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1995 MAZDA Xedos 9 OEM Service and Repair Workshop Manual

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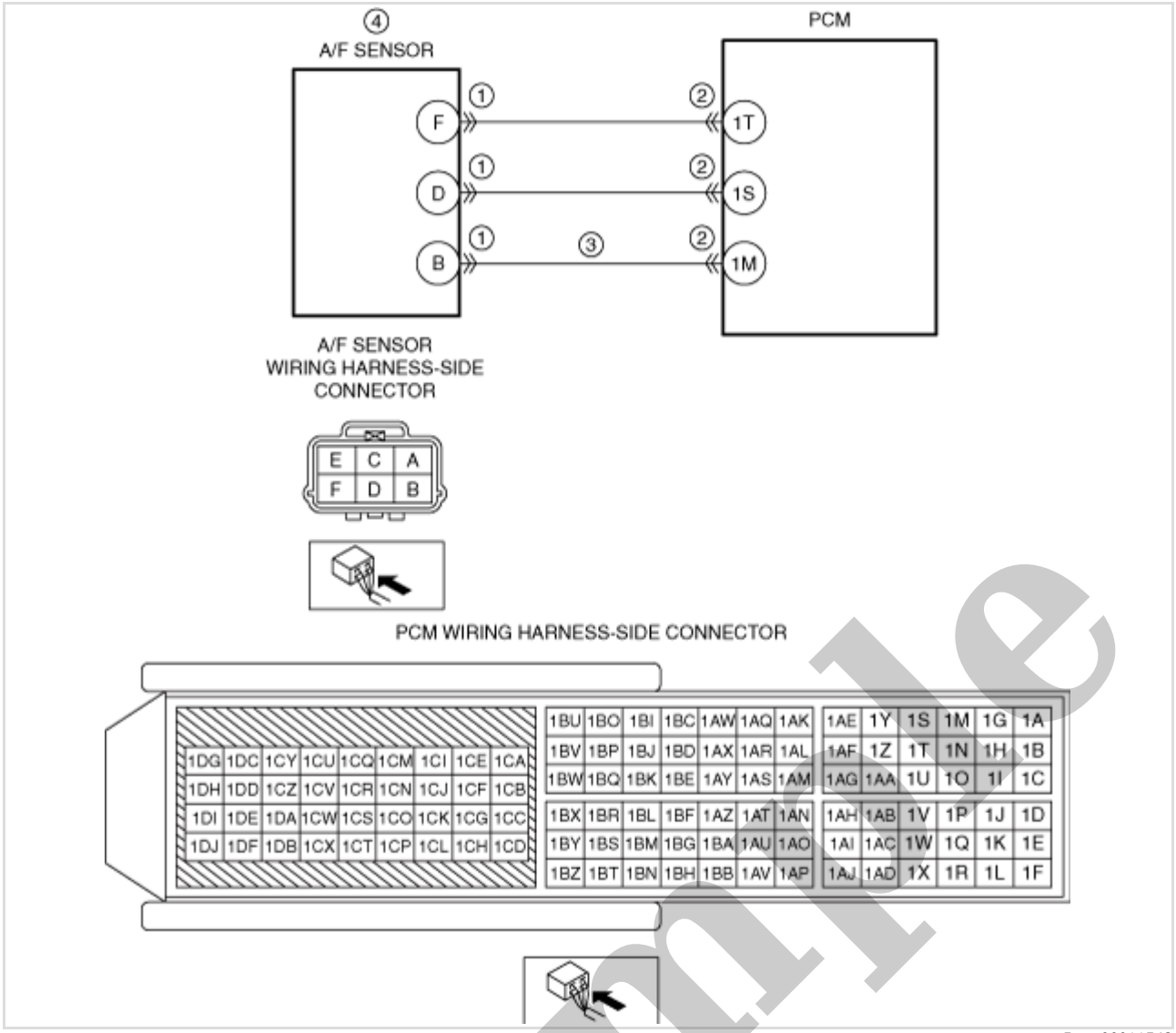

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Function Explanation (DTC Detection Outline)

• If a condition in which terminal 1S remains within the specified range for 5 s or more, the PCM determines an open circuit between A/F sensor terminal B and PCM terminal 1M and stores a DTC.

Repeatability Verification Procedure

1. Warm up the engine to allow the engine coolant temperature to reach 80 °C {176 °F} or more.
2. Start the engine and leave it idling for 1 min.
3. Shift to 2nd gear and drive the vehicle for 1 min at a speed of 50 km/h {31 mph} or more.

Note

• Match the engine coolant temperature in the recorded FREEZE FRAME DATA/snapshot data, the vehicle speed, and engine speed values to the best extent possible while driving the vehicle.

4. Try to reproduce the malfunction by driving the vehicle for 5 min based on the values in the FREEZE FRAME DATA/snapshot data.

PID Item/Simulation Item Used In Diagnosis

PID/DATA monitor item table

DTC P2251:00 [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))]

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Note

• To determine the malfunctioning part, proceed with the diagnostics from "Function Inspection Using M-MDS".

Details On DTCs

DESCRIPTION	**Open circuit between A/F sensor terminal D and PCM terminal 1S**	
DETECTION CONDITION	Determination conditions	• The following conditions are met: — A/F sensor element impedance is specified value or more — A/F sensor terminal F voltage (B+ terminal) is less than specified value or unstable.
	Preconditions	• Battery voltage: 11−18 V *1 • A/F sensor is activated. • The following DTCs are not detected: — A/F sensor terminal F voltage (B+ terminal) is less than specified value: • A/F sensor heater: P0031:00, P0032:00 — A/F sensor terminal F voltage (B+ terminal) is unstable: • Internal PCM malfunction: P064D:00 *1: Standard can be verified by displaying PIDs using M-MDS
	Drive cycle	• 2
	Self test type	• CMDTC self test, KOER self test
	Sensor used	• A/F sensor
FAIL-SAFE FUNCTION	• Not applicable	
VEHICLE STATUS WHEN DTCs ARE OUTPUT	• Illuminates check engine light.	
POSSIBLE CAUSE	• A/F sensor connector or terminals malfunction • PCM connector or terminals malfunction • Open circuit in wiring harness between A/F sensor terminal D and PCM terminal 1S • A/F sensor malfunction • PCM malfunction	

System Wiring Diagram

STEP	INSPECTION	RESULTS	ACTION
6	**PURPOSE: DETERMINE INTEGRITY OF A/F SENSOR** • Start the engine and warm it up completely. • Access the O2S11 PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].) • Drive the vehicle under the following conditions. **Warning** **• When the M-MDS is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the M-MDS using the PID/DATA MONITOR AND RECORD capturing function and inspect later.** **• While performing this step, always operate the vehicle in a safe and lawful manner.** — After increasing the engine speed to 3,000 rpm, decelerate using engine braking. • Is the displayed PID value as follows? — O2S11: 0.25 mA or more	Yes	Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 1.
		No	Go to the next step.
7	**PURPOSE: INSPECT RELATED SENSOR WIRING HARNESS AND CONNECTOR** • Access the O2S11 PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].) • Does the PID value fluctuate when the PCM and A/F sensor connectors are shaken?	Yes	Inspect the related wiring harness and connector. • Repair or replace the malfunctioning part. Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 1.
		No	Replace the A/F sensor. (See AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 1.

Troubleshooting Diagnostic Procedure

Intention of troubleshooting procedure

• Step 1–2

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

STEP	INSPECTION	RESULTS	ACTION
1	**PURPOSE: VERIFICATION OF VEHICLE REPAIR COMPLETION** • Always reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See CLEARING DTC [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].) • Perform the KOER self test. (See KOEO/KOER SELF TEST [PCM (SKYACTIV-G 2.5 (WITH 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 (WITH CYLINDER DEACTIVATION)].) Go to the next step.
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
3	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.
4	PURPOSE: 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 2.5 (WITH CYLINDER DEACTIVATION))].) • Are any other PENDING CODEs and/or DTCs present?	Yes	Go to the applicable PENDING CODE or DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].) Go to the next step.
		No	Go to the next step.
5	PURPOSE: VERIFY CONNECTOR CONNECTIONS • Start the engine. • Access the FUEL_PRES PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].) • Does the PID value fluctuate when the following connectors are shaken? — Fuel pressure sensor — PCM	Yes	Repair or replace the applicable wiring harness or connector parts. Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 2.
		No	Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 1.

Troubleshooting Diagnostic Procedure

Intention of troubleshooting procedure

• Step 1

— Perform a unit inspection of the fuel pressure sensor.

• Step 2–3

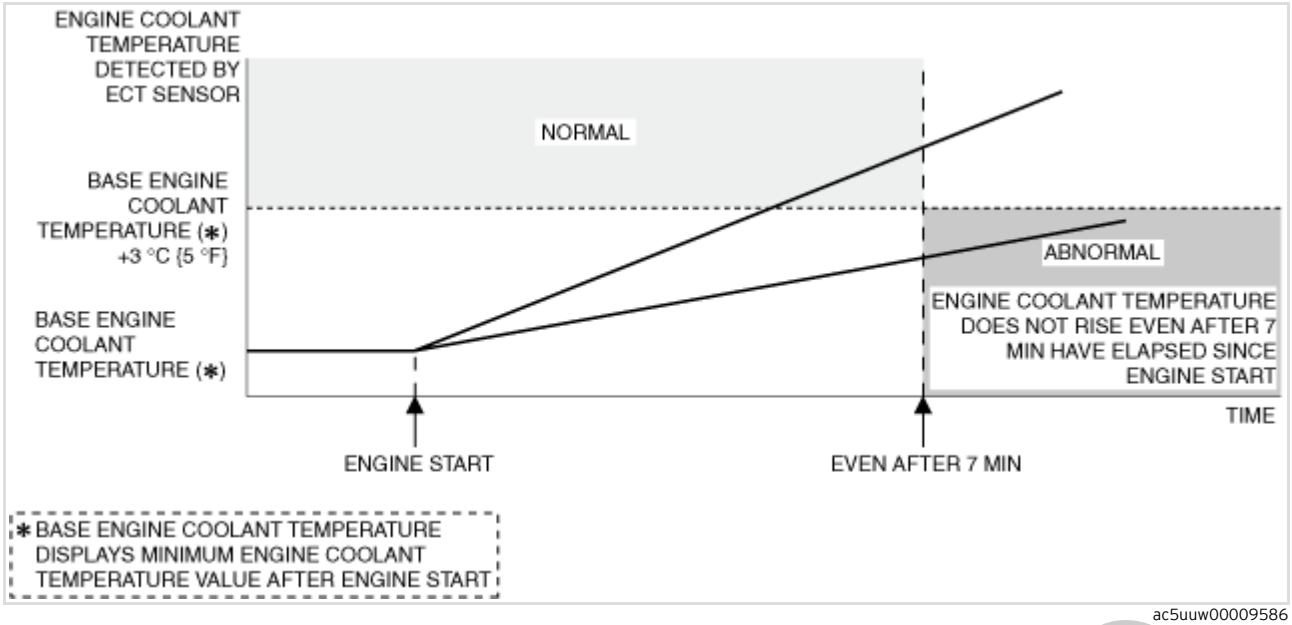
— Verify that the primary malfunction is resolved and there are no other malfunctions.

STEP	INSPECTION	RESULTS	ACTION
1	PURPOSE: DETERMINE INTEGRITY OF FUEL PRESSURE SENSOR • Inspect the fuel pressure sensor. (See FUEL PRESSURE SENSOR INSPECTION [SKYACTIV-G (WITHOUT EGR COOLER)].) (See HIGH FUEL PRESSURE SENSOR INSPECTION [SKYACTIV-G (WITH EGR COOLER)].) • Is there any malfunction?	Yes	Replace the fuel distributor, then go to the next step. (See FUEL INJECTOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].)
		No	Go to the next step.
2	PURPOSE: VERIFICATION OF VEHICLE REPAIR COMPLETION • Always reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See CLEARING DTC [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].) • Implement the repeatability verification procedure. (See Repeatability Verification Procedure.) • Perform the DTC Reading Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITH 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 (WITH CYLINDER DEACTIVATION)].) Go to the next step.
		No	Go to the next step.

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 (WITH CYLINDER DEACTIVATION)].)
		No	Go to the next step.
5	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 9.
		No	Go to the next step.
6	INSPECT IAT SENSOR No.2 SIGNAL CIRCUIT FOR SHORT TO GROUND • Verify that the MAP sensor/IAT sensor No.2 and PCM connectors are disconnected. • Switch the ignition off. • Inspect for continuity between MAP sensor/IAT sensor No.2 terminal B (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 MAP sensor/IAT sensor No.2 terminal B and PCM terminal 1Q. 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 9.
		No	Go to the next step.

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 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	**DETERMINE IF IAT SENSOR No.2 OR WIRING HARNESS MALFUNCTION** • Access the IAT2 PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].) • Verify the IAT2 PID value. • Is the IAT2 PID value 5 V or B+?	Yes	Go to Step 7.
		No	Go to the next step.
4	**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 10.
		No	Go to the next step.
5	**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 10.
		No	Go to the next step.
6	**INSPECT IAT SENSOR No.2** • Inspect the IAT sensor No.2. (See INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Replace the MAP sensor/IAT sensor No.2, then go to Step 10. (See MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR/INTAKE AIR TEMPERATURE (IAT) SENSOR NO.2 REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].)
		No	Go to Step 10.
7	**DETERMINE IF IAT SENSOR No.2 SIGNAL CIRCUIT OR IAT SENSOR No.2 GROUND CIRCUIT MALFUNCTION** • Switch the ignition off. • Disconnect the MAP sensor/IAT sensor No.2 connector. • Access the IAT2 PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].) • Verify the IAT2 PID value. • Is the IAT2 PID value 5 V or B+?	Yes	Go to the next step.
		No	Go to Step 9.



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Repeatability Verification Procedure

1. Start the engine and leave it idling for 10 s.
2. Switch the ignition off.
3. Leave the vehicle for 6 h or more.
4. Start the engine and leave it idling for 6 min.

PID Item/Simulation Item Used In Diagnosis

PID/DATA monitor item table

Item	Definition	Unit	Condition/Specification
ECT	Engine coolant temperature input from ECT sensor No.1	°C, °F	• Displays ECT
	ECT sensor No.1 voltage	V	• ECT is 20 °C {68 °F}: Approx. 3.10 V • ECT is 40 °C {104 °F}: Approx. 2.16 V • ECT is 60 °C {140 °F}: Approx. 1.40 V • ECT is 80 °C {176 °F}: Approx. 0.87 V • ECT is 100 °C {212 °F}: Approx. 0.54 V

Function Inspection Using M-MDS

STEP	INSPECTION	RESULTS	ACTION
1	PURPOSE: 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.