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1993 MAZDA MX-6 OEM Service and Repair Workshop Manual

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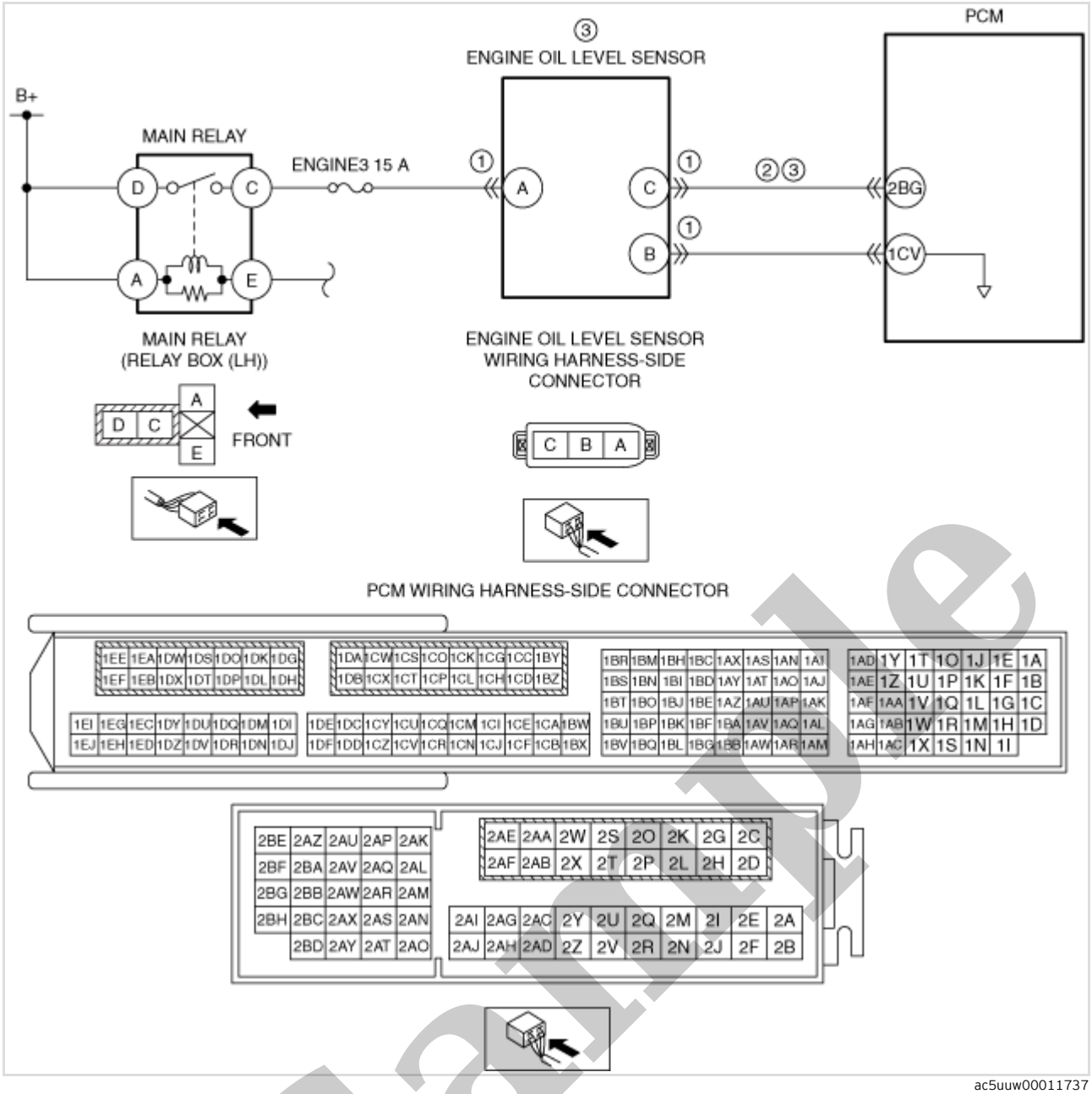
STEP	INSPECTION	RESULTS	ACTION
6	**INSPECT FUEL TANK PRESSURE SENSOR SIGNAL CIRCUIT AND GROUND CIRCUIT FOR SHORT TO EACH OTHER** • Verify that the fuel tank pressure sensor and PCM connectors are disconnected. • Inspect for continuity between fuel tank pressure sensor terminals C and B (wiring harness-side). • Is there continuity?	Yes	Refer to the wiring diagram and verify whether or not there is a common connector between the following terminals: • Fuel tank pressure sensor terminal C—PCM terminal 2M • Fuel tank pressure sensor terminal B—PCM terminal 2V **If there is a common connector:** • Determine the malfunctioning part by inspecting the common connector and the terminal for corrosion, damage, or pin disconnection, and the common wiring harness for a short to each other. • Repair or replace the malfunctioning part. **If there is no common connector:** • Repair or replace the wiring harness which has a short to each other. Go to Step 9.
		No	Go to the next step.
7	**INSPECT FUEL TANK PRESSURE SENSOR CIRCUIT FOR OPEN CIRCUIT** • Verify that the fuel tank pressure sensor and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — Fuel tank pressure sensor terminal A—PCM terminal 2Y — Fuel tank pressure sensor terminal C—PCM terminal 2M • Is there continuity?	Yes	Go to the next step.
		No	Refer to the wiring diagram and verify whether or not there is a common connector between the following terminals: • Fuel tank pressure sensor terminal A—PCM terminal 2Y • Fuel tank pressure sensor terminal C—PCM terminal 2M **If there is a common connector:** • Determine the malfunctioning part by inspecting the common connector and the terminal for corrosion, damage, or pin disconnection, and the common wiring harness for an open circuit. • Repair or replace the malfunctioning part. **If there is no common connector:** • Repair or replace the wiring harness which has an open circuit. Go to Step 9.
8	**INSPECT FUEL TANK PRESSURE SENSOR** • Inspect the fuel tank pressure sensor. (See FUEL TANK PRESSURE SENSOR INSPECTION [SKYACTIV-G 2.5T].) • Is there any malfunction?	Yes	Replace the charcoal canister, then go to the next step. (See CHARCOAL CANISTER REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].)
		No	Go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Always reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See CLEARING DTC [PCM (SKYACTIV-G 2.5T)].) • Perform the KOEO or KOER self test. (See KOEO/KOER SELF TEST [PCM (SKYACTIV-G 2.5T)].) • Is the same Pending DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].) Go to the next step.
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the "AFTER REPAIR PROCEDURE". (See AFTER REPAIR PROCEDURE [PCM (SKYACTIV-G 2.5T)].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5T)].)
		No	DTC troubleshooting completed.

STEP	INSPECTION	RESULTS	ACTION
3	VERIFY RELATED PENDING CODE AND/OR DTC • Switch the ignition off, then ON (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5T)].) • Is the PENDING CODE/DTC P0302:00 also present?	Yes	Go to the applicable PENDING CODE or DTC inspection. (See DTC P0301:00, P0302:00, P0303:00, P0304:00 [PCM (SKYACTIV-G 2.5T)].)
		No	Go to the next step.
4	INSPECT IGNITION COIL/ION SENSOR No.2 CONNECTOR CONDITION • Switch the ignition off. • Disconnect the ignition coil/ion sensor No.2 connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 12.
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
9	**INSPECT ION SENSOR No.2 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • Verify that the ignition coil/ion sensor No.2 and PCM connectors are disconnected. • Switch the ignition ON (engine off). **Note** **• Another DTC may be stored by the PCM detecting an open circuit.** • Measure the voltage at the ignition coil/ion sensor No.2 terminal C (wiring harness-side). • Is the voltage 0 V?	Yes	Go to the next step.
		No	Refer to the wiring diagram and verify whether or not there is a common connector between ignition coil/ion sensor No.2 terminal C and PCM terminal 1AV. **If there is a common connector:** • Determine the malfunctioning part by inspecting the common connector and the terminal for corrosion, damage, or pin disconnection, and the common wiring harness for a short to power supply. • Repair or replace the malfunctioning part. **If there is no common connector:** • Repair or replace the wiring harness which has a short to power supply. Go to Step 12.
10	**INSPECT ION SENSOR No.2 SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Verify that the ignition coil/ion sensor No.2 and PCM connectors are disconnected. • Switch the ignition off. • Inspect for continuity between ignition coil/ion sensor No.2 terminal C (wiring harness-side) and PCM terminal 1AV (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Refer to the wiring diagram and verify whether or not there is a common connector between ignition coil/ion sensor No.2 terminal C and PCM terminal 1AV. **If there is a common connector:** • Determine the malfunctioning part by inspecting the common connector and the terminal for corrosion, damage, or pin disconnection, and the common wiring harness for an open circuit. • Repair or replace the malfunctioning part. **If there is no common connector:** • Repair or replace the wiring harness which has an open circuit. Go to Step 12.
11	**INSPECT ION SENSOR No.2** • Inspect the ion sensor No.2. (See ION SENSOR INSPECTION [SKYACTIV-G 2.5T].) • Is there any malfunction?	Yes	Replace the ignition coil/ion sensor No.2, then go to the next step. (See IGNITION COIL/ION SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].)
		No	Go to the next step.
12	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Always reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See CLEARING DTC [PCM (SKYACTIV-G 2.5T)].) • Perform the KOER self test. (See KOEO/KOER SELF TEST [PCM (SKYACTIV-G 2.5T)].) • Is the same Pending DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].) Go to the next step.
		No	Go to the next step.
13	**VERIFY AFTER REPAIR PROCEDURE** • Perform the "AFTER REPAIR PROCEDURE". (See AFTER REPAIR PROCEDURE [PCM (SKYACTIV-G 2.5T)].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5T)].)
		No	DTC troubleshooting completed.

STEP	INSPECTION	RESULTS	ACTION
3	VERIFY RELATED PENDING CODE AND/OR DTC • Switch the ignition off, then ON (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5T)].) • Is the PENDING CODE/DTC P0303:00 also present?	Yes	Go to the applicable PENDING CODE or DTC inspection. (See DTC P0301:00, P0302:00, P0303:00, P0304:00 [PCM (SKYACTIV-G 2.5T)].)
		No	Go to the next step.
4	INSPECT IGNITION COIL/ION SENSOR No.3 CONNECTOR CONDITION • Switch the ignition off. • Disconnect the ignition coil/ion sensor No.3 connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 12.
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
9	**INSPECT ION SENSOR No.3 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • Verify that the ignition coil/ion sensor No.3 and PCM connectors are disconnected. • Switch the ignition ON (engine off). **Note** **• Another DTC may be stored by the PCM detecting an open circuit.** • Measure the voltage at the ignition coil/ion sensor No.3 terminal C (wiring harness-side). • Is the voltage 0 V?	Yes	Go to the next step.
		No	Refer to the wiring diagram and verify whether or not there is a common connector between ignition coil/ion sensor No.3 terminal C and PCM terminal 1AQ. **If there is a common connector:** • Determine the malfunctioning part by inspecting the common connector and the terminal for corrosion, damage, or pin disconnection, and the common wiring harness for a short to power supply. • Repair or replace the malfunctioning part. **If there is no common connector:** • Repair or replace the wiring harness which has a short to power supply. Go to Step 12.
10	**INSPECT ION SENSOR No.3 SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Verify that the ignition coil/ion sensor No.3 and PCM connectors are disconnected. • Switch the ignition off. • Inspect for continuity between ignition coil/ion sensor No.3 terminal C (wiring harness-side) and PCM terminal 1AQ (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Refer to the wiring diagram and verify whether or not there is a common connector between ignition coil/ion sensor No.3 terminal C and PCM terminal 1AQ. **If there is a common connector:** • Determine the malfunctioning part by inspecting the common connector and the terminal for corrosion, damage, or pin disconnection, and the common wiring harness for an open circuit. • Repair or replace the malfunctioning part. **If there is no common connector:** • Repair or replace the wiring harness which has an open circuit. Go to Step 12.
11	**INSPECT ION SENSOR No.3** • Inspect the ion sensor No.3. (See ION SENSOR INSPECTION [SKYACTIV-G 2.5T].) • Is there any malfunction?	Yes	Replace the ignition coil/ion sensor No.3, then go to the next step. (See IGNITION COIL/ION SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].)
		No	Go to the next step.
12	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Always reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See CLEARING DTC [PCM (SKYACTIV-G 2.5T)].) • Perform the KOER self test. (See KOEO/KOER SELF TEST [PCM (SKYACTIV-G 2.5T)].) • Is the same Pending DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].) Go to the next step.
		No	Go to the next step.
13	**VERIFY AFTER REPAIR PROCEDURE** • Perform the "AFTER REPAIR PROCEDURE". (See AFTER REPAIR PROCEDURE [PCM (SKYACTIV-G 2.5T)].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5T)].)
		No	DTC troubleshooting completed.



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Function Explanation (DTC Detection Outline)

• The PCM receives the signal from the engine oil level sensor and diagnoses the following malfunctions.

— With an engine oil temperature of −35 °C {−31 °F} or more, the PCM receives an error signal related to the engine oil temperature from the engine oil level sensor continuously for the specified time or more.
— The PCM receives an error signal from the engine oil level sensor continuously for the specified time or more.
— The engine oil level signal of the engine oil level sensor received by the PCM does not change for the specified time or more under the following certain diagnostic conditions.

• The PCM performs diagnosis when each of the preconditions is met during a drive cycle. If any of the above malfunctions is detected a malfunction is determined, DTCs are stored and the engine oil level warning light is turned on.
• The PCM performs diagnosis when each of the preconditions is met during a drive cycle. If any of the above malfunctions is detected a malfunction is determined, DTCs are stored and the master warning light is turned on. (Without multi-information display)
• The PCM performs diagnosis when each of the preconditions is met during a drive cycle. If any of the above malfunctions is detected a malfunction is determined, DTCs are stored and the master warning indication or engine oil level warning indication is displayed on the multi-information display. (With multi-information display)

Repeatability Verification Procedure

1. Start the engine and run it at idle.

STEP	INSPECTION	RESULTS	ACTION
9	PURPOSE: VERIFY IF CAUSE IS ENGINE OIL LEVEL SENSOR STICKING MALFUNCTION • Access the following PID using the M-MDS: (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5T)].) PCM: — OIL_LEVEL • Start the engine while verifying the monitor value with the ignition switched ON (engine off). • Leave for 30 s or more. • Does the monitor value decrease by 7 mm {0.3 in} or more compared to the value with the ignition switched ON (engine off)?	Yes	The cause is an excessive engine oil amount exceeding the measurable range of the engine oil level sensor. Replace the engine oil because there is the possibility that the engine oil is diluted. (See ENGINE OIL REPLACEMENT [SKYACTIV-G 2.5T].) Go to the troubleshooting procedure to perform the procedure from Step 4.
		No	Go to the troubleshooting procedure to perform the procedure from Step 1.

Troubleshooting Diagnostic Procedure

Intention of troubleshooting procedure

• Step 1–3

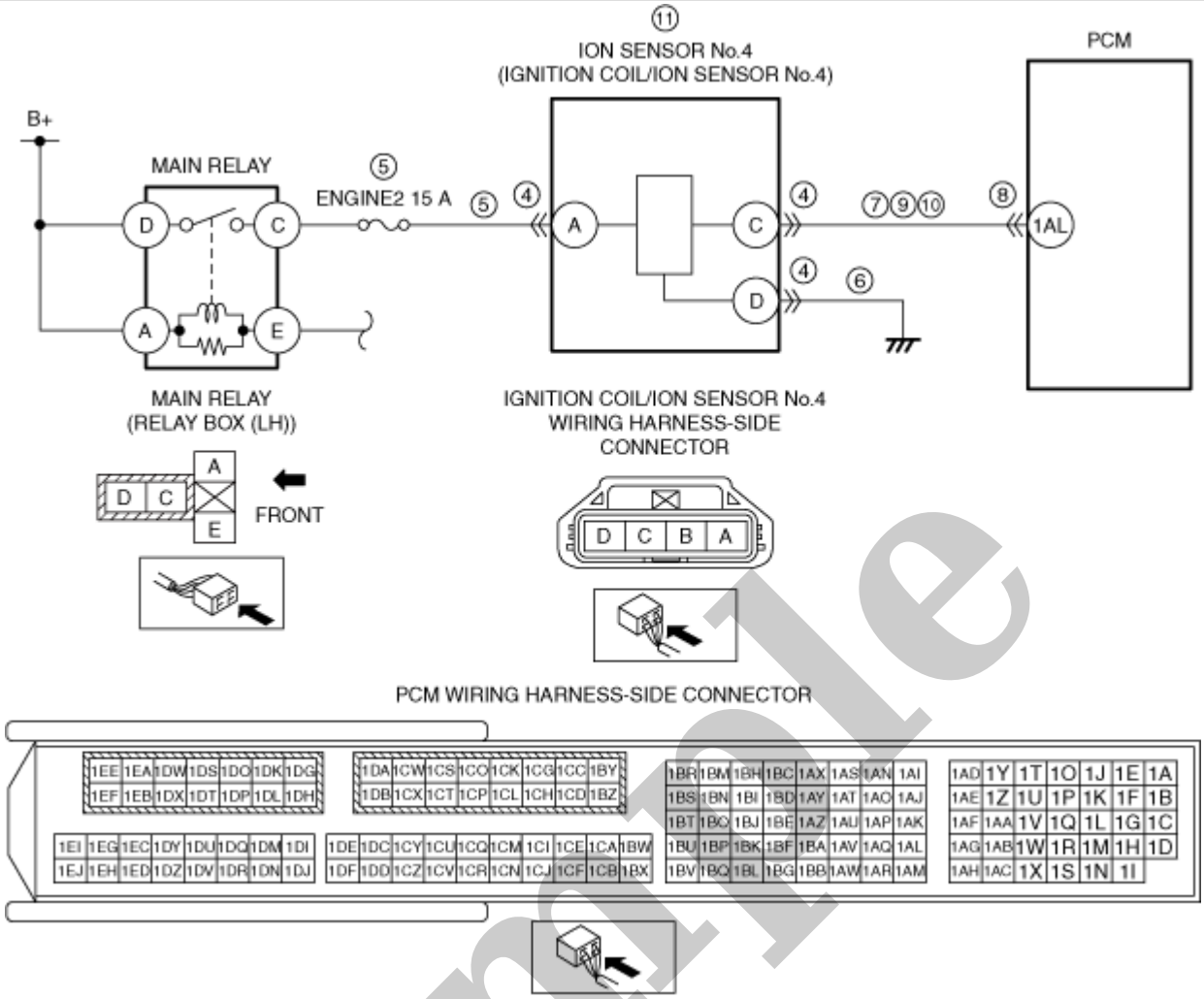
— Perform the LIN communication line inspection.

• Step 4–5

— Verify that the primary malfunction is resolved and there are no other malfunctions.

STEP	INSPECTION	RESULTS	ACTION
1	PURPOSE: INSPECT ENGINE OIL LEVEL SENSOR CONNECTOR CONDITION • Switch the ignition off. • Disconnect the engine oil level sensor connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminals, then go to Step 4.
2	PURPOSE: INSPECT ENGINE OIL LEVEL SENSOR CONTROL CIRCUIT FOR SHORT TO GROUND • Disconnect the PCM connector. • Verify that the engine oil level sensor and PCM connectors are disconnected. • Inspect for continuity between engine oil level sensor terminal C (wiring harness-side) and body ground. • Is there continuity?	Yes	Refer to the wiring diagram and verify whether or not there is a common connector between engine oil level sensor terminal C and PCM terminal 2BG. **If there is a common connector:** • Determine the malfunctioning part by inspecting the common connector and the terminal for corrosion, damage, or pin disconnection, and the common wiring harness for a short to ground. • Repair or replace the malfunctioning part. **If there is no common connector:** • Repair or replace the wiring harness which has a short to ground. Go to Step 4.
		No	Go to the next step.

DTC P2311:00	Ion sensor No.4 circuit problem



Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	RECORD VEHICLE STATUS AT TIME OF DTC DETECTION TO UTILIZE WITH REPEATABILITY VERIFICATION Note • Recording can be facilitated using the screen capture function of the PC. • Record the snapshot data on the repair order.	–	Go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY • Verify related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
6	**INSPECT ION SENSOR No.4 GROUND CIRCUIT FOR OPEN CIRCUIT** • Verify that the ignition coil/ion sensor No.4 connector is disconnected. • Switch the ignition off. • Inspect for continuity between ignition coil/ion sensor No.4 terminal D (wiring harness-side) and body ground. • Is there continuity?	Yes	Go to the next step.
		No	Refer to the wiring diagram and verify whether or not there is a common connector between ignition coil/ion sensor No.4 terminal D and body ground. **If there is a common connector:** • Determine the malfunctioning part by inspecting the common connector and the terminal for corrosion, damage, or pin disconnection, and the common wiring harness for an open circuit. • Repair or replace the malfunctioning part. **If there is no common connector:** • Inspect for the following: — Open circuit between ignition coil/ion sensor No.4 and body ground — Loose or lifting ground point • Repair or replace the malfunctioning part. Go to Step 12.
7	**INSPECT ION SENSOR No.4 SIGNAL CIRCUIT FOR SHORT TO GROUND** • Verify that the ignition coil/ion sensor No.4 connector is disconnected. • Inspect for continuity between ignition coil/ion sensor No.4 terminal C (wiring harness-side) and body ground. • Is there continuity?	Yes	Disconnect the PCM connector and inspect the wiring harness for short to ground. • If the short to ground circuit could be detected in the wiring harness: — Refer to the wiring diagram and verify whether or not there is a common connector between ignition coil/ion sensor No.4 terminal C and PCM terminal 1AL. **If there is a common connector:** • Determine the malfunctioning part by inspecting the common connector and the terminal for corrosion, damage, or pin disconnection, and the common wiring harness for a short to ground. • Repair or replace the malfunctioning part. **If there is no common connector:** • Repair or replace the wiring harness which has a short to ground. • If the short to ground circuit could not be detected in the wiring harness: — Replace the PCM (short to ground in the PCM internal circuit). (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].) Go to Step 12.
		No	Go to the next step.
8	**INSPECT PCM CONNECTOR CONDITION** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 12.
		No	Go to the next step.