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2001 MAZDA MX-5 / Miata OEM Service and Repair Workshop Manual

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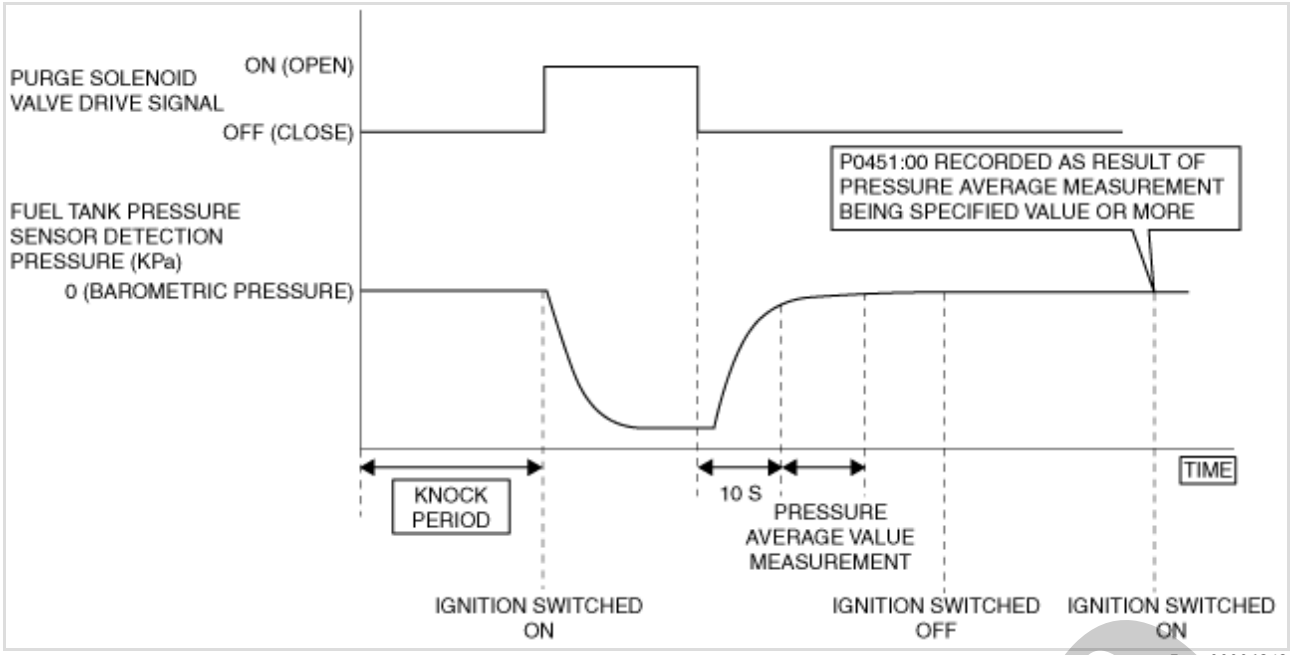


Repeatability Verification Procedure

1. Switch the ignition off.
2. Leave the vehicle for 2 h or more.
3. Start the engine and leave it idling for 1 min.

PID Item/Simulation Item Used In Diagnosis

PID/DATA monitor item table

Item	Definition	Unit	Condition/Specification
AAT	Ambient air temperature	°C, °F	• Displays ambient air temperature
FTP	Fuel tank pressure input from fuel tank	Pa {KPA}, mBar {BAR}, psi, in H20	• Ignition switched ON (engine off): Approx. −23 Pa {−2.3 kgf/m ^{2}, −0.0033 psi} • Idle (after warm up): −282− −46 Pa {−28.7− −4.7 kgf/m ^{2}, −0.0409− −0.0067 psi} • Racing (Engine speed 2,000 rpm): −1.47− −0.869 kPa {−0.0149− −0.0089 kgf/cm ^{2}, −0.213− −0.127 psi} • Racing (Engine speed 4,000 rpm): −1.69− −1.07 kPa {−0.0172− −0.0110 kgf/cm ^{2}, −0.245− −0.156 psi}
	Fuel tank pressure sensor voltage	V	• Ignition switched ON (engine off): Approx. 2.6 V • Idle (after warm up): 2.2−2.62 V • Racing (Engine speed 2,000 rpm): 1.9−1.91 V • Racing (Engine speed 4,000 rpm): 1.73−1.76 V

Function Inspection Using M-MDS

STEP	INSPECTION	RESULTS	ACTION
2	PURPOSE: INSPECTION OF CHARCOAL CANISTER FOR CLOGGING • Inspect for clogging in the charcoal canister. (See CHARCOAL CANISTER INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Replace the charcoal canister, then go to Step 6. (See CHARCOAL CANISTER REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
		No	Go to the next step.
3	PURPOSE: DETERMINE INTEGRITY OF CV SOLENOID VALVE • Inspect the CV solenoid valve. (See CANISTER VENT (CV) SOLENOID VALVE INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Replace the CV solenoid valve, then go to Step 6. (See CANISTER VENT (CV) SOLENOID VALVE REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
		No	Go to the next step.
4	PURPOSE: INSPECTION OF EVAPORATIVE HOSE FOR BREAKAGE OR CLOGGING • Inspect for breakage or clogging in the evaporative hose (hose between CV solenoid valve and atmosphere). • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 6.
		No	Go to the next step.
5	PURPOSE: DETERMINE INTEGRITY OF FUEL TANK PRESSURE SENSOR • Inspect the fuel tank pressure sensor. (See FUEL TANK PRESSURE SENSOR INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Replace the charcoal canister, then go to the next step. (See CHARCOAL CANISTER REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
		No	Go to the next step.
6	PURPOSE: VERIFICATION OF VEHICLE REPAIR COMPLETION • Reconnect all the removed parts. • Clear the DTC from the PCM memory using the M-MDS. (See CLEARING DTC [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Implement the repeatability verification procedure. (See Repeatability Verification Procedure.) • Perform the Pending Trouble Code Access Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Is the PENDING CODE for this DTC present?	Yes	Repeat the inspection from Step 1 of the troubleshooting diagnostic procedure. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) Go to the next step.
		No	Go to the next step.
7	PURPOSE: VERIFY IF THERE IS ANY OTHER MALFUNCTION • Is any other DTC or pending code stored?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)
		No	DTC troubleshooting completed.

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 2AJ • Fuel tank pressure sensor terminal B—PCM terminal 2AI **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 2AU — Fuel tank pressure sensor terminal C—PCM terminal 2AJ • 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 2AU • Fuel tank pressure sensor terminal C—PCM terminal 2AJ **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 2.5 (WITHOUT CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Replace the charcoal canister, then go to the next step. (See CHARCOAL CANISTER REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
		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 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Perform the KOEO or KOER self test. (See KOEO/KOER SELF TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Is the PENDING CODE for this DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) 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 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)
		No	DTC troubleshooting completed.

STEP	INSPECTION	RESULTS	ACTION
6	**INSPECT FUEL TANK PRESSURE SENSOR** • Inspect the fuel tank pressure sensor. (See FUEL TANK PRESSURE SENSOR INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Replace the charcoal canister, then go to Step 12. (See CHARCOAL CANISTER REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
		No	Go to Step 12.
7	**DETERMINE IF FUEL TANK PRESSURE SENSOR SIGNAL CIRCUIT OR FUEL TANK PRESSURE SENSOR GROUND CIRCUIT MALFUNCTION** • Switch the ignition off. • Disconnect the fuel tank pressure sensor connector. • Access the FTP PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Verify the FTP PID value. • Is the FTP PID value 5 V or B+?	Yes	Go to the next step.
		No	Go to Step 10.
8	**INSPECT FUEL TANK PRESSURE SENSOR SIGNAL CIRCUIT FOR TO POWER SUPPY** • Verify that the fuel tank pressure sensor connector is disconnected. • Switch the ignition off. • Disconnect the PCM connector. • Switch the ignition ON (engine off). **Note** **• Another DTC may be stored by the PCM detecting an open circuit.** • Measure the voltage at the fuel tank pressure sensor 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 fuel tank pressure sensor terminal C and PCM terminal 2AJ. **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.
9	**INSPECT FUEL TANK PRESSURE SENSOR POWER SUPPLY CIRCUIT AND SIGNAL 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 terminal A and C (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 A—PCM terminal 2AU • Fuel tank pressure sensor terminal C—PCM terminal 2AJ **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 12.
		No	Replace the PCM, then go to Step 12. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

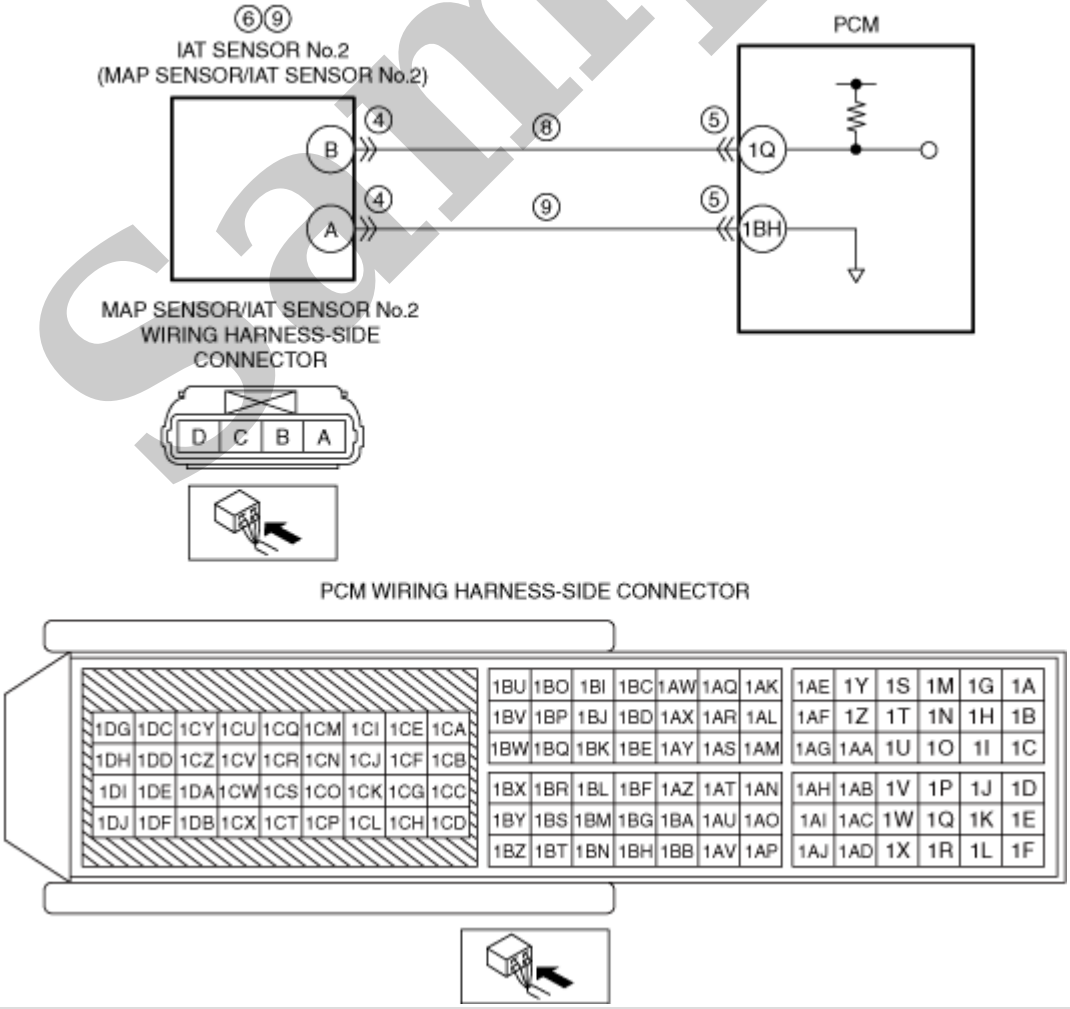
STEP	INSPECTION	RESULTS	ACTION
1	**RECORD VEHICLE STATUS AT TIME OF DTC DETECTION TO UTILIZE WITH REPEATABILITY VERIFICATION** **Note** **• Recording can be facilitated using the screen capture function of the PC.** • Record the FREEZE FRAME DATA/snapshot data on the repair order.	–	Go to the next step.
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.
3	**INSPECT MAP SENSOR/IAT SENSOR No.2 CONNECTOR CONDITION** • Switch the ignition off. • Disconnect the MAP sensor/IAT 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 9.
		No	Go to the next step.
4	**DETERMINE IF IAT SENSOR No.2 OR WIRING HARNESS MALFUNCTION** • Verify that the MAP sensor/IAT sensor No.2 connector is 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 MAP sensor/IAT sensor No.2 terminal B (wiring harness-side). • Is the voltage approx. 5 V?	Yes	Replace the MAP sensor/IAT sensor No.2, then go to Step 9. (See MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR/INTAKE AIR TEMPERATURE (IAT) SENSOR NO.2 REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
		No	Go to the next step.

DTC P0098:00 [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))]

SM2896864

id0102t314650

DTC P0098:00	IAT sensor No.2 circuit high input
DETECTION CONDITION	• If the PCM detects that the IAT sensor No.2 voltage at the PCM terminal 1Q is 4.94 V or more for 5 s, the PCM determines that the IAT sensor No.2 circuit voltage is high. Diagnostic support note • This is a continuous monitor (CCM). • The check engine light illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA/Snapshot data is available. • DTC is stored in the PCM memory.
FAIL-SAFE FUNCTION	• Not applicable
POSSIBLE CAUSE	• MAP sensor/IAT sensor No.2 connector or terminals malfunction • PCM connector or terminals malfunction • IAT sensor No.2 malfunction • Short to power supply in wiring harness between MAP sensor/IAT sensor No.2 terminal B and PCM terminal 1Q • Open circuit in wiring harness between the following terminals: — MAP sensor/IAT sensor No.2 terminal B—PCM terminal 1Q — MAP sensor/IAT sensor No.2 terminal A—PCM terminal 1BH • PCM malfunction



STEP	INSPECTION	RESULTS	ACTION
9	**INSPECT IAT SENSOR No.2 GROUND CIRCUIT FOR OPEN CIRCUIT** • Verify that the MAP sensor/IAT sensor No.2 connector is disconnected. • Switch the ignition off. • Disconnect the PCM connector. • Inspect for continuity between MAP sensor/IAT sensor No.2 terminal A (wiring harness-side) and PCM terminal 1BH (wiring harness-side). • Is there continuity?	Yes	Replace the MAP sensor/IAT sensor No.2, then go to the next step. (See MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR/INTAKE AIR TEMPERATURE (IAT) SENSOR NO.2 REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
		No	Refer to the wiring diagram and verify whether or not there is a common connector between MAP sensor/IAT sensor No.2 terminal A and PCM terminal 1BH. **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 the next step.
10	**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 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Perform the KOEO or KOER self test. (See KOEO/KOER SELF TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • 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 2.5 (WITHOUT CYLINDER DEACTIVATION)].) Go to the next step.
		No	Go to the next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform the "AFTER REPAIR PROCEDURE". (See AFTER REPAIR PROCEDURE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)
		No	DTC troubleshooting completed.

STEP	INSPECTION	RESULTS	ACTION
2	PURPOSE: 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 FREEZE FRAME DATA/snapshot data on the repair order.	–	Go to the next step.
3	PURPOSE: VERIFY CONNECTOR CONNECTIONS • Start the engine. • Access the ECT PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Does the PID value fluctuate when the PCM and ECT sensor No.1 connectors are shaken?	Yes	Repair or replace the applicable connector parts. Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 7.
		No	Go to the next step.
4	PURPOSE: VERIFY ECT SENSOR No.1 INPUT SIGNAL • Access the ECT PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Is the PID value within specification?	Yes	Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 3.
		No	Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 1.

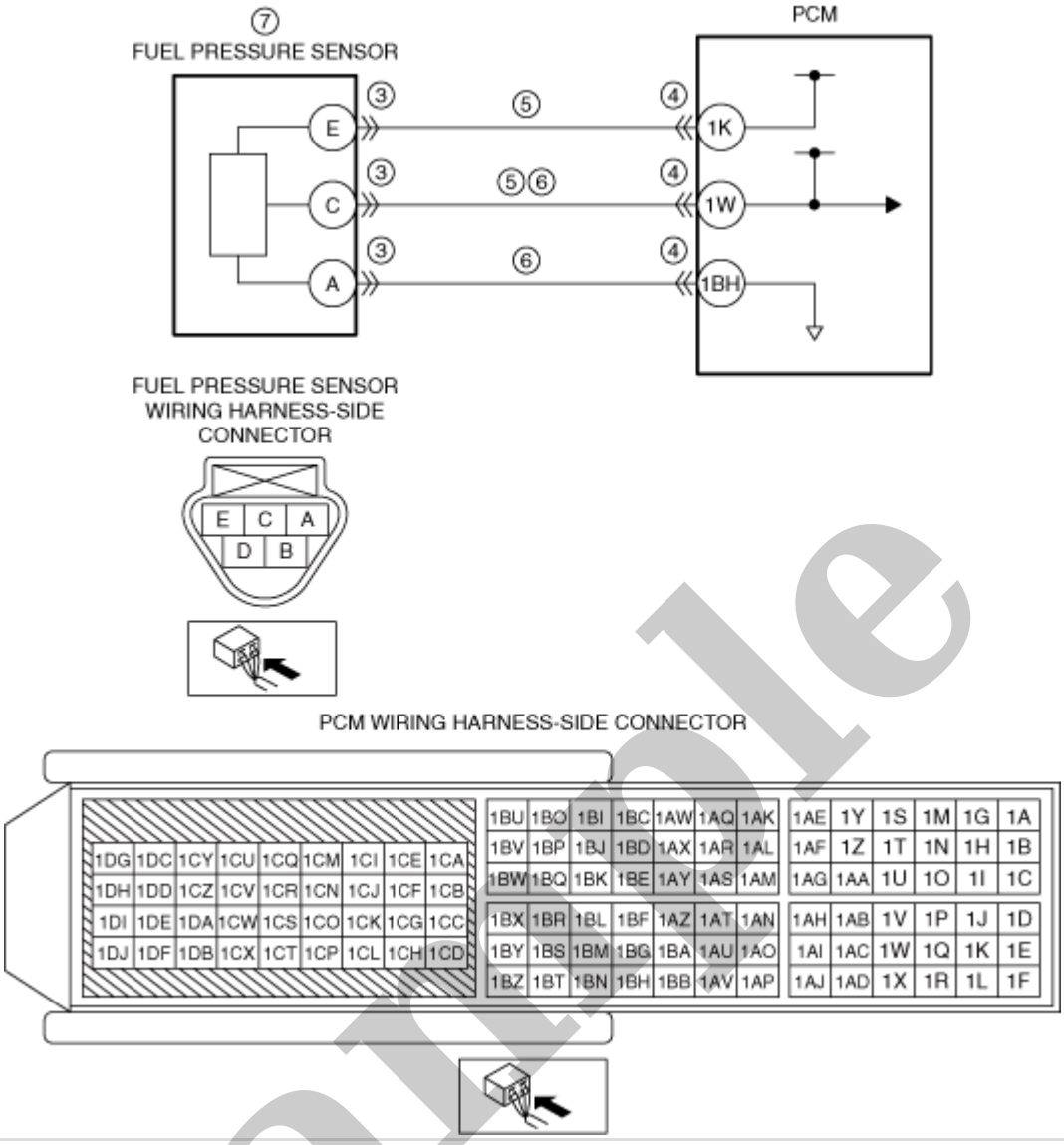
Troubleshooting Diagnostic Procedure

Intention of troubleshooting procedure

- Step 1–2
  - — Perform an ECT sensor No.1-related inspection.
- Step 3–5
  - — Perform an engine coolant-related inspection.
- Step 6
  - — Perform a unit inspection of the coolant control valve.
- Step 7–8
  - — Verify that the primary malfunction is resolved and there are no other malfunctions.

STEP	INSPECTION	RESULTS	ACTION
1	PURPOSE: INSPECT INSTALLATION OF ECT SENSOR No.1 • Inspect installation of ECT sensor No.1. • Is the ECT sensor No.1 installed securely?	Yes	Go to the next step.
		No	Retighten the ECT sensor No.1, then go to Step 7. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
2	PURPOSE: DETERMINE INTEGRITY OF ECT SENSOR No.1 • Inspect the ECT sensor No.1. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Replace the ECT sensor No.1, then go to Step 7. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
		No	Go to the next step.

DTC P0192:00	Fuel pressure sensor circuit low input



Caution

• Verify the malfunction symptom according to not only the PID value but also the symptom troubleshooting.

Related PIDs

Item	Definition	Unit	Condition/Specification
FUEL_PRES	Fuel pressure input from fuel pressure sensor	KPa {MPA}, mBar {BAR}, psi, in H20	• Displays fuel pressure
	Fuel pressure sensor voltage	V	Idle (ECT 80 °C {176 °F}) • Fuel pressure is 10 MPa {102 kgf/cm ^{2}, 1450 psi}: Approx. 1.4 V

Related Simulation Item