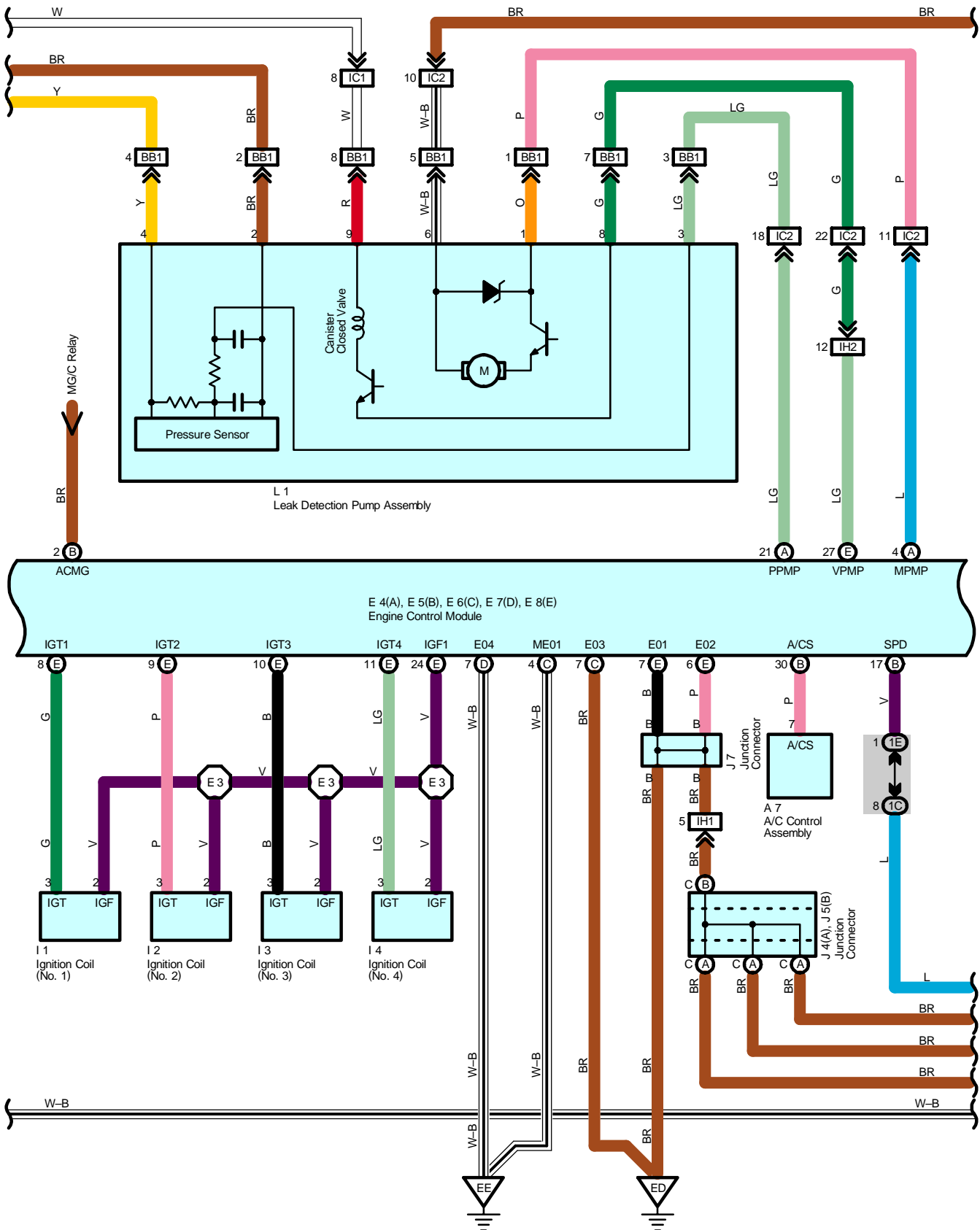
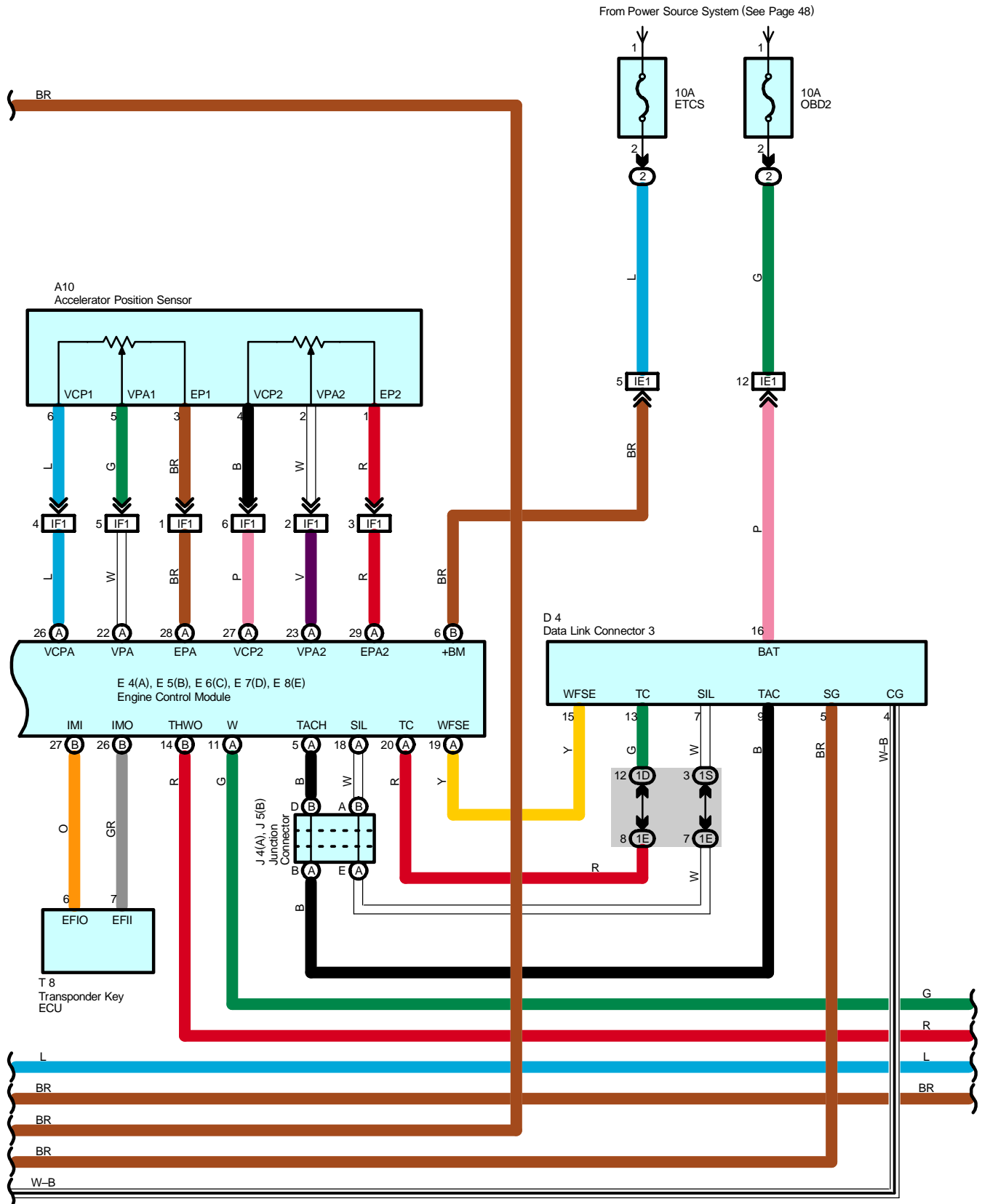


\* 1 : Shielded







## System Outline

The engine control system utilizes a microcomputer and maintains overall control of the engine, transaxle etc. An outline of the engine control is given here.

### 1. Input Signals

#### (1) Engine coolant temp. signal circuit

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.. The engine coolant temp. which is input into TERMINAL THW of the engine control module as a control signal.

#### (2) Intake air temp. signal circuit

The intake air temp. sensor is installed in the mass air flow meter and detects the intake air temp. which is input as a control signal to TERMINAL THA of the engine control module.

#### (3) Oxygen density signal circuit

The oxygen density in the exhaust emission is detected by the heated oxygen sensor and input as a control signal to TERMINAL OX1B of the engine control module.

#### (4) RPM signal circuit

Camshaft position and crankshaft position are detected by the camshaft position sensor and crankshaft position sensor. Camshaft position is input as a control signal to TERMINAL G2+ of the engine control module, and engine RPM is input into TERMINAL NE+.

#### (5) Throttle position signal circuit

The throttle body assembly detects the throttle valve opening angle as a control signal, which is input into TERMINALS VTA1 and VTA2 of the engine control module.

#### (6) Vehicle speed circuit

The vehicle speed sensor detects the vehicle speed and inputs a control signal to TERMINAL SPD of the engine control module.

#### (7) Battery signal circuit

Voltage is constantly applied to TERMINAL BATT of the engine control module. With the ignition SW turned on, the voltage for engine control module start-up power supply is applied to TERMINAL +B of the engine control module via the EFI relay.

#### (8) A/C SW signal circuit

The A/C control assembly inputs the A/C operations into TERMINAL A/CS of the engine control module.

#### (9) Stop lamp SW signal circuit

The stop lamp SW is used to detect whether the vehicle is braking or not and the signal is input into TERMINAL STP of the engine control module as a control signal.

#### (10) Starter signal circuit

To confirm whether the engine is cranking, the voltage is applied to the starter motor during cranking is detected and the signal is input into TERMINAL STA of the engine control module as a control signal.

#### (11) Engine knock signal circuit

Engine knocking is detected by knock control sensor and the signal is input into TERMINAL KNK1 as a control signal.

#### (12) Air fuel ratio signal system

The air fuel ratio is detected by air fuel ratio sensor and input as a control signal into TERMINAL A1A+ of the engine control module.

## 2. Control System

### \* SFI system

The SFI system monitors the engine condition through the signals input from each sensor to the engine control module. And the control signal is output to TERMINALS #1, #2, #3 and #4 of the engine control module to operate the fuel injector (Inject the fuel). The SFI system controls the fuel injection operation by the engine control module in response to the driving conditions.

### \* ESA system

The ESA system monitors the engine condition through the signals input to the engine control module from each sensor. The best ignition timing is decided according to this data and the memorized data in the engine control module and the control signal is output to TERMINALS IGT1, IGT2, IGT3, IGT4. This signal controls the igniter (Ignition coil) to provide the best ignition timing for the driving conditions.

### \* Heated oxygen sensor heater control system

The heated 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 to improve detection performance of the sensor. The engine control module evaluates the signals from each sensor, and outputs current to TERMINAL HT1B to control the heater.

## 3. Diagnosis System

With the diagnosis system, when there is a malfunction in the engine control module 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.

## 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 memory or else stops the engine.

### Service Hints

#### E4 (A), E5 (B), E6 (C), E7 (D), E8 (E) Engine Control Module

BATT-E1 : Always 9.0–14.0 volts

VC-E2 : 4.5–5.5 volts (Ignition SW at ON position)

VG-E2G : 1.1–1.5 volts (Engine idling and A/C SW off)

THA-E2 : 0.5–3.4 volts (Engine idling and intake air temp. 20°C, 68°F)

THW-E2 : 0.2–1.0 volts (Engine idling and coolant temp. 80°C, 176°F)

IGF1-E1 : 4.5–5.5 volts (Ignition SW at ON position)

Pulse generation (Engine idling)

TACH-E1 : Pulse generation (Engine idling)

STA-E1 : 6.0 volts or more (Engine cranking)

FC-E01 : 9.0–14.0 volts (Ignition SW at ON position)

SPD-E1 : Pulse generation (Ignition SW on and rotate driving wheel slowly)

W-E01 : Below 3.0 volts (Ignition SW at ON position)

NSW-E1 : 9.0–14.0 volts (Ignition SW on and other shift position in P or N position)

0–3.0 volts (Ignition SW on and shift position in P or N position)

PRG-E01 : 9.0–14.0 volts (Ignition SW at ON position)

STP-E1 : 7.5–14.0 volts (Ignition SW on and brake pedal depressed)

Below 1.5 volts (Ignition SW on and brake pedal released)

KNK1-E1 : Pulse generation (Engine idling)

HA1A-E04 : Below 3.0 volts (Engine idling)

IGSW-E1 : 9.0–14.0 volts (Ignition SW at ON position)

MREL-E1 : 9.0–14.0 volts (Ignition SW at ON position)

G2+, NE+ –NE– : Pulse generation (Engine idling)

HT1B-E1 : 9.0–14.0 volts (Engine idling)

Below 3.0 volts (Ignition SW at ON position)

A1A+ –E1 : 3.3 volts (Ignition SW at ON position)

A1A– –E1 : 3.0 volts (Ignition SW at ON position)

OX1B-E1 : Pulse generation (Maintain engine speed at 2500 rpm for 90 sec. after warming up)

IGT1, IGT2, IGT3, IGT4-E1 : Pulse generation (Engine idling)

#1, #2, #3, #4-E01 : 9.0–14.0 volts (Ignition SW at ON position)

Pulse generation (Engine idling)

# Engine Control

## : Parts Location

Code	See Page	Code	See Page	Code	See Page
A3	<a href="#">32</a>	E6	<a href="#">34</a>	J4	<a href="#">35</a>
A7	<a href="#">34</a>	E7	<a href="#">34</a>	J5	<a href="#">35</a>
A10	<a href="#">34</a>	E8	<a href="#">34</a>	J7	<a href="#">35</a>
A12	<a href="#">34</a>	F1	<a href="#">32</a>	J8	<a href="#">35</a>
C1	<a href="#">32</a>	F2	<a href="#">32</a>	K1	<a href="#">33</a>
C2	<a href="#">32</a>	F3	<a href="#">32</a>	L1	<a href="#">36</a>
C3	<a href="#">32</a>	F4	<a href="#">32</a>	M1	<a href="#">33</a>
C5	<a href="#">34</a>	F9	<a href="#">36</a>	P1	<a href="#">33</a>
C6	<a href="#">34</a>	H5	<a href="#">32</a>	P4	<a href="#">33</a>
D4	<a href="#">34</a>	I1	<a href="#">33</a>	S1	<a href="#">33</a>
D6	<a href="#">34</a>	I2	<a href="#">33</a>	S8	<a href="#">35</a>
E2	<a href="#">32</a>	I3	<a href="#">33</a>	T1	<a href="#">33</a>
E4	<a href="#">34</a>	I4	<a href="#">33</a>	T8	<a href="#">35</a>
E5	<a href="#">34</a>	J3	<a href="#">35</a>	V1	<a href="#">33</a>

## : Relay Blocks

Code	See Page	Relay Blocks (Relay Block Location)
2	<a href="#">22</a>	Engine Room R/B (Engine Compartment Left)
3	<a href="#">23</a>	Engine Room R/B No.2 (Inside of the Engine Room R/B Box)

## : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	<a href="#">24</a>	Floor Wire and Instrument Panel J/B (Lower Finish Panel)
1B	<a href="#">24</a>	Engine Room Main Wire and Instrument Panel J/B (Lower Finish Panel)
1C	<a href="#">24</a>	Instrument Panel Wire and Instrument Panel J/B (Lower Finish Panel)
1D		
1E		
1M	<a href="#">25</a>	
1S		

## : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EA1	<a href="#">38</a>	Engine Wire and Engine Room Main Wire (Inside of the Engine Room R/B Box)
IC1	<a href="#">40</a>	Floor Wire and Instrument Panel Wire (Left Kick Panel)
IC2		
IE1	<a href="#">40</a>	Engine Room Main Wire and Instrument Panel Wire (Behind of the Combination Meter)
IE2		
IF1	<a href="#">42</a>	Instrument Panel Wire and Switch Wire (Instrument Panel Brace LH)
IH1	<a href="#">42</a>	Engine Wire and Instrument Panel Wire (Cowl Side Panel RH)
IH2		
BB1	<a href="#">44</a>	Floor Wire and Floor No.3 Wire (Center Floor Pan Center)

## : Ground Points

Code	See Page	Ground Points Location
EC	<a href="#">38</a>	Front Left Fender
ED	<a href="#">38</a>	Front Left Side of the Cylinder Head
EE	<a href="#">38</a>	Left Side of the Cylinder Head
IF	<a href="#">40</a>	Cowl Brace LH
IH	<a href="#">40</a>	Cowl Brace RH



: Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E3	38	Engine Wire	E6	38	Engine Room Main Wire
E4			I2	42	Engine Wire