

# Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

## 17. Diagnostics for Engine Starting Failure

### A: PROCEDURE

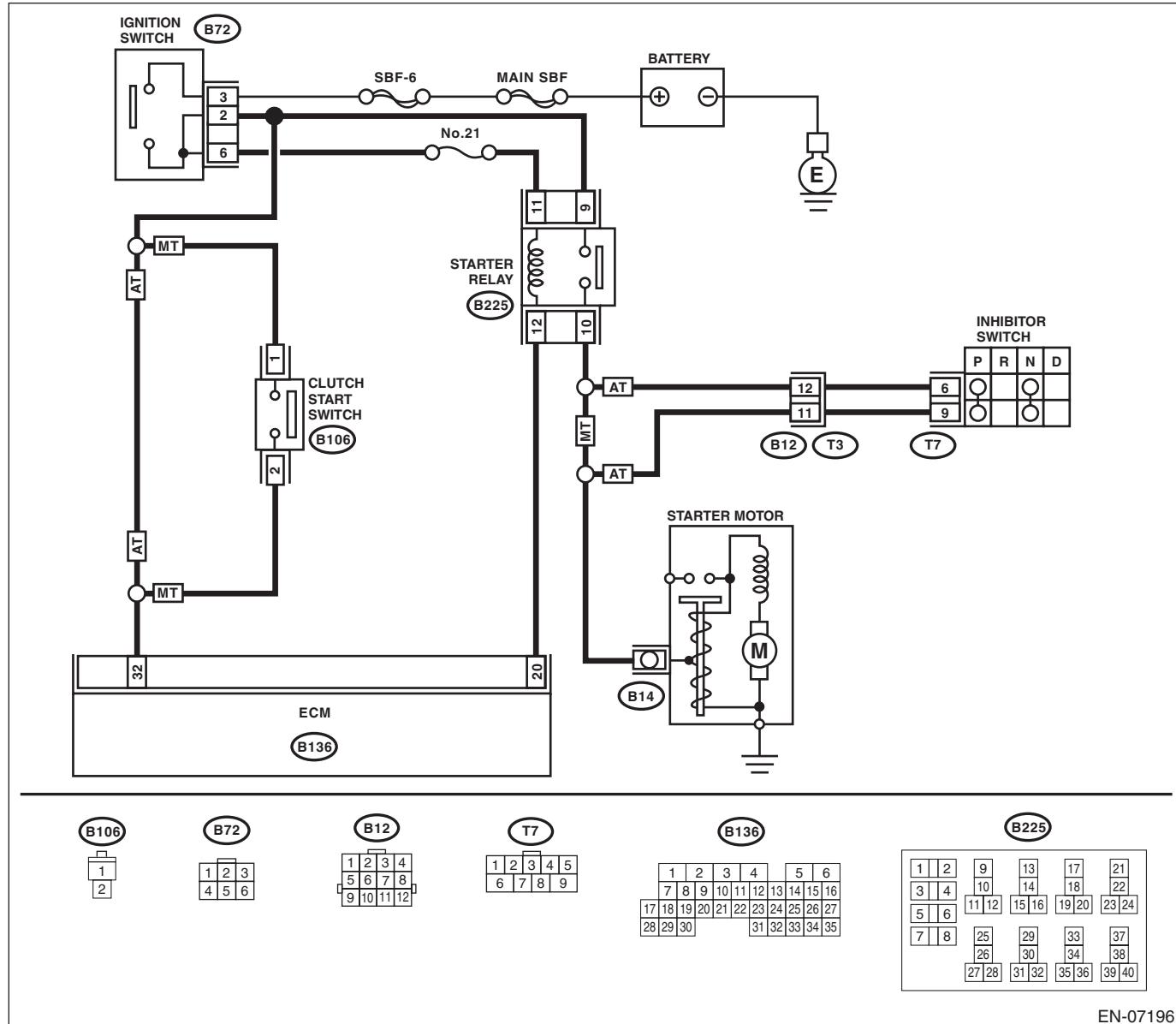
1. Check of the fuel amount
↓
2. Inspection of starter motor circuit <Ref. to EN(H4DOTC)(diag)-71, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
3. Inspection of ECM power supply and ground line <Ref. to EN(H4DOTC)(diag)-75, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>
↓
4. Inspection of ignition control system <Ref. to EN(H4DOTC)(diag)-77, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
↓
5. Inspection of fuel pump circuit <Ref. to EN(H4DOTC)(diag)-80, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
6. Inspection of fuel injector circuit <Ref. to EN(H4DOTC)(diag)-81, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

## B: STARTER MOTOR CIRCUIT

### CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-56, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-45, PROCEDURE, Inspection Mode.>.

### WIRING DIAGRAM:



EN-07196

Step	Check	Yes	No
1 <b>CHECK BATTERY.</b> Check the battery voltage.	Is the voltage 12 V or more?	Go to step 2.	Charge or replace the battery.
2 <b>CHECK OPERATION OF STARTER MOTOR.</b>	Does the starter motor operate?	Go to step 3.	Go to step 4.

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Step	Check	Yes	No
<b>3 CHECK DTC.</b>	Is DTC displayed? <Ref. to EN(H4DOTC)(diag)-44, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DOTC)(diag)-85, List of Diagnostic Trouble Code (DTC).>	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again.  NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
<b>4 CHECK INPUT SIGNAL FOR STARTER MOTOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from starter motor. 3) On AT models, set the select lever to the "P" range or "N" range, and on MT models, depress the clutch pedal. 4) Turn the ignition switch to START. 5) Measure the voltage between the starter motor connector and the engine ground.  <i>Connector &amp; terminal (B14) No. 1 (+) — Engine ground (-):</i>	Is the voltage 10 V or more?	Check the starter motor. <Ref. to SC(H4SO)-7, Starter.>	Go to step 5.
<b>5 CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ignition switch. 3) Measure the voltage between ignition switch connector and chassis ground.  <i>Connector &amp; terminal (B72) No. 3 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Go to step 6.	Repair the power supply circuit.
<b>6 CHECK IGNITION SWITCH.</b> Measure the resistance between ignition switch terminals after turning the ignition switch to START position.  <i>Terminals No. 3 — No. 2: No. 3 — No. 6:</i>	Is the resistance less than 1 $\Omega$ ?	Go to step 7.	Replace the ignition switch. <Ref. to SL-43, REPLACEMENT, Ignition Key Lock.>
<b>7 CHECK INPUT VOLTAGE OF STARTER RELAY.</b> 1) Remove the starter relay. 2) Connect the connector to ignition switch. 3) Measure the voltage between starter relay connector and chassis ground after turning the ignition switch to START position.  <i>Connector &amp; terminal (B225) No. 9 (+) — Chassis ground (-): (B225) No. 11 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Go to step 8.	Check the following item and repair if necessary. <ul style="list-style-type: none"><li>• Open or short circuit to ground in harness between starter relay connector and ignition switch connector</li><li>• Blown out of fuse</li></ul>

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Step	Check	Yes	No
8 <b>CHECK STARTER RELAY.</b> 1) Connect the battery to starter relay terminals No. 11 and No. 12. 2) Measure the resistance between starter relay terminals. <i>Terminals No. 9 — No. 10:</i>	Is the resistance less than 1 Ω?	Go to step 9.	Replace the starter relay. <Ref. to EN(H4DOTC)(diag)-9, Electrical Component Location.>
9 <b>CHECK HARNESS BETWEEN ECM AND STARTER RELAY CONNECTOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance of harness between ECM and starter relay connector. <i>Connector &amp; terminal (B136) No. 20 — (B225) No. 12:</i>	Is the resistance less than 1 Ω?	Go to step 10.	Repair the open circuit of harness between ECM and starter relay connector.
10 <b>CHECK TRANSMISSION TYPE.</b>	Is the transmission type AT?	Go to step 14.	Go to step 11.
11 <b>CHECK INPUT VOLTAGE OF CLUTCH START SWITCH.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the clutch start switch connector. 3) Turn the ignition switch to START. 4) Measure the voltage between the clutch start switch connector and chassis ground. <i>Connector &amp; terminal (B106) No. 1 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Go to step 12.	Repair open circuit or short circuit to ground in harness between ignition switch connector and clutch start switch connector.
12 <b>CHECK CLUTCH START SWITCH.</b> Measure the resistance between clutch start switch terminals while depressing the clutch pedal. <i>Terminals No. 1 — No. 2:</i>	Is the resistance less than 1 Ω?	Go to step 13.	Replace the clutch start switch. <Ref. to CL-27, Clutch Switch.>
13 <b>CHECK HARNESS BETWEEN ECM AND CLUTCH START SWITCH.</b> Measure the resistance of harness between ECM and clutch start switch connector. <i>Connector &amp; terminal (B136) No. 32 — (B106) No. 2:</i>	Is the resistance less than 1 Ω?	Check the engine control module (ECM) power supply and ground line. <Ref. to EN(H4DOTC)(diag)-75, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>	Repair open circuit or short circuit to ground in harness between ECM and clutch start switch connector.
14 <b>CHECK HARNESS BETWEEN ECM AND IGNITION SWITCH.</b> 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between the ECM and ignition switch connector. <i>Connector &amp; terminal (B136) No. 32 — (B72) No. 6:</i>	Is the resistance less than 1 Ω?	Go to step 15.	Repair open circuit or short circuit to ground in harness between ECM and ignition switch connector.

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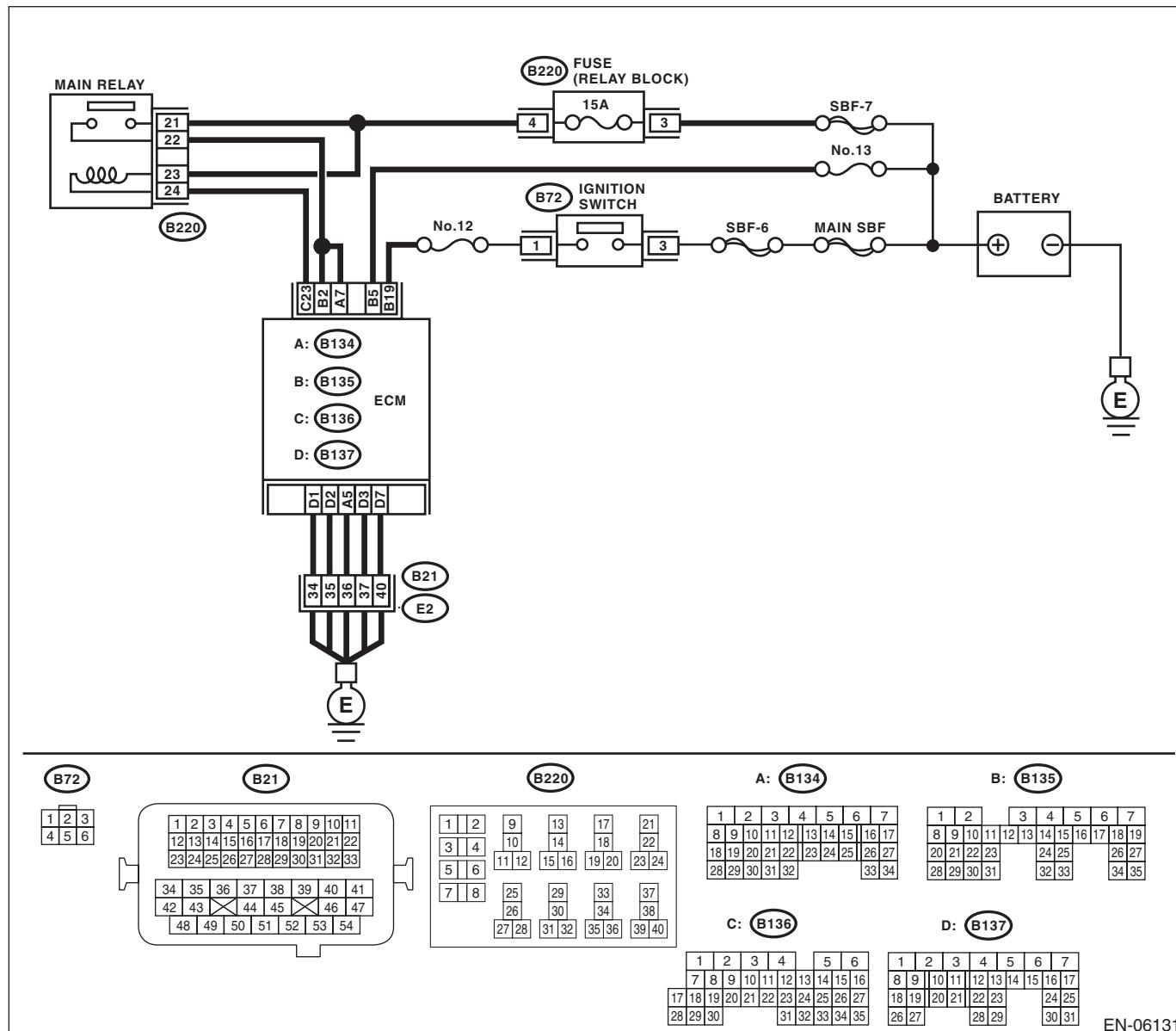
Step	Check	Yes	No
<b>15 CHECK INPUT VOLTAGE OF INHIBITOR SWITCH.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from inhibitor switch. 3) Connect the starter relay and ECM. 4) Measure the input voltage between inhibitor switch connector and engine ground after turning the ignition switch to START position. <b>Connector &amp; terminal</b> <b>(T7) No. 6 (+) — Engine ground (-):</b>	Is the voltage 10 V or more?	Go to step 16.	Repair the open circuit in harness between inhibitor switch connector and starter relay connector.
<b>16 CHECK INHIBITOR SWITCH.</b> 1) Place the select lever in "P" range or "N" range. 2) Measure the resistance between inhibitor switch terminals. <b>Connector &amp; terminal</b> <b>No. 6 — No. 9:</b>	Is the resistance less than 1 Ω?	Go to step 17.	Replace the inhibitor switch. <Ref. to 4AT-46, Inhibitor Switch.>
<b>17 CHECK HARNESS BETWEEN INHIBITOR SWITCH AND STARTER MOTOR.</b> Measure the resistance of harness between the inhibitor switch connector and starter motor. <b>Connector &amp; terminal</b> <b>(T7) No. 9 — (B14) No. 1:</b>	Is the resistance less than 1 Ω?	Check the engine control module (ECM) power supply and ground line. <Ref. to EN(H4DOTC)(diag)-75, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>	Repair the harness and connector. <b>NOTE:</b> In this case, repair the following item: • Open or ground short circuit of harness between inhibitor switch connector and starter motor • Poor contact of coupling connector

## C: CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM)

## **CAUTION:**

**After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-56, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-45, PROCEDURE, Inspection Mode.>.**

## WIRING DIAGRAM:



Step	Check	Yes	No	
1	<b>CHECK MAIN RELAY.</b> <ol style="list-style-type: none"> <li>1) Turn the ignition switch to OFF.</li> <li>2) Remove the main relay.</li> <li>3) Connect the battery to main relay terminals No. 23 and No. 24.</li> <li>4) Measure the resistance between main relay terminals.</li> </ol> <p><b>Terminals</b> <b>No. 21 — No. 22:</b></p>	Is the resistance less than 1 Ω?	Go to step 2.	Replace the main relay. <Ref. to FU(H4DOTC)-52, Main Relay.>

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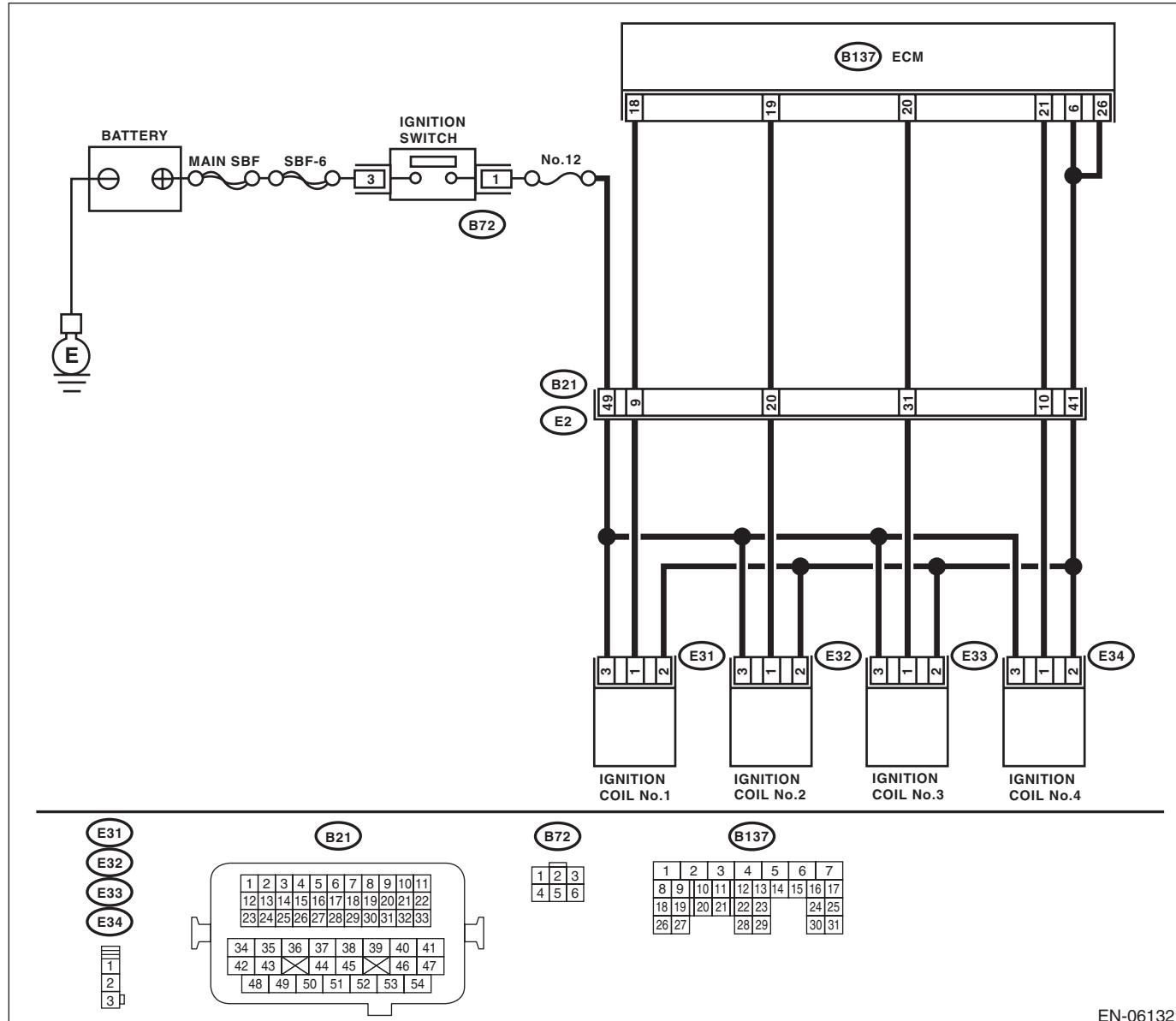
Step	Check	Yes	No
<b>2 CHECK GROUND CIRCUIT FOR ECM.</b> 1) Disconnect the connectors from ECM. 2) Measure the resistance of harness between ECM and chassis ground. <b>Connector &amp; terminal</b> <i>(B134) No. 5 — Chassis ground:</i> <i>(B137) No. 1 — Chassis ground:</i> <i>(B137) No. 2 — Chassis ground:</i> <i>(B137) No. 3 — Chassis ground:</i> <i>(B137) No. 7 — Chassis ground:</i>	Is the resistance less than 5 Ω?	Go to step 3.	Repair the harness and connector. <b>NOTE:</b> In this case, repair the following item: <ul style="list-style-type: none"><li>• Open circuit of harness between ECM and engine ground</li><li>• Poor contact of coupling connector</li></ul>
<b>3 CHECK INPUT VOLTAGE OF ECM.</b> 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground. <b>Connector &amp; terminal</b> <i>(B135) No. 5 (+) — Chassis ground (-):</i> <i>(B135) No. 19 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Go to step 4.	Repair the open or ground short circuit of harness of power supply circuit.
<b>4 CHECK INPUT VOLTAGE OF MAIN RELAY.</b> Measure the voltage between main relay connector and chassis ground. <b>Connector &amp; terminal</b> <i>(B220) No. 21 (+) — Chassis ground (-):</i> <i>(B220) No. 23 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Go to step 5.	Repair the open or ground short circuit of harness of power supply circuit.
<b>5 CHECK INPUT VOLTAGE OF ECM.</b> 1) Turn the ignition switch to OFF. 2) Install the main relay. 3) Measure the voltage between ECM and chassis ground. <b>Connector &amp; terminal</b> <i>(B136) No. 23 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Go to step 6.	Repair the open or ground short circuit of harness between ECM and main relay connector.
<b>6 CHECK INPUT VOLTAGE OF ECM.</b> 1) Turn the ignition switch to OFF. 2) Connect the connector to ECM. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground. <b>Connector &amp; terminal</b> <i>(B134) No. 7 (+) — Chassis ground (-):</i> <i>(B135) No. 2 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Check ignition control system. <Ref. to EN(H4DOTC)(diag)-77, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Repair the harness and connector. <b>NOTE:</b> In this case, repair the following item: <ul style="list-style-type: none"><li>• Open circuit in harness between ECM and main relay connector</li><li>• Poor contact of main relay connector</li><li>• Poor contact of ECM connector</li></ul>

## D: IGNITION CONTROL SYSTEM

### CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-56, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-45, PROCEDURE, Inspection Mode.>.

### WIRING DIAGRAM:



EN-06132

Step	Check	Yes	No
1 <b>CHECK SPARK PLUG CONDITION.</b> 1) Remove the spark plug. <Ref. to IG(H4DOTC)-4, REMOVAL, Spark Plug.> 2) Check the spark plug condition. <Ref. to IG(H4DOTC)-5, INSPECTION, Spark Plug.>	Is the spark plug condition normal?	Go to step 2.	Replace the spark plug. <Ref. to IG(H4DOTC)-4, Spark Plug.>

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Step	Check	Yes	No
<b>2 CHECK IGNITION SYSTEM FOR SPARKS.</b> 1) Connect the spark plug to ignition coil. 2) Release the fuel pressure. <Ref. to FU(H4DOTC)-59, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.> 3) Contact the spark plug thread portion to engine. 4) While opening the throttle valve fully, crank the engine to check that spark occurs at each cylinder.	Does spark occur at each cylinder?	Check fuel pump system. <Ref. to EN(H4DOTC)(diag)-80, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step 3.
<b>3 CHECK IGNITION COIL POWER SUPPLY CIRCUIT.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ignition coil. 3) Turn the ignition switch to ON. 4) Measure the power supply voltage between ignition coil connector and engine ground. <b>Connector &amp; terminal</b> <i>(E31) No. 3 (+) — Engine ground (-):</i> <i>(E32) No. 3 (+) — Engine ground (-):</i> <i>(E33) No. 3 (+) — Engine ground (-):</i> <i>(E34) No. 3 (+) — Engine ground (-):</i>	Is the voltage 10 V or more?	Go to step 4.	Repair the harness and connector. <b>NOTE:</b> In this case, repair the following item: <ul style="list-style-type: none"><li>• Open or ground short circuit of power supply circuit</li><li>• Poor contact of coupling connector</li><li>• Blown out of fuse</li></ul>
<b>4 CHECK HARNESS OF IGNITION COIL GROUND CIRCUIT.</b> 1) Turn the ignition switch to OFF. 2) Measure the resistance between ECM and ignition coil connector. <b>Connector &amp; terminal</b> <i>(E31) No. 2 — (B137) No. 6:</i> <i>(E32) No. 2 — (B137) No. 6:</i> <i>(E33) No. 2 — (B137) No. 6:</i> <i>(E34) No. 2 — (B137) No. 6:</i> <i>(E31) No. 2 — (B137) No. 26:</i> <i>(E32) No. 2 — (B137) No. 26:</i> <i>(E33) No. 2 — (B137) No. 26:</i> <i>(E34) No. 2 — (B137) No. 26:</i>	Is the resistance less than 1 $\Omega$ ?	Go to step 5.	Repair the harness and connector. <b>NOTE:</b> In this case, repair the following item: <ul style="list-style-type: none"><li>• Open circuit of harness between ECM and ignition coil connector</li><li>• Poor contact of coupling connector</li></ul>
<b>5 CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and ignition coil. 3) Measure the resistance of harness between ECM and ignition coil connector. <b>Connector &amp; terminal</b> <i>(B137) No. 18 — (E31) No. 1:</i> <i>(B137) No. 19 — (E32) No. 1:</i> <i>(B137) No. 20 — (E33) No. 1:</i> <i>(B137) No. 21 — (E34) No. 1:</i>	Is the resistance less than 1 $\Omega$ ?	Go to step 6.	Repair the harness and connector. <b>NOTE:</b> In this case, repair the following item: <ul style="list-style-type: none"><li>• Open circuit of harness between ECM and ignition coil connector</li><li>• Poor contact of coupling connector</li></ul>
<b>6 CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR.</b> Measure the resistance of harness between ECM and engine ground. <b>Connector &amp; terminal</b> <i>(B137) No. 18 — Engine ground:</i> <i>(B137) No. 19 — Engine ground:</i> <i>(B137) No. 20 — Engine ground:</i> <i>(B137) No. 21 — Engine ground:</i>	Is the resistance 1 $M\Omega$ or more?	Go to step 7.	Repair the ground short circuit of harness between ECM and ignition coil connector.

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Step	Check	Yes	No
7 <b>CHECK FOR POOR CONTACT.</b> Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Replace the ignition coil. <Ref. to IG(H4DOTC)-6, Ignition Coil.>

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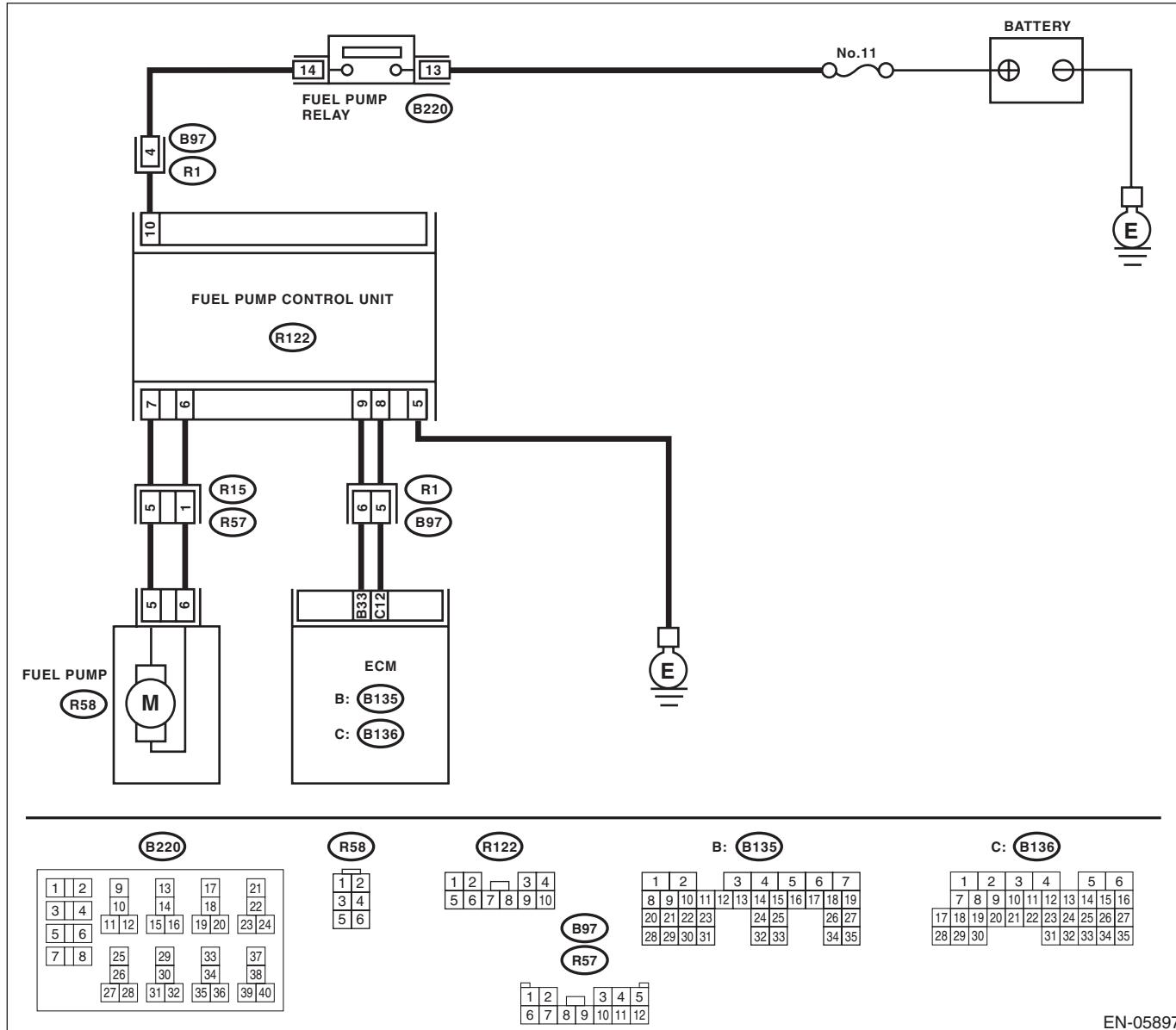
## ENGINE (DIAGNOSTICS)

### E: FUEL PUMP CIRCUIT

#### CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-56, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-45, PROCEDURE, Inspection Mode.>.

#### WIRING DIAGRAM:



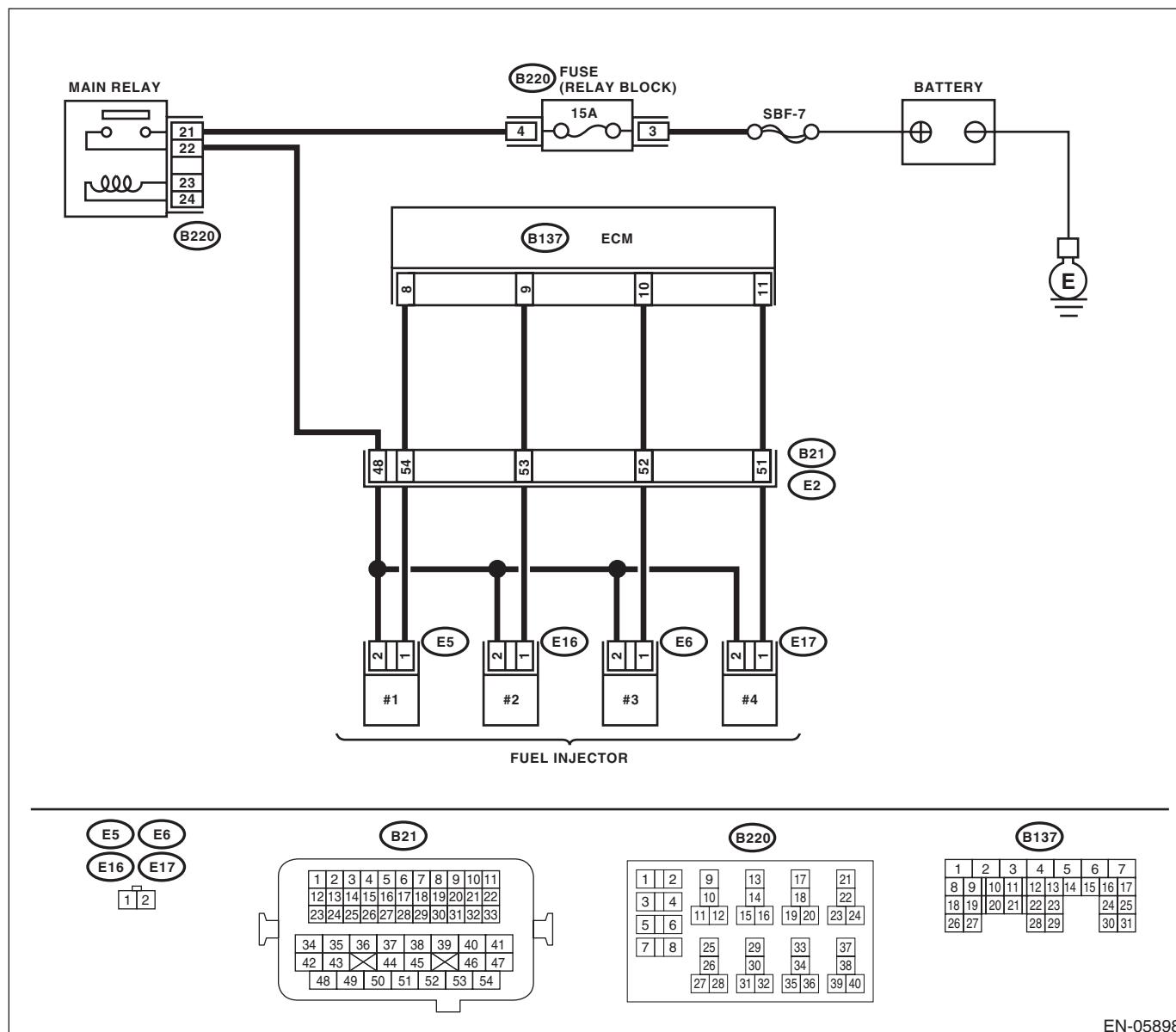
Step	Check	Yes	No
1 <b>CHECK OPERATING SOUND OF FUEL PUMP.</b> Make sure that the fuel pump operates for two seconds when turning the ignition switch to ON. NOTE: Fuel pump operation can be executed using the Subaru Select Monitor. For the procedures, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4DOTC)(diag)-57, Compulsory Valve Operation Check Mode.>	Does the fuel pump emit operating sound?	Check the fuel injector circuit. <Ref. to EN(H4DOTC)(diag)-81, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>	Display the DTC. <Ref. to EN(H4DOTC)(diag)-44, OPERATION, Read Diagnostic Trouble Code (DTC).>

## F: FUEL INJECTOR CIRCUIT

**CAUTION:**

- Check or repair only faulty parts.
- After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-56, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-45, PROCEDURE, Inspection Mode.>.

## WIRING DIAGRAM:



Step	Check	Yes	No
<b>1 CHECK OPERATION OF EACH FUEL INJECTOR.</b> While cranking the engine, check each fuel injector emits operating sound. Use a sound scope or attach a screwdriver to the injector for this check.	Does the fuel injector emit operating sound?	Check the fuel pressure. <Ref. to ME(H4DOTC)-26, INSPECTION, Fuel Pressure.>	Go to step 2.

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Step	Check	Yes	No
<b>2 CHECK POWER SUPPLY TO EACH FUEL INJECTOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector. 3) Turn the ignition switch to ON. 4) Measure the power supply voltage between fuel injector connector and the engine ground.  <i>Connector &amp; terminal</i> <b>#1 (E5) No. 2 (+) — Engine ground (-):</b> <b>#2 (E16) No. 2 (+) — Engine ground (-):</b> <b>#3 (E6) No. 2 (+) — Engine ground (-):</b> <b>#4 (E17) No. 2 (+) — Engine ground (-):</b>	Is the voltage 10 V or more?	Go to step 3.	Repair the harness and connector.  NOTE: In this case, repair the following item: <ul style="list-style-type: none"><li>• Open circuit in harness between main relay connector and fuel injector connector</li><li>• Poor contact of main relay connector</li><li>• Poor contact of coupling connector</li></ul>
<b>3 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance of harness between ECM and fuel injector connector.  <i>Connector &amp; terminal</i> <b>#1 (B137) No. 8 — (E5) No. 1:</b> <b>#2 (B137) No. 9 — (E16) No. 1:</b> <b>#3 (B137) No. 10 — (E6) No. 1:</b> <b>#4 (B137) No. 11 — (E17) No. 1:</b>	Is the resistance less than 1 $\Omega$ ?	Go to step 4.	Repair the harness and connector.  NOTE: In this case, repair the following item: <ul style="list-style-type: none"><li>• Open circuit in harness between ECM and fuel injector connector</li><li>• Poor contact of coupling connector</li></ul>
<b>4 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.</b> Measure the resistance of harness between ECM and chassis ground.  <i>Connector &amp; terminal</i> <b>#1 (B137) No. 8 — Chassis ground:</b> <b>#2 (B137) No. 9 — Chassis ground:</b> <b>#3 (B137) No. 10 — Chassis ground:</b> <b>#4 (B137) No. 11 — Chassis ground:</b>	Is the resistance 1 $M\Omega$ or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM and fuel injector connector.
<b>5 CHECK EACH FUEL INJECTOR.</b> Measure the resistance between each fuel injector terminals.  <i>Terminals</i> <b>No. 1 — No. 2:</b>	Is the resistance 5 — 20 $\Omega$ ?	Go to step 6.	Replace the faulty fuel injector. <Ref. to FU(H4DOTC)-40, Fuel Injector.>
<b>6 CHECK FOR POOR CONTACT.</b> Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Inspection using "General Diagnostic Table". <Ref. to EN(H4DOTC)(diag)-386, INSPECTION, General Diagnostic Table.>