINE KNOCK SIGNAL SYSTEM

ENGINE KNOCKING IS DETECTED BY THE KNOCK SENSOR AND INPUT AS A CONTROL SIGNAL TO **TERMINAL KNK1** OF THE ENGINE CONTROL MODULE (ECU).

(13) 4WD SIGNAL SYSTEM

WHETHER OR NOT THE VEHICLE IS OPERATING IN 4WD MODE IS DETERMINED, AND A CONTROL SIGNAL IS INPUT TO **TERMINAL 4WD** OF THE ENGINE CONTROL MODULE (ECU).

2. CONTROL SYSTEM

* MFI (EFI) SYSTEM

THE MFI (EFI) SYSTEM MONITORS THE ENGINE CONDITIONS THROUGH THE SIGNALS EACH SENSOR (INPUT SIGNALS (1 TO 13)) INPUTS TO THE ENGINE CONTROL MODULE (ECU). BASED ON THIS DATA AND THE PROGRAM MEMORIZED IN THE ENGINE CONTROL MODULE (ECU), THE MOST APPROPRIATE FUEL INJECTION TIMING IS DECIDED AND CURRENT IS OUTPUT TO **TERMINALS #10 AND #20** OF THE ENGINE CONTROL MODULE (ECU). CAUSING THE INJECTORS TO OPERATE (TO INJECT FUEL). IT IS THIS SYSTEM WHICH, THROUGH THE WORK OF THE ENGINE CONTROL MODULE (ECU), FINELY CONTROLS FUEL INJECTION IN RESPONSE TO DRIVING CONDITIONS.

* ESA (ELECTRONIC SPARK ADVANCE) SYSTEM

THE ESA SYSTEM MONITORS THE ENGINE CONDITIONS USING THE SIGNALS (INPUT SIGNALS (1, 4, 5 TO 7, 9, 11, 12)) INPUT TO THE ENGINE CONTROL MODULE (ECU) FROM EACH SENSOR. BASED ON THIS DATA AND THE PROGRAM MEMORIZED IN THE ENGINE CONTROL MODULE (ECU), THE MOST APPROPRIATE IGNITION TIMING IS DECIDED AND CURRENT IS OUTPUT TO **TERMINAL 1GT** OF THE ENGINE CONTROL MODULE (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, A/C IDLE-UP) TO COME ON FOR HIGH TEMP. STARTS AND FOR ABOUT **180** SECONDS AFTER STARTING IN ORDER TO INCREASE THE FUEL PRESSURE, IMPROVE STARTABILITY AT HIGH TEMPERATURES AND PROVIDE STABLE IDLING. THE ENGINE CONTROL MODULE (ECU) EVALUATES THE INPUT SIGNALS FROM EACH SENSOR (1, 2, 4 AND 11), OUTPUTS CURRENT TO **TERMINAL FPU** AND CONTROLS THE VSV.

* HEATED OXYGEN SENSOR (OXYGEN SENSOR) HEATER CONTROL SYSTEM

THE HEATED OXYGEN SENSOR (OXYGEN 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 HEATED OXYGEN SENSOR (OXYGEN SENSOR) TO IMPROVE DETECTION PERFORMANCE OF THE SENSOR. THE ENGINE CONTROL MODULE (ECU) EVALUATES THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS (1, 4, 8, 9, 11)), CURRENT IS OUTPUT TO **TERMINAL HT1 OR HT2** AND CONTROLS THE HEATER.

* AS CONTROL SYSTEM

THE AS CONTROL SYSTEM TURNS ON THE VSV (FOR AS) WHEN THE ENGINE IS COLD AND DURING DECELERATION, PREVENTING OVERHEATING OF THE TWC (THREE-WAY CATALYTIC CONVERTER) AND REDUCING HC AND CO EMISSIONS. THE ENGINE CONTROL MODULE (ECU) EVALUATES THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS (1, 4, 8, 9, 11)), THEN SENDS OUTPUT TO **TERMINAL AS** AND CONTROLS THE VSV.

* EGR CUT CONTROL SYSTEM

THE EGR CUT CONTROL SYSTEM CONTROLS THE VSV (FOR EGR) BY EVALUATING THE SIGNALS FROM EACH SENSOR INPUT TO THE ENGINE CONTROL MODULE (ECU) (INPUT SIGNALS (1, 9)) AND BY SENDING OUTPUT TO **TERMINAL EGR** OF THE ENGINE CONTROL MODULE (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 MALFUNCTION INDICATOR LAMP (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 ENGINE CONTROL MODULE (ECU) MEMORY OR ELSE STOPS THE ENGINE.

ENGINE CONTROL

SERVICE HINTS

EFI MAIN RELAY

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

V 3 VOLUME AIR FLOW (AIR FLOW METER)

1-2 : CLOSED WITH STARTER RUNNING OR MEASURING PLATE OPEN

4-5 : **200-400 Ω**

5-6 : **200-600 Ω** (MEASURING PLATE FULLY CLOSED)

20-1200 Ω (MEASURING PLATE FULLY OPEN)

5-7 : **10-20 K Ω** (**-20°C, -4°F**)

4-7 K Ω (**0°C, 32°F**)

2-3 K Ω (**20°C, 68°F**)

0.9-1.3 K Ω (**40°C, 104°F**)

0.4-0.7 K Ω (**60°C, 140°F**)

C 4 CIRCUIT OPENING RELAY

1-2 : CLOSED WITH STARTER RUNNING OR MEASURING PLATE (VOLUME AIR FLOW (AIR FLOW METER)) OPEN

I 3, I 4, I 5, I 6, I 7, I 8 INJECTOR

1-2 : **13.4-14.2 Ω**

P 1 PARK/NEUTRAL POSITION SW (NEUTRAL START SW) (A/T)

5-6 : CLOSED WITH A/T SHIFT LEVER IN **P** OR **N** POSITION

T 1 THROTTLE POSITION SENSOR

2-4 : **0.2- 0.8 K Ω** WITH CLEARANCE BETWEEN LEVER AND STOP SCREW **0 MM (0 IN.)**

3-4 : **2.3 K Ω** OR LESS WITH CLEARANCE BETWEEN LEVER AND STOP SCREW **0.50 MM (0.0197 IN.)**

INFINITY WITH CLEARANCE BETWEEN LEVER AND STOP SCREW **0.77 MM (0.0303 IN.)**

2-4 : **3.3-10 K Ω** WITH THROTTLE VALVE FULLY OPEN

1-4 : **4-9 K Ω**

E 3 ENGINE COOLANT TEMP. (EFI WATER TEMP.) SENSOR

1-2 : **10- 20 K Ω** (**-20°C, -4°F**)

: **4- 7 K Ω** (**0°C, 32°F**)

: **2- 3 K Ω** (**20°C, 68°F**)

: **0.9- 1.3 K Ω** (**40°C, 104°F**)

: **0.4- 0.7 K Ω** (**60°C, 140°F**)

: **0.2- 0.4 K Ω** (**80°C, 176°F**)

E 4, E 5, E 6 ENGINE CONTROL MODULE (ENGINE AND ELECTRONIC CONTROLLED TRANSMISSION ECU (A/T), ENGINE ECU (M/T))

VOLTAGE AT ECU CONNECTORS

+B - E1 : **9-14 VOLTS** (IGNITION SW ON)

BATT - E1 : **9-14 VOLTS** (ALWAYS)

VC - E2 : **4.5-5.5 VOLTS** (IGNITION SW ON)

IDL - E2 : **9-14 VOLTS** (IGNITION SW ON AND THROTTLE VALVE OPEN)

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 FULLY OPEN)

IGT - E1 : PULSE GENERATION (CRANKING OR IDLING)

STA - E1 : **6 VOLTS** OR MORE (IGNITION SW AT **ST** POSITION)

+B1 - E1 : **9-14 VOLTS** (IGNITION SW ON)

#10, #20 - E1 : **9-14 VOLTS** (IGNITION SW ON)

W - E1 : **9-14 VOLTS** (NO TROUBLE AND ENGINE RUNNING)

VS-E2 : **4.0-5.5 VOLTS** (IGNITION SW ON AND MEASURING PLATE FULLY CLOSED)

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**)

SPD - E1 : PULSE GENERATION WITH VEHICLE MOVING

STP - E1 : **7.5-14 VOLTS** (STOP LIGHT SW ON)

RESISTANCE AT ECU WIRING CONNECTOR

(DISCONNECT WIRING CONNECTOR)

IDL - E2 : INFINITY (THROTTLE VALVE OPEN)

0-100 Ω (THROTTLE VALVE FULLY CLOSED)

VTA - E2 : **3.3- 10 K Ω** (THROTTLE VALVE FULLY OPEN)

0.2-0.8 K Ω (THROTTLE VALVE FULLY CLOSED)

THA - E2 : **2-3 K Ω** (INTAKE AIR TEMP. **20°C, 68°F**)

THW - E2 : **0.2-0.4 K Ω** (COOLANT TEMP. **80°C, 176°F**)

+B - E2 : **0.2-0.4 K Ω**

VS-E2 : **0.02-0.1 K Ω** (MEASURING PLATE FULLY CLOSED)

0.02-1.0 K Ω (MEASURING PLATE FULLY OPEN)

NE - E1 : **140-180 Ω**

STJ - E1 : INFINITY

○ : PARTS LOCATION

| CODE | SEE PAGE | CODE | SEE PAGE | CODE | SEE PAGE |
|------|----------|------|----------|------|----------|
| C 4 | 24 | H 9 | 23 | K 1 | 23 |
| C 9 | A 24 | I 1 | 23 | P 1 | 23 |
| C11 | B 24 | I 2 | 23 | R10 | 24 |
| D 1 | 22 | I 3 | 23 | S 1 | 23 |
| D 7 | 22 | I 4 | 23 | S 7 | 24 |
| E 1 | 22 | I 5 | 23 | S10 | 24 |
| E 3 | 22 | I 6 | 23 | T 1 | 23 |
| E 4 | A 24 | I 7 | 23 | V 3 | 23 |
| E 5 | B 24 | I 8 | 23 | V 6 | 23 |
| E 6 | C 24 | I10 | 23 | V 7 | 23 |
| F 6 | 25 | I11 | 24 | V 8 | 23 |
| H 8 | 23 | I 24 | 24 | V 9 | 23 |

○ : RELAY BLOCKS

| CODE | SEE PAGE | RELAY BLOCKS (RELAY BLOCK LOCATION) |
|------|----------|--------------------------------------|
| 2 | 19 | R/B NO. 2 (ENGINE COMPARTMENT RIGHT) |

○ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

| CODE | SEE PAGE | JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION) |
|------|----------|--|
| 1C | 20 | COWL WIRE AND J/B NO. 1 (LEFT KICK PANEL) |
| 1D | | |

□ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

| CODE | SEE PAGE | JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION) |
|------|----------|--|
| EA1 | 26 | COWL WIRE AND ENGINE ROOM MAIN WIRE (INNER THE R/B NO. 2) |
| EB1 | 26 | SENSOR WIRE AND ENGINE WIRE (OVER THE CYLINDER HEAD) |
| ID1 | 28 | ENGINE WIRE AND COWL WIRE (RIGHT KICK PANEL) |
| BG1 | 30 | FRAME WIRE AND COWL WIRE (UNDER THE PASSENGER'S SEAT) |

▽ : GROUND POINTS

| CODE | SEE PAGE | GROUND POINTS LOCATION |
|------|----------|------------------------|
| EA | 26 | LEFT FENDER |
| ED | 26 | CAMSHAFT BEARING CAP |
| IE | 28 | LEFT KICK PANEL |

○ : SPLICE POINTS

| CODE | SEE PAGE | WIRE HARNESS WITH SPLICE POINTS | CODE | SEE PAGE | WIRE HARNESS WITH SPLICE POINTS |
|------|----------|---------------------------------|------|----------|---------------------------------|
| E 5 | 26 | ENGINE ROOM MAIN WIRE | I 1 | 28 | ENGINE WIRE |
| E 9 | 26 | ENGINE WIRE | I 2 | 28 | COWL WIRE |
| E10 | | | B 1 | 30 | |