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1989 MAZDA 626 (Mk.3) Station Wagon OEM Service and Repair Workshop Manual

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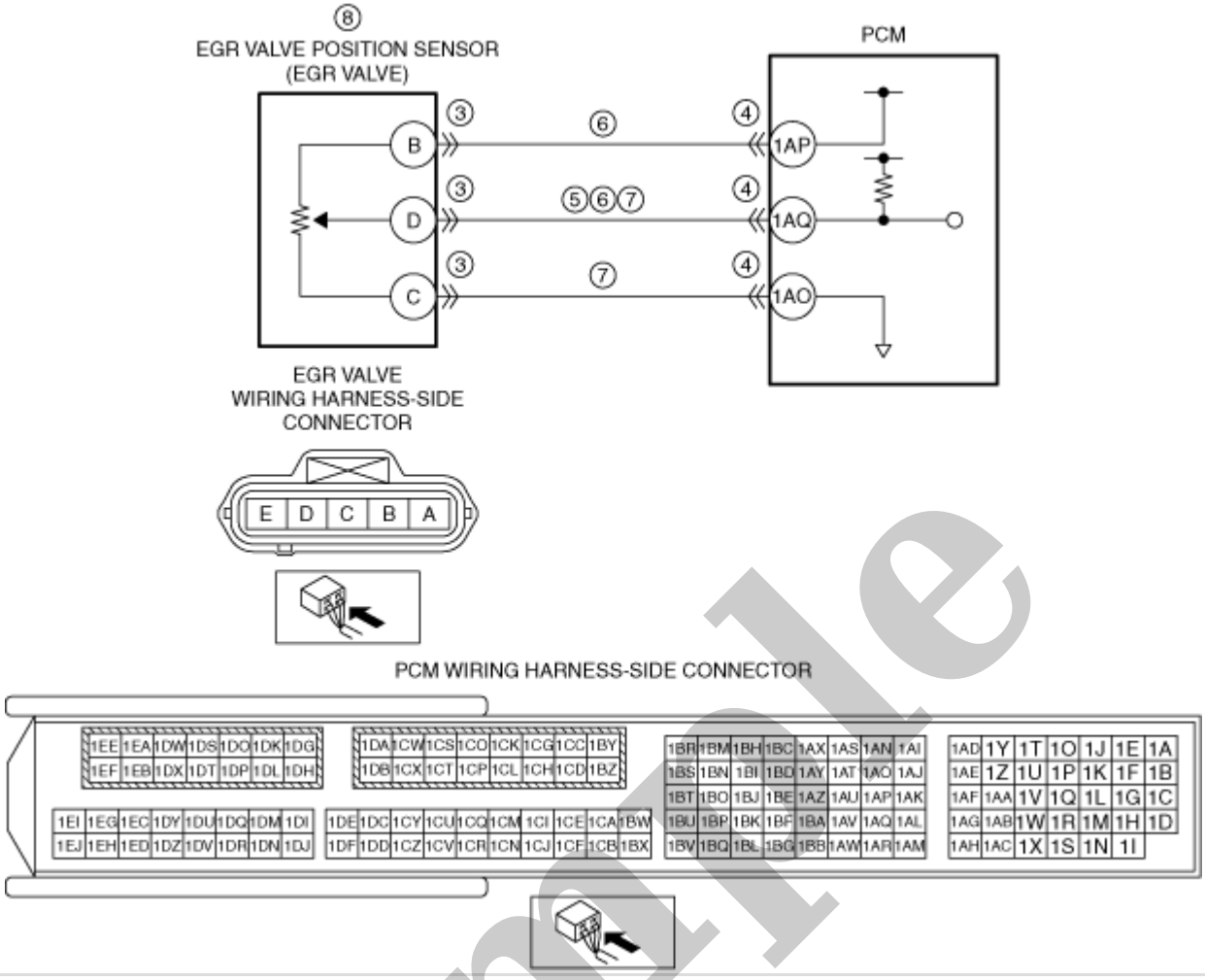
DTC P0406:00	EGR valve position sensor circuit high input



Diagnostic Procedure

STEP	INSPECTION		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.

DTC P0504:00 [PCM (SKYACTIV-D 2.2)]

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DTC P0504:00	Brake switch No.1/No.2 correlation
DETECTION CONDITION	• The condition in which the brake switch No.1 and No.2 signals are both on or off continues for 3 s or more and the condition is repeated 5 times. **Diagnostic support note** — This is a continuous monitor (CCM). — The check engine light illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. — PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle. — FREEZE FRAME DATA/Snapshot data is available. — DTC is stored in the PCM memory.
FAIL-SAFE FUNCTION	• Not applicable.
POSSIBLE CAUSE	**Caution** **• Inspect the brake switch with it installed to the brake pedal, otherwise the brake switch may not operate normally. If the brake switch is removed from the brake pedal, replace the brake switch with a new one.** • Brake switch connector or terminals malfunction • Short to ground or open circuit in brake switch No.1 power supply circuit — Short to ground in wiring harness between MAIN 200 A fuse and brake switch terminal A — MAIN 200 A fuse and/or STOP 10 A fuse malfunction — Open circuit in wiring harness between battery positive terminal and brake switch terminal A • Open circuit in wiring harness between brake switch terminal B and body ground • PCM connector or terminals malfunction • Short to power supply in wiring harness between the following terminals: — Brake switch terminal D–PCM terminal 2AA — Brake switch terminal C–PCM terminal 2AB • Open circuit in wiring harness between the following terminals: — Brake switch terminal D–PCM terminal 2AA — Brake switch terminal C–PCM terminal 2AB • Brake switch No.1 malfunction • Brake switch No.2 malfunction • PCM malfunction

STEP	INSPECTION		ACTION
6	**INSPECT BRAKE SWITCH No.2 GROUND CIRCUIT FOR OPEN CIRCUIT** • Verify that the brake switch connector is disconnected. • Inspect for continuity between brake switch terminal B (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 brake switch terminal B 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 brake switch and body ground — Loose or lifting ground point • Repair or replace the malfunctioning part. Go to Step 11.
7	**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 11.
		No	Go to the next step.
8	**INSPECT BRAKE SWITCH SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • Verify that the brake switch and PCM connectors are disconnected. • Switch the ignition ON (engine off). • Measure the voltage at the following terminals (wiring harness-side): — Brake switch terminal D — Brake switch terminal C • 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 the following terminals: • Brake switch terminal D–PCM terminal 2AA • Brake switch terminal C–PCM terminal 2AB **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 11.
9	**INSPECT BRAKE SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Verify that the brake switch and PCM connectors are disconnected. • Switch the ignition off. • Inspect for continuity between the following terminals (wiring harness-side): — Brake switch terminal D–PCM terminal 2AA — Brake switch terminal C–PCM terminal 2AB • 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: • Brake switch terminal D–PCM terminal 2AA • Brake switch terminal C–PCM terminal 2AB **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 11.
10	**INSPECT BRAKE SWITCH** • Inspect the brake switch. (See BRAKE SWITCH INSPECTION.) • Is there any malfunction?	Yes	Replace the brake switch, then go to the next step. (See BRAKE PEDAL REMOVAL/INSTALLATION.)
		No	Go to the next step.

STEP	INSPECTION		ACTION
5	INSPECT CMP SENSOR CONNECTOR CONDITION • Switch the ignition off. • Disconnect the CMP sensor 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 CMP SENSOR • Inspect the CMP sensor. (See CAMSHAFT POSITION (CMP) SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the CMP sensor, then go to Step 9. (See CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
7	INSPECT PCM CONNECTOR CONDITION • Switch the ignition off. • 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.
8	INSPECT VALVE TIMING • Inspect the valve timing. (See TIMING CHAIN REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Adjust the valve timing to the correct timing, then go to the next step. (See TIMING CHAIN REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Replace the timing chain, then perform the following procedure: (See TIMING CHAIN REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) • Perform the "FUEL INJECTOR INJECTION AMOUNT CORRECTION" procedure. (See FUEL INJECTOR INJECTION AMOUNT CORRECTION [SKYACTIV-D 2.2].) • Perform the "TIMING CHAIN LEARNING" procedure. (See TIMING CHAIN LEARNING [SKYACTIV-D 2.2].) 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-D 2.2)].) • Start the engine and warm it up completely. • Perform the KOER self test. (See KOEO/KOER SELF TEST [PCM (SKYACTIV-D 2.2)].) • Is the same DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV D 2.2].) 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-D 2.2)].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-D 2.2)].)
		No	DTC troubleshooting completed.

DTC P0472:00 [PCM (SKYACTIV-D 2.2)]

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DTC P0472:00	Exhaust gas pressure sensor No.1 circuit low input
DETECTION CONDITION	• If the input voltage at the PCM terminal 1CE is less than 0.16 V for 5 s, the PCM determines that the exhaust gas pressure sensor No.1 circuit has a malfunction. MONITORING CONDITIONS — Battery voltage: 8 V or more 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	• Limits the engine torque or the upper limit of the engine speed. • Inhibits the DENOx/DESOx control. • Inhibits the EGR control. • PCM restricts engine-transaxle integration control.
POSSIBLE CAUSE	• Exhaust gas pressure sensor No.1 connector or terminals malfunction • PCM connector or terminals malfunction • Short to ground in wiring harness between the following terminals: — Exhaust gas pressure sensor No.1 terminal A—PCM terminal 1CJ — Exhaust gas pressure sensor No.1 terminal B—PCM terminal 1CE • Exhaust gas pressure sensor No.1 signal circuit and ground circuit are shorted to each other • Open circuit in wiring harness between the following terminals: — Exhaust gas pressure sensor No.1 terminal A—PCM terminal 1CJ — Exhaust gas pressure sensor No.1 terminal B—PCM terminal 1CE • Exhaust gas pressure sensor No.1 malfunction • PCM malfunction

STEP	INSPECTION		ACTION
7	**INSPECT EXHAUST GAS PRESSURE SENSOR No.1 CIRCUIT FOR OPEN CIRCUIT** • Verify that the exhaust gas pressure sensor No.1 and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — Exhaust gas pressure sensor No.1 terminal A—PCM terminal 1CJ — Exhaust gas pressure sensor No.1 terminal B—PCM terminal 1CE • 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: • Exhaust gas pressure sensor No.1 terminal A—PCM terminal 1CJ • Exhaust gas pressure sensor No.1 terminal B—PCM terminal 1CE **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 EXHAUST GAS PRESSURE SENSOR No.1** • Reconnect all disconnected connectors. • Inspect the exhaust gas pressure sensor No.1. (See EXHAUST GAS PRESSURE SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the exhaust gas pressure sensor No.1, then go to the next step. (See EXHAUST GAS PRESSURE SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		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-D 2.2)].) • Perform the KOEO or KOER self test. (See KOEO/KOER SELF TEST [PCM (SKYACTIV-D 2.2)].) • Is the same DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) 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-D 2.2)].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-D 2.2)].)
		No	DTC troubleshooting completed.

DESCRIPTION	P01CB:00: Fuel injector No.1 system: Fuel injection start timing retard
	P01CD:00: Fuel injector No.2 system: Fuel injection start timing retard
	P01CF:00: Fuel injector No.3 system: Fuel injection start timing retard
	P01D1:00: Fuel injector No.4 system: Fuel injection start timing retard
POSSIBLE CAUSE	• Fuel injector No.1 malfunction • Fuel injector No.2 malfunction • Fuel injector No.3 malfunction • Fuel injector No.4 malfunction • Fuel pressure sensor/fuel temperature sensor No.1 (built-into fuel injector No.1) malfunction • Fuel pressure sensor/fuel temperature sensor No.2 (built-into fuel injector No.2) malfunction • Fuel pressure sensor/fuel temperature sensor No.3 (built-into fuel injector No.3) malfunction • Fuel pressure sensor/fuel temperature sensor No.4 (built-into fuel injector No.4) malfunction • PCM malfunction

System Wiring Diagram

• Not applicable

Function Explanation (DTC Detection Outline)

• The PCM monitors the fuel injection timing.
• If the fuel injection timing is excessively later than the target fuel injection timing, the PCM stores a DTC.

Repeatability Verification Procedure

1. Start the engine.
2. Accelerate to 100 km/h {63 mph}, and decelerate to 0 km/h {0 mph}. (Reference acceleration speed is vehicle speed of 100 km/h {63 mph} for 30 s)
3. Perform Step 2 again.
4. Stop the engine.

PID Item/Simulation Item Used In Diagnosis

• Not applicable

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.

DTC P01CC:00, P01CE:00, P01D0:00, P01D2:00 [PCM (SKYACTIV-D 2.2)]

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Note

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

Details On DTCs

STEP	INSPECTION	RESULTS	ACTION
2	PURPOSE: IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA • Is the DTC P01CC:00, P01CE:00, P01D0:00 or P01D2:00 on FREEZE FRAME DATA?	Yes	Go to the next step.
		No	Go to the troubleshooting procedure for DTC on FREEZE FRAME DATA. (See DTC TABLE [PCM (SKYACTIV-D 2.2)].)
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 IF DIAGNOSTIC RESULT IS AFFECTED BY DTC OCCURRING FROM FUEL INJECTOR • 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-D 2.2)].) • Is a DTC related to the fuel injector present?	Yes	Go to the applicable PENDING CODE or DTC inspection. (See DTC TABLE [PCM (SKYACTIV-D 2.2)].)
		No	Go to the next step.
5	PURPOSE: VERIFY IF DIAGNOSTIC RESULT IS AFFECTED BY DTC OCCURRING FROM FUEL PRESSURE SENSOR • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].) • Is a DTC related to the fuel pressure sensor present?	Yes	Go to the applicable PENDING CODE or DTC inspection. (See DTC TABLE [PCM (SKYACTIV-D 2.2)].)
		No	Go to the next step.
6	PURPOSE: VERIFY IF DIAGNOSTIC RESULT IS AFFECTED BY DTC OCCURRING FROM FUEL TEMPERATURE SENSOR • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].) • Is a DTC related to the fuel temperature sensor present?	Yes	Go to the applicable PENDING CODE or DTC inspection. (See DTC TABLE [PCM (SKYACTIV-D 2.2)].)
		No	Go to the troubleshooting procedure to perform the procedure from Step 1.

Troubleshooting Diagnostic Procedure

Caution

• If a hand or tool touches a fuel injector terminal or fuel injector connector terminal, the fuel injector might be damaged. To prevent damage to a fuel injector, do not touch the terminals.
• If high-voltage generating parts or components and electronic devices come near a fuel injector, the fuel injector could be damaged. To prevent damage to a fuel injector, always keep high-voltage generating parts or components and electronic devices away from it.

Intention of troubleshooting procedure

• Step 1

— Perform a unit inspection of the fuel injector No.1–No.4.

• Step 2

— Inspect the fuel pressure sensor No.1–No.4.

• Step 3

— Inspect the fuel temperature sensor No.1–No.4.

• Step 4–5

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