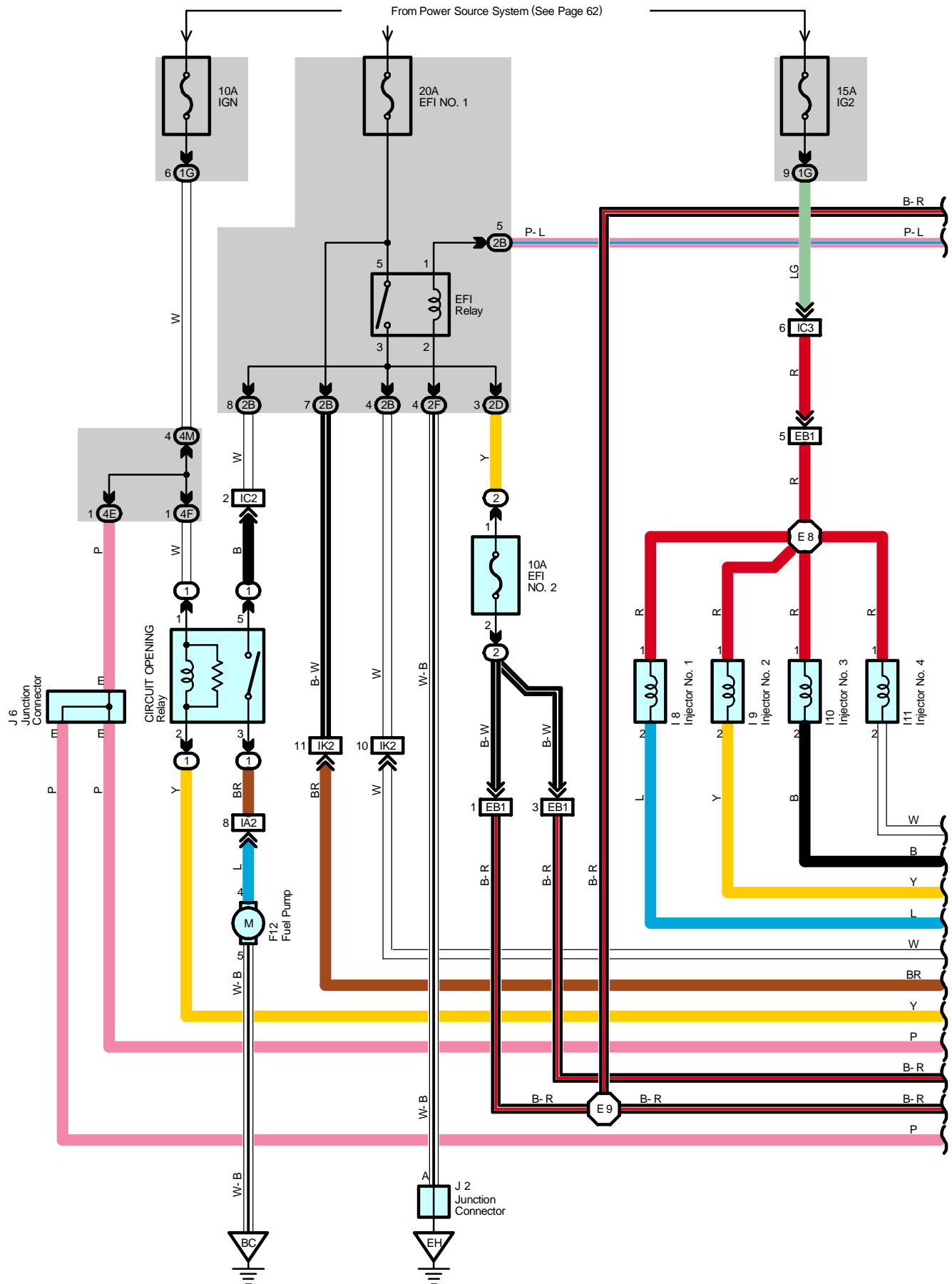
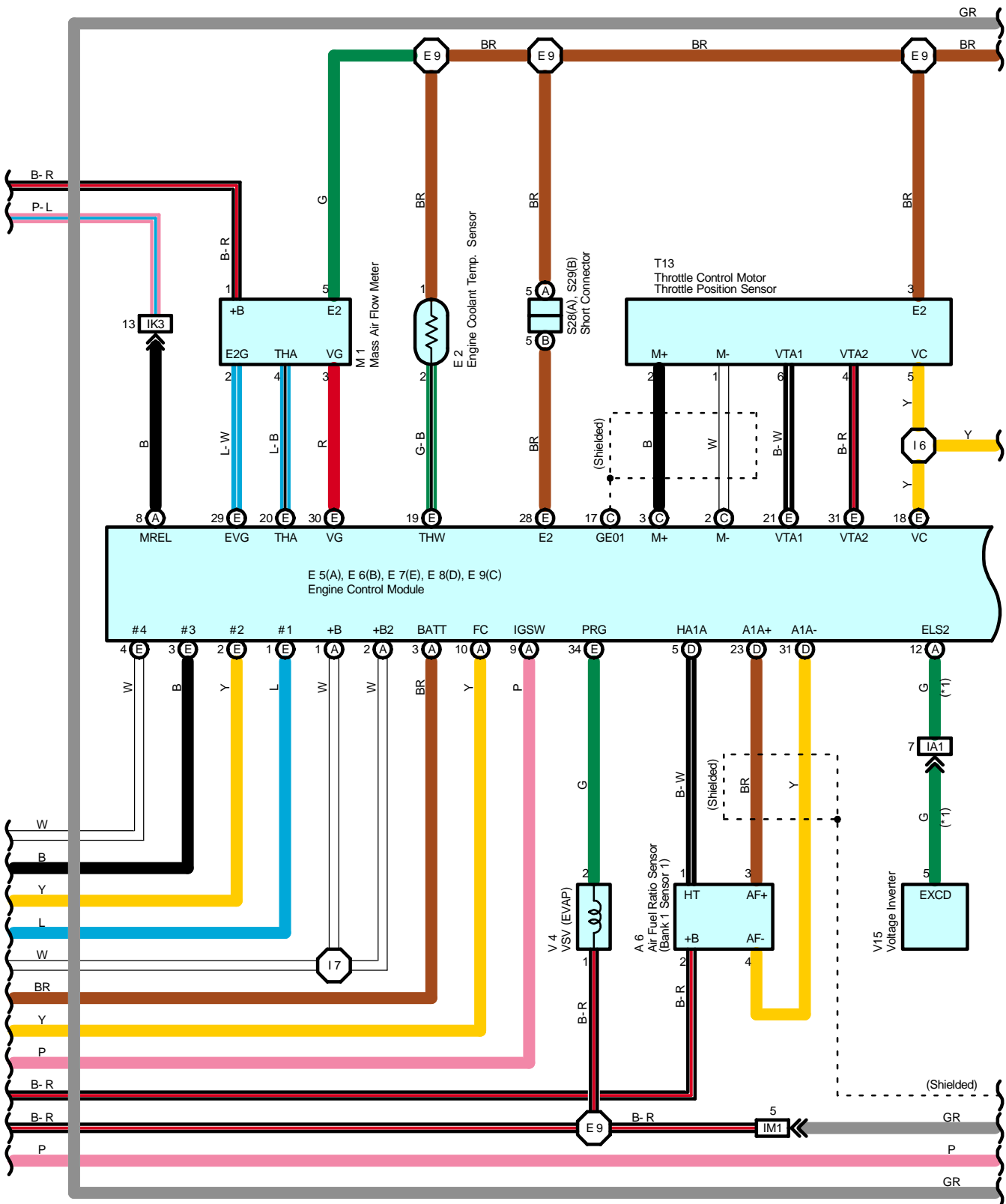
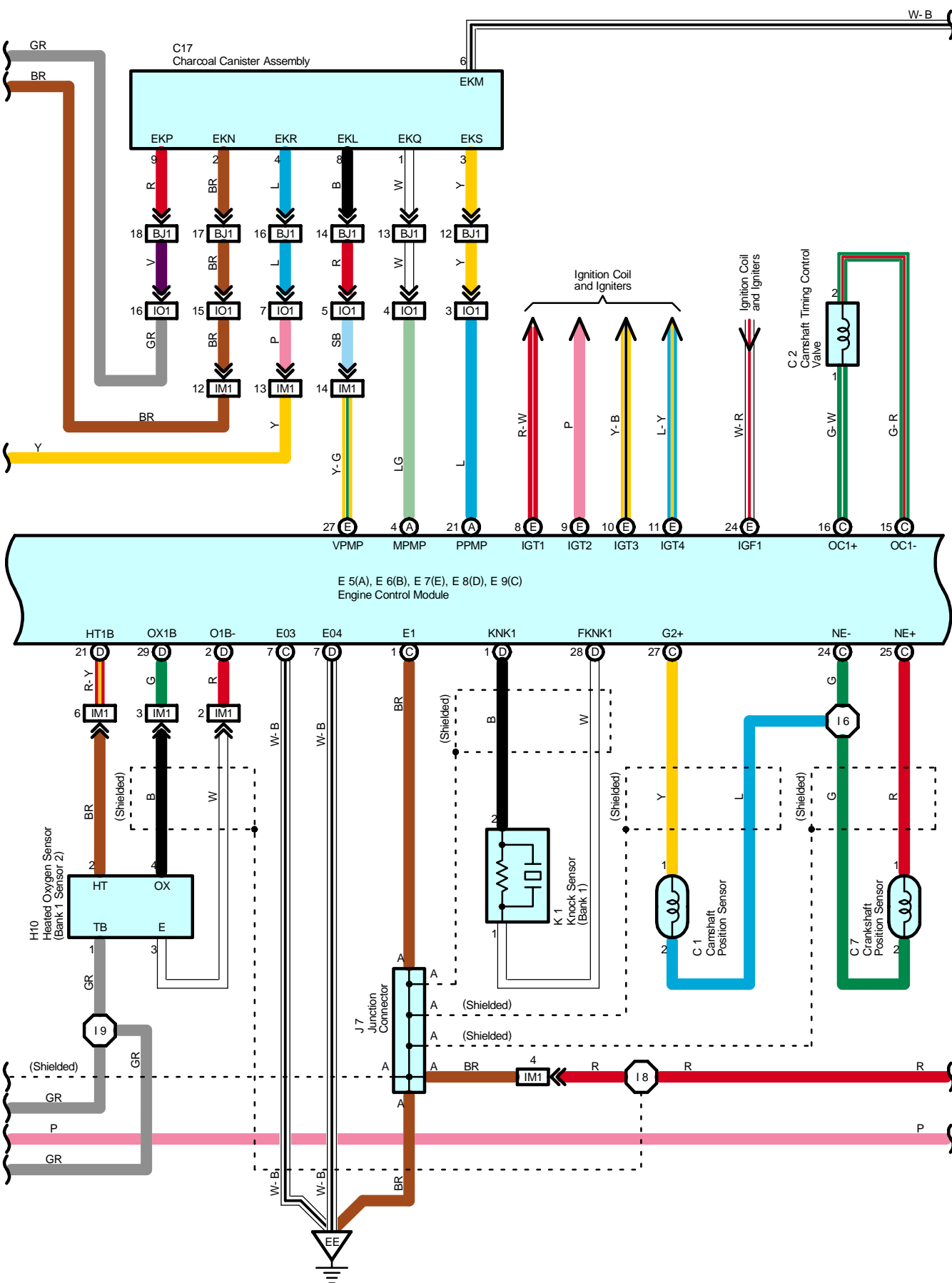


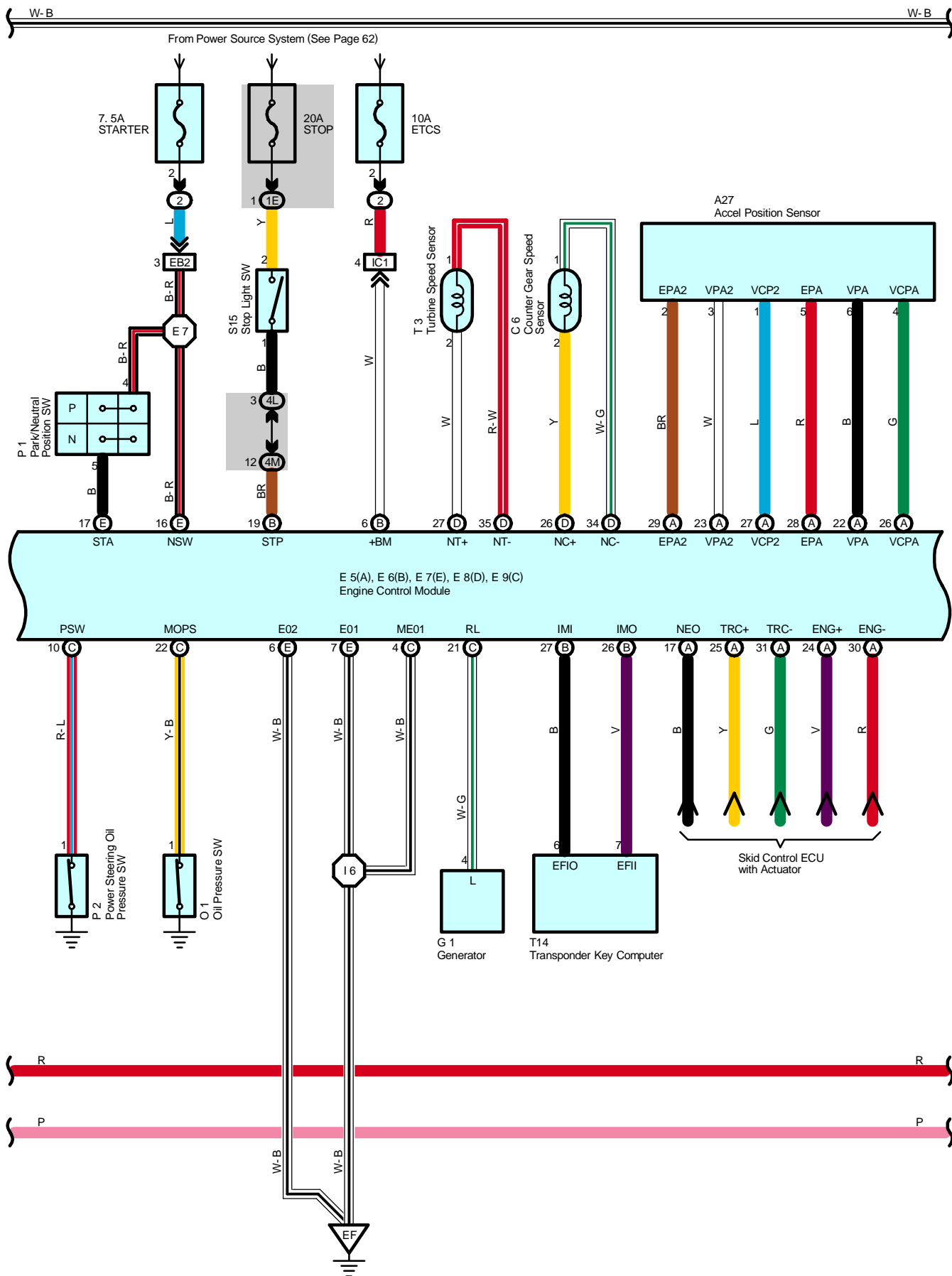
# Engine Control for 2AZ-FE



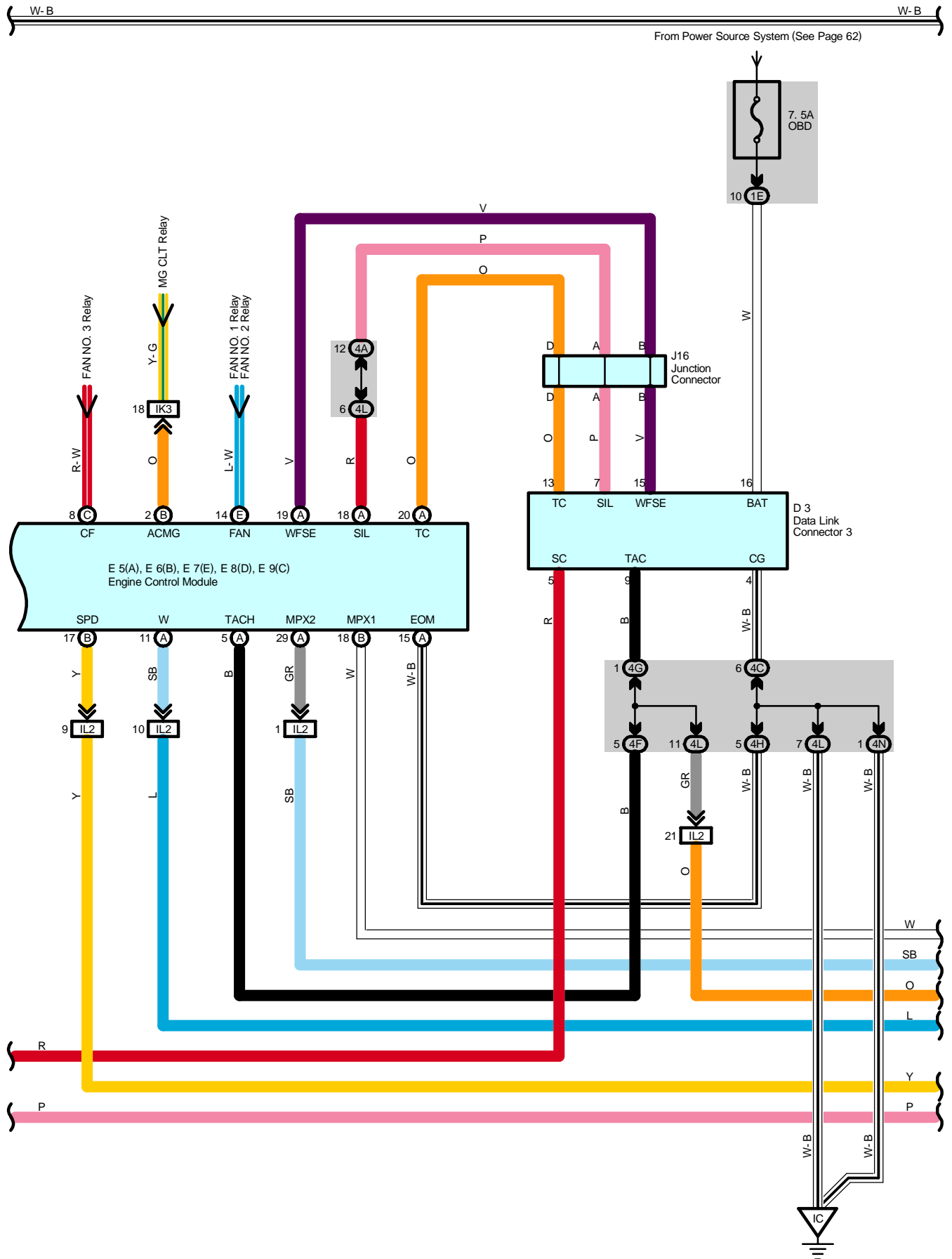
\* 1 : w/ Rear Seat Entertainment System



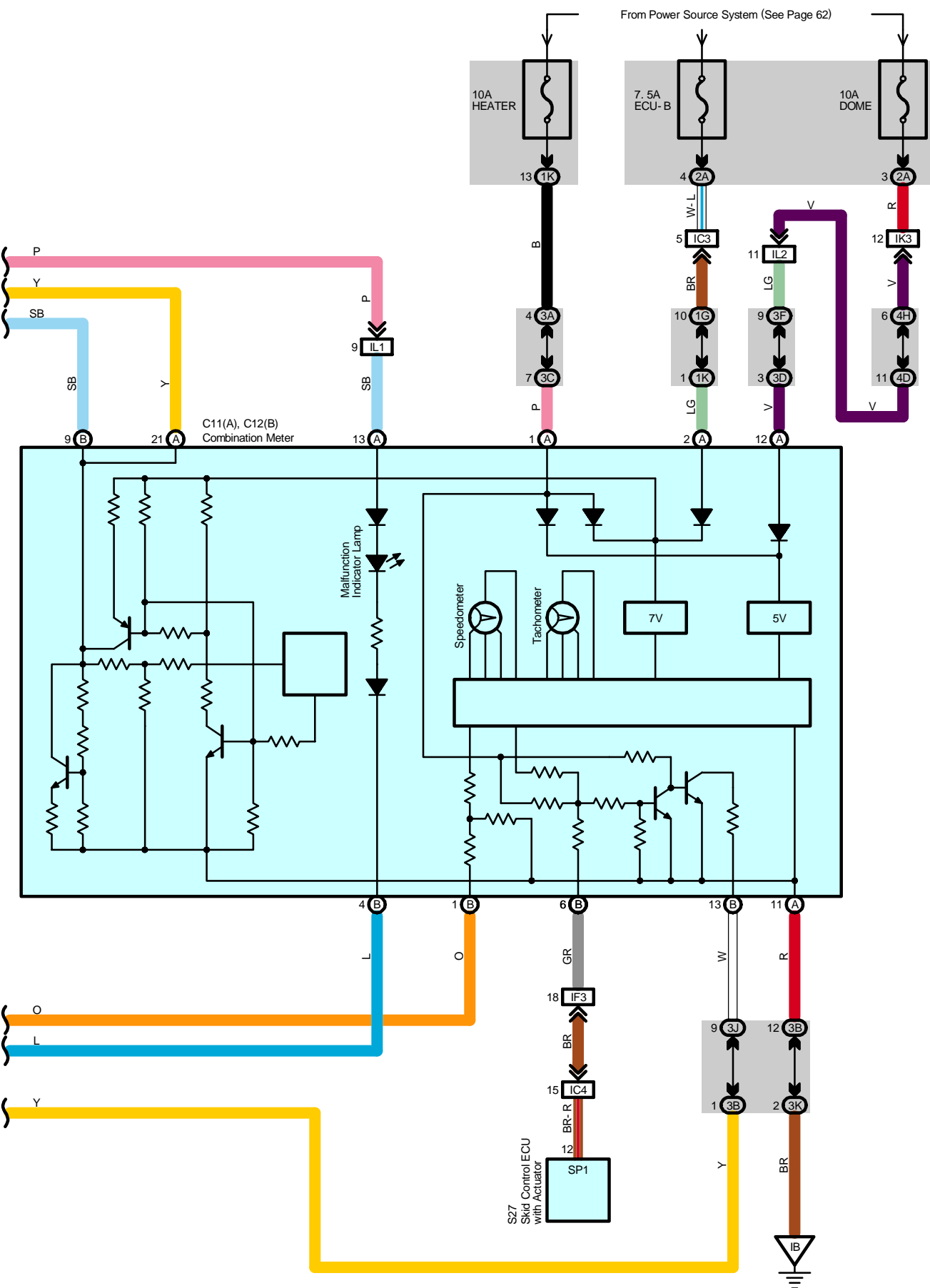




# Engine Control for 2AZ-FE







## System Outline

The engine control system utilizes a microcomputer and maintains overall control of the engine, transmission 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) Vehicle speed signal circuit  
The vehicle speed signal is input from the ABS speed sensor to skid control ECU with actuator, and are sent to the engine control module through communication control.
- (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 position sensor detects the throttle valve opening angle as a control signal, which is input into TERMINALS VTA1 and VTA2 of the engine control module.
- (6) 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 TERMINALS +B and +B2 of the engine control module via the EFI relay.  
The current flowing through the IGN fuse flows to TERMINAL IGSW of the engine control module.
- (7) Intake air volume signal circuit  
Intake air volume is detected by the mass air flow meter and the signal is input to TERMINAL VG of the engine control module as a control signal.
- (8) Stop light SW signal circuit  
The stop light 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.
- (9) 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.
- (10) Engine knock signal circuit  
Engine knocking is detected by knock sensor and the signal is input into TERMINAL KNK1 as a control signal.
- (11) Air fuel ratio signal system  
The air fuel ratio is detected and input as a control signal into TERMINAL A1A+ of the engine control module.
- (12) Oxygen sensor signal circuit  
The oxygen density in the exhaust gases is detected and input as a control signal into TERMINAL OX1B of the engine control module. To maintain stable detection performance by the heated oxygen sensor, a heater is used for warming the sensor. The heater is also controlled by engine control module (O1B-).
- (13) Fuel cut in a collision  
The system receives the collision signal from center airbag sensor assembly in the vehicle has a collision and stops the fuel pump operation on the side of the engine control module.



## 2. Control System

### \* SFI system

The SFI system monitors the engine condition through the signals input from each sensor (Input signals from (1) to (12) etc.) 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 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 (Input signals from (1) to (12) etc.). 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 and IGT4. This signal controls the igniter to provide the best ignition timing for the driving conditions.

## 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

### CIRCUIT OPENING Relay

5-3 : Closed with the starter running

### EFI Relay

5-3 : Closed with the ignition SW at ON or ST position

### E5 (A), E6 (B), E7 (E), E8 (D), E9 (C) Engine Control Module

BATT-E1 : Always 9.0-14.0 volts

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

VG-EVG : 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)

IG1-E1 : 4.5-5.5 volts (Ignition SW at ON position)

Pulse generation (Engine idling)

SIL-E1 : Pulse generation (During transmission)

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)

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

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)

OC1+ -OC1- : Pulse generation (Ignition SW at ON position)

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)

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)

## ○ : PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
A6	40 (2AZ-FE)	E6	B 42	K1	41 (2AZ-FE)
A10	A 42	E7	E 42	M1	41 (2AZ-FE)
A11	B 42	E8	D 42	O1	41 (2AZ-FE)
A17	42	E9	C 42	P1	41 (2AZ-FE)
A27	42	F12	44	P2	41 (2AZ-FE)
B9	A 42	G1	40 (2AZ-FE)	P5	44
B10	B 42	G5	43	S15	43
C1	40 (2AZ-FE)	H10	43	S27	41 (2AZ-FE)
C2	40 (2AZ-FE)	I8	41 (2AZ-FE)	S28	A 43
C6	40 (2AZ-FE)	I9	41 (2AZ-FE)	S29	B 43
C7	40 (2AZ-FE)	I10	41 (2AZ-FE)	S30	A 43
C11	A 42	I11	41 (2AZ-FE)	S31	B 43
C12	B 42	J2	41 (2AZ-FE)	T3	41 (2AZ-FE)
C17	44	J6	43	T13	41 (2AZ-FE)
D3	42	J7	43	T14	43
E2	40 (2AZ-FE)	J16	43	V4	41 (2AZ-FE)
E5	A 42	J19	44	V15	45

## ○ : RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
1	24	R/B No.1 (Lower Finish Panel)
2	22	Engine Room R/B (Engine Compartment Left)

## ○ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1E	29	Cowl Wire and Instrument Panel J/B (Lower Finish Panel)
1G		
1K	28	Instrument Panel Wire and Instrument Panel J/B (Lower Finish Panel)
2A	27	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
2B		
2D		
2F		
3A	30	Instrument Panel Wire and Center J/B (Behind the Instrument Panel Center)
3B		
3C		
3D		
3E		
3F	31	
3J		
3K	33	Cowl Wire and Passenger Side J/B (Right Side of Grove Box)
4A		
4C		
4D		
4E		
4F		
4G		
4H		
4L	32	
4M		
4N		

# Engine Control for 2AZ-FE

## : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EB1	50 (2AZ-FE)	Engine Wire and Engine Room Main Wire (Front Side of Engine Room R/B)
EB2		
IA1	52	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IA2		
IB2	52	Front Door LH Wire and Cowl Wire (Left Kick Panel)
IC1	52	Engine Room Main Wire and Cowl Wire (Left Cowl Side Panel)
IC2		
IC3		
IC4		
IF3	52	Instrument Panel Wire and Cowl Wire (Right Side of Instrument Panel J/B)
IK2	54	Engine Room Main Wire and Cowl Wire (Right Cowl Side Panel)
IK3		
IL1	54	Instrument Panel Wire and Cowl Wire (Upper Side of Passenger Side J/B)
IL2		
IM1	54	Engine Wire and Cowl Wire (Right Kick Panel)
IO1	54	Cowl Wire and Floor Wire (Right Kick Panel)
BJ1	56	Floor Wire and Floor No.4 Wire (Right Side of Rear Floor Crossmember)

## : GROUND POINTS

Code	See Page	Ground Points Location
EE	50 (2AZ-FE)	Intake Side of Cylinder Block
EF	50 (2AZ-FE)	Left Side of Cylinder Block
EH	50 (2AZ-FE)	Under the Left Headlight
IB	52	Right Instrument Panel Brace
IC	52	Right Cowl Side Panel
BB	56	Right Center Pillar
BC	56	Left Side of Rear Cross Member
BF	56	Near the Rear Side Marker Light RH

## : SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E7	50 (2AZ-FE)	Engine Wire	I7	54	Cowl Wire
E8			I8		
E9			I9		
I6	54				

