

FUEL PUMP CONTROL CIRCUIT

CIRCUIT DESCRIPTION

The fuel pump is operated by the ECM according to the vehicle running condition. After the ECM receives the engine start requirement signal from the HV control ECU, an NE signal comes in immediately when the engine is cranked by MG1 (basically, the fuel pump can operate while the NE signal is generated).

The ECM grounds the FC terminal line after receiving NE signal. It causes to energize the coil in the circuit opening relay, and the current flows to the fuel pump.

When the signal to stop the engine comes from the HV control ECU to the ECM, or when the fuel cut operation is performed such as decelerating by the engine brake, the fuel pump is stopped.

INSPECTION PROCEDURE

Hand-held tester:

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER(OPERATE CIRCUIT OPENING RELAY)

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch ON (IG).
- (c) Turn the hand-held tester ON.
- (d) Select the item: DIAGNOSIS / ENHANCED OBD II / ENGINE AND ECT / ACTIVE TEST / FUEL PUMP/ SPD.
- (e) Check the relay operation while operating it using the hand-held tester.

Standard: Operating noise can be heard from the relay.

OK → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

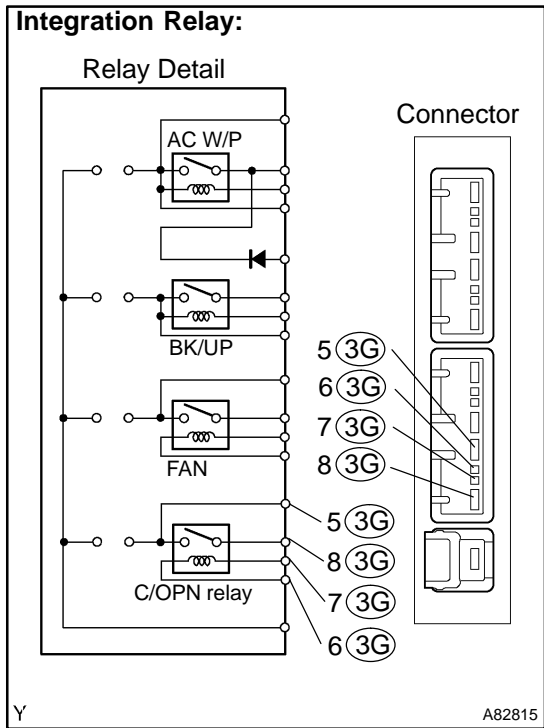
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2 INSPECT POWER SOURCE CIRCUIT (See page 05-366)

NG → REPAIR OR REPLACE POWER SOURCE CIRCUIT COMPONENTS

OK

3 INSPECT INTEGRATION RELAY(C/OPN RELAY)



- (a) Remove the integration relay from the engine room R/B.
- (b) Inspect the circuit opening relay.

Standard:

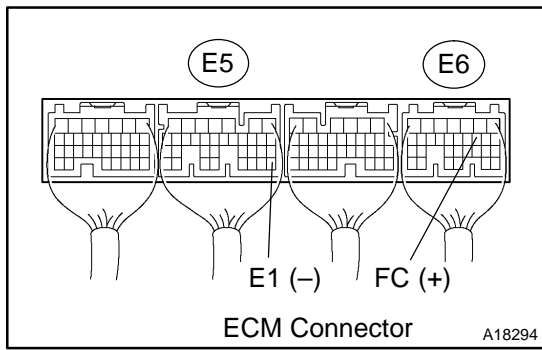
Tester Connection	Specified Condition
(3G-5) - (3G-8)	10 kΩ or higher
(3G-5) - (3G-8)	Below 1 Ω (Apply battery voltage to terminals 3G-6 and 3G-7)

- (c) Reinstall the integration relay.

NG → REPLACE INTEGRATION RELAY

OK

4 INSPECT ECM(FC VOLTAGE)



- (a) Turn the power switch ON (IG).
- (b) Measure the voltage between the specified terminals of the E5 and E6 ECM connectors.

Standard:

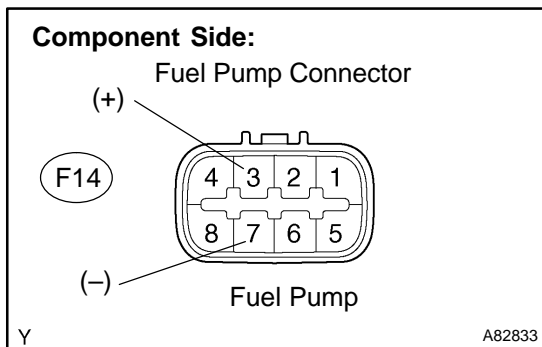
Tester Connection	Specified Condition
FC (E6-10) - E1 (E5-28)	9 to 14 V

OK → Go to step 5

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CHECK AND REPAIR HARNESS OR CONNECTOR

5 INSPECT FUEL PUMP



- (a) Disconnect the F14 fuel pump connector.
- (b) Inspect the fuel pump resistance.
 - (1) Measure the resistance between terminals 3 and 7.

Standard:

Tester Connection	Specified Condition
3 - 7	0.2 to 3.0 Ω at 20 °C (68 °F)

- (c) Inspect the fuel pump operation
 - (1) Apply battery voltage to the fuel pump terminals. Check that the pump operates.

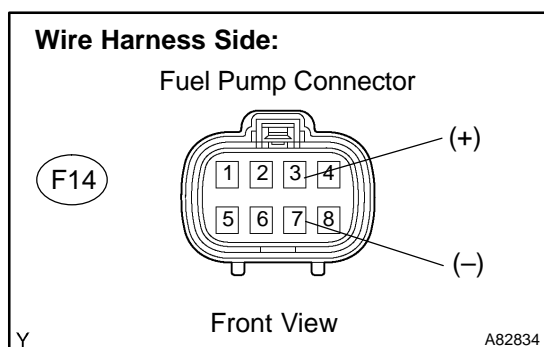
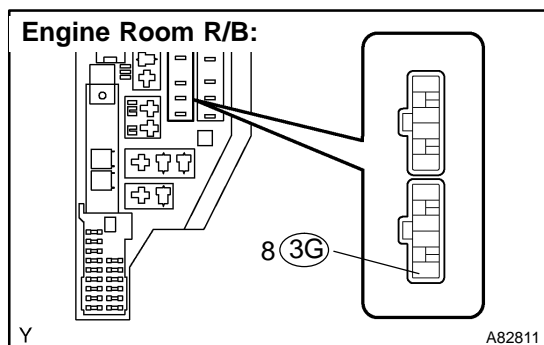
NOTICE:

- These tests must be done quickly (within 10 seconds) to prevent the coil from burning out.
 - Keep fuel pump as far away from the battery as possible.
 - Always do the switching at the battery side.
- (d) Reconnect the fuel pump connector.

NG → REPAIR OR REPLACE FUEL TANK ASSY

OK

6 CHECK HARNESS AND CONNECTOR(C/OPN RELAY – FUEL PUMP, FUEL PUMP – BODY GROUND)



- (a) Check the harness and the connectors between the circuit opening relay and the fuel pump connector.
- (1) Remove the integration relay from the engine room R/B.
 - (2) Disconnect the F14 fuel pump connector.
 - (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Circuit opening relay (3G-8) – Fuel pump (F14-3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Circuit opening relay (3G-8) or Fuel pump (F14-3) – Body ground	10 k Ω or higher

- (4) Reinstall the integration relay.
 - (5) Reconnect the fuel pump connector.
- (b) Check the harness and the connectors between the fuel pump connector and the body ground.
- (1) Disconnect the F14 fuel pump connector.
 - (2) Check the resistance between the wire harness side connector and the body ground.

Standard (Check for open):

Tester Connection	Specified Condition
Fuel pump (F14-7) – Body ground	Below 1 Ω

- (3) Reconnect the fuel pump connector.

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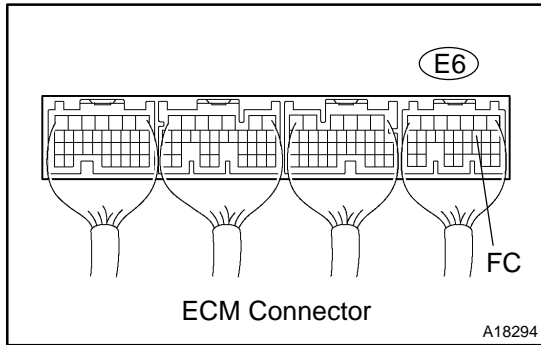
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM (See page 10-24)

OBD II scan tool (excluding hand-held tester):

1 CHECK FUEL PUMP OPERATION



(a) When the terminal FC of the ECM connector and the body ground are connected, check the relay operation.

Standard:

Operating noise can be heard from the circuit opening relay.

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-33)**

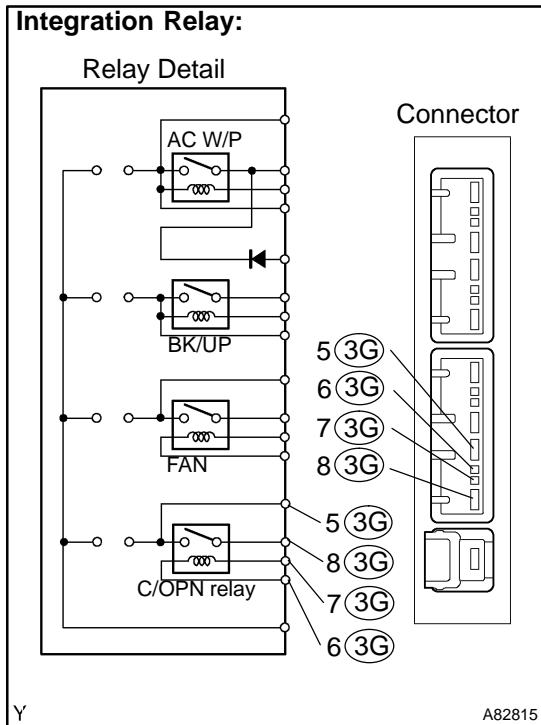
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2 CHECK FOR ECM POWER SOURCE CIRCUIT (See page 05-366)

NG → **REPAIR OR REPLACE POWER SOURCE CIRCUIT COMPONENTS**

OK

3 INSPECT INTEGRATION RELAY(C/OPN RELAY)



(a) Remove the integration relay from the engine room R/B.
 (b) Inspect the circuit opening relay.

Standard:

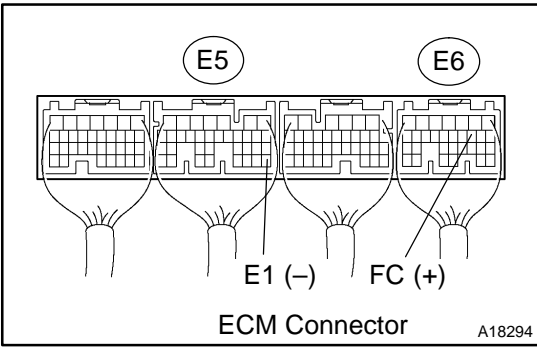
Tester Connection	Specified Condition
(3G-5) - (3G-8)	10 kΩ or higher
(3G-5) - (3G-8)	Below 1 Ω (Apply battery voltage to terminals 3G-6 and 3G-7)

(c) Reinstall the integration relay.

NG → **REPLACE INTEGRATION RELAY**

OK

4 INSPECT ECM(FC VOLTAGE)



- (a) Turn the power switch ON (IG).
- (b) Measure the voltage between the specified terminals of the E5 and E6 ECM connectors.

Standard:

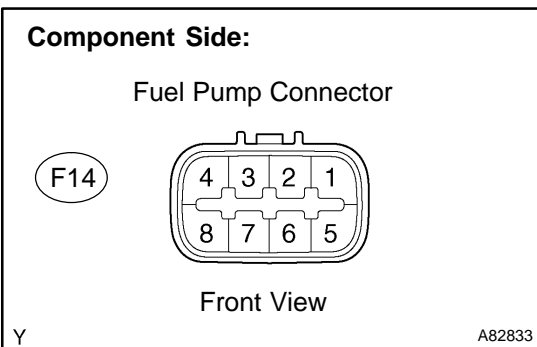
Tester Connection	Specified Condition
FC (E6-10) - E1 (E5-28)	9 to 14 V

OK → Go to step 5

NG

CHECK AND REPAIR HARNESS OR CONNECTOR

5 INSPECT FUEL PUMP



- (a) Disconnect the F14 fuel pump connector.
- (b) Inspect the fuel pump resistance.
 - (1) Measure the resistance between terminals 3 and 7.

Standard:

Tester Connection	Specified Condition
3 - 7	0.2 to 3.0 Ω at 20 °C (68 °F)

- (c) Inspect the fuel pump operation
 - (1) Apply battery voltage to the fuel pump terminals. Check that the pump operates.

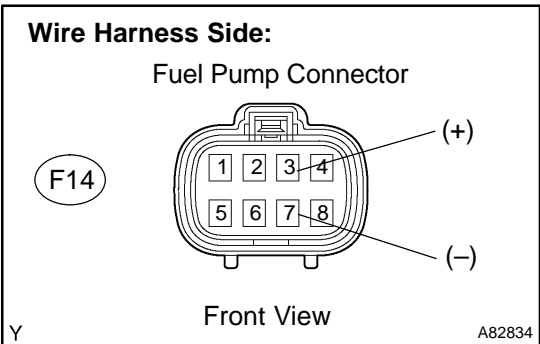
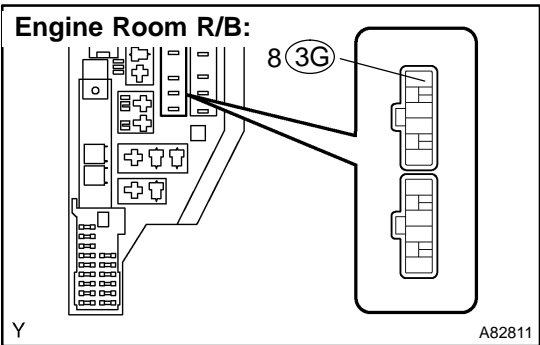
NOTICE:

- **These tests must be done quickly (within 10 seconds) to prevent the coil from burning out.**
- **Keep fuel pump as far away from the battery as possible.**
- **Always do the switching at the battery side.**
- (d) Reconnect the fuel pump connector.

NG → REPLACE FUEL TANK ASSY

OK

6 CHECK HARNESS AND CONNECTOR(C/OPN RELAY - FUEL PUMP, FUEL PUMP - BODY GROUND)



- (a) Check the harness and the connectors between the circuit opening relay and the fuel pump connector.
 - (1) Remove the integration relay from the engine room R/B.
 - (2) Disconnect the F14 fuel pump connector.
 - (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Circuit opening relay (3G-8) - Fuel pump (F14-3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Circuit opening relay (3G-8) or Fuel pump (F14-3) - Body ground	10 kΩ or higher

- (4) Reinstall the integration relay.
- (5) Reconnect the fuel pump connector.
- (b) Check the harness and the connectors between the fuel pump connector and the body ground.
 - (1) Disconnect the F14 fuel pump connector.
 - (2) Check the resistance between the wire harness side connector and the body ground.

Standard (Check for open):

Tester Connection	Specified Condition
Fuel pump (F14-7) - Body ground	Below 1 Ω

- (3) Reconnect the fuel pump connector.

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

OK

REPLACE ECM (See page 10-24)