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1991 MAZDA 323 (BF) Station Wagon OEM Service and Repair Workshop Manual

Go to manual page

DTC P0506:00	Idle speed control system: RPM lower than expected
POSSIBLE CAUSE	• Fuel freezing • Intake air system malfunction (air suction, leakage, perforation) • Fuel system malfunction — Fuel injector No.1–No.4 malfunction — Fuel injector No.1–No.4 connectors or terminals malfunction — Fuel leakage from fuel system or trapped air — Supply pump malfunction — Fuel feed valve malfunction — Fuel check valve malfunction — Fuel pressure relief valve malfunction — Fuel pipe improper routing (improper connection) — Fuel filter clogged • Erratic signal to PCM — CKP sensor malfunction — Engine oil temperature sensor malfunction • EGR valve malfunction • EGR cooler bypass valve malfunction • Refrigerant pressure sensor malfunction • Engine mechanical system malfunction — Large mechanical resistance — Insufficient engine compression — Improper valve timing — Engine oil malfunction (oil working up or down/poor engine oil quality/improper engine oil level/dilution) — Piston ring malfunction — Slippage of belts for engine accessories — Excessive load on generator • A/C relay malfunction • Magnetic clutch (A/C system) malfunction • A/C compressor malfunction • ATX malfunction • NSC (NOx Storage Catalyst) malfunction (deterioration) • PCM malfunction • Misfire
SYSTEM WIRING DIAGRAM	Not applicable

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.

Diagnostic Procedure

STEP	INSPECTION		ACTION
14	**INSPECT EGR VALVE** • Inspect the EGR valve. (See EGR VALVE INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the EGR valve, then go to Step 28. (See EGR VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
15	**INSPECT EGR VALVE POSITION SENSOR** • Reconnect all disconnected connectors. • Inspect the EGR valve position sensor. (See EGR VALVE POSITION SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the EGR valve, then go to Step 28. (See EGR VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
16	**INSPECT EGR COOLER BYPASS VALVE** • Inspect the EGR cooler bypass valve. (See EGR COOLER BYPASS VALVE INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the EGR cooler bypass valve, then go to Step 28. (See EGR COOLER BYPASS VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
17	**INSPECT EGR COOLER BYPASS VALVE POSITION SENSOR** • Reconnect all disconnected connectors. • Inspect the EGR cooler bypass valve position sensor. (See EGR VALVE POSITION SENSOR INSPECTION [SKYACTIV-D 2.2] • Is there any malfunction?	Yes	Replace the EGR cooler bypass valve, then go to Step 28. (See EGR COOLER BYPASS VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
18	**INSPECT ENGINE OIL TEMPERATURE SENSOR** • Inspect the engine oil temperature sensor. (See ENGINE OIL TEMPERATURE SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the engine oil temperature sensor/engine oil pressure sensor, then go to Step 28. (See ENGINE OIL TEMPERATURE SENSOR/ENGINE OIL PRESSURE SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
19	**INSPECT REFRIGERANT PRESSURE SENSOR** • Inspect the refrigerant pressure sensor. (See REFRIGERANT PRESSURE SENSOR INSPECTION [MANUAL AIR CONDITIONER].) (See REFRIGERANT PRESSURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].) • Is there any malfunction?	Yes	Replace the refrigerant pressure sensor, then go to Step 28. (See REFRIGERANT PRESSURE SENSOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].) (See REFRIGERANT PRESSURE SENSOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)
		No	Go to the next step.
20	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (See COMPRESSION INSPECTION [SKYACTIV-D 2.2].) • Are compression pressures within specification?	Yes	Go to Step 22.
		No	Go to the next step.
21	**INSPECT FOR MALFUNCTION DUE TO DEVIATED VALVE TIMING** • Inspect the valve timing (timing chain installation condition). (See TIMING CHAIN REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) • Is the valve timing normal?	Yes	Go to the next step.
		No	Adjust the valve timing to the correct timing, then go to Step 28. (See TIMING CHAIN REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)

DTC P0602:00 [PCM (SKYACTIV-D 2.2)]

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DTC P0602:00	PCM Programming Error
DETECTION CONDITION	• With the following conditions met, the vehicle recognition is not stored in the PCM for a continuous 1 s. MONITORING CONDITIONS • When all of the following conditions are met: — Ignition switched ON (engine off or on) 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	• Configuration has not been completed • PCM connector or terminals malfunction • PCM malfunction
SYSTEM WIRING DIAGRAM	Not applicable

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.
3	PERFORM PCM CONFIGURATION • Perform the PCM configuration (using read/write function). (See PCM CONFIGURATION (USING READ/WRITE FUNCTION) [SKYACTIV-D 2.2].) • Clear the DTC from the PCM memory using the M-MDS. (See CLEARING DTC [PCM (SKYACTIV-D 2.2)].) • Perform the DTC Reading Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].) • Is the same DTC present?	Yes	Go to the next step.
		No	Go to Step 6.

DTC P0507:00	Idle speed control system: RPM higher than expected
POSSIBLE CAUSE	• Fuel freezing • Intake air system malfunction (air suction, leakage, perforation) • Fuel system malfunction — Fuel injector No.1–No.4 malfunction — Fuel injector No.1–No.4 connectors or terminals malfunction — Fuel leakage from fuel system or trapped air — Supply pump malfunction — Fuel feed valve malfunction — Fuel check valve malfunction — Fuel pressure relief valve malfunction — Fuel pipe improper routing (improper connection) — Fuel filter clogged • Erratic signal to PCM — CKP sensor malfunction — Engine oil temperature sensor malfunction • EGR valve malfunction • EGR cooler bypass valve malfunction • Refrigerant pressure sensor malfunction • Engine mechanical system malfunction — Large mechanical resistance — Insufficient engine compression — Improper valve timing — Engine oil malfunction (oil working up or down/poor engine oil quality/improper engine oil level/dilution) — Piston ring malfunction — Slippage of belts for engine accessories — Excessive load on generator • A/C relay malfunction • Magnetic clutch (A/C system) malfunction • A/C compressor malfunction • ATX malfunction • NSC (NOx Storage Catalyst) malfunction (deterioration) • PCM malfunction
SYSTEM WIRING DIAGRAM	Not applicable

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.

Diagnostic Procedure

STEP	INSPECTION		ACTION
16	**INSPECT EGR COOLER BYPASS VALVE POSITION SENSOR** • Reconnect all disconnected connectors. • Inspect the EGR cooler bypass valve position sensor. (See EGR VALVE POSITION SENSOR INSPECTION [SKYACTIV-D 2.2] • Is there any malfunction?	Yes	Replace the EGR cooler bypass valve, then go to Step 26. (See EGR COOLER BYPASS VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
17	**INSPECT ENGINE OIL TEMPERATURE SENSOR** • Inspect the engine oil temperature sensor. (See ENGINE OIL TEMPERATURE SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the engine oil temperature sensor/engine oil pressure sensor, then go to Step 26. (See ENGINE OIL TEMPERATURE SENSOR/ENGINE OIL PRESSURE SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
18	**INSPECT REFRIGERANT PRESSURE SENSOR** • Inspect the refrigerant pressure sensor. (See REFRIGERANT PRESSURE SENSOR INSPECTION [MANUAL AIR CONDITIONER].) (See REFRIGERANT PRESSURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].) • Is there any malfunction?	Yes	Replace the refrigerant pressure sensor, then go to Step 26. (See REFRIGERANT PRESSURE SENSOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].) (See REFRIGERANT PRESSURE SENSOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)
		No	Go to the next step.
19	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (See COMPRESSION INSPECTION [SKYACTIV-D 2.2].) • Are compression pressures within specification?	Yes	Go to Step 22.
		No	Go to the next step.
20	**INSPECT FOR MALFUNCTION DUE TO DEVIATED VALVE TIMING** • Inspect the valve timing (timing chain installation condition). (See TIMING CHAIN REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) • Is the valve timing normal?	Yes	Go to the next step.
		No	Adjust the valve timing to the correct timing, then go to Step 26. (See TIMING CHAIN REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
21	**INSPECT FOR MALFUNCTION DUE TO INTERNAL ENGINE WEAR, DAMAGE** • Inspect for the following engine internal parts: — Cylinder — Piston ring — Intake valve — Exhaust valve — Such as cylinder head gasket • Are all items normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 26.
22	**INSPECT DRIVE BELT** • Inspect the drive belt. (See DRIVE BELT INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the drive belt, then go to Step 26. (See DRIVE BELT REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
23	**INSPECT GENERATOR** • Inspect the generator. (See GENERATOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the generator, then go to the next step. (See GENERATOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	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.

STEP	INSPECTION		ACTION
3	INSPECT EGR COOLER BYPASS VALVE CONNECTOR CONDITION • Switch the ignition off. • Disconnect the EGR cooler bypass valve 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.
4	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.
5	INSPECT EGR COOLER BYPASS VALVE CIRCUIT FOR OPEN CIRCUIT • Verify that the EGR cooler bypass valve and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — EGR cooler bypass valve terminal E—PCM terminal 1BH — EGR cooler bypass valve terminal A—PCM terminal 1BC • 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: • EGR cooler bypass valve terminal E—PCM terminal 1BH • EGR cooler bypass valve terminal A—PCM terminal 1BC 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.
6	INSPECT EGR COOLER BYPASS VALVE CIRCUIT FOR SHORT TO GROUND • Verify that the EGR cooler bypass valve and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — EGR cooler bypass valve terminal E — EGR cooler bypass valve terminal A • Is there continuity?	Yes	Refer to the wiring diagram and verify whether or not there is a common connector between the following terminals: • EGR cooler bypass valve terminal E—PCM terminal 1BH • EGR cooler bypass valve terminal A—PCM terminal 1BC 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.

DTC P151B:00	Idle speed control system: RPM lower than expected
POSSIBLE CAUSE	• Fuel freezing • Intake air system malfunction (air suction, leakage, perforation) • Fuel system malfunction — Fuel injector No.1–No.4 malfunction — Fuel injector No.1–No.4 connectors or terminals malfunction — Fuel leakage from fuel system or trapped air — Supply pump malfunction — Fuel feed valve malfunction — Fuel check valve malfunction — Fuel pressure relief valve malfunction — Fuel pipe improper routing (improper connection) — Fuel filter clogged • Erratic signal to PCM — CKP sensor malfunction — Engine oil temperature sensor malfunction • EGR valve malfunction • EGR cooler bypass valve malfunction • Refrigerant pressure sensor malfunction • Engine mechanical system malfunction — Large mechanical resistance — Insufficient engine compression — Improper valve timing — Engine oil malfunction (oil working up or down/poor engine oil quality/improper engine oil level/dilution) — Piston ring malfunction — Slippage of belts for engine accessories — Excessive load on generator • A/C relay malfunction • Magnetic clutch (A/C system) malfunction • A/C compressor malfunction • ATX malfunction • NSC (NOx Storage Catalyst) malfunction (deterioration) • Misfire • PCM malfunction
SYSTEM WIRING DIAGRAM	Not applicable

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.

Diagnostic Procedure

STEP	INSPECTION		ACTION
15	**INSPECT EGR COOLER BYPASS VALVE** • Inspect the EGR cooler bypass valve. (See EGR COOLER BYPASS VALVE INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the EGR cooler bypass valve, then go to Step 27. (See EGR COOLER BYPASS VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
16	**INSPECT EGR COOLER BYPASS VALVE POSITION SENSOR** • Reconnect all disconnected connectors. • Inspect the EGR cooler bypass valve position sensor. (See EGR COOLER BYPASS VALVE POSITION SENSOR INSPECTION [SKYACTIV-D 2.2] • Is there any malfunction?	Yes	Replace the EGR cooler bypass valve, then go to Step 27. (See EGR COOLER BYPASS VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
17	**INSPECT ENGINE OIL TEMPERATURE SENSOR** • Inspect the engine oil temperature sensor. (See ENGINE OIL TEMPERATURE SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the engine oil temperature sensor/engine oil pressure sensor, then go to Step 27. (See ENGINE OIL TEMPERATURE SENSOR/ENGINE OIL PRESSURE SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
18	**INSPECT REFRIGERANT PRESSURE SENSOR** • Inspect the refrigerant pressure sensor. (See REFRIGERANT PRESSURE SENSOR INSPECTION [MANUAL AIR CONDITIONER].) (See REFRIGERANT PRESSURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].) • Is there any malfunction?	Yes	Replace the refrigerant pressure sensor, then go to Step 27. (See REFRIGERANT PRESSURE SENSOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].) (See REFRIGERANT PRESSURE SENSOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)
		No	Go to the next step.
19	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (See COMPRESSION INSPECTION [SKYACTIV-D 2.2].) • Are compression pressures within specification?	Yes	Go to Step 22.
		No	Go to the next step.
20	**INSPECT FOR MALFUNCTION DUE TO DEVIATED VALVE TIMING** • Inspect the valve timing (timing chain installation condition). (See TIMING CHAIN REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) • Is the valve timing normal?	Yes	Go to the next step.
		No	Adjust the valve timing to the correct timing, then go to Step 27. (See TIMING CHAIN REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
21	**INSPECT FOR MALFUNCTION DUE TO INTERNAL ENGINE WEAR, DAMAGE** • Inspect for the following engine internal parts: — Cylinder — Piston ring — Intake valve — Exhaust valve — Such as cylinder head gasket • Are all items normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results then go to Step 27.
22	**INSPECT DRIVE BELT** • Inspect the drive belt. (See DRIVE BELT INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the drive belt, then go to Step 27. (See DRIVE BELT REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.