### SYSTEM OUTLINE

THIS SYSTEM UTILIZES AN ENGINE CONTROL MODULE (ENGINE AND ELECTRONIC CONTROLLED TRANSMISSION ECU) AND MAINTAINS OVERALL CONTROL OF THE ENGINE, TRANSMISSION AND SO ON. AN OUTLINE OF THE ENGINE CONTROL IS EXPLAINED HERE.

#### 1. INPUT SIGNALS

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

THE ENGINE COOLANT TEMP. SENSOR (WATER TEMP. SENSOR) DETECTS THE ENGINE COOLANT TEMP. AND HAS A BUILT-IN THERMISTOR WITH A RESISTANCE WHICH VARIES ACCORDING TO THE ENGINE COOLANT TEMP. (WATER TEMP.) THE ENGINE COOLANT TEMP. (WATER TEMP.) IS INPUT INTO **TERMINAL THW** OF ENGINE CONTROL MODULE (ENGINE AND ELECTRONIC CONTROLLED TRANSMISSION ECU) AS A CONTROL SIGNAL.

(2) INTAKE AIR TEMP. SIGNAL CIRCUIT

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

(3) OXYGEN SENSOR SIGNAL CIRCUIT

THE OXYGEN DENSITY IN THE EXHAUST EMISSION IS DETECTED AND INPUT AS A CONTROL SIGNAL FROM THE HEATED OXYGEN SENSOR (OXYGEN SENSOR) MAIN (FOR LEFT AND RIGHT BANK) TO **TERMINALS OXL1**, **OXR1** OF THE ENGINE CONTROL MODULE (ECU) AND FROM THE OXYGEN SENSOR SUB (FOR LEFT AND RIGHT BANK) TO **TERMINAL OXL2**, **OXR2** OF THE ENGINE CONTROL MODULE (ECU).

TO STABILIZE DETECTION PERFORMANCE BY THE HEATED OXYGEN SENSOR (OXYGEN SENSOR) (MAIN), THE HEATED OXYGEN SENSOR (OXYGEN SENSOR) (MAIN) IS WARMED. THIS HEATER IS ALSO CONTROLLED BY THE ENGINE CONTROL MODULE (ECU) (HT1, HT2).

(4) RPM SIGNAL CIRCUIT

CAMSHAFT POSITION IS DETECTED BY THE CAMSHAFT POSITION SENSOR (FOR LEFT AND RIGHT BANK) AND ITS SIGNAL IS INPUT TO **TERMINALS G1+, G2+** OF ENGINE CONTROL MODULE (ECU) AS A CONTROL SIGNAL. ALSO, THE ENGINE RPM IS DETECTED BY THE CRANKSHAFT POSITION SENSOR INSTALLED IN THE CYLINDER BLOCK AND THE SIGNAL IS INPUT INTO **TERMINAL NE+** OF ENGINE CONTROL MODULE (ECU) AS A CONTROL SIGNAL.

(5) THROTTLE SIGNAL CIRCUIT

THE THROTTLE POSITION SENSOR DETECTS THE THROTTLE VALVE OPENING ANGLE AS A CONTROL SIGNAL, WHICH IS INPUT INTO **TERMINAL VTA1** OF THE ENGINE CONTROL MODULE (ECU). WHEN THE VALVE IS COMPLETELY CLOSED, THE CONTROL SIGNAL IS INPUT INTO **TERMINAL IDL 1**.

(6) VEHICLE SPEED CIRCUIT

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

(7) NEUTRAL START SIGNAL CIRCUIT

THE PARK/NEUTRAL POSITION SW (NEUTRAL START SW) DETECTS WHETHER THE SHIFT POSITION IS IN NEUTRAL OR NOT, AND THE SIGNAL IS INPUT INTO **TERMINAL NSW** OF THE ENGINE CONTROL MODULE (ECU).

(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 ENGINE CONTROL MODULE (ECU) AS A CONTROL SIGNAL.

(9) BATTERY SIGNAL CIRCUIT

VOLTAGE IS CONSTANTLY APPLIED TO **TERMINAL BATT** OF THE ENGINE CONTROL MODULE (ECU). WITH THE IGNITION SW TURNED ON, THE VOLTAGE FOR ENGINE CONTROL MODULE (ECU) START-UP POWER SUPPLY IS APPLIED TO **TERMINAL +B** AND **+B1** OF ENGINE CONTROL MODULE (ECU) VIA EFI MAIN RELAY.

THE CURRENT FLOWING THROUGH THE IGN FUSE FLOWS TO TERMINAL IGSW OF THE ENGINE CONTROL MODULE (ECU).

(10) INTAKE AIR VOLUME SIGNAL CIRCUIT

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

(12) STA 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 (ECU) AS A CONTROL SIGNAL.

(13) ENGINE KNOCK SIGNAL CIRCUIT

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

### 2. CONTROL SYSTEM

\* MFI (EFI) (MULTIPORT FUEL INJECTION) SYSTEM

THE MFI (EFI) SYSTEM MONITORS THE ENGINE CONDITION THROUGH THE SIGNALS INPUT FROM EACH SENSOR (INPUT SIGNAL FROM (1) TO (13) ETC.) TO THE ENGINE CONTROL MODULE (ECU). THE BEST FUEL INJECTION TIMING IS DECIDED BASED ON THIS DATA AND THE PROGRAM MEMORIZED BY THE ENGINE CONTROL MODULE (ECU), AND THE CONTROL SIGNAL IS OUTPUT TO **TERMINAL #10, #20, #30,** AND **#40** OF THE ENGINE CONTROL MODULE (ECU) TO OPERATE THE INJECTOR. (INJECT THE FUEL). THE MFI (EFI) SYSTEM PRODUCES CONTROL OF FUEL INJECTION OPERATION BY THE ENGINE CONTROL MODULE (ECU) 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 (ECU) FROM EACH SENSOR (INPUT SIGNALS FROM (1), (2), (4) TO (13) ETC.). THE BEST IGNITION TIMING IS DECIDED ACCORDING TO THIS DATA AND THE MEMORIZED DATA IN THE ENGINE CONTROL MODULE (ECU) AND THE CONTROL SIGNAL IS OUTPUT TO TERMINAL IGT1 AND IGT2. THIS SIGNAL CONTROLS THE IGNITER TO PROVIDE THE BEST IGNITION TIMING FOR THE DRIVING CONDITIONS.

\* FUEL PRESSURE-UP SYSTEM

THE FUEL PRESSURE-UP SYSTEM CAUSES THE VSV (FOR FUEL PRESSURE-UP) TO COME ON FOR HIGH TEMP. STARTING AND INCREASED THE FUEL PRESSURE TO IMPROVE STARTABILITY AT HIGH TEMPERATURES AND TO PROVIDE STABLE IDLING. THE ENGINE CONTROL MODULE (ECU) EVALUATES THE INPUT SIGNALS FROM EACH SENSOR ((1), (2), (4), (9) AND (10) ETC.), AND OUTPUTS CURRENT TO **TERMINAL PR** OF ENGINE CONTROL MODULE (ECU) TO CONTROL THE VSV.

\* HEATED OXYGEN SENSOR (OXYGEN SENSOR) HEATER CONTROL SYSTEM

THE HEATED OXYGEN SENSOR (OXYGEN SENSOR) HEATER 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 (OXYGEN SENSOR) (FOR LEFT AND RIGHT BANK) TO IMPROVE DETECTION PERFORMANCE OF THE SENSOR.

THE ENGINE CONTROL MODULE (ECU) EVALUATES THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS FROM (1), (2), (4), (9) TO (11) ETC.), AND OUTPUTS CURRENT TO **TERMINAL HT1, HT2** TO CONTROL THE HEATER.

\* IDLE AIR CONTROL (ISC) (IDLE SPEED CONTROL) SYSTEM

THE IDLE AIR CONTROL (ISC) SYSTEM (STEP MOTOR 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 AND SO ON. THE ENGINE CONTROL MODULE (ECU) EVALUATES THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS FROM (1), (4), (5), (8), (9), (11) ETC.), OUTPUTS CURRENT TO **TERMINALS ISC1, ISC2, ISC3** AND **ISC4** TO CONTROL IDLE AIR CONTROL VALVE (ISC VALVE).

\* ECP CONTROL SYSTEM

THE EGR CONTROL SYSTEM DETECTS THE SIGNAL FROM EACH SENSOR (INPUT SIGNALS FROM (1), (4), (9), (10) ETC.), AND OUTPUTS CURRENT TO **TERMINALS EGR1**, **EGR2**, **EGR3**, **EGR4** TO CONTROL THE EGR VALVE.

\* FUEL PUMP CONTROL SYSTEM

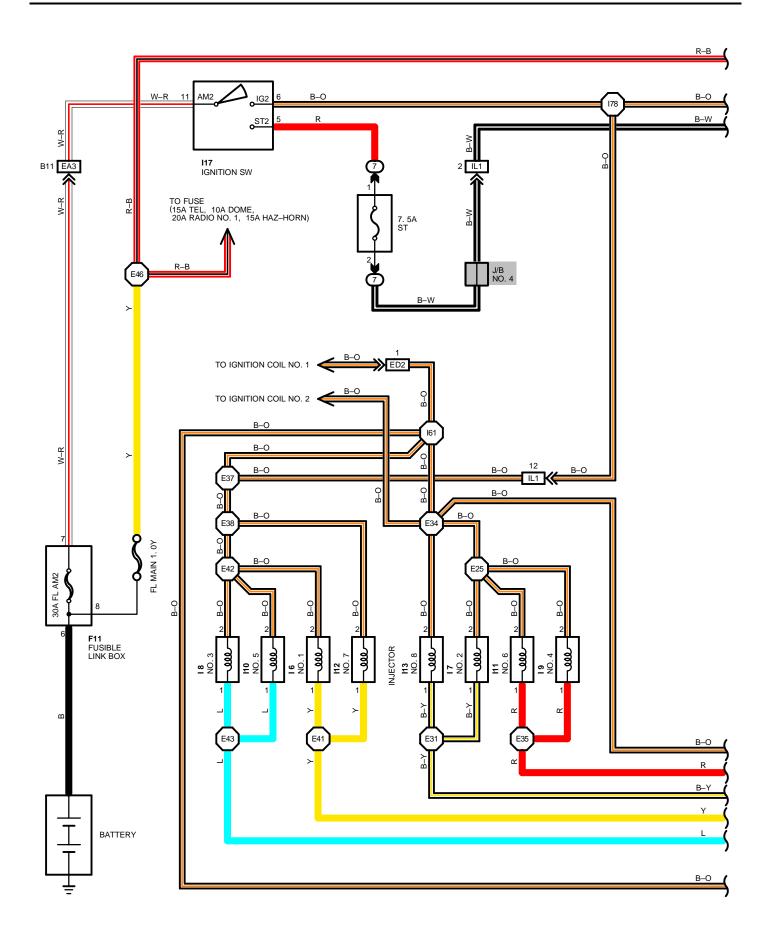
THE ENGINE CONTROL MODULE (ECU) OUTPUTS CURRENT TO **TERMINAL FPR** AND CONTROLS THE FUEL PUMP ECU AND FUEL PUMP DRIVE SPEED IN RESPONSE TO CONDITIONS.

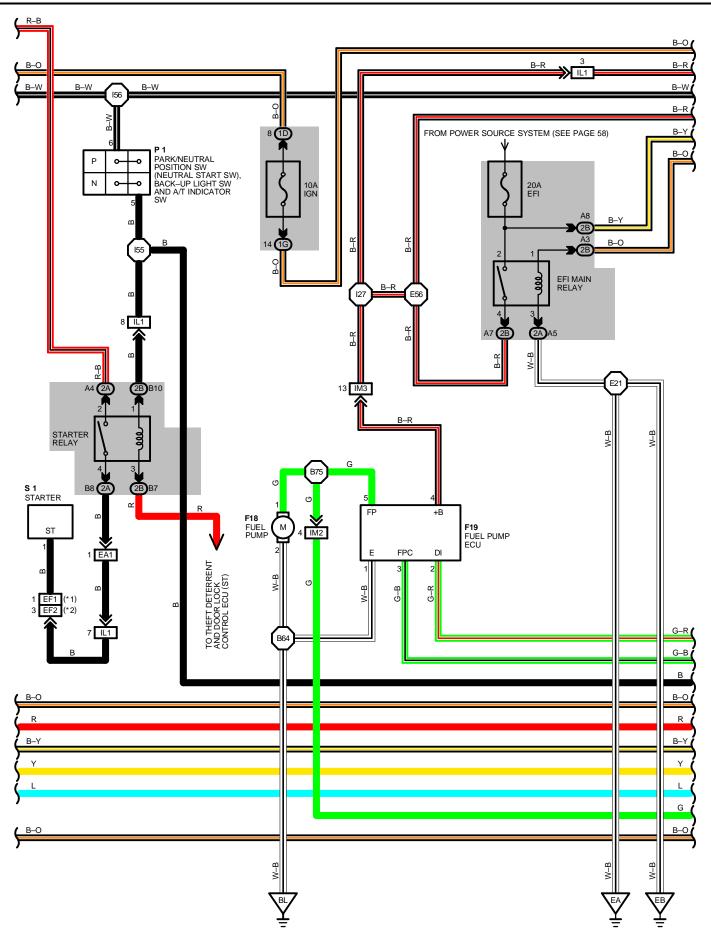
## 3. DIAGNOSIS SYSTEM

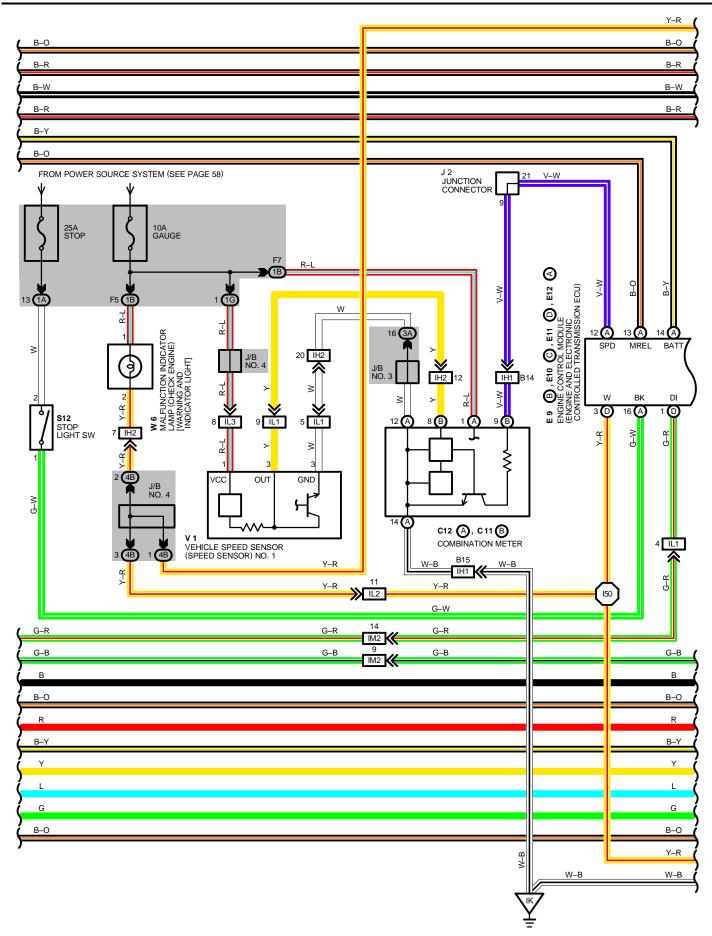
WITH THE DIAGNOSIS SYSTEM, WHEN THERE IS A MALFUNCTION IN THE ENGINE CONTROL MODULE (ECU) SIGNAL SYSTEM, THE MALFUNCTIONING SYSTEM IS RECORDED IN THE MEMORY. THE MALFUNCTIONING SYSTEM CAN BE FOUND BY READING THE CODE DISPLAYED BY THE MALFUNCTION INDICATOR LAMP (CHECK ENGINE WARNING LIGHT).

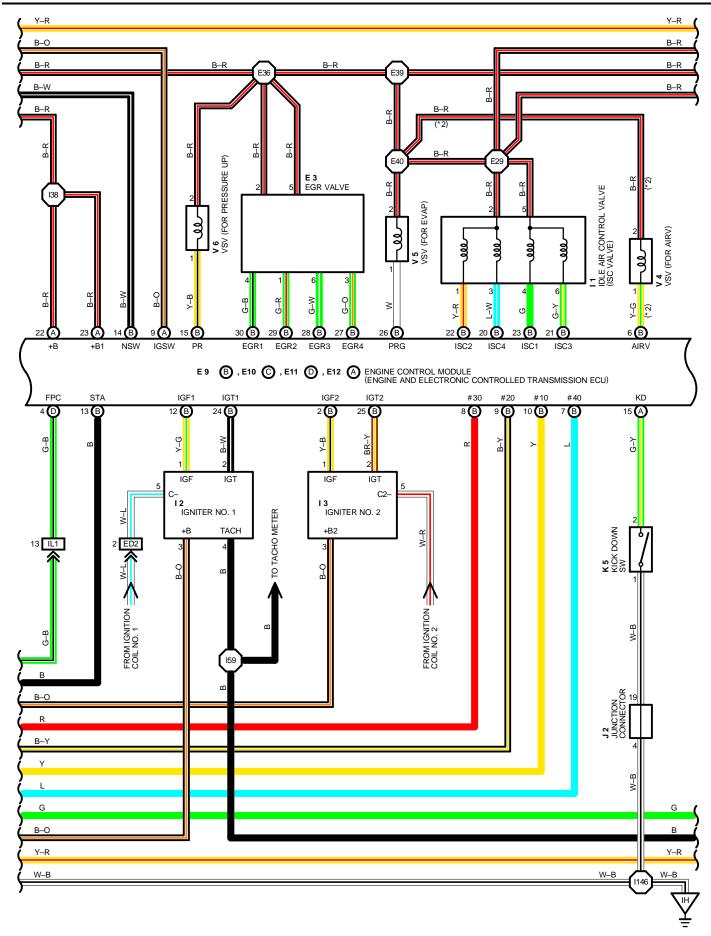
### 4. FAIL-SAFE SYSTEM

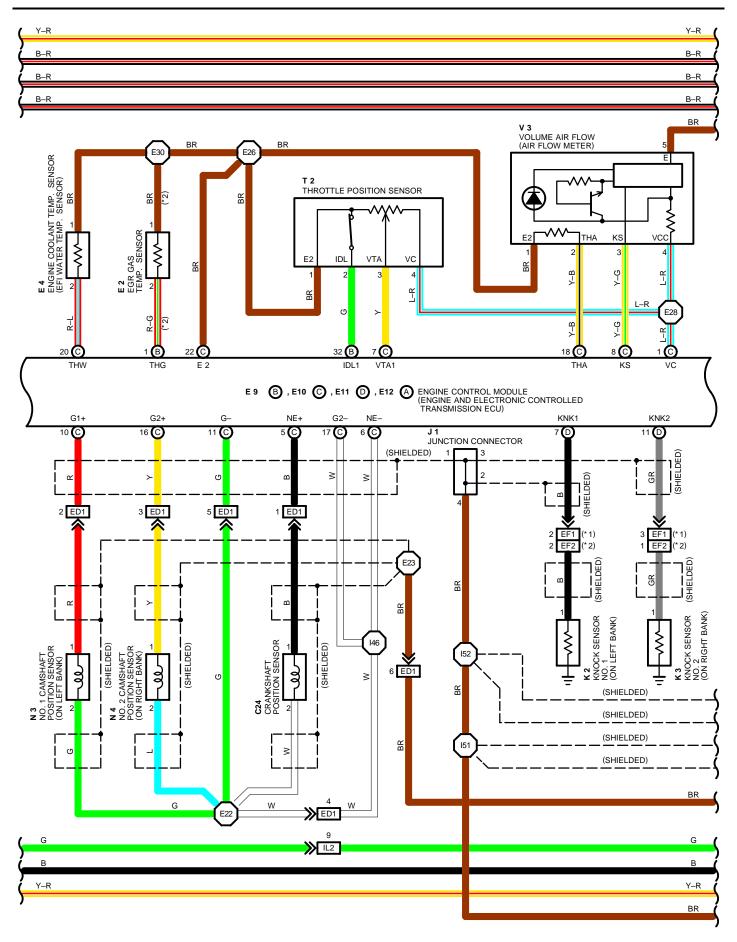
WHEN A MALFUNCTION HAS OCCURRED IN ANY SYSTEM, IF THERE IS A POSSIBILITY OF ENGINE TROUBLE BEING CAUSED BY CONTINUED CONTROL BASED ON THE SIGNALS FROM THAT SYSTEM, THE FAIL—SAFE SYSTEM EITHER CONTROLS THE SYSTEM BY USING DATA (STANDARD VALUES) RECORDED IN THE ENGINE CONTROL MODULE (ECU) MEMORY OR ELSE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

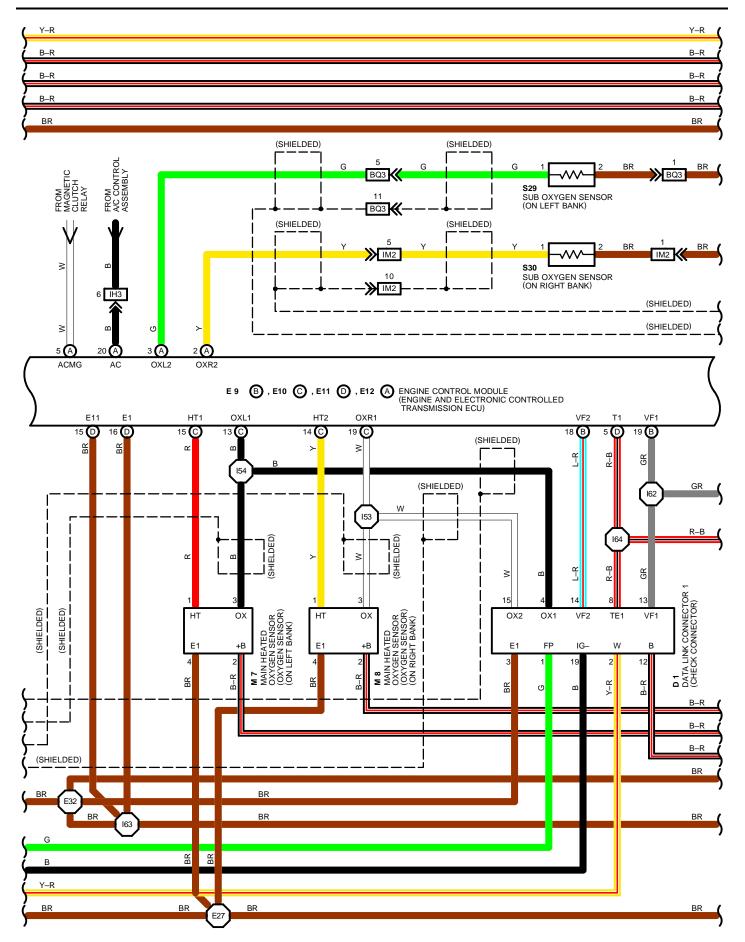


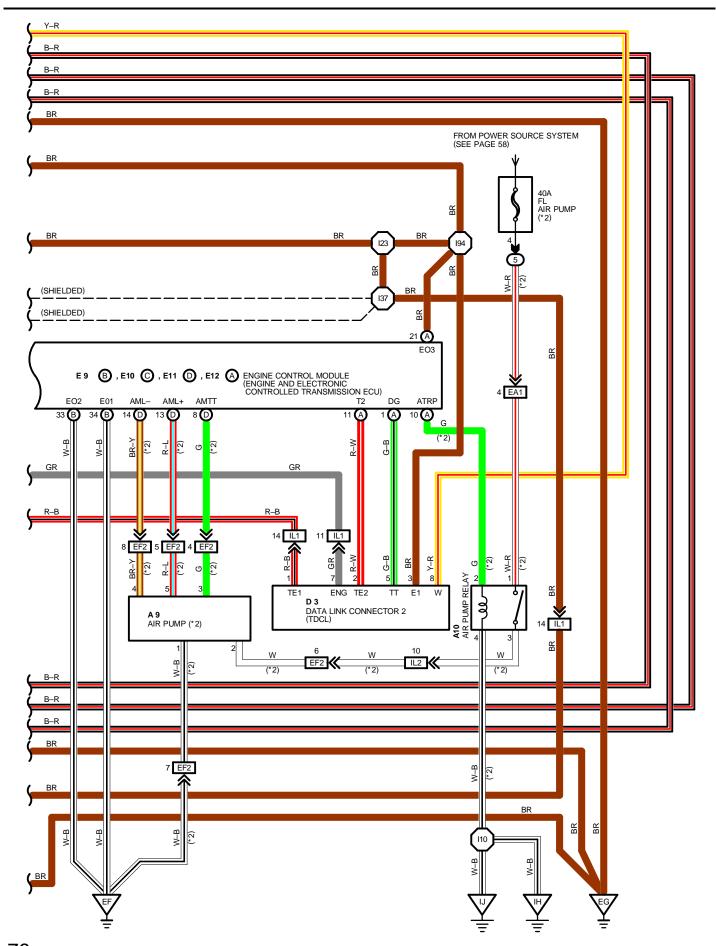












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SERVICE HINTS
EFI MAIN RELAY
 1-3: CLOSED WITH IGNITION SW AT ON OR ST POSITION
E 4 ENGINE COOLANT TEMP. SENSOR (WATER TEMP. SENSOR)
 1–2 : APPROX. 16.2KΩ (-20^{\circ}C, -4^{\circ}F)
     APPROX. 2.45K\Omega (20°C, .68°F)
     APPROX. 0.32KΩ (80°C, 176°F)
E 2 EGR GAS TEMP. SENSOR (FOR USA SPEC.)
 1–2: 69KΩ–89KΩ (50°C, 122°F)
     12K\Omega-15K\Omega (100°C, 212°F)
      2KΩ- 4KΩ (150°C, 302°F)
E 9, E10, E11, E12 ENGINE CONTROL MODULE (ENGINE AND ELECTRONIC CONTROLLED TRANSMISSION ECU)
 VOLTAGE AT ENGINE CONTROL MODULE (ENGINE ECU)
                   BATT - E1 : ALWAYS 9-14 VOLTS
          IGSW. + B. + B1 - E1 : 9.0-14.0 VOLTS WITH IGNITION SW ON
                     VC - E2: 4.5-5.5 VOLTS WITH IGNITION SW ON
                     IDL - E2: 0-3.0 VOLTS WITH IGNITION SW ON AND THROTTLE VALVE FULLY CLOSED
                               : 9.0-14.0 VOLTS WITH IGNITION SW ON AND THROTTLE VALVE FULLY CLOSED
                    VTA - 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 CLANKING
 #10, #20, #30, #40-E01: 9.0-14.0 VOLTS WITH IGNITION SW ON PULSE GENERATION WITH IDLING ISC1, ISC2, ISC3, ISC4
                         - E1: 9.0-14.0 VOLTS WITH IGNITION SW ON
                    NSW - E1: 0-3.0 VOLTS WITH IGNITION SW ON AND SHIFT LEVER "P", "N" POSITION
                               : 9.0-14.0 VOLTS WITH IGNITION SW ON AND OTHER SHIFT LEVER "P", "N" POSITION
                    TE1 - E1: 9.0-14.0 VOLTS WITH IGNITION SW ON
                      W - E1: 9.0-14.0 VOLTS WITH IDLING
                               0-3.0 VOLTS WITH IGNITION SW ON
                     A/C - E1 : 0-1.5 VOLTS WITH A/C SW ON (AT IDLING)
                               : 7.5-14.0 VOLTS WITH A/C SW OFF AND THROTTLE VALVE FULLY OPEN
11 IDLE AIR CONTROL VALVE (ISC VALVE)
 5–4, 6 : 10Ω–30Ω
 2–1, 3 : 10Ω–30Ω
16, 17, 18, 19, 110, 111, 112, 113 INJECTOR
 1–2 : 13.4Ω–14.2Ω
M 7, M 8 MAIN HEATED OXYGEN SENSOR (OXYGEN SENSOR)
 1-2: 5.1\Omega - 6.3\Omega
T 2 THROTTLE POSITION SENSOR
 1-3 : 2.8K\Omega-8.0\Omega WITH THROTTLE VALVE FULLY OPEN
      0.2K\Omega-0.8\Omega WITH THROTTLE VALVE FULLY CLOSED
 1–2 : LESS THAN {\bf 0.5}{\rm K}\Omega WITH THROTTLE VALVE FULLY CLOSED
      1.0MΩ OR HIGHER WITH THROTTLE VALVE FULLY OPEN
V 6 VSV (FOR FUEL PRESSURE UP)
 1–2 : APPROX. 30Ω–50Ω (20°C, 68°F)
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# : PARTS LOCATION

CODE		SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE	
A 9		26	12	27	M 8	27	
<b>A</b> 1	10	26	13	27	N 1	27	
C11	В	28	16	27	N 3	27	
C12	Α	28	17	27	N 4	27	
C2	24	26	18	27	P 1	27	
D	1	26	19	27	S 1	27	
D	3	28	I10	27	S12	29	
Е	2	26	l11	27	S29	31	
Е	3	26	l12	27	S30	31	
E	4	26	I13	27	T 2	27	
E 9	В	28	l17	28	V 1	27	
E10	С	28	J1	29	V 3	27	
E11	D	28	J 2	29	V 4	27	
E12	Α	28	K 2	27	V 5	27	
F1	8	30	K 3	27	V 6	27	
F1	19	30	K 5	29	W 6	29	
I1		27	M 7	27			

## : RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
5	22	R/B NO. 5 (NEAR THE J/B NO. 2)
7	20	R/B NO. 7 (RIGHT SIDE OF J/B NO. 1)

# : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	20	COWL WIRE AND J/B NO. 1 (LEFT SIDE OF STEERING COLUMN TUBE)
1B	20	INSTRUMENT PANEL WIRE AND J/B NO. 1 (LEFT SIDE OF STEERING COLUMN TUBE)
1D	20	COWL WIRE AND J/B NO. 1 (LEFT SIDE OF STEERING COLUMN TUBE)
1G	720	COWL WIRE AND 3/B NO. 1 (LET 1 SIDE OF STEERING COLDWIN TOBE)
2A	22	ENGINE ROOM MAIN WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
2B	22	COWL WIRE AND J/B NO. 2 (ENGINE COMPARTMENT LEFT)
3A	24	INSTRUMENT PANEL WIRE AND J/B NO. 3 (BEHIND THE INSTRUMENT PANEL CENTER)
4B	25	COWL WIRE AND J/B NO. 4 (BEHIND THE COMBINATION METER)

## : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)			
EA1	34	COWL WIRE AND ENGINE ROOM MAIN WIRE (FRONT SIDE OF RIGHT FENDER)			
EA3	34	COWL WIRE AND ENGINE ROOM MAIN WIRE (INSIDE OF J/B NO. 2)			
ED1	34	ENGINE WIRE AND ENGINE NO. 4 WIRE (FRONT SIDE OF CYLINDER HEAD COVER LH)			
ED2	34	ENGINE WIRE AND ENGINE INC. 4 WIRE (FRONT SIDE OF CYLINDER HEAD GOVER LM)			
EF1	34	ENGINE NO. 2 WIRE AND ENGINE WIRE (REAR SIDE OF AIR INTAKE CHAMBER)			
EF2	34	ENGINE NO. 2 WIRE AND ENGINE WIRE (REAR SIDE OF AIR INTARE CHAMBER)			
IH1	36	INSTRUMENT PANEL WIRE AND COWL WIRE (J/B NO. 1)			
IH2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (BEHIND GLOVE BOX)			
IH3	30	INSTRUMENT FAMILE WIRE AND COWL WIRE (BETTING GLOVE BOX)			
IL1					
IL2	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)			
IL3	1				
IM2	38	FLOOR NO. 1 WIRE AND COWL WIRE (UNDER THE GLOVE BOX)			
IM3	38	COWL WIRE AND FLOOR NO. 1 WIRE (RIGHT KICK PANEL)			
BQ3	40	COWL WIRE AND FLOOR NO. 2 WIRE (LEFT KICK PANEL)			

## : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	FRONT SIDE OF RIGHT FENDER
EB	34	FRONT SIDE OF LEFT FENDER
EF	34	REAR SIDE OF CYLINDER HEAD RH
EG	34	REAR SIDE OF CYLINDER HEAD LH
IH	36	RIGHT KICK PANEL
IJ	36	INSTRUMENT PANEL BRACE LH
IK	36	LEFT KICK PANEL
BL	40	UNDER THE RIGHT REAR PILLAR

# : SPLICE POINTS

<u> </u>		THE THE PROPERTY OF THE POINTS	0005	255 54 65	THE THE PRICE OF THE POINTS
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E21	34	ENGINE ROOM MAIN WIRE	I10	38	COWL WIRE
E22	34	ENGINE NO. 4 WIRE	123		
E23	34		127		
E25			137		
E26			138		
E27			146	38 ENGINE WIRE	
E28			150		
E29			I51		
E30		ENGINE WIRE	152		ENGINE WIRE
E31			153		
E32			154		
E34			155		
E35	34		156		
E36			159		
E37			I61		
E38			162		
E39			163		
E40	-		164		
E41			178	38	COWL WIRE
E42			194		
E43	-		I146		
E46			B64	1,0	EL COD NO. 4 WIDE
E56	34	COWL WIRE	B75	<b>4</b> 0	FLOOR NO. 1 WIRE









C11 (B) ORANGE

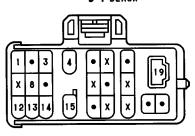




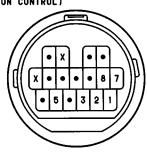
C24 DRAK GRAY







(USA W/ D 3 DARK GRAY TRACTION CONTROL)



(USA W/O TRACTION CONTROL) D 3 DARK GRAY

