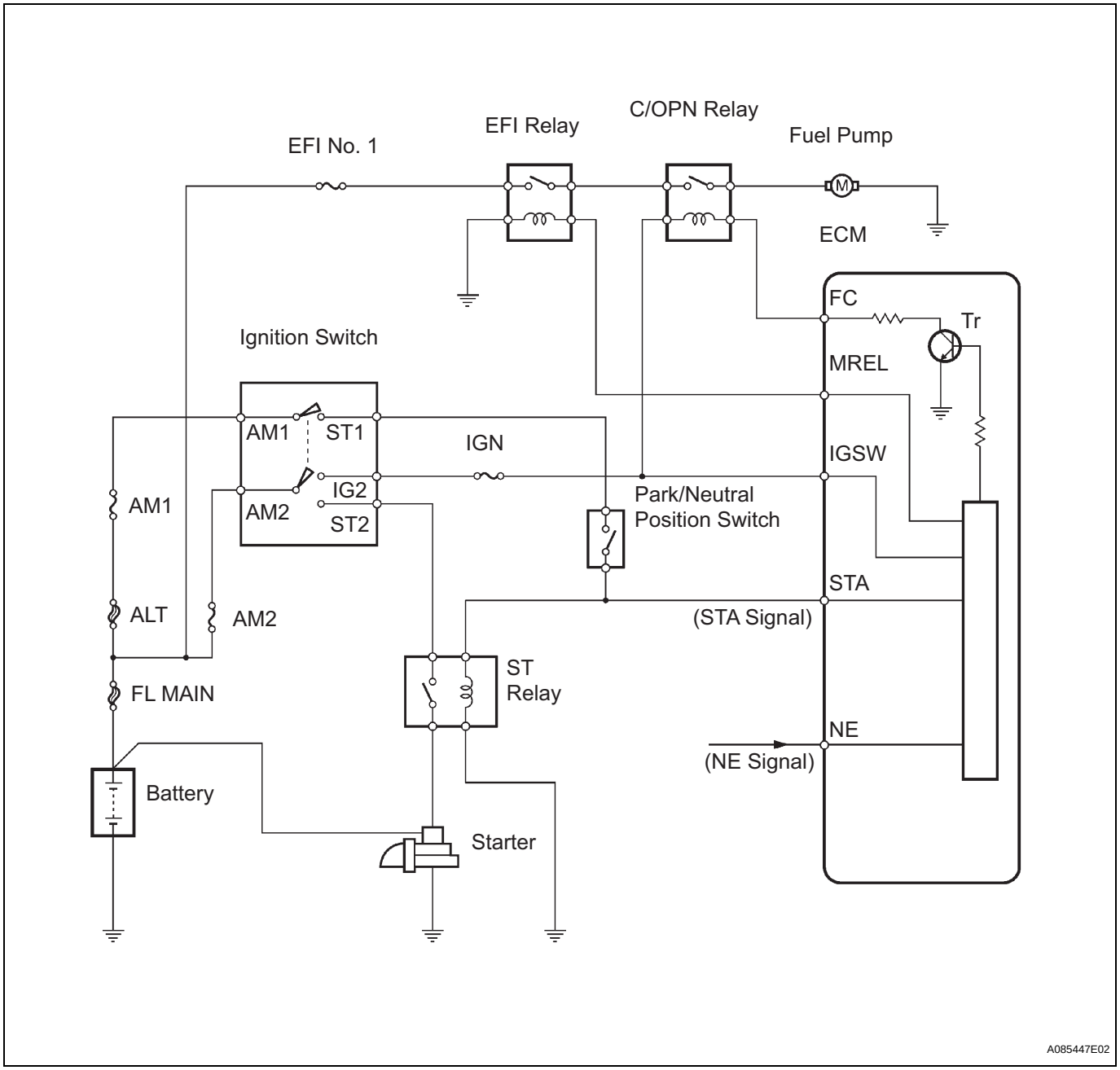
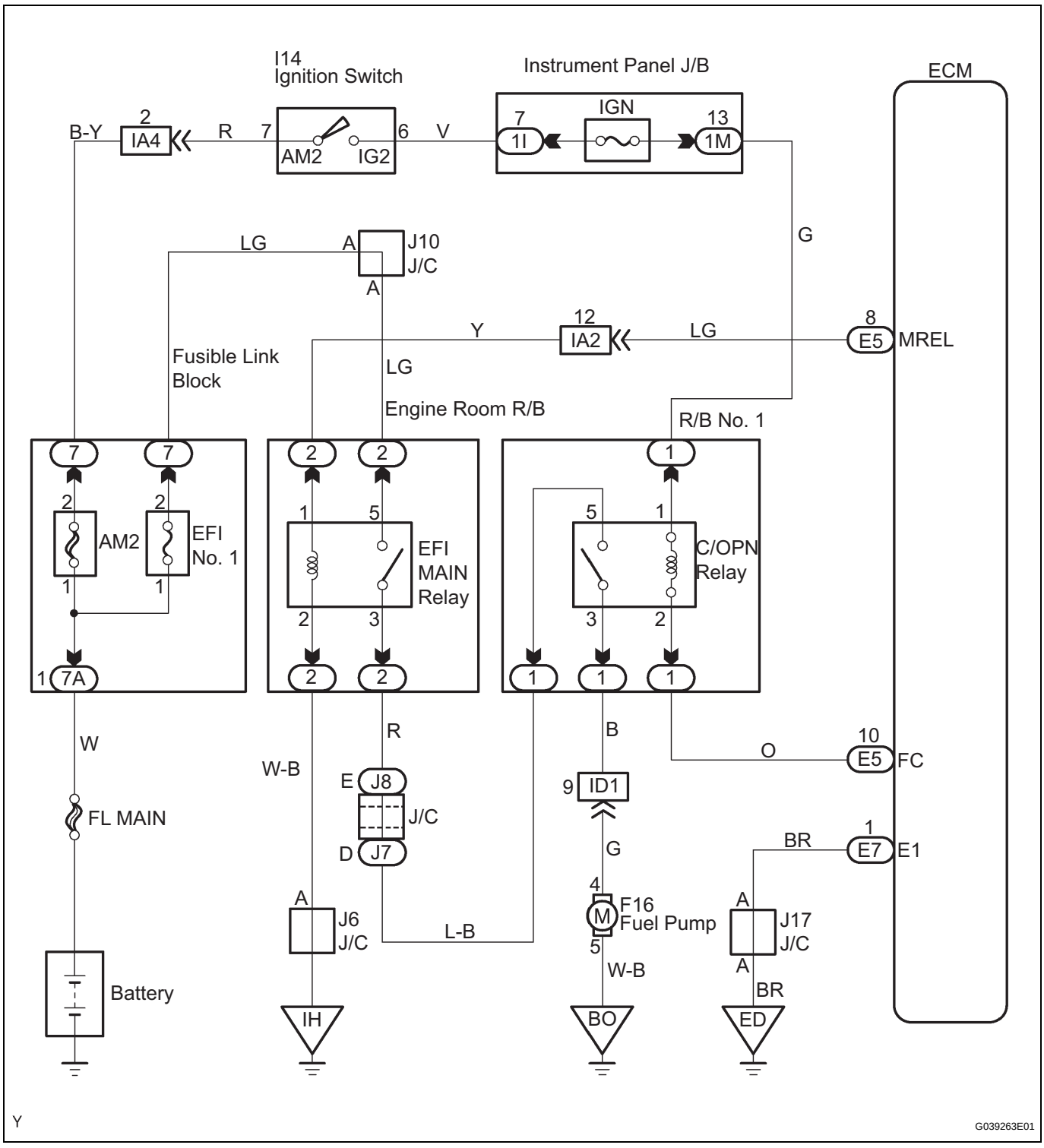
Fuel Pump Control Circuit

DESCRIPTION

When the engine is cranked, current flows from the IG2ition switch terminal ST1 to the starter relay coil (marking: ST), and 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 and the engine is running, the ECM keeps Tr ON (C/OPN relay ON) and the fuel pump also keeps operating.



WIRING DIAGRAM



1	PERFORM ACTIVE TEST BY INTELLIGENT TESTER (OPERATE C/OPN RELAY)

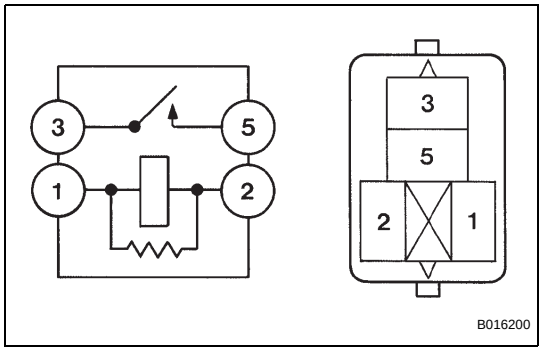
(a) Connect the intelligent tester to the DLC3.
(b) Turn ON the ignition switch, push the intelligent tester or the OBD II scan tool main switch ON.

(c) Enter the following menus :DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / FUEL PUMP / SPD.
(d) Check the relay operation while operating it using the intelligent tester.
Standard:
Operating noise can be heard from the relay.

OK → **Go to step 5**

NG

2 INSPECT C/OPN RELAY



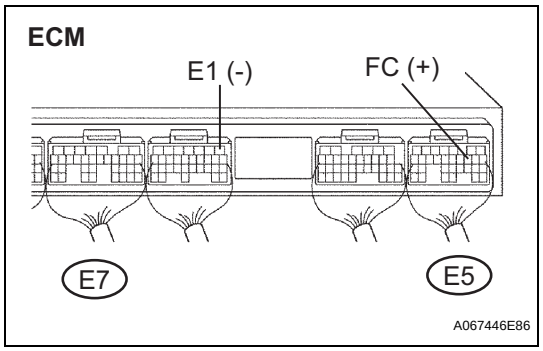
(a) Remove the C/OPN relay from the R/B No. 1.
(b) Measure the resistance of the C/OPN relay.
Standard resistance

Tester Connection	Specified Condition
1 - 2	Below 1 Ω
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (When battery voltage is applied to terminals 1 and 2)

NG → **REPLACE C/OPN RELAY**

OK

3 INSPECT ECM (FC VOLTAGE)



(a) Turn the ignition switch ON.
(b) Measure the voltage of the ECM connectors.
Standard voltage

Tester Connection	Specified Condition
E5-10 (FC) - E7-1 (E1)	9 to 14 V

OK → **REPLACE ECM**

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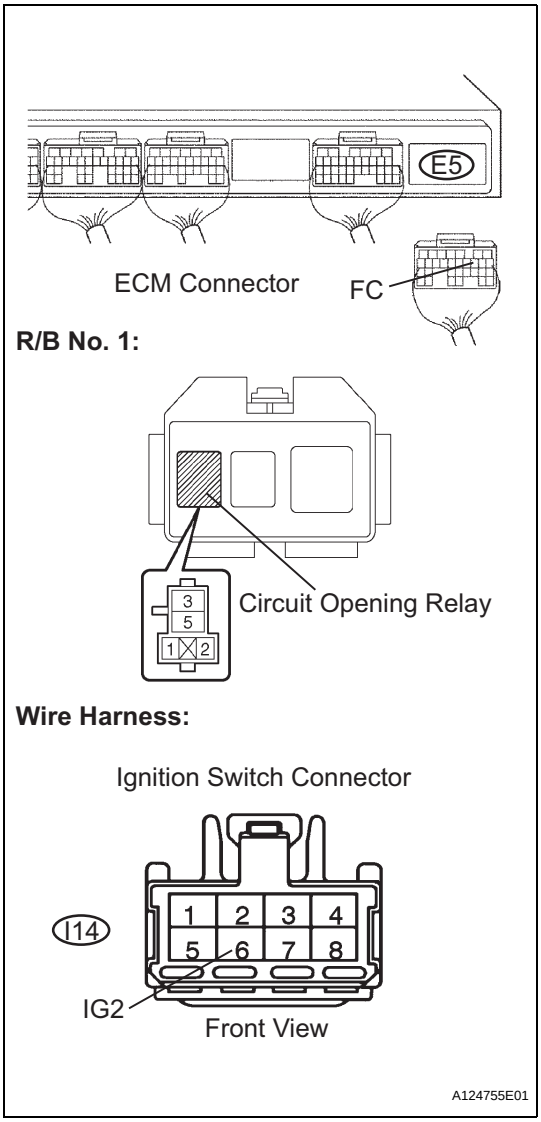
4	CHECK HARNESS AND CONNECTOR (ECM - C/OPN RELAY, C/OPN RELAY - IGNITION)



(a) Check the wire harness between the ECM and C/OPN relay.
  (1) Disconnect the E5 ECM connector.
  (2) Remove the C/OPN relay from the R/B No. 1.
  (3) Measure the resistance of the wire harness side connectors.
  Standard resistance

Terminal Connections	Specified Condition
E5-10 (FC) - 2 of C/OPN relay	Below 1 Ω
E5-10 (FC) or 2 of C/OPN relay - Body ground	10 kΩ or higher

(b) Check the wire harness between the C/OPN relay and ignition switch.
  (1) Inspect the IGN fuse.
    • Remove the IGN fuse from the instrument panel J/B.
    • Check the resistance of the IGN fuse.
    Standard resistance:
    Below 1 Ω
    • Reinstall the IG2 fuse.
  (2) Remove the C/OPN relay from the R/B No. 1.
  (3) Disconnect the I14 ignition switch connector.
  (4) Measure the resistance of the wire harness side connectors.
  Standard resistance

Terminal Connections	Specified Condition
C/OPN relay terminal 1 - I14-6	Below 1 Ω
C/OPN relay terminal 1 or I14-6 - Body ground	10 kΩ or higher

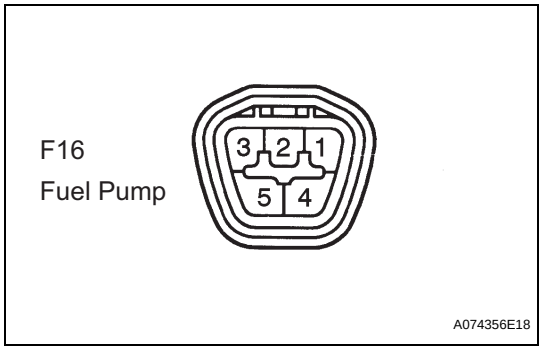
(c) Install the C/OPN relay.
(d) Reconnect the ECM connector and ignition switch connector.

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

OK

REPLACE ECM

5 INSPECT FUEL PUMP



(a) Measure the resistance of the fuel pump.
(1) Measure the resistance between terminals 4 and 5.
Standard resistance

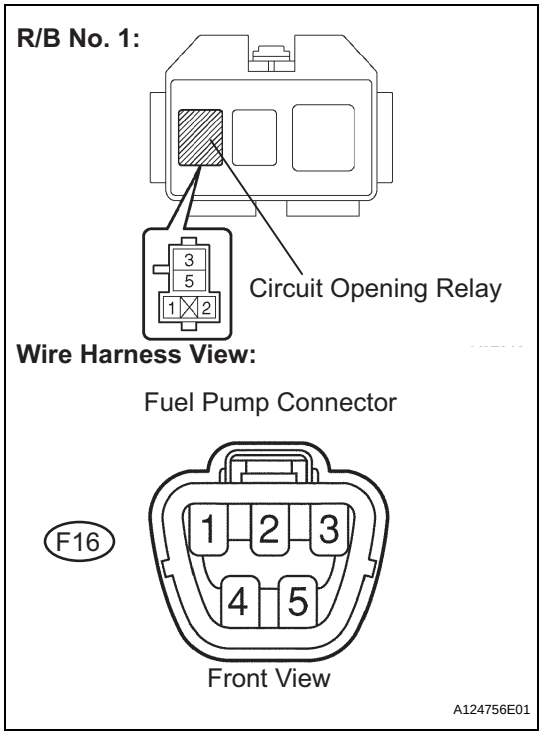
Terminal Connections	Condition	Specified Condition
4-5	20°C (68°F)	0.2 to 0.3 Ω

(b) Check operation of the fuel pump.
(1) Apply battery voltage to both terminals. Check that the pump operates.
NOTICE:
- **These tests must be done quickly (within 10 seconds) to prevent the coil from burning out.**
- **Keep the fuel pump as far away from the battery as possible.**
- **Always turn ON and OFF the voltage on the battery side, not the fuel pump side.**

NG → **REPLACE FUEL PUMP**

OK

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



(a) Check the wire harness between the C/OPN relay and fuel pump.
(1) Remove the C/OPN relay from the R/B No. 1.
(2) Disconnect the F16 fuel pump connector.
(3) Measure the resistance of the wire harness side connectors.
Standard resistance

Tester Connection	Specified Condition
C/OPN relay terminal 3 - F16-4	Below 1 Ω
C/OPN relay terminal 3 or F16-4 - Body ground	10 kΩ or higher

(b) Check the wire harness between the fuel pump and body ground.
(1) Disconnect the F16 fuel pump connector.
(2) Measure the resistance of the wire harness side connector and body ground.
Standard resistance

Tester Connection	Specified Condition
F16-5 (Fuel pump) - Body ground	Below 1 Ω

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

OK

REPLACE ECM

1	CHECK FUEL PUMP OPERATION

(a) Check if there is pressure in the fuel inlet hose.
HINT:
The pump has fuel pressure if the sound of fuel flowing can be heard.

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OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE**

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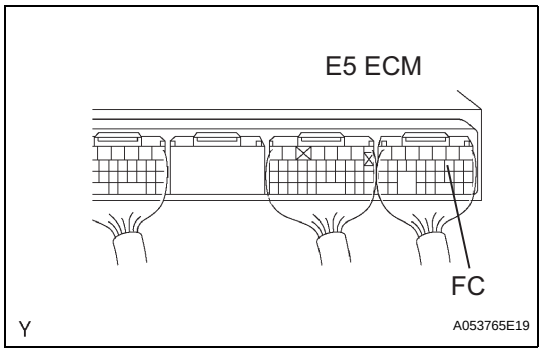
2	CHECK RELAY OPERATION (C/OPN)



(a) Connect terminal FC of the E5 ECM connector and body ground, and check relay operation.
Standard:
Noise can be heard from the C/OPN relay.

OK → **Go to step 6**

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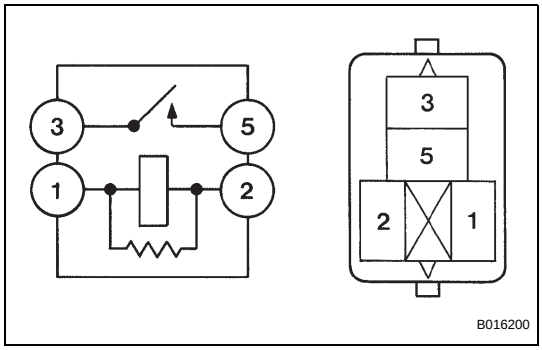
3	INSPECT C/OPN RELAY



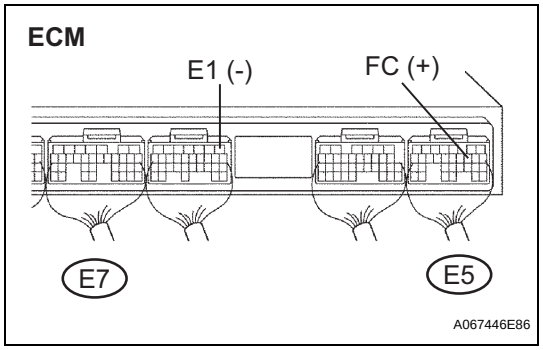
(a) Remove the C/OPN relay from the R/B No. 1.
(b) Measure the resistance of the C/OPN relay.
Standard resistance

Tester Connection	Specified Condition
1 - 2	Below 1 Ω
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

NG → **REPLACE RELAY**

OK

4 INSPECT ECM (FC VOLTAGE)



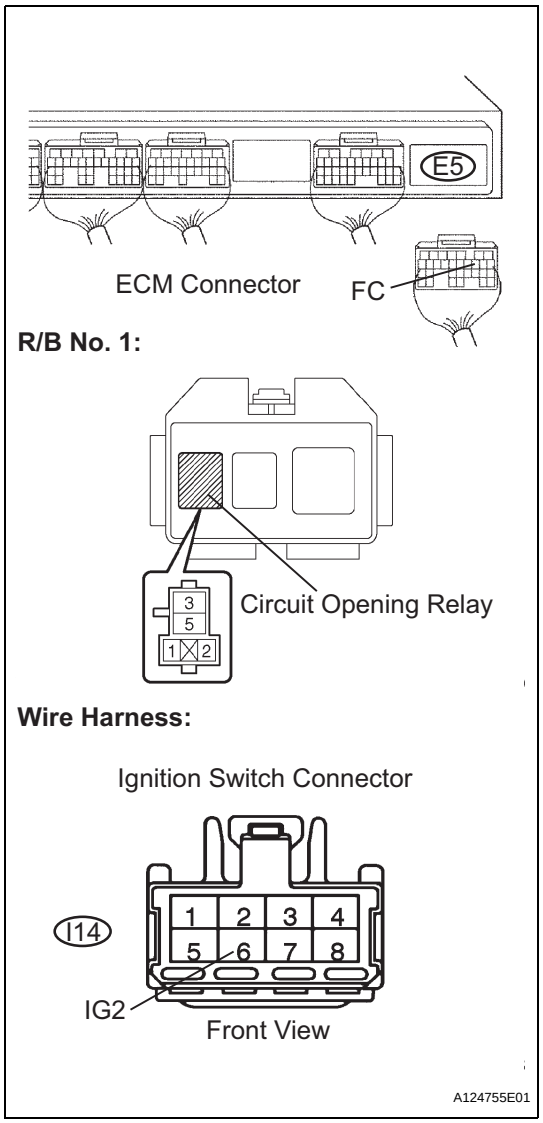
(a) Turn the ignition switch ON.
(b) Measure the voltage of the ECM connectors.
Standard voltage

Tester Connection	Specified Condition
E5-10 (FC) - E7-1 (E1)	9 to 14 V

NG → **REPLACE ECM**

OK

5 CHECK HARNESS AND CONNECTOR (ECM - C/PN RELAY , C/OPN RELAY IGNITION)



(a) Check the wire harness between the ECM and C/OPN relay.
(1) Disconnect the E5 ECM connector.
(2) Remove the C/OPN relay from the R/B No. 1.
(3) Measure the resistance of the wire harness side connectors.
Standard resistance

Tester Connection	Specified Condition
E5-10 (FC) - C/OPN relay terminal 2	Below 1 Ω
E5-10 (FC) or C/OPN relay terminal 2 - Body ground	10 kΩ or higher

(b) Check the wire harness between the C/OPN relay and ignition switch.
(1) Check the IGN fuse.
- Remove the IGN fuse from the engine room J/B.
- Measure the resistance of the IGN fuse.
Standard resistance:
Below 1 Ω
- Reinstall the IGN fuse.

(2) Remove the C/OPN relay from the R/B No. 1.
(3) Disconnect the I14 ignition switch connector.
(4) Measure the resistance of the wire harness side connectors.
Standard resistance

Tester Connection	Specified Condition
C/OPN relay terminal 1 - I14-6 (Ignition switch)	Below 1 Ω
C/OPN relay terminal 1 or I14-6 (Ignition switch) - Body ground	10 kΩ or higher

(c) Install the C/OPN relay.
(d) Reconnect the ECM connector and ignition switch connector.

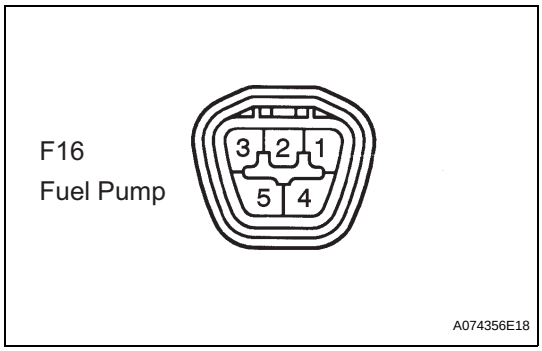
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

ES

OK

REPLACE ECM

6	INSPECT FUEL PUMP



(a) Measure the resistance of the fuel pump.
(1) Measure the resistance between terminals 4 and 5.
Standard resistance

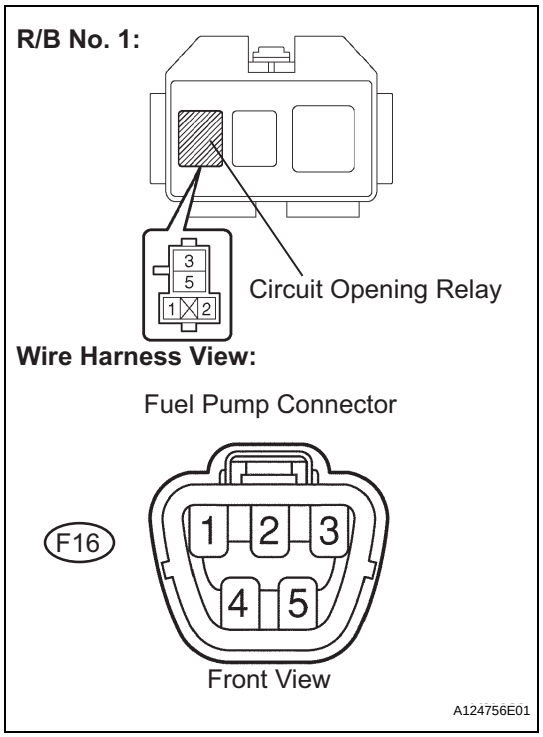
Tester Connection	Condition	Specified Condition
4-5	20°C (68°F)	0.2 to 0.3 Ω

(b) Check operation of the fuel pump.
(1) Apply battery voltage to both the terminals. Check that the pump operates.
NOTICE:
- **These tests must be done quickly (within 10 seconds) to prevent the coil from burning out.**
- **Keep the fuel pump as far away from the battery as possible.**
- **Always turns ON and OFF the voltage on the battery side, not the fuel pump side.**

NG → **REPLACE FUEL PUMP**

OK

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



(a) Check the wire harness between the C/OPN relay and fuel pump.
  (1) Remove the C/OPN relay from the R/B No. 1.
  (2) Disconnect the F16 fuel pump connector.
  (3) Measure the resistance of the wire harness side connectors.
  Standard resistance

Tester Connection	Specified Condition
C/OPN relay terminal 3 - F16-4	Below 1 Ω
C/OPN relay terminal 3 or F16-4 - Body ground	10 kΩ or higher

(b) Check the wire harness between the fuel pump and body ground.
  (1) Disconnect the F16 fuel pump connector.
  (2) Measure the resistance of the wire harness side connector.
  Standard resistance

Tester Connection	Specified Condition
F16-5 - Body ground	Below 1 Ω

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

OK

REPLACE ECM

ES