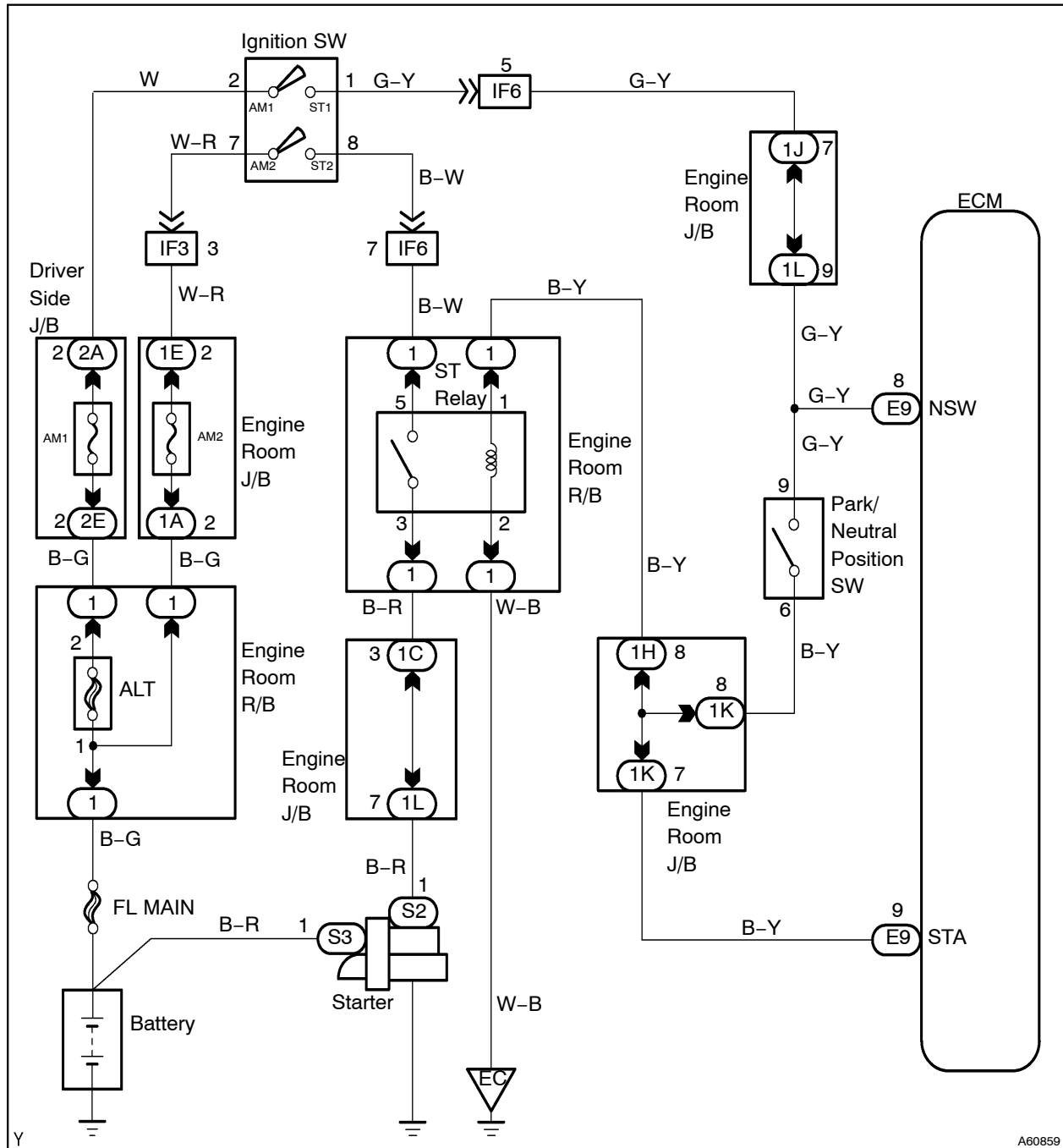


STARTER SIGNAL CIRCUIT

CIRCUIT DESCRIPTION

When the engine is cranked, the intake air flow is slow, so fuel vaporization is poor. A rich mixture is therefore necessary in order to achieve good startability. While the engine is being cranked, the battery positive voltage is applied to terminal STA of the ECM. The starter signal is mainly used to increase the fuel injection volume for the starting injection control and after-start injection control.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

This diagnostic chart is based on the premise that the engine is cranked normally. If the engine is not cranked, proceed to the problem symptoms table on page 05-30.

Hand-held Tester:

1	READ VALUE OF HAND-HELD TESTER(STARTER SIGNAL)
----------	---

- (a) Turn the ignition switch ON and push the hand-held tester main switch ON.
 (b) Read the STA signal on the hand-held tester while the starter operates.

Result:

Ignition Switch Position	ON	START
STA Signal	OFF	ON

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE

NG

2	CHECK HARNESS AND CONNECTOR(ECM - STARTER RELAY)
----------	---

NG

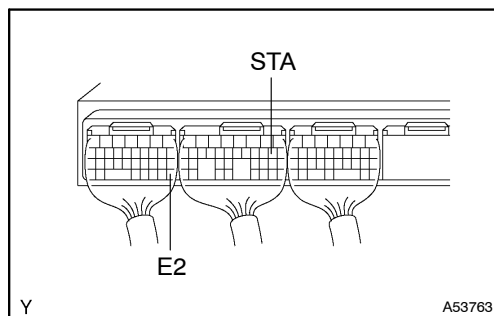
REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

CHECK AND REPLACE ECM

OBDII scan tool (excluding Hand-held Tester):

1	INSPECT ECM
----------	--------------------



- (a) Measure the voltage between terminal STA and E2 of the ECM connector during the engine cranking.
Voltage: 6 V or more

OK

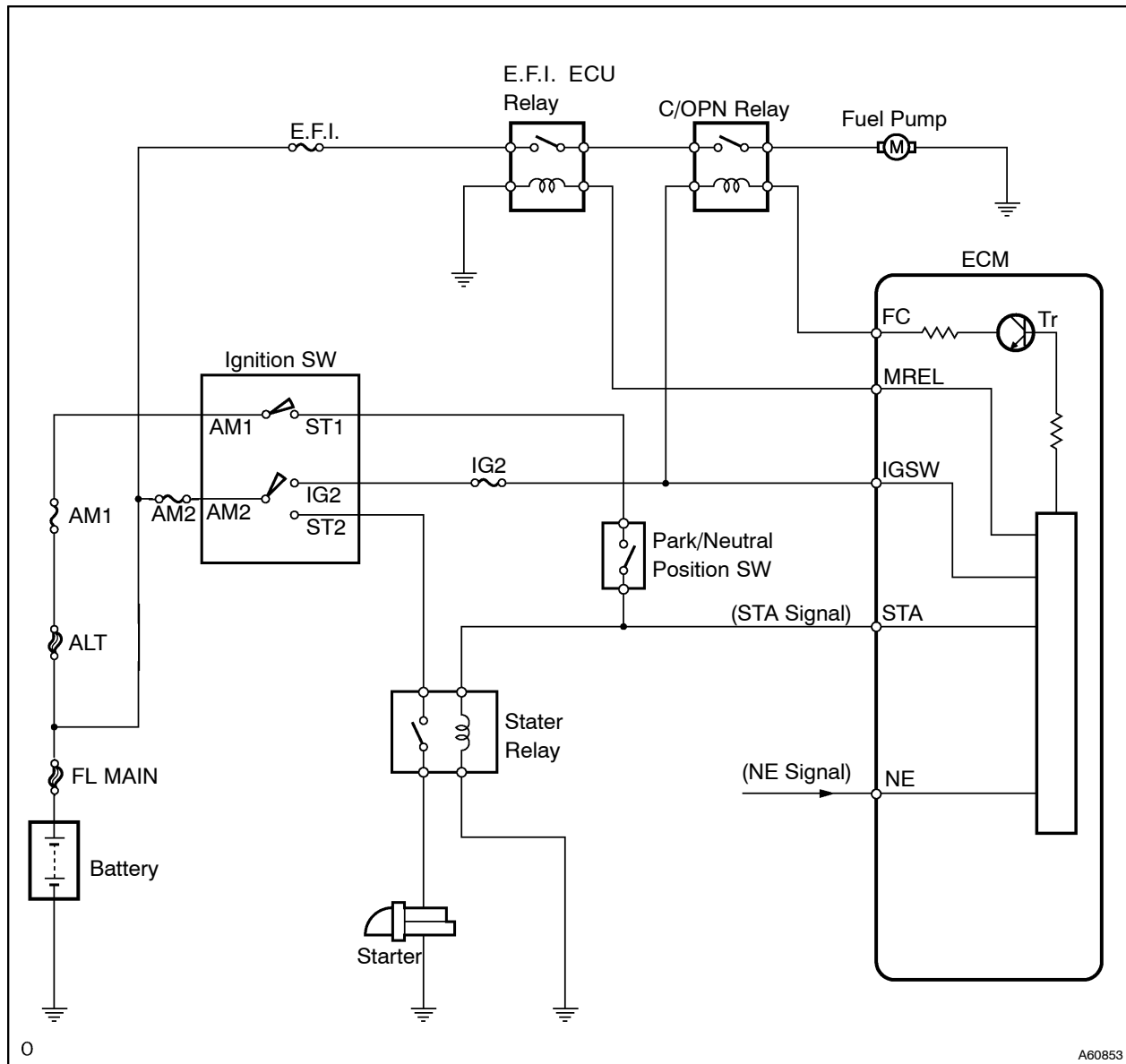
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE

NG

FUEL PUMP CONTROL CIRCUIT

CIRCUIT DESCRIPTION

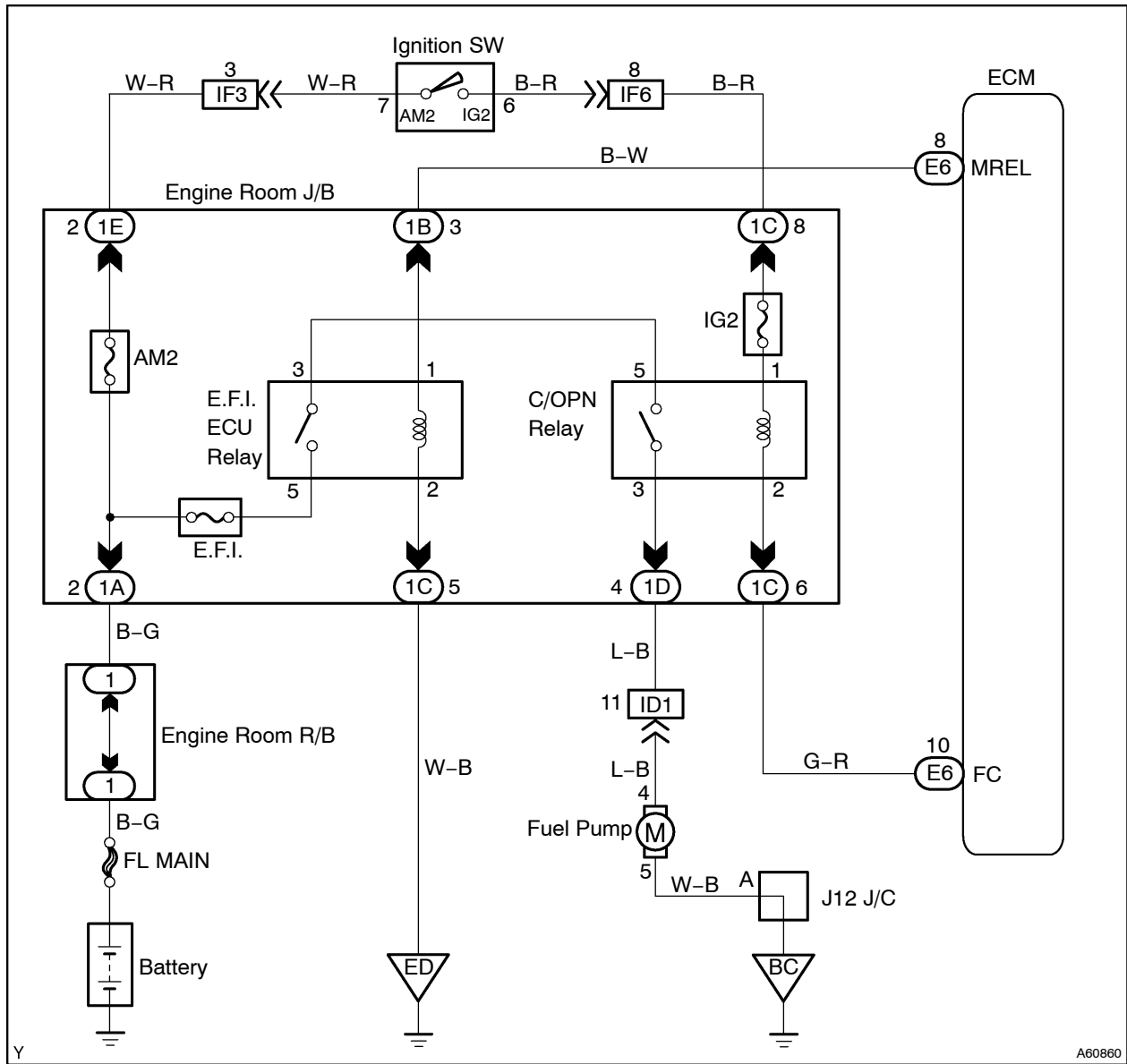
In the diagram below, when the engine is cranked, current flows from terminal ST of the ignition switch to the starter relay (Marking: ST) coil and also current flows to terminal STA of ECM (STA signal). When the STA signal and NE signal are input to the ECM, Tr is turned ON, current flows to coil of the circuit opening relay (Marking: C/OPN), the relay switches on, power is supplied to the fuel pump and the fuel pump operates. While the NE signal is generated (engine running), the ECM keeps Tr ON (circuit opening relay ON) and the fuel pump also keeps operating.



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A60853

WIRING DIAGRAM



5 INSPECT FUEL PUMP (See page 11-4)

NG → REPLACE FUEL PUMP

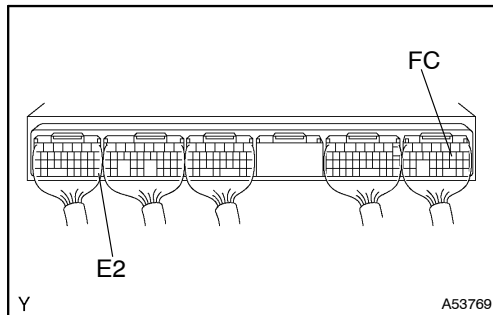
OK

6 CHECK HARNESS AND CONNECTOR(CIRCUIT OPENING RELAY - FUEL PUMP,FUEL PUMP - E2)

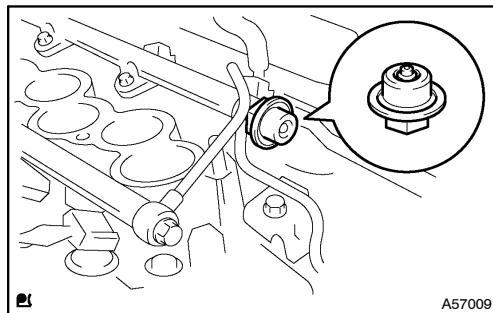
NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

CHECK AND REPLACE ECM

OBDII scan tool (excluding Hand-held Tester):**1 CHECK OPERATION OF FUEL PUMP**

- (a) Turn the ignition switch ON.
- (b) Connect between terminal FC and E2 of the ECM connector.
- (c) Check that the pulsation damper screw rises up when connecting between terminal FC and E2 of the ECM and E8 connector.

Result: The pulsation damper screw rises up.

OK → CHECK FOR STARTER SIGNAL CIRCUIT

NG

2 CHECK FOR ECM POWER SOURCE CIRCUIT (See page 05-178)

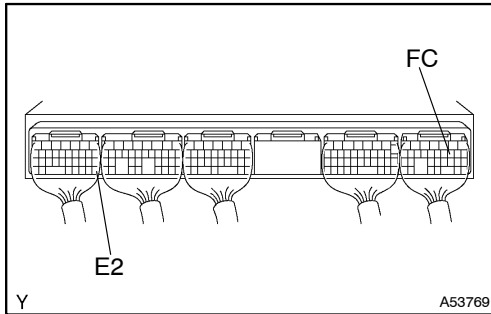
NG → REPAIR OR REPLACE

OK

3 CHECK E.F.I. CIRCUIT OPENING RELAY ASSY (See page 10-2)

NG → **REPLACE E.F.I. CIRCUIT OPENING RELAY ASSY**

OK

4 INSPECT ECM

- (a) Turn the ignition switch ON.
 (b) Measure the voltage between terminal FC and E2 of the ECM connector.
Voltage: 9 - 14 V

NG → **CHECK HARNESS AND CONNECTOR**

OK

5 CHECK FUEL PUMP (See page 11-4)

NG → **REPLACE FUEL PUMP**

OK

6 CHECK HARNESS AND CONNECTOR(CIRCUIT OPENING RELAY - FUEL PUMP, FUEL PUMP - E2)

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

CHECK AND REPLACE ECM

ECM POWER SOURCE CIRCUIT

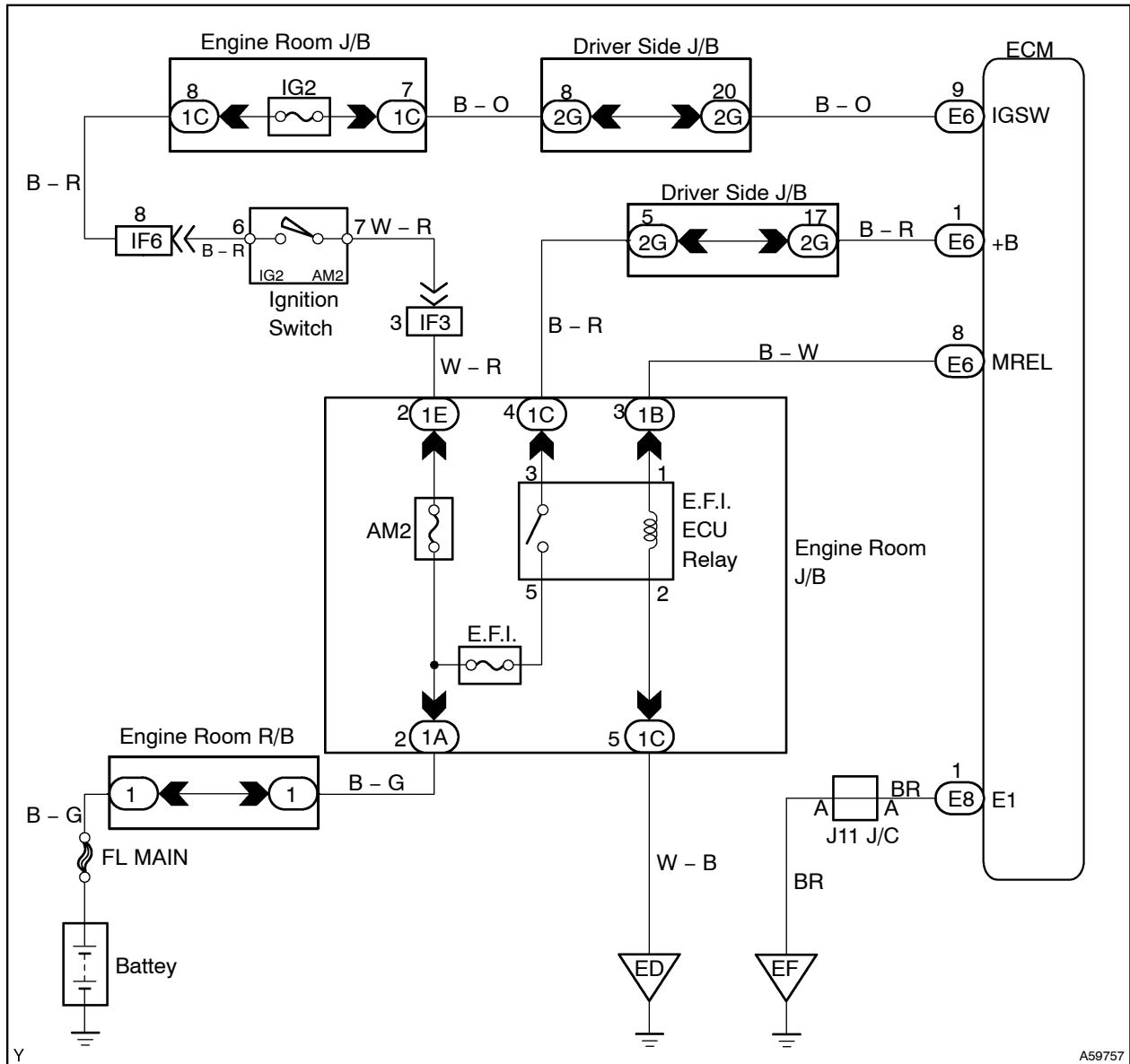
CIRCUIT DESCRIPTION

When the ignition switch is turned ON, battery positive voltage is applied to terminal IGSW of the ECM and the E.F.I. ECU relay (Marking: E.F.I.) control circuit in the ECM sends a signal to terminal MREL of the ECM switching on the E.F.I. ECU relay.

This signal causes current to flow to the coil, closing the contacts of the E.F.I. ECU relay and supplying power to terminal +B of the ECM.

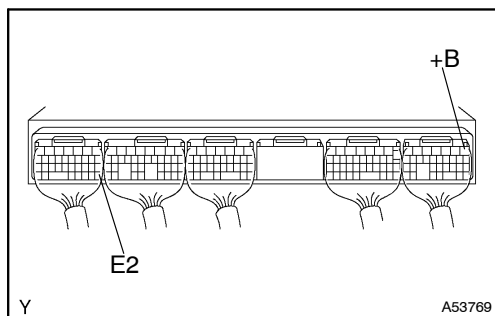
If the ignition switch is turned off, the ECM continues to switch on the E.F.I. ECU relay for a maximum of 2 seconds for the initial setting of the IAC valve.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT ECM



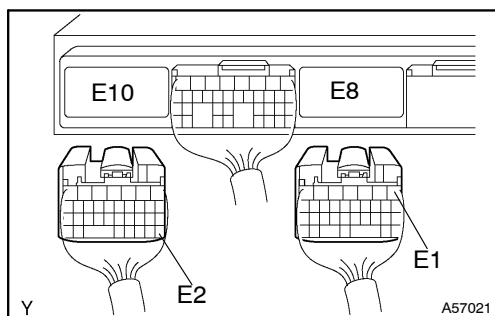
- Turn the ignition switch ON.
- Measure the voltage between terminals +B and E2 of the ECM connectors.
Voltage: 9 – 14 V

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE

NG

2 CHECK HARNESS AND CONNECTOR(E1,E2 – BODY EARTH)



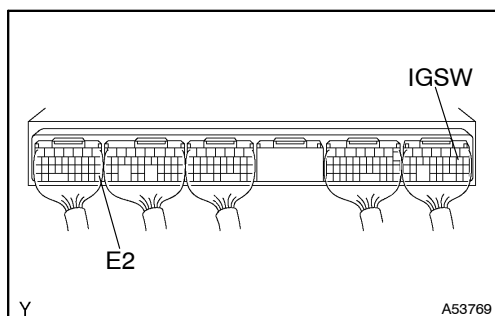
- Disconnect the ECM E10 and E8 connector.
- Check for open between the terminals E1 and E2 of the ECM connector and Body ground.
Resistance: 1 Ω or less

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3 INSPECT ECM



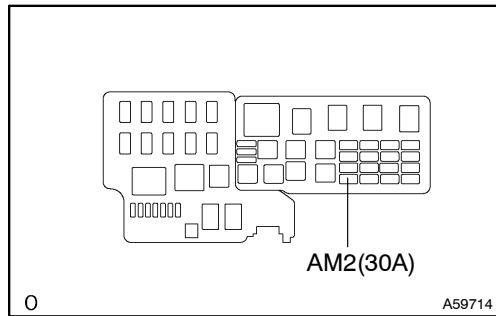
- Turn the ignition switch ON.
- Measure the voltage between terminal IGSW and E2 of the ECM connector.
Voltage: 9 – 14 V

OK

Go to step 6

NG

4 CHECK FUSE(AM2)

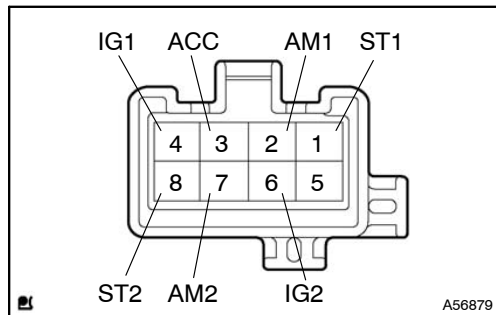


- (a) Remove the AM2 fuse from the engine room J/B.
- (b) Check the continuity of the AM2 fuse.

NG CHECK FOR SHORT IN ALL HARNESS AND COMPONENTS CONNECTED AM2 FUSE

OK

5 CHECK IGNITION OR STARTER SWITCH ASSY



- (a) Check continuity between the connector terminals shown in the chart below.

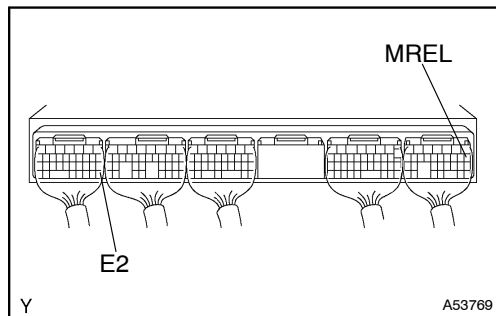
Switch	Terminal No.	Resistance
LOCK	All Terminal to Terminal	1MΩ or more
ACC	2↔3	1Ω or less
ON	2↔3↔4 6↔7	1Ω or less
START	1↔2↔4 6↔7↔8	1Ω or less

NG REPLACE IGNITION OR STARTER SWITCH ASSY

OK

REPAIR OR REPLACE HARNESS AND CONNECTOR

6 INSPECT ECM

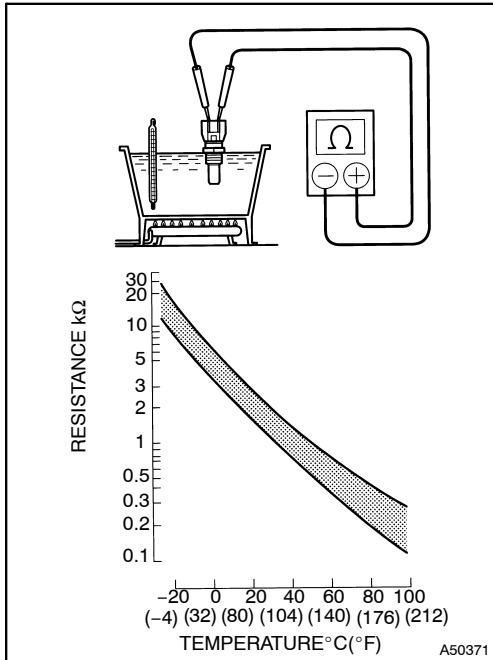


- (a) Turn the ignition switch ON.
- (b) Measure the voltage between terminal MREL and E2 of the ECM connector.
Voltage: 9 - 14 V

NG CHECK AND REPLACE ECM

OK

7 CHECK FUSE(E.F.I.)**NG****CHECK FOR SHORT IN ALL HARNESS AND COMPONENTS CONNECTED EFI FUSE****OK****8 CHECK E.F.I ECU RELAY (See page 10-2)****NG****REPLACE E.F.I ECU RELAY****OK****9 CHECK HARNESS AND CONNECTOR(MREL - E2)****NG****REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****REPAIR OR REPLACE HARNESS AND CONNECTOR**



6. E.F.I. ENGINE COOLANT TEMPERATURE SENSOR

- (a) Resistance inspection.
 (1) Using an ohmmeter, measure the resistance between each terminal.

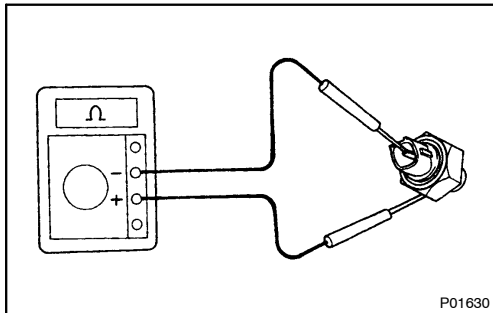
Resistance:

Approx. 20°C (68°F) 2.32 – 2.59 kΩ

Approx. 80°C (176°F) 0.310 – 0.326 kΩ

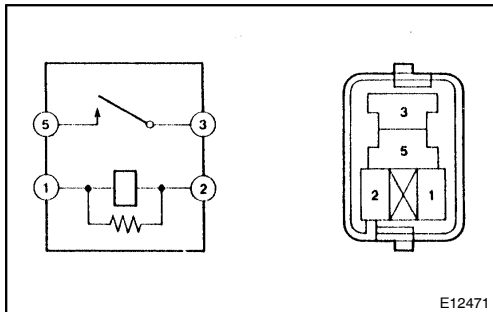
NOTICE:

In case of checking the water temperature sensor in the water, be careful not to allow water to go into the terminals, and after checking, wipe out the sensor.



7. KNOCK CONTROL SENSOR

- (a) Continuity inspection.
 (1) Using an ohmmeter, check that no continuity exists between the terminal and body.



8. E.F.I. CIRCUIT OPENING RELAY ASSY, E.F.I. ECU RELAY

- (a) Continuity inspection.
 (1) Using an ohmmeter, check that continuity exists between each terminal.

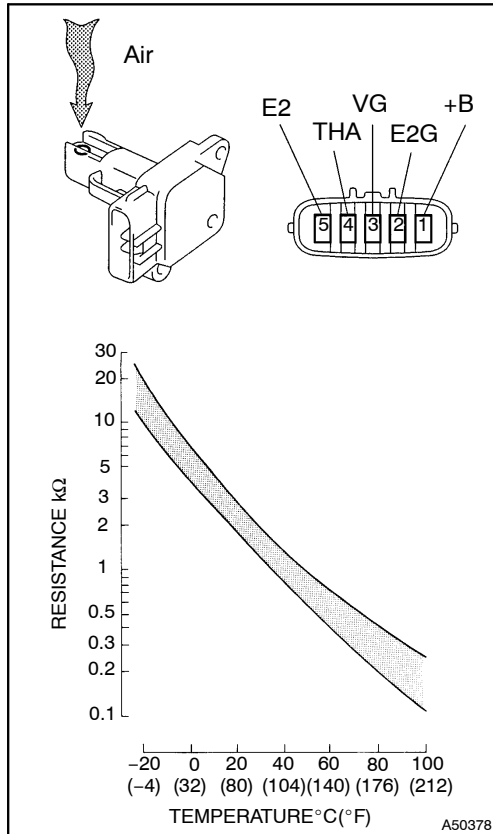
Specified condition:

Between terminal 1 and 2 Continuity

Between terminal 3 and 5 No continuity

- (2) Using an ohmmeter, check that continuity exists between terminals 3 and 5 when the battery voltage is applied across terminals 1 and 2.

INSPECTION



1. INTAKE AIR FLOW METER SUB-ASSY

(a) Output voltage inspection.

- (1) Apply battery voltage across terminals 1 (+B) and 2 (E2G).
- (2) Using a voltmeter, connect the positive (+) tester probe to terminal VG, and negative (-) tester probe to terminal E2G.
- (3) Blow air into the MAF meter, and check that the voltage fluctuates.

(b) Resistance inspection.

- (1) Using an ohmmeter, measure the resistance between terminals 4 (THA) and 5 (E2).

Resistance:

-20°C (-4°F) 13.6 - 18.4 kΩ

20°C (68°F) 2.21 - 2.69 kΩ

60°C (140°F) 0.493 - 0.667 kΩ

2. CAMSHAFT TIMING OIL CONTROL VALVE ASSY

(a) Resistance inspection.

- (1) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 6.9 - 7.9 Ω at 20°C (68°F)

(b) Movement inspection.

- (1) Connect the positive (+) lead from the battery to terminal 1 and negative (-) lead to terminal 2, and check the movement of the valve.

NOTICE:

Confirm the valve does not adhere.

HINT:

Bad returning of the valve by entrance of foreign objects causes subtle pressure leak to the advanced direction. Then, DTC can be detected.

