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1990 MAZDA 626 (Mk.3) Station Wagon OEM Service and Repair Workshop Manual

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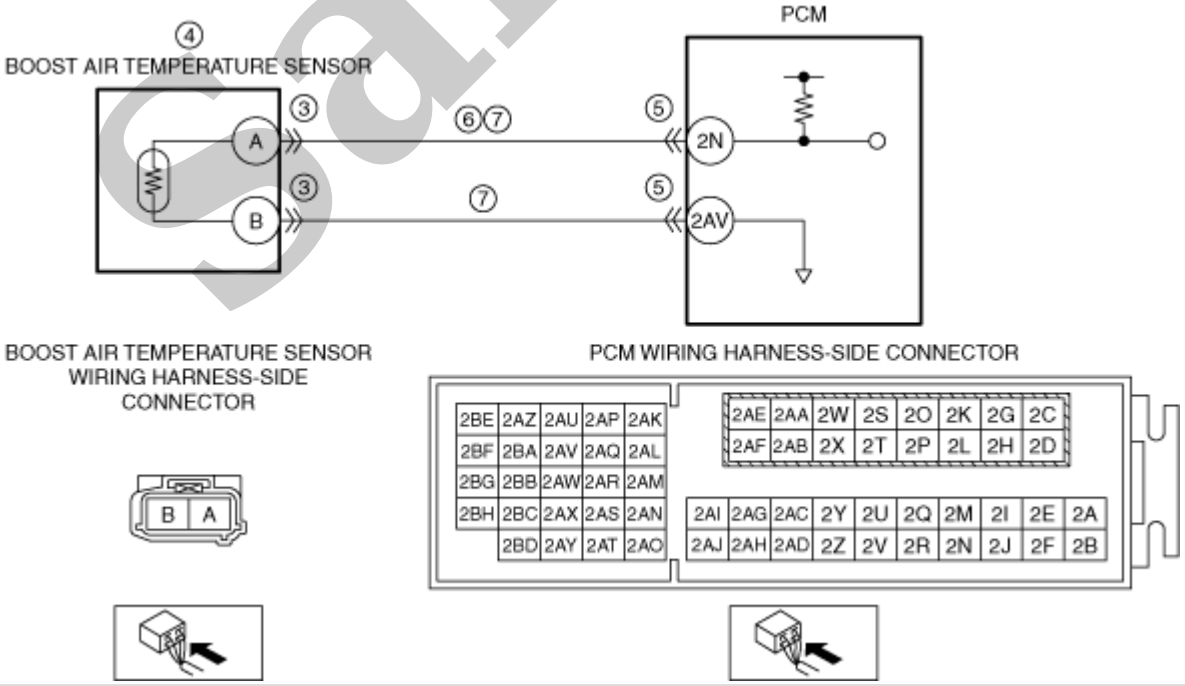
DTC P007C:00 [PCM (SKYACTIV-D 2.2)]

SM2896061

id0102j521080

DTC P007C:00	Boost air temperature sensor circuit low input
DETECTION CONDITION	• If the PCM detects that the boost air temperature sensor voltage at the PCM terminal 2N is below 0.05 V for 5 s with the following condition met, the PCM determines that the boost air temperature sensor circuit voltage is low. 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	• Inhibits the automatic diesel particulate filter regeneration control and compulsory diesel particulate filter regeneration control. • Inhibits the DENOx/DESOx control. • Fully opens the intake shutter valve opening angle. • Inhibits the EGR control. • PCM restricts engine-transaxle integration control.
POSSIBLE CAUSE	• Intake air temperature is too high • Boost air temperature sensor connector or terminals malfunction • Boost air temperature sensor malfunction • PCM connector or terminals malfunction • Short to ground in wiring harness between boost air temperature sensor terminal A and PCM terminal 2N • Boost air temperature sensor signal circuit and ground circuit are shorted to each other • PCM malfunction



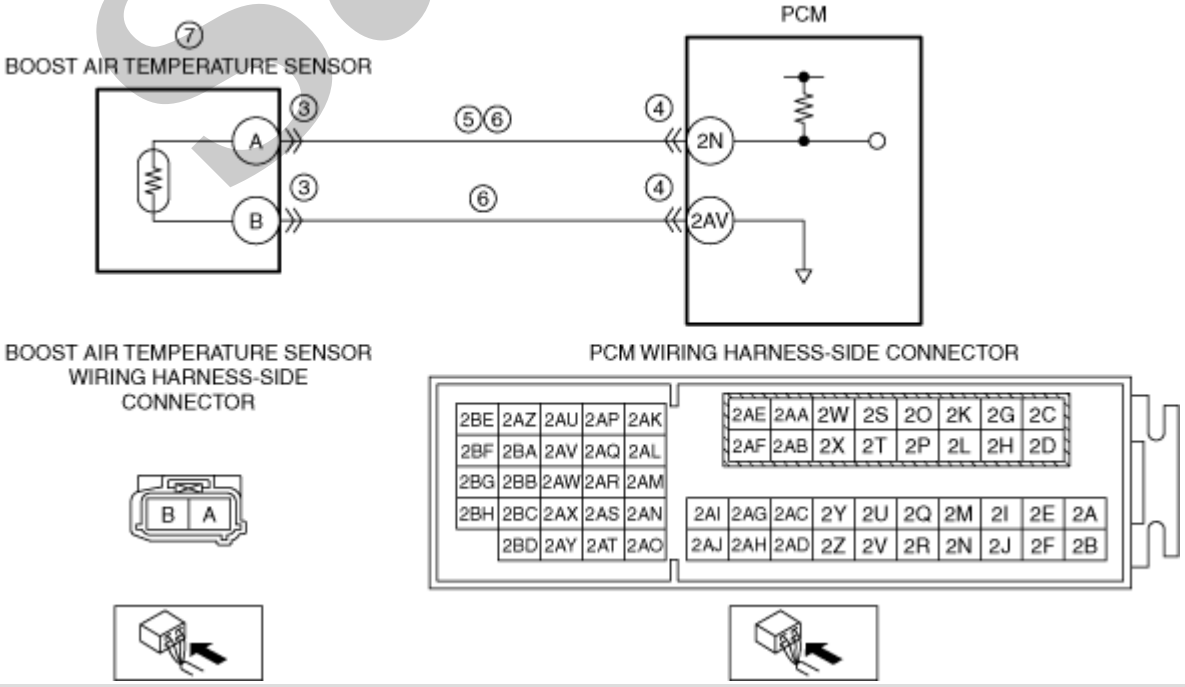
Diagnostic Procedure

DTC P007D:00 [PCM (SKYACTIV-D 2.2)]

SM2896062

id0102j521090

DTC P007D:00	Boost air temperature sensor circuit high input
DETECTION CONDITION	• The PCM monitors the input signal from the boost air temperature sensor. If the voltage from the boost air temperature sensor is above 4.94 V for 5 s, the PCM determines that the boost air temperature sensor 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 automatic diesel particulate filter regeneration control and compulsory diesel particulate filter regeneration control. • Inhibits the DENOx/DESOx control. • Fully opens the intake shutter valve opening angle. • Inhibits the EGR control. • PCM restricts engine-transaxle integration control.
POSSIBLE CAUSE	• Intake air temperature is too low • Boost air temperature sensor connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between boost air temperature sensor terminal A and PCM terminal 2N • Open circuit in wiring harness between the following terminals: — Boost air temperature sensor terminal A—PCM terminal 2N — Boost air temperature sensor terminal B—PCM terminal 2AV • Boost air temperature sensor malfunction • PCM malfunction



DTC P2195:00, P2196:00 [PCM (SKYACTIV-D 2.2)]

SM2896138

id0102j534450

Note

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

Details On DTCs

1. Accelerate to 40 km/h {25 mph}.
2. Accelerate from 40 km/h {25 mph} to 80 km/h {50 mph} taking 20 s or more.
3. Drive the vehicle at a constant speed of 80 km/h {50 mph} for 30 s.

3. Verify the DTC while idling. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].)
4. Stop the engine.

PID Item/Simulation Item Used In Diagnosis

PID/DATA monitor item table

Item	Definition	Unit	Condition/Specification
BARO	Barometric pressure	KPa {MPA}, mBar {BAR}, psi	• Displays the BARO.
ECT	Engine coolant temperature	°C, °F	• Displays the ECT.
EGRP	EGR valve	%	• Displays the EGR valve position.
EGRP_ACT	EGR valve actual opening angle	%	ECT: above 70 °C {158 °F} • Idle: 0 % (after 20−30 s have elapsed since start the engine) • Racing (engine speed 2,000 rpm): Approx. 60 %
EGRB_DC_POS	EGR cooler bypass valve	%	• Displays the EGR cooler bypass valve position.
EXHTEMP1	Exhaust gas temperature (No.2)	°C, °F	• Displays the exhaust gas temperature.
EXHTEMP2	Exhaust gas temperature (No.3)	°C, °F	• Displays the exhaust gas temperature.
EXHTEMP4	Exhaust gas temperature (No.4)	°C, °F	• Displays the exhaust gas temperature.
EXHPRESS_DIF	Exhaust gas pressure (No.2)	KPa {MPA}, mBar {BAR}, psi	• Displays the difference in pressure between exhaust gas pressure before and after passing the diesel particulate filter
HTR11	A/F sensor heater operation status	Off/On	• Ignition switched ON (engine off): Off • Idle (after warm up): On
	A/F sensor heater control duty value	%	• Ignition switched ON (engine off): 0 % • Idle (after warm up): Approx. 43 %
IAT	Intake air temperature (No.1)	°C, °F	• Displays the intake air temperature (No.1).
ISV_POS	Intake shutter valve	%	• Switch the ignition ON (engine off): Approx. 88.23 % • Idle: Approx. 4.31 % • Racing (engine speed above 4,000 rpm): Approx. 82.35 %
ISV_DSD	Intake shutter valve control desired value	°(deg) %	• Displays the intake shutter valve control desired value.
O2S11	A/F sensor current	µA	• Idle (after warm up): Approx. −39 µA • Deceleration fuel cut (accelerator pedal released from engine speed of 4,000 rpm or more): Approx. 3.84 mA
MAF	Mass air flow	g/sec	• Switch the ignition ON (engine off): Approx. 1.00 g/s {0.132 lb/min} • Idle: Approx. 5.47 g/s {0.724 lb/min} • Racing (engine speed 2,000 rpm): Approx. 13.84 g/s {1.831 lb/min} • Racing (engine speed 4,000 rpm): Approx. 85.13 g/s {11.26 lb/min}

Function Inspection Using M-MDS

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

• Step 7

— Perform a unit inspection of the MAF sensor.

• Step 8

— Perform a unit inspection of the IAT sensor No.1.

• Step 9–10

— Perform a unit inspection of the intake shutter valve.

• Step 11–12

— Perform a unit inspection of the EGR valve.

• Step 13–14

— Perform a unit inspection of the EGR cooler bypass valve.

• Step 15

— Perform a unit inspection of the BARO sensor.

• Step 16

— Perform a unit inspection of the exhaust gas temperature sensor No.2, No.3 and No.4.

• Step 17

— Perform a unit inspection of the exhaust gas pressure sensor No.2.

• Step 18

— Perform a unit inspection of the ECT sensor No.1.

• Step 19

— Perform inspection of piping in exhaust system.

• Step 20

— VERIFY IF MISFIRE IS OCCURRING

• Step 21

— Perform inspection of the diesel particulate filter.

• Step 22

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

STEP	INSPECTION	RESULTS	ACTION
1	PURPOSE: INSPECT A/F SENSOR CONNECTOR CONDITION • Switch the ignition off. • Disconnect the A/F 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 22.
		No	Go to the next step.
2	PURPOSE: INSPECT INSTALLATION OF A/F SENSOR • Inspect installation of A/F sensor. • Is the A/F sensor installed securely?	Yes	Go to the next step.
		No	Retighten the A/F sensor, then go to Step 22. (See AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
3	PURPOSE: VERIFY IF MALFUNCTION RELATED TO EMISSION SYSTEM AFFECTS A/F SENSOR SIGNAL • Inspect for exhaust gas leakage from the exhaust system. (between A/F sensor and HO2S) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
22	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-D 2.2)].) • Implement the repeatability verification procedure. (See Repeatability Verification Procedure.) • Perform the Pending Trouble Code Access Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].) • 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-D 2.2].)
		No	DTC troubleshooting completed.

DTC P0047:00 [PCM (SKYACTIV-D 2.2)]

SM2896139

id0102j534570

DTC P0047:00	Regulating solenoid valve control circuit low input
DETECTION CONDITION	• If the PCM detects that the regulating solenoid valve voltage at the PCM terminal 1CP is less than the specified value for 5 s with the following condition met, the PCM determines that the regulating solenoid valve circuit voltage is low. 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	• Regulating solenoid valve connector or terminals malfunction • Short to ground or open circuit in regulating solenoid valve power supply circuit — Short to ground in wiring harness between ENGINE2 15 A fuse and regulating solenoid valve terminal A — ENGINE2 15 A fuse malfunction — Open circuit in wiring harness between main relay terminal C and regulating solenoid valve terminal A • PCM connector or terminals malfunction • Short to ground in wiring harness between regulating solenoid valve terminal B and PCM terminal 1CP • Open circuit in wiring harness between regulating solenoid valve terminal B and PCM terminal 1CP • Regulating solenoid valve malfunction • PCM malfunction

STEP	INSPECTION	RESULTS	ACTION
6	**INSPECT REGULATING SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO GROUND** • Verify that the regulating solenoid valve and PCM connectors are disconnected. • Inspect for continuity between regulating solenoid valve 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 regulating solenoid valve terminal B and PCM terminal 1CP. **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.
7	**INSPECT REGULATING SOLENOID VALVE CONTROL CIRCUIT FOR OPEN CIRCUIT** • Verify that the regulating solenoid valve and PCM connectors are disconnected. • Inspect for continuity between regulating solenoid valve terminal B (wiring harness-side) and PCM terminal 1CP (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 regulating solenoid valve terminal B and PCM terminal 1CP. **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 REGULATING SOLENOID VALVE** • Inspect the regulating solenoid valve. (See REGULATING SOLENOID VALVE INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the regulating solenoid valve, then go to the next step. (See REGULATING SOLENOID VALVE 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.

DTC P161D:00 [PCM (SKYACTIV-D 2.2)]

SM2896141

id0102j534640

DTC P161D:00	Malfunction in PCM: Exhaust gas temperature sensor No.1 control transistor malfunction
DETECTION CONDITION	• If any of the following conditions is met for 6 s under condition A or condition B: **Condition A:** — When the transistor in the exhaust gas temperature sensor No.1 operates, the transistor's downstream voltage is 3.19 V or less. **Condition B:** — When the transistor in the exhaust gas temperature sensor No.1 is not operating the transistor's downstream voltage is 4.85 V or more. **MONITORING CONDITIONS** • The DTC P0546:00 is not detected. **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	• Inhibits the auto diesel particulate filter regeneration control. • Inhibits the DENOx/DESOx control. • Inhibits the EGR control.
POSSIBLE CAUSE	• Exhaust gas temperature sensor No.1 malfunction • PCM malfunction
SYSTEM WIRING DIAGRAM	Not applicable

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	**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.
2	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Is the DTC P161D: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)].)