

**17. Diagnostics for Engine Starting Failure****A: PROCEDURE**

1. Inspection of starter motor circuit. <Ref. to EN(H4DOTC)-62, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>
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2. Inspection of ECM power supply and ground line. <Ref. to EN(H4DOTC)-68, CONTROL MODULE POWER SUPPLY AND GROUND LINE, Diagnostics for Engine Starting Failure.>
↓
3. Inspection of ignition control system. <Ref. to EN(H4DOTC)-72, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
↓
4. Inspection of fuel pump circuit. <Ref. to EN(H4DOTC)-76, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>
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5. Inspection of fuel injector circuit. <Ref. to EN(H4DOTC)-78, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>



## **B: STARTER MOTOR CIRCUIT**

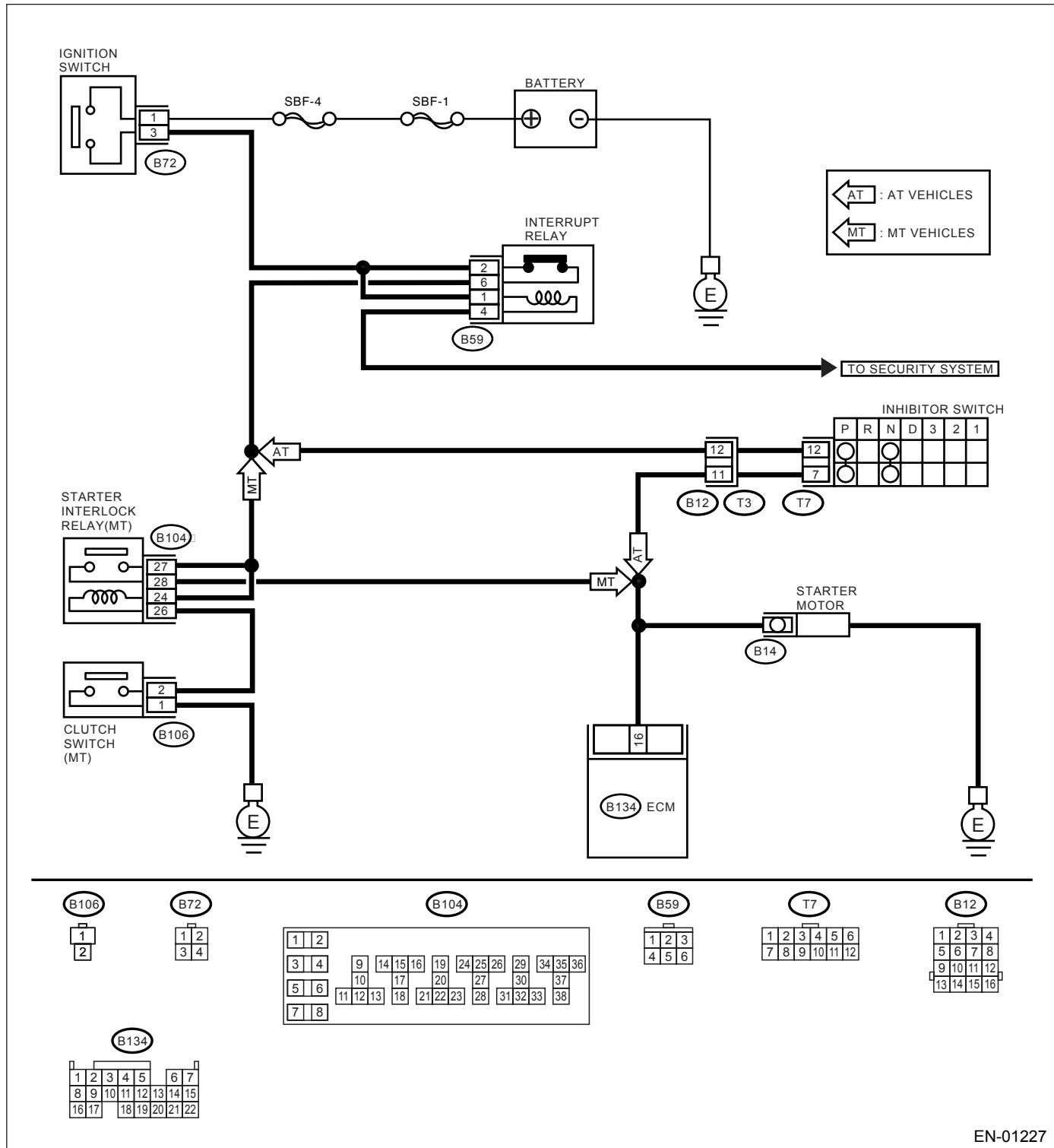
### **CAUTION:**

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(H4DOTC)-49, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN(H4DOTC)-41, Inspection Mode.>.

# DIAGNOSTICS FOR ENGINE STARTING FAILURE

ENGINE (DIAGNOSTICS)

## • WIRING DIAGRAM:



Step	Check	Yes	No
1 <b>CHECK OPERATION OF STARTER MOTOR.</b> Does the starter motor operate when switch is turned to ST?	Starter operates.	Go to step 2.	Go to step 3.

# DIAGNOSTICS FOR ENGINE STARTING FAILURE

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>2 CHECK DTC.</b> Is a DTC displayed?	DTC is displayed.	Inspect the related DTC using "List of Diagnostic Trouble Codes (DTC)". <Ref. to EN(H4DOTC)-81, List of Diagnostic Trouble Codes (DTC).>	Repair poor contact in ECM connector.
<b>3 CHECK INPUT SIGNAL FOR STARTER MOTOR.</b> 1)Turn ignition switch to OFF. 2)Disconnect the connector from starter motor. 3)Turn the ignition switch to ST. 4)Measure the power supply voltage between starter motor connector terminal and engine ground.  <i>Connector &amp; terminal</i> <b>(B14) No. 1 (+) — Engine ground (-):</b> Is the measured value more than the specified value?  NOTE: •On AT vehicles, place the selector lever in the "P" or "N" position. •On MT vehicles, depress the clutch pedal.	10 V	Go to step 4.	Go to step 5.
<b>4 CHECK GROUND CIRCUIT OF STARTER MOTOR.</b> 1)Turn ignition switch to OFF. 2)Disconnect the terminal from starter motor. 3)Measure the resistance of ground cable between ground cable terminal and engine ground.  Is the measured value less than the specified value?	5 Ω	Check the starter motor. <Ref. to SC(H4SO)-7, Starter.>	Repair open circuit of ground cable.
<b>5 CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR.</b> 1)Disconnect the connector from ignition switch. 2)Measure the power supply voltage between ignition switch connector and chassis ground.  <i>Connector &amp; terminal</i> <b>(B72) No. 1 (+) — Chassis ground (-):</b> Is the measured value more than the specified value?	10 V	Go to step 6.	Repair open circuit in harness between ignition switch and battery, and check fuse SBF No. 4 and SBF No. 1.
<b>6 CHECK IGNITION SWITCH.</b> 1)Disconnect the connector from ignition switch. 2)Measure the resistance between ignition switch terminals while turning ignition switch to the "ST" position.  <i>Terminal</i> <b>No. 1 — No. 3:</b> Is the measured value less than the specified value?	5 Ω	Go to step 7.	Replace the ignition switch.
<b>7 CHECK TRANSMISSION TYPE.</b> Is the transmission AT?	AT.	Go to step 8.	Go to step 10.

# DIAGNOSTICS FOR ENGINE STARTING FAILURE

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 <b>CHECK INPUT VOLTAGE OF INHIBITOR SWITCH.</b> 1)Turn ignition switch to OFF. 2)Disconnect the connector from inhibitor switch. 3)Connect the connector to ignition switch. 4)Measure the input voltage between inhibitor switch connector terminal and engine ground while turning ignition switch to ST.  <i>Connector &amp; terminal</i> <b>(B12) No. 12 (+) — Engine ground (-):</b> Is the measured value more than the specified value?	10 V	Go to step 9.  NOTE: Check security system (if equipped). <Ref. to SL-23, Security System.>	Repair open or short circuit to ground in harness between inhibitor switch and ignition switch.
9 <b>CHECK INHIBITOR SWITCH.</b> 1)Place the selector lever in "P" or "N" position. 2)Measure the resistance between inhibitor switch terminals.  <i>Connector &amp; terminal</i> <b>(T3) No. 11 — No. 12:</b> Is the measured value less than the specified value?	1 Ω	Repair open or short circuit to ground in harness between inhibitor switch and starter motor.	Replace the inhibitor switch. <Ref. to AT-48, Inhibitor Switch.>
10 <b>CHECK INPUT VOLTAGE OF STARTER INTERLOCK RELAY.</b> 1)Turn ignition switch to OFF. 2)Disconnect the connector from starter interlock relay. 3)Connect the connector to ignition switch. 4)Measure the input voltage between starter interlock relay connector and chassis ground while turning ignition switch to ST.  <i>Connector &amp; terminal</i> <b>(B104) No. 27 (+) — Chassis ground (-):</b> <b>(B104) No. 24 (+) — Chassis ground (-):</b> Is the measured value more than the specified value?	10 V	Go to step 11.  NOTE: Check security system (if equipped). <Ref. to SL-23, Security System.>	Repair open or short circuit to ground in harness between starter interlock relay and ignition switch.
11 <b>CHECK STARTER INTERLOCK RELAY.</b> 1)Connect the battery to starter interlock relay terminals No. 26 and No. 24. 2)Measure the resistance between starter interlock relay terminals.  <i>Terminal</i> <b>No. 27 — No. 28:</b> Is the measured value less than the specified value?	1 Ω	Go to step 12.	Replace the starter interlock relay.
12 <b>CHECK GROUND CIRCUIT OF CLUTCH SWITCH.</b> 1)Disconnect the connector from clutch switch. 2)Measure the resistance between clutch switch connector and chassis ground.  <i>Connector &amp; terminal</i> <b>(B106) No. 1 — Chassis ground:</b> Is the measured value less than the specified value?	1 Ω	Go to step 13.	Repair open circuit of ground cable.

# DIAGNOSTICS FOR ENGINE STARTING FAILURE

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
13 <b>CHECK CLUTCH SWITCH.</b> 1)Measure the resistance between clutch switch terminals while depressing the clutch pedal.  <i>Terminal</i> <b>No. 1 — No. 2:</b> Is the measured value less than the specified value?	1 Ω	Go to step 14.	Replace the clutch switch. <Ref. to CL-30, Clutch Switch.>
14 <b>CHECK CLUTCH SWITCH CIRCUIT.</b> 1)Connect the connector to clutch switch. 2)Measure the resistance between starter interlock relay connector and chassis ground while depressing the clutch pedal.  <i>Connector &amp; terminal</i> <b>(B104) No. 26 (+) — Chassis ground:</b> Is the measured value less than the specified value?	1 Ω	Repair short circuit to ground in harness between starter interlock relay and starter motor.	Repair open circuit in harness between starter interlock relay and clutch switch.



## DIAGNOSTICS FOR ENGINE STARTING FAILURE

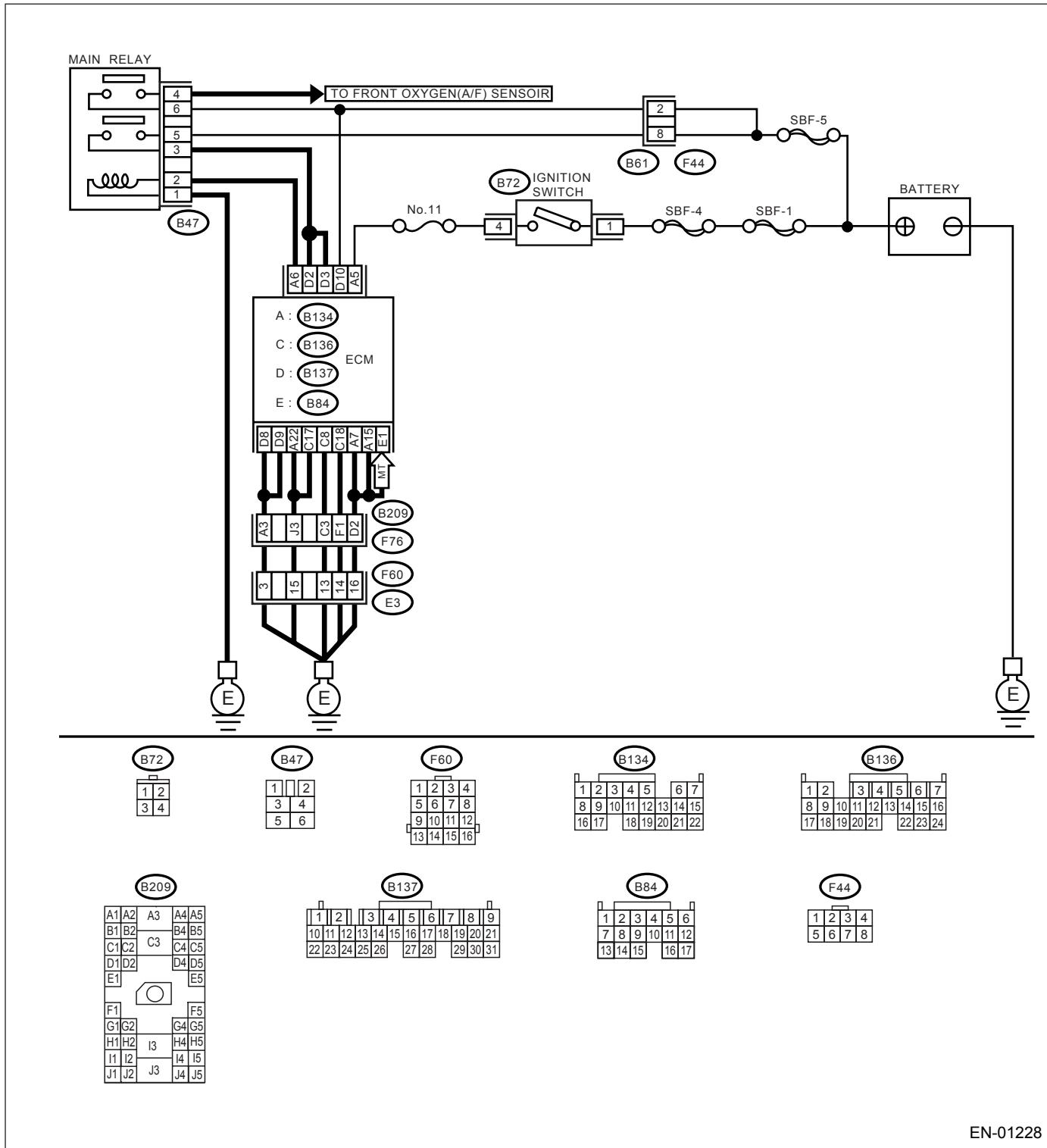
## ENGINE (DIAGNOSTICS)

## C: CONTROL MODULE POWER SUPPLY AND GROUND LINE

## **CAUTION:**

**After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(H4DOTC)-49, Clear Memory Mode. > and INSPECTION MODE <Ref. to EN(H4DOTC)-41, Inspection Mode. >.**

- **WIRING DIAGRAM:**



# DIAGNOSTICS FOR ENGINE STARTING FAILURE

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 <b>CHECK MAIN RELAY.</b> 1)Turn ignition switch to OFF. 2)Remove the main relay. 3)Connect the battery to main relay terminals No. 1 and No. 2. 4)Measure the resistance between main relay terminals.  <b>Terminal</b> <b>No. 3 — No. 5:</b> <b>No. 4 — No. 6:</b> Is the measured value less than the specified value?	10 Ω	Go to step 2.	Replace the main relay.
2 <b>CHECK GROUND CIRCUIT OF ECM.</b> 1)Disconnect the connector from ECM. 2)Measure the resistance of harness between ECM and chassis ground.  <b>Connector &amp; terminal</b> <b>(B134) No. 7 — Chassis ground:</b> <b>(B134) No. 15 — Chassis ground:</b> <b>(B134) No. 22 — Chassis ground:</b> <b>(B136) No. 8 — Chassis ground:</b> <b>(B136) No. 17 — Chassis ground:</b> <b>(B136) No. 18 — Chassis ground:</b> <b>(B137) No. 8 — Chassis ground:</b> <b>(B137) No. 9 — Chassis ground:</b> <b>(B84) No. 1 — Chassis ground:</b> Is the measured value less than the specified value?	5 Ω	Go to step 3.	Repair open circuit in harness between ECM connector and engine grounding terminal.
3 <b>CHECK INPUT VOLTAGE OF ECM.</b> Measure the voltage between ECM connector and chassis ground.  <b>Connector &amp; terminal</b> <b>(B137) No. 10 (+) — Chassis ground (-):</b> <b>(B134) No. 5 (+) — Chassis ground (-):</b> Is the measured value more than the specified value?	10 V	Go to step 4.	Repair open or short circuit to ground in power supply circuit.
4 <b>CHECK HARNESS BETWEEN ECM AND MAIN RELAY CONNECTOR.</b> 1)Turn ignition switch to OFF. 2)Measure the resistance between ECM and chassis ground.  <b>Connector &amp; terminal</b> <b>(B134) No. 6 — Chassis ground:</b> Is the measured value more than the specified value?	1 MΩ	Go to step 5.	Repair short circuit to ground in harness between ECM connector and main relay connector, then replace the ECM.
5 <b>CHECK OUTPUT VOLTAGE FROM ECM.</b> 1)Connect the connector to ECM. 2)Turn ignition switch to ON. 3)Measure the voltage between ECM connector and chassis ground.  <b>Connector &amp; terminal</b> <b>(B134) No. 6 (+) — Chassis ground (-):</b> Is the measured value more than the specified value?	10 V	Go to step 6.	Replace the ECM. <Ref. to FU(H4DOTC)-50, Engine Control Module.>

# DIAGNOSTICS FOR ENGINE STARTING FAILURE

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 <b>CHECK INPUT VOLTAGE OF MAIN RELAY.</b> Check the voltage between main relay connector and chassis ground. <b>Connector &amp; terminal</b> <b>(B47) No. 2 (+) — Chassis ground (-):</b> Is the measured value more than the specified value?	10 V	Go to step 7.	Repair open circuit in harness between ECM connector and main relay connector.
7 <b>CHECK GROUND CIRCUIT OF MAIN RELAY.</b> 1)Turn ignition switch to OFF. 2)Measure the resistance between main relay connector and chassis ground. <b>Connector &amp; terminal</b> <b>(B47) No. 1 — Chassis ground:</b> Is the measured value less than the specified value?	5 Ω	Go to step 8.	Repair open circuit between main relay and chassis ground.
8 <b>CHECK INPUT VOLTAGE OF MAIN RELAY.</b> Check the voltage between main relay connector and chassis ground. <b>Connector &amp; terminal</b> <b>(B47) No. 5 (+) — Chassis ground (-):</b> <b>(B47) No. 6 (+) — Chassis ground (-):</b> Is the measured value more than the specified value?	10 V	Go to step 9.	Repair open or short circuit to ground in harness of power supply circuit.
9 <b>CHECK INPUT VOLTAGE OF ECM.</b> 1)Connect the main relay connector. 2)Turn ignition switch to ON. 3)Measure the voltage between ECM connector and chassis ground. <b>Connector &amp; terminal</b> <b>(B137) No. 2 (+) — Chassis ground (-):</b> <b>(B137) No. 3 (+) — Chassis ground (-):</b> Is the measured value more than the specified value?	10 V	Check ignition control system. <Ref. to EN(H4DOTC)-72, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Repair open or short circuit to ground in harness between ECM connector and main relay connector.



# DIAGNOSTICS FOR ENGINE STARTING FAILURE

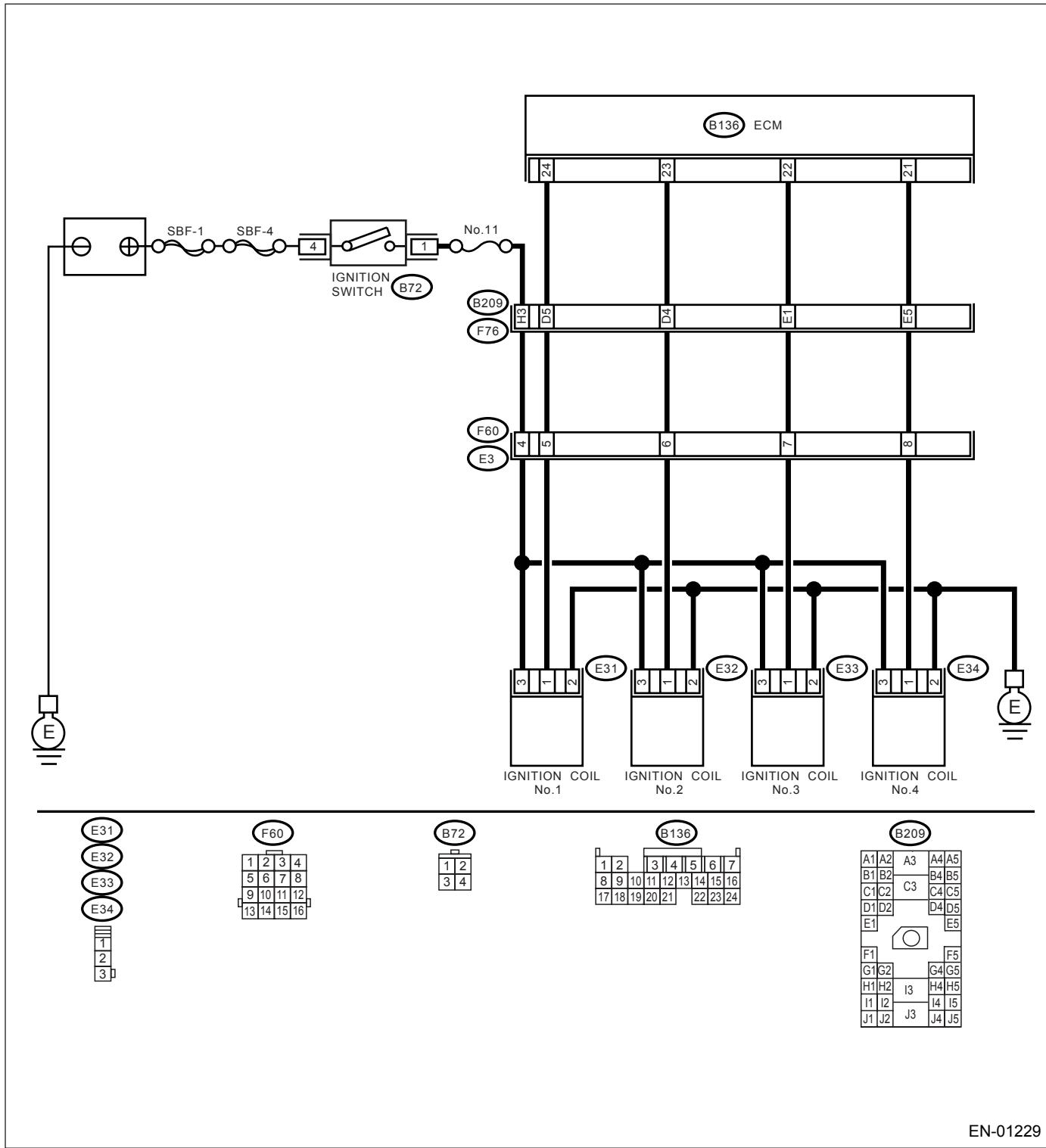
## ENGINE (DIAGNOSTICS)

### D: IGNITION CONTROL SYSTEM

#### CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(H4DOTC)-49, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN(H4DOTC)-41, Inspection Mode.>.

#### • WIRING DIAGRAM:



EN-01229

# DIAGNOSTICS FOR ENGINE STARTING FAILURE

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 <b>CHECK SPARK PLUG CONDITION.</b> 1)Remove the spark plug. <Ref. to IG(H4DOTC)-5, INSTALLATION, Spark Plug.> 2)Check the condition of the spark plug. <Ref. to IG(H4DOTC)-6, INSPECTION, Spark Plug.> Is the spark plug's condition OK?	OK.	Go to step 2.	Replace the spark plug.
2 <b>CHECK IGNITION SYSTEM FOR SPARKS.</b> 1)Connect the spark plug to ignition coil. 2)Lower the fuel pressure. <Ref. to FU(H4DOTC)-54, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.> 3)Bring the spark plug's threaded portion in contact with the engine. 4)With the throttle wide open, crank the engine to check that sparks are generated at each cylinder. Are sparks generated at each cylinder?	Sparks are generated.	Check fuel pump system. <Ref. to EN(H4DOTC)-76, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step 3.
3 <b>CHECK POWER SUPPLY CIRCUIT FOR IGNITION COIL &amp; IGNITOR ASSEMBLY.</b> 1)Turn ignition switch to OFF. 2)Disconnect the connector from ignition coil & ignitor assembly. 3)Turn ignition switch to ON. 4)Measure the power supply voltage between ignition coil & ignitor assembly connector and engine ground. <b>Connector &amp; terminal</b> <b>(E31) No. 3 (+) — Engine ground (-):</b> <b>(E32) No. 3 (+) — Engine ground (-):</b> <b>(E33) No. 3 (+) — Engine ground (-):</b> <b>(E34) No. 3 (+) — Engine ground (-):</b> Is the measured value more than the specified value?	10 V	Go to step 4.	Repair harness and connector. <b>NOTE:</b> In this case, repair the following: <ul style="list-style-type: none"><li>• Open circuit in harness between ignition coil &amp; ignitor assembly, and ignition switch connector</li><li>• Poor contact in coupling connector</li></ul>
4 <b>CHECK HARNESS OF IGNITION COIL &amp; IGNITOR ASSEMBLY GROUND CIRCUIT.</b> 1)Turn ignition switch to OFF. 2)Measure the resistance between ignition coil & ignitor assembly connector and engine ground. <b>Connector &amp; terminal</b> <b>(E31) No. 2 — Engine ground:</b> <b>(E32) No. 2 — Engine ground:</b> <b>(E33) No. 2 — Engine ground:</b> <b>(E34) No. 2 — Engine ground:</b> Is the measured value less than the specified value?	5 Ω	Go to step 5.	Repair harness and connector. <b>NOTE:</b> In this case, repair the following: <ul style="list-style-type: none"><li>• Open circuit in harness between ignition coil &amp; ignitor assembly connector and engine grounding terminal</li></ul>

# DIAGNOSTICS FOR ENGINE STARTING FAILURE

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 <b>CHECK HARNESS BETWEEN ECM AND IGNITION COIL &amp; IGNITOR ASSEMBLY CONNECTOR.</b> 1) Turn ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Disconnect the connector from ignition coil & ignitor assembly. 4) Measure the resistance of harness between ECM and ignition coil & ignitor assembly connector.  <b>Connector &amp; terminal</b> <i>(B136) No. 21 — (E34) No. 1: (B136) No. 22 — (E33) No. 1: (B136) No. 23 — (E32) No. 1: (B136) No. 24 — (E31) No. 1:</i>  Is the measured value less than the specified value?	1 Ω	Go to step 6.	Repair harness and connector.  NOTE: In this case, repair the following: <ul style="list-style-type: none"><li>• Open circuit in harness between ECM and ignition coil &amp; ignitor assembly connector</li><li>• Poor contact in coupling connector</li></ul>
6 <b>CHECK HARNESS BETWEEN ECM AND IGNITION COIL &amp; IGNITOR ASSEMBLY CONNECTOR.</b> Measure the resistance of harness between ECM and engine ground.  <b>Connector &amp; terminal</b> <i>(B136) No. 21 — Engine ground: (B136) No. 22 — Engine ground: (B136) No. 23 — Engine ground: (B136) No. 24 — Engine ground:</i>  Is the measured value more than the specified value?	1 MΩ	Go to step 7.	Repair short circuit to ground in harness between ECM and ignition coil & ignitor assembly connector.
7 <b>CHECK FOR POOR CONTACT.</b> Check for poor contact in ECM connector. Is there poor contact in ECM connector?	There is poor contact.	Repair poor contact in ECM connector.	Replace the ignition coil & ignitor assembly.



## DIAGNOSTICS FOR ENGINE STARTING FAILURE

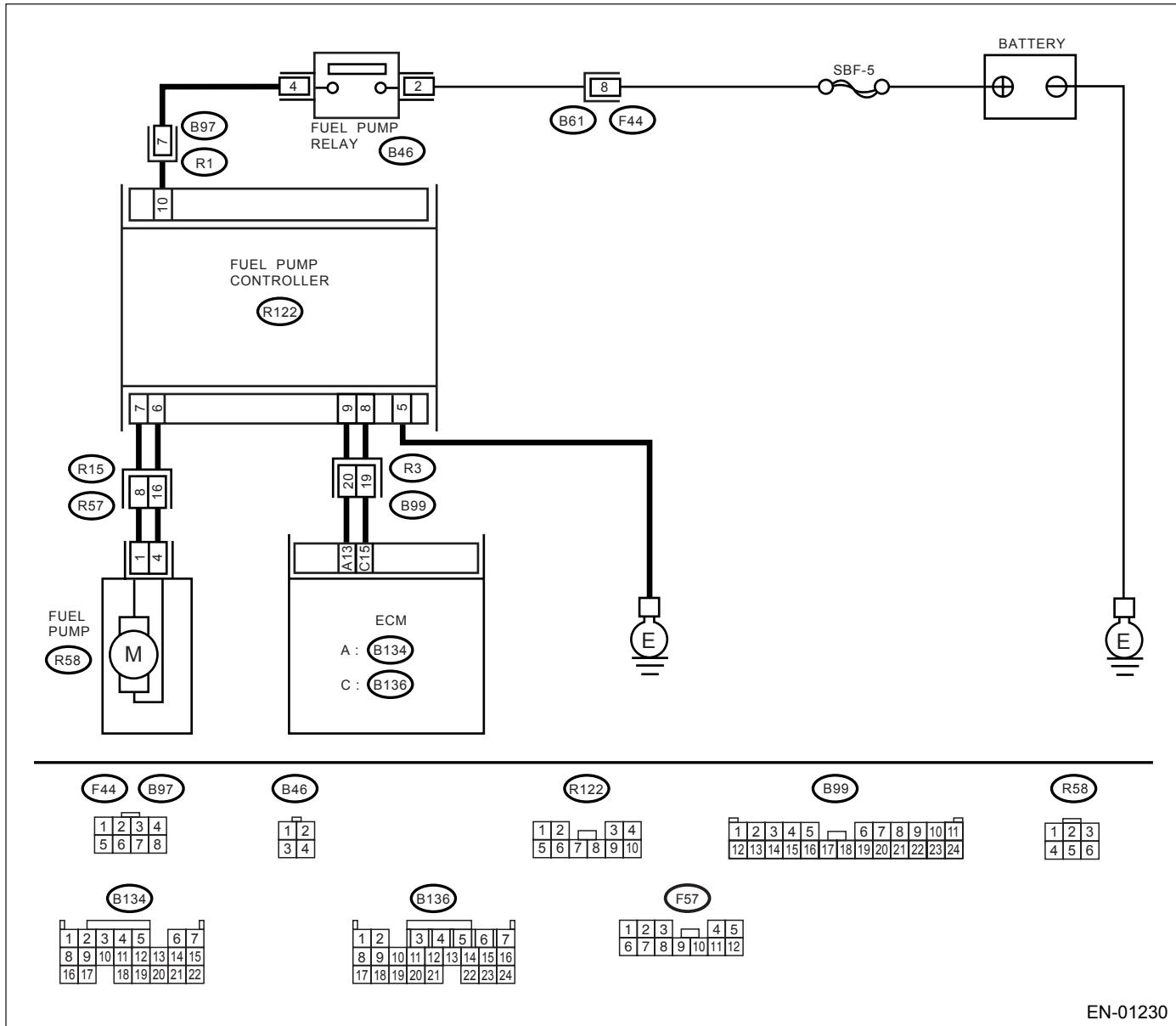
## ENGINE (DIAGNOSTICS)

## **E: FUEL PUMP CIRCUIT**

## **CAUTION:**

**After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(H4DOTC)-49, Clear Memory Mode. > and INSPECTION MODE <Ref. to EN(H4DOTC)-41, Inspection Mode. >.**

- **WIRING DIAGRAM:**



## DIAGNOSTICS FOR ENGINE STARTING FAILURE

### ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>1 CHECK OPERATING SOUND OF FUEL PUMP.</b> Make sure that the fuel pump operates for two seconds when the ignition switch is tuned to ON.  NOTE: Fuel pump operation can also be executed using Subaru Select Monitor. For the procedure, refer to Compulsory Valve Operation Check Mode. <Ref. to EN(H4DOTC)-50, Compulsory Valve Operation Check Mode.>  Does the fuel pump produce an operating sound?	Operating sound is produced.	Check fuel injector circuit. <Ref. to EN(H4DOTC)-78, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>	Read diagnostic trouble code (DTC). <Ref. to EN(H4DOTC)-40, OPERATION, Read Diagnostic Trouble Code.>

## DIAGNOSTICS FOR ENGINE STARTING FAILURE

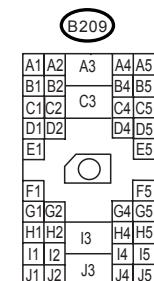
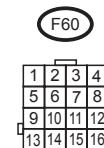
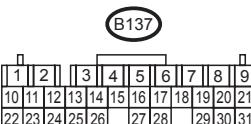
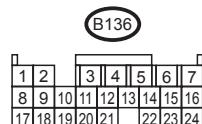
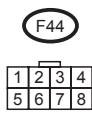
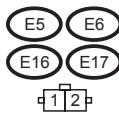
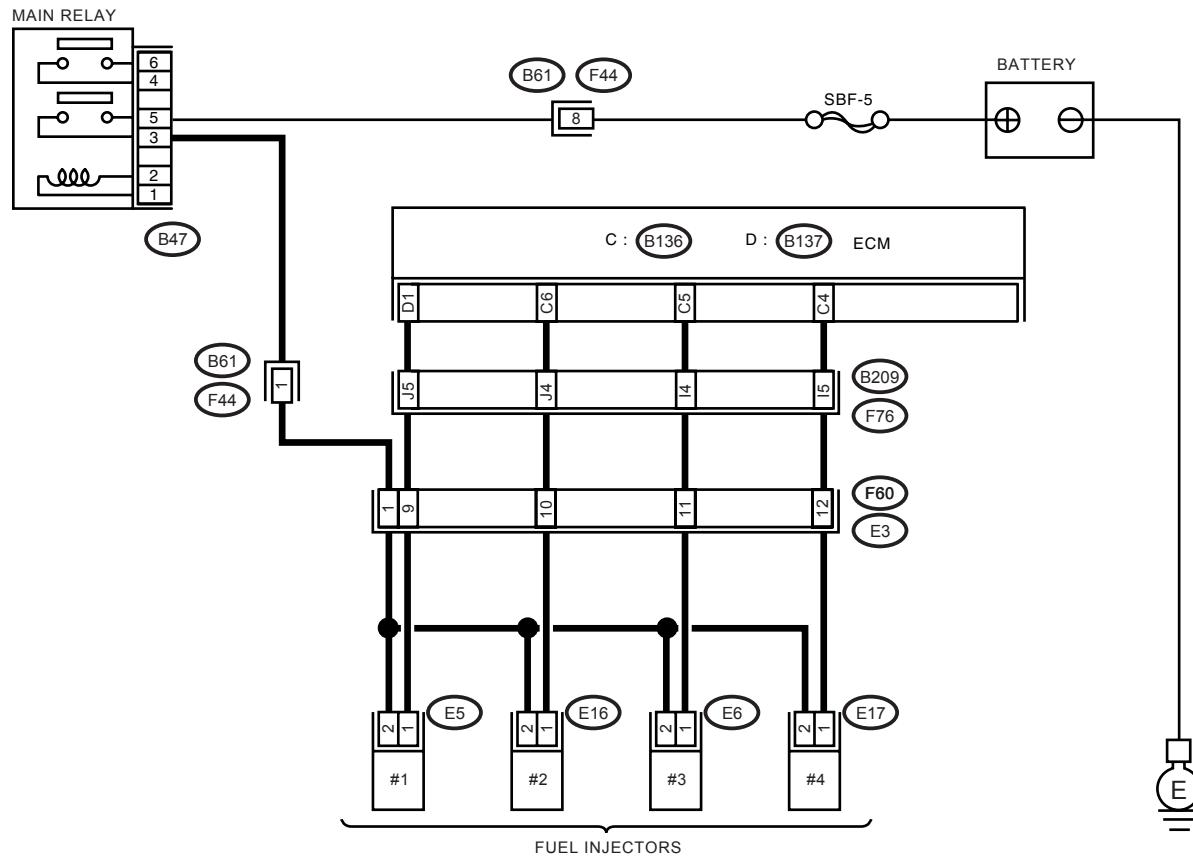
## ENGINE (DIAGNOSTICS)

## F: FUEL INJECTOR CIRCUIT

## **CAUTION:**

- Check or repair only faulty parts.
- After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(H4DOTC)-49, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN(H4DOTC)-41, Inspection Mode.>.
- **WIRING DIAGRAM:**

1. **What is the primary purpose of the study?**



EN-01231

# DIAGNOSTICS FOR ENGINE STARTING FAILURE

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 <b>CHECK OPERATION OF EACH FUEL INJECTOR.</b>  While cranking the engine, check that each fuel injector emits an operating sound. Use a sound scope or hold a screwdriver against the injector for this check. Does the fuel pump produce an operating sound?	Operating sound is produced.	Check the fuel pressure. <Ref. to ME(H4DOTC)-27, INSPECTION, Fuel Pressure.>	Go to step 2.
2 <b>CHECK POWER SUPPLY TO EACH FUEL INJECTOR.</b>  1)Turn ignition switch to OFF. 2)Disconnect the connector from fuel injector. 3)Turn ignition switch to ON. 4)Measure the power supply voltage between the fuel injector terminal and engine ground.  <b>Connector &amp; terminal</b> <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 measured value more than the specified value?	10 V	Go to step 3.	Repair harness and connector.  NOTE: In this case, repair the following: <ul style="list-style-type: none"><li>• Open circuit in harness between main relay and fuel injector connector</li><li>• Poor contact in main relay connector</li><li>• Poor contact in coupling connector</li><li>• Poor contact in fuel injector connector</li></ul>
3 <b>CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.</b>  1)Disconnect the connector from ECM. 2)Measure the resistance of harness between ECM and fuel injector connector.  <b>Connector &amp; terminal</b> <b>(B137) No. 1 — (E5) No. 1:</b> <b>(B136) No. 6 — (E16) No. 1:</b> <b>(B136) No. 5 — (E6) No. 1:</b> <b>(B136) No. 4 — (E6) No. 1:</b>  Is the measured value less than the specified value?	1 Ω	Go to step 4.	Repair harness and connector.  NOTE: In this case, repair the following: <ul style="list-style-type: none"><li>• Open circuit in harness between ECM and fuel injector connector</li><li>• Poor contact in coupling connector</li></ul>
4 <b>CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.</b>  Measure the resistance of harness between ECM and fuel injector connector.  <b>Connector &amp; terminal</b> <b>(B137) No. 1 — Chassis ground:</b> <b>(B136) No. 6 — Chassis ground:</b> <b>(B136) No. 5 — Chassis ground:</b> <b>(B136) No. 4 — Chassis ground:</b>  Is the measured value less than the specified value?	1 Ω	Repair short circuit to ground in harness between ECM and fuel injector connector.	Go to step 5.
5 <b>CHECK EACH FUEL INJECTOR.</b>  1)Turn ignition switch to OFF. 2)Measure the resistance between each fuel injector terminals.  <b>Terminal</b> <b>No. 1 — No. 2:</b>  Is the measured value within the specified range?	5 — 20 Ω	Go to step 6.	Replace the faulty fuel injector.

## DIAGNOSTICS FOR ENGINE STARTING FAILURE

### ENGINE (DIAGNOSTICS)

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Step	Check	Yes	No
<b>6 CHECK FOR POOR CONTACT.</b> Check for poor contact in ECM connector. Is there poor contact in ECM connector?	There is poor contact.	Repair poor contact in ECM connector.	Inspection using "General Diagnostic Table". <Ref. to EN(H4DOTC)-390, INSPECTION, General Diagnostic Table.>