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

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DTC P0643:00 [PCM (SKYACTIV-D 2.2)]

SM2896122

id0102j531560

DTC P0643:00	Constant voltage power supply circuit high input
DETECTION CONDITION	• When the following condition is met, the output voltage of the 5 V power supply terminal exceeds 5.14 V for a continuous 0.5 s: 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. • Stops activation of the A/F sensor heater. • Fully opens the intake shutter valve opening angle. • Inhibits the EGR control. • PCM restricts engine-transaxle integration control.
POSSIBLE CAUSE	• APP sensor connector or terminals malfunction • CKP sensor connector or terminals malfunction • MAP sensor No.2 connector or terminals malfunction • Engine oil temperature sensor/engine oil pressure sensor connector or terminals malfunction • MAF sensor/IAT sensor No.1 connector or terminals malfunction • Regulating valve position sensor connector or terminals malfunction • Refrigerant pressure sensor connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between the following terminals: — APP sensor terminal A—PCM terminal 2AM — CKP sensor terminal A—PCM terminal 1J — MAP sensor No.2 terminal C—PCM terminal 1CN — Engine oil temperature sensor/engine oil pressure sensor terminal A—PCM terminal 1DN — MAF sensor/IAT sensor No.1 terminal D—PCM terminal 2AC — Regulating valve position sensor terminal C—PCM terminal 1BO — Refrigerant pressure sensor terminal A—PCM terminal 2BB • PCM malfunction

STEP	INSPECTION		ACTION
9	**INSPECT REGULATING VALVE POSITION SENSOR CONNECTOR CONDITION** • Disconnect the regulating valve position 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 13.
		No	Go to the next step.
10	**INSPECT REFRIGERANT PRESSURE SENSOR CONNECTOR CONDITION** • Disconnect the refrigerant pressure 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 13.
		No	Go to the next step.
11	**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 13.
		No	Go to the next step.
12	**INSPECT EACH POWER SUPPLY CIRCUIT FOR SHORT TO POWER SUPPLY** • Verify that the following connectors are disconnected. — PCM — APP sensor — CKP sensor — MAP sensor No.2 — Engine oil temperature sensor/engine oil pressure sensor — MAF sensor/IAT sensor No.1 — Regulating valve position sensor — Refrigerant pressure sensor • Switch the ignition ON (engine off). **Note** **• Another DTC may be stored by the PCM detecting an open circuit.** • Measure the voltage at the following terminals (wiring harness-side): — APP sensor terminal A — CKP sensor terminal A — MAP sensor No.2 terminal C — Engine oil temperature sensor/engine oil pressure sensor terminal A — MAF sensor/IAT sensor No.1 terminal D — Regulating valve position sensor terminal C — Refrigerant pressure sensor terminal A • 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: • APP sensor terminal A—PCM terminal 2AM • CKP sensor terminal A—PCM terminal 1J • MAP sensor No.2 terminal C—PCM terminal 1CN • Engine oil temperature sensor/engine oil pressure sensor terminal A—PCM terminal 1DN • MAF sensor/IAT sensor No.1 terminal D—PCM terminal 2AC • Regulating valve position sensor terminal C—PCM terminal 1BO • Refrigerant pressure sensor terminal A—PCM terminal 2BB **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 the next step.

STEP	INSPECTION		ACTION
4	VERIFY DTC TROUBLESHOOTING COMPLETED • Always reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See AFTER REPAIR PROCEDURE [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	Replace the PCM, then go to the next step. (See PCM REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
5	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 P2080:00	Exhaust gas temperature sensor No.1 circuit range/performance problem
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. • Inhibits the EGR control.
POSSIBLE CAUSE	• Exhaust gas temperature sensor No.1 connector or terminals malfunction • Exhaust gas temperature sensor No.2 connector or terminals malfunction • Exhaust gas temperature sensor No.3 connector or terminals malfunction • Exhaust gas temperature sensor No.4 connector or terminals malfunction • Exhaust gas temperature sensor No.5 connector or terminals malfunction • PCM connector or terminals malfunction • Short to ground in wiring harness between the following terminals: — Exhaust gas temperature sensor No.1 terminal A—PCM terminal 1CI — Exhaust gas temperature sensor No.2 terminal A—PCM terminal 1CA — Exhaust gas temperature sensor No.3 terminal A—PCM terminal 1BW — Exhaust gas temperature sensor No.4 terminal A—PCM terminal 1DU — Exhaust gas temperature sensor No.5 terminal A—PCM terminal 1DQ • Short to power supply in wiring harness between the following terminals: — Exhaust gas temperature sensor No.1 terminal A—PCM terminal 1CI — Exhaust gas temperature sensor No.2 terminal A—PCM terminal 1CA — Exhaust gas temperature sensor No.3 terminal A—PCM terminal 1BW — Exhaust gas temperature sensor No.4 terminal A—PCM terminal 1DU — Exhaust gas temperature sensor No.5 terminal A—PCM terminal 1DQ • Open circuit in wiring harness between the following terminals: — Exhaust gas temperature sensor No.1 terminal A—PCM terminal 1CI — Exhaust gas temperature sensor No.1 terminal B—PCM terminal 1AC — Exhaust gas temperature sensor No.2 terminal A—PCM terminal 1CA — Exhaust gas temperature sensor No.2 terminal B—PCM terminal 1CB — Exhaust gas temperature sensor No.3 terminal A—PCM terminal 1BW — Exhaust gas temperature sensor No.3 terminal B—PCM terminal 1BS — Exhaust gas temperature sensor No.4 terminal A—PCM terminal 1DU — Exhaust gas temperature sensor No.4 terminal B—PCM terminal 1DR — Exhaust gas temperature sensor No.5 terminal A—PCM terminal 1DQ — Exhaust gas temperature sensor No.5 terminal B—PCM terminal 1DZ • Exhaust gas temperature sensor No.1 malfunction • PCM malfunction

STEP	INSPECTION		ACTION
5	INSPECT EXHAUST GAS TEMPERATURE SENSOR CIRCUIT FOR SHORT TO GROUND • Verify that the exhaust gas temperature sensor No.1, exhaust gas temperature sensor No.2, exhaust gas temperature sensor No.3, exhaust gas temperature sensor No.4 and exhaust gas temperature sensor No.5 connectors are disconnected. • Switch the ignition off. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — Exhaust gas temperature sensor No.1 terminal A — Exhaust gas temperature sensor No.2 terminal A — Exhaust gas temperature sensor No.3 terminal A — Exhaust gas temperature sensor No.4 terminal A — Exhaust gas temperature sensor No.5 terminal A • Is there continuity?	Yes	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 the following terminals: — Exhaust gas temperature sensor No.1 terminal A–PCM terminal 1CI — Exhaust gas temperature sensor No.2 terminal A–PCM terminal 1CA — Exhaust gas temperature sensor No.3 terminal A–PCM terminal 1BW — Exhaust gas temperature sensor No.4 terminal A–PCM terminal 1DU — Exhaust gas temperature sensor No.5 terminal A–PCM terminal 1DQ **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-D 2.2].) Go to Step 9.
		No	Go to the next step.

DTC P0102:00 [PCM (SKYACTIV-D 2.2)]

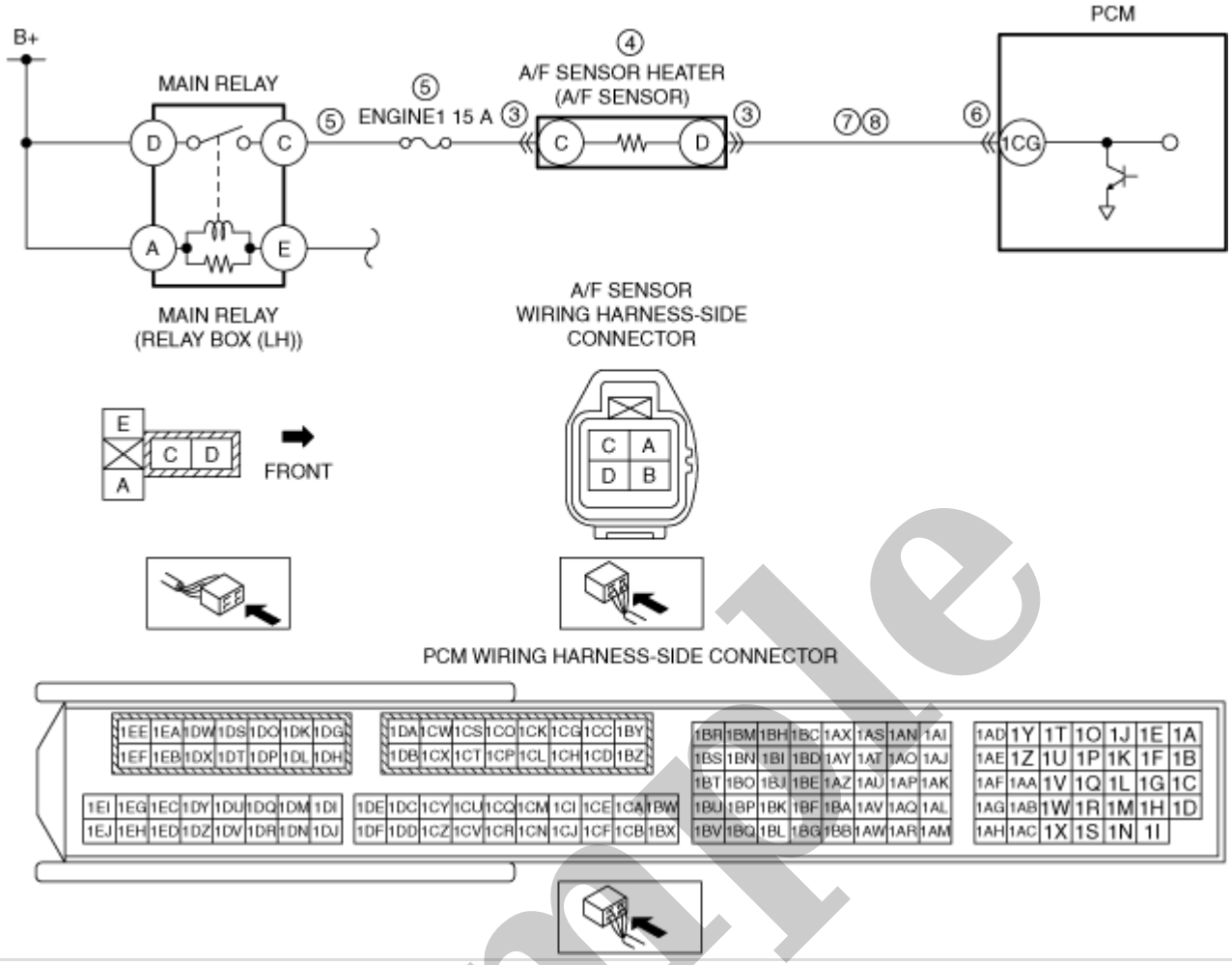
SM2896202

id0102j570090

DTC P0102:00	MAF sensor circuit low input
DETECTION CONDITION	• If the PCM detects that the MAF sensor voltage at the PCM terminal 2U is below 0.29 V for 5 s with the following condition met, the PCM determines that the MAF 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	• PCM restricts engine torque. • Inhibits the automatic diesel particulate filter regeneration control and compulsory diesel particulate filter regeneration control. • Inhibits the DENOx/DESOx control. • Stops activation of the A/F sensor heater. • Inhibits the EGR control. • PCM restricts engine-transaxle integration control.
POSSIBLE CAUSE	• MAF sensor/IAT sensor No.1 connector or terminals malfunction • Short to ground or open circuit in MAF sensor power supply circuit — Short to ground in wiring harness between ENGINE1 15 A fuse and MAF sensor/IAT sensor No.1 terminal E — ENGINE1 15 A fuse malfunction — Open circuit in wiring harness between main relay terminal C and MAF sensor/IAT sensor No.1 terminal E • PCM connector or terminals malfunction • Short to ground in wiring harness between the following terminals: — MAF sensor/IAT sensor No.1 terminal D—PCM terminal 2AC — MAF sensor/IAT sensor No.1 terminal C—PCM terminal 2U • MAF sensor signal circuit and ground circuit are shorted to each other • Open circuit in wiring harness between the following terminals: — MAF sensor/IAT sensor No.1 terminal D—PCM terminal 2AC — MAF sensor/IAT sensor No.1 terminal C—PCM terminal 2U • MAF sensor malfunction • PCM malfunction

STEP	INSPECTION	RESULTS	ACTION
6	**INSPECT MAF SENSOR CIRCUIT FOR SHORT TO GROUND** • Verify that the MAF sensor/IAT sensor No.1 and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — MAF sensor/IAT sensor No.1 terminal D — MAF sensor/IAT sensor No.1 terminal C • Is there continuity?	Yes	Refer to the wiring diagram and verify whether or not there is a common connector between the following terminals: • MAF sensor/IAT sensor No.1 terminal D—PCM terminal 2AC • MAF sensor/IAT sensor No.1 terminal C—PCM terminal 2U **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 10.
		No	Go to the next step.
7	**INSPECT MAF SENSOR SIGNAL CIRCUIT AND GROUND CIRCUIT FOR SHORT TO EACH OTHER** • Verify that the MAF sensor/IAT sensor No.1 and PCM connectors are disconnected. • Inspect for continuity between MAF sensor/IAT sensor No.1 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: • MAF sensor/IAT sensor No.1 terminal C—PCM terminal 2U • MAF sensor/IAT sensor No.1 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 10.
		No	Go to the next step.
8	**INSPECT MAF SENSOR CIRCUIT FOR OPEN CIRCUIT** • Verify that the MAF sensor/IAT sensor No.1 and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — MAF sensor/IAT sensor No.1 terminal D—PCM terminal 2AC — MAF sensor/IAT sensor No.1 terminal C—PCM terminal 2U • 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: • MAF sensor/IAT sensor No.1 terminal D—PCM terminal 2AC • MAF sensor/IAT sensor No.1 terminal C—PCM terminal 2U **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 10.
9	**INSPECT MAF SENSOR** • Reconnect all disconnected connectors. • Inspect the MAF sensor. (See MASS AIR FLOW (MAF) SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the MAF sensor/IAT sensor No.1, then go to the next step. (See MASS AIR FLOW (MAF) SENSOR/INTAKE AIR TEMPERATURE (IAT) SENSOR NO.1 REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.

DTC P0031:00	A/F sensor heater control circuit low input



Diagnostic Procedure

STEP	INSPECTION		ACTION
1	RECORD FREEZE FRAME DATA/SNAPSHOT DATA AND DIAGNOSTIC MONITORING TEST RESULTS 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 and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor related) 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 P0032:00 [PCM (SKYACTIV-D 2.2)]

SM2896200

id0102j570050

DTC P0032:00	A/F sensor heater control circuit high input
DETECTION CONDITION	• If the PCM detects that the A/F sensor heater control circuit voltage is above the specified value for 5 s with the following condition met, the PCM determines that the A/F sensor heater control circuit voltage is high. MONITORING CONDITIONS — Battery voltage: 10 V or more — A/F sensor heater control duty value: 10% or more Diagnostic support note • This is a continuous monitor (A/F sensor). • 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	• PCM restricts engine torque. • Inhibits the automatic diesel particulate filter regeneration control and compulsory diesel particulate filter regeneration control. • Inhibits the DENOx/DESOx control. • Stops activation of the A/F sensor heater. • Inhibits the EGR control.
POSSIBLE CAUSE	• A/F sensor connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between A/F sensor terminal D and PCM terminal 1CG • A/F sensor heater malfunction • PCM malfunction