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1992 MAZDA 323 (BG) Hatchback OEM Service and Repair Workshop Manual

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STEP	INSPECTION	RESULTS	ACTION
4	PURPOSE: INSPECT NOx SENSOR NO.1 CIRCUIT FOR OPEN CIRCUIT • Verify that the NOx sensor No.1 and dosing control unit connectors are disconnected. • Switch the ignition off. • Inspect for continuity between the following terminals (wiring harness-side): — NOx sensor No.1 terminal B–dosing control unit terminal BK — NOx sensor No.1 terminal C–dosing control unit terminal BL • Is there continuity?	Yes	Replace the NOx sensor No.1, then go to the next step. (See NOx SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Refer to the wiring diagram and verify whether or not there is a common connector between the following terminals: • NOx sensor No.1 terminal B–dosing control unit terminal BK • NOx sensor No.1 terminal C–dosing control unit terminal BL 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 the next step.
5	PURPOSE: VERIFICATION OF VEHICLE REPAIR COMPLETION • Clear the DTC from the dosing control unit memory using the M-MDS. (See CLEARING DTC [DOSING CONTROL UNIT (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 [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].) • Is the same Pending DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the dosing control unit. (See DOSING CONTROL UNIT REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) Go to the next step.
		No	Go to the next step.
6	PURPOSE: VERIFY IF THERE IS ANY OTHER MALFUNCTION • Is any other DTC or pending code stored?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].)
		No	DTC troubleshooting completed.

STEP	INSPECTION	RESULTS	ACTION
3	PURPOSE: VERIFY IF DIAGNOSTIC RESULT IS AFFECTED BY OTHER RELATED DTCs OCCURRING - Switch the ignition off, then ON (engine off). - Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. - Is the PENDING CODE/DTC P2200:00 or U029D:00 also present?	Yes	Go to the applicable DTC inspection. (See DTC P2200:00 [DOSING CONTROL UNIT (SKYACTIV-D 2.2)] .) (See DTC U029D:00 [DOSING CONTROL UNIT (SKYACTIV-D 2.2)] .) Repair or replace the applicable wiring harness or connector parts. Go to the troubleshooting procedure to perform the procedure from Step 2.
		No	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 [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].) - Is the PENDING CODE/DTC P0301:00, P0302:00, P0303:00 or P0304:00 also present?	Yes	Go to the applicable DTC inspection. (See DTC P0301:00, P0302:00, P0303:00, P0304:00 [PCM (SKYACTIV-D 2.2)] .) Repair or replace the applicable wiring harness or connector parts. Go to the troubleshooting procedure to perform the procedure from Step 4.
		No	Go to the next step.
5	PURPOSE: VERIFY IF THERE IS PID ITEM CAUSING DRASTIC CHANGES OF ACCELERATION FLUCTUATION BY INPUT SIGNAL TO PCM OR DOSING CONTROL UNIT - Access the following PIDs using the M-MDS: (See ON-BOARD DIAGNOSTIC TEST [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].) — NOX_C_B1S1 - Is there any signal that is far out of specification?	Yes	Go to the next step.
		No	Go to Troubleshooting Diagnostic Procedure to perform the procedure from step 1.
6	PURPOSE: VERIFY CONNECTOR CONNECTIONS - Access the following PIDs using the M-MDS: (See ON-BOARD DIAGNOSTIC TEST [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].) — NOX_C_B1S1 - When the following parts are shaken, does the PID value include a PID item which has changed? — NOx sensor No.1 — Dosing control unit	Yes	Inspect the related wiring harness and connector. • Repair or replace the malfunctioning part.
		No	Go to Troubleshooting Diagnostic Procedure to perform the procedure from step 1.

Troubleshooting Diagnostic Procedure

Intention of troubleshooting procedure

• Step 1

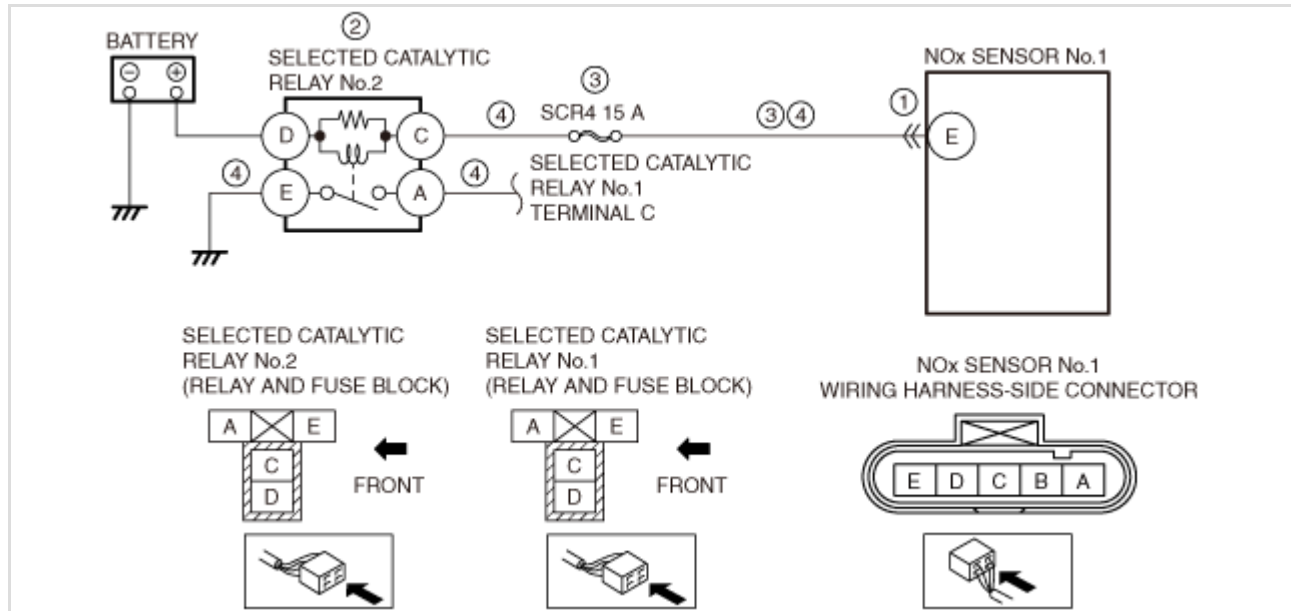
— Perform inspection of NOx sensor No.1.

• Step 2

— Verify the inspection of the piping for the exhaust system.

• Step 3–4

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



Function Explanation (DTC Detection Outline)

- NOx sensor No.1 performs diagnosis independently and if it detects a power supply voltage malfunction, it sends a malfunction signal to the dosing control unit. When the malfunction signal is received from NOx sensor No.1, the dosing control unit stores a DTC.

Repeatability Verification Procedure

1.Perform the "COMPULSORY DIESEL PARTICULATE FILTER REGENERATION". (See [COMPULSORY DIESEL PARTICULATE FILTER REGENERATION \[SKYACTIV-D 2.2\].](#))

2.Idle the engine for 30 s.

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.
		No	Go to the next step.
2	PURPOSE: IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA • Is the DTC P220A: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 [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].)

DTC P2203:00 [DOSING CONTROL UNIT (SKYACTIV-D 2.2)]

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Note

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

DTC P2203:00	NOx sensor No.1 (NOx oxygen concentration) circuit high input	
DETECTION CONDITION	Determination conditions	• The NOx concentration output by NOx sensor No.1 exceeds 2,900 ppm for a continuous 8.0 s.
	Preconditions	• NOx sensor No.1 is activating • Catalytic converter internal temperature 320 degrees C or less • Ignition has been switched ON (engine on) for 20 s or more • Diesel particulate filter regeneration control is not operating and 5 min have elapsed since diesel particulate filter regeneration was completed • Battery voltage: 10.9–16.0 V • Ignition switched ON (engine on) • The following DTCs are not detected: — NOx sensor No.1: P2200:00, U029D:00
	Drive cycle	• 1
	Self test type	• CMDTC self test
	Sensor used	• NOx sensor No.1 • Dosing control unit
FAIL-SAFE FUNCTION	• Restricts the maximum remaining distance to empty. • Limits the upper limit of the engine speed.	
VEHICLE STATUS WHEN DTCs ARE OUTPUT	• DTC P2BAF:00 is also stored in the PCM and the vehicle speed is restricted. • DTC P1640:00 is also stored in the PCM.	
POSSIBLE CAUSE	• NOx sensor No.1 connector or terminals malfunction • Dosing control unit connector or terminals malfunction • NOx sensor No.1 malfunction • Dosing control unit malfunction	

Function Explanation (DTC Detection Outline)

- The dosing control unit receives the NOx concentration in the exhaust gas based on the NOx sensor No.1 signal. The dosing control unit determines a NOx sensor No.1 signal error and stores a DTC based on a condition continuing for 8 s in which the NOx concentration detected by NOx sensor No.1 exceeds 2,900 ppm.

Repeatability Verification Procedure

1.Perform the "COMPULSORY DIESEL PARTICULATE FILTER REGENERATION". (See [COMPULSORY DIESEL PARTICULATE FILTER REGENERATION \[SKYACTIV-D 2.2\]](#).)

2.Idle the engine for 10 min.

PID Item/Simulation Item Used In Diagnosis

DTC P2204:00 [DOSING CONTROL UNIT (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

DESCRIPTION	Continuous monitoring of NOx sensor No.1 signal validity	
DETECTION CONDITION	Determination conditions	• A slow communication time of the NOx sensor No.1 signal, measured by the dosing control unit, was repeated 2 times.
	Preconditions	• All of the following conditions are met for 110 s or more: — Target heat amount of NOx sensor: 18–1000 kJ • Battery voltage: 10.9–16.0 V • Exhaust gas temperature sensor No.5: 849.96 °C {1561.9 °F} or less • CAN communication is normal at engine start for a continuous 20 s or more • Fuel injection amount: -0.4–11.2 mg/stroke • All of the following conditions are met for 2 s or more: — Modeled Air/fuel ratio of NOx sensor No.1: 1.3 or more • A/F sensor is active • The following DTCs are not detected: — Boost air temperature sensor: P007B:00, P007C:00, P007D:00 — IAT sensor No.2: P00E9:00, P00EA:00, P00EB:00 — MAF sensor: P0101:00, P0102:00, P0103:00 — MAP sensor No.2: P0106:00, P0107:00, P0108:00 — ECT sensor: P0116:00, P0117:00, P0118:00, P011A:00 — Intake shutter valve position sensor: P0122:00, P0123:00 — A/F sensor: P0031:00, P0032:00, P0053:00, P0130:00, P0131:00, P0132:00, P0133:00, P0134:00, P2195:00, P2196:00 — Exhaust gas pressure sensor No.1: P0471:00, P0472:00, P0473:00, P0545:00, P0546:00 — NOx sensor No.1: P06EA:00, P2200:00, P220A:00, P220B:00, P220E:00, P229E:00, P22A0:00, P22A1:00 — Exhaust gas temperature sensor: P161D:00, P161E:00, P166E:00 — Exhaust gas temperature sensor No.2: P2031:00, 2032:00, P2033:00, P2080:00 — BARO sensor: P2227:00, P2228:00, P2229:00 — PM sensor: P2453:00, P2454:00, P2455:00 — Exhaust gas temperature sensor No.5: P2481:00, P2482:00, P2483:00 — CAN system communication error: U0100:00, U029D:00, U029E:00
	Drive cycle	• 1
	Self test type	• CMDTC self test
	Sensor used	• NOx sensor No.1 • Dosing control unit
FAIL-SAFE FUNCTION	• Restricts the maximum remaining distance to empty. • Limits the upper limit of the engine speed.	

• Step 3–4

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

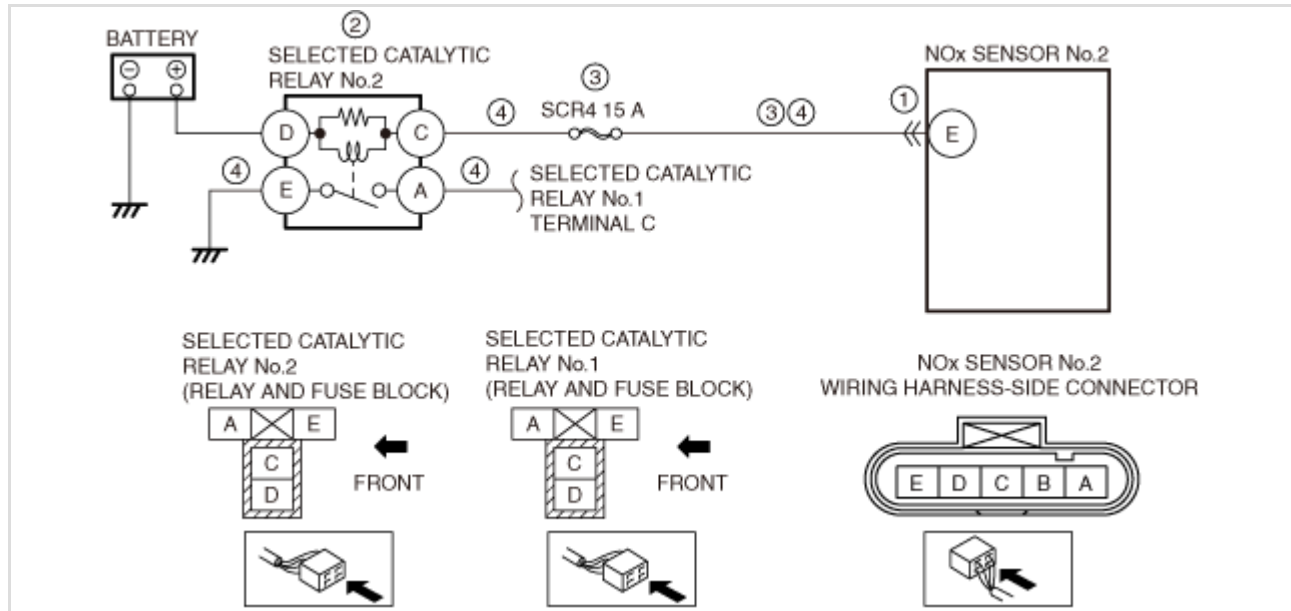
STEP	INSPECTION	RESULTS	ACTION
1	PURPOSE: DETERMINE INTEGRITY OF EXHAUST GAS TEMPERATURE SENSOR No.5 • Inspect the exhaust gas temperature sensor No.5. (See EXHAUST GAS TEMPERATURE SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the exhaust gas temperature sensor No.5, then go to Step 3. (See NOx SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
2	PURPOSE: DETERMINE INTEGRITY OF NOx SENSOR No.1 • Inspect the NOx sensor No.1. (See NOx SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the NOx sensor No.1, then go to the next step. • (See NOx SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) Go to the next step.
		No	Go to the next step.
3	PURPOSE: VERIFICATION OF VEHICLE REPAIR COMPLETION • Always reconnect all disconnected connectors. • Clear the DTC from the dosing control unit memory using the M-MDS. (See CLEARING DTC [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].) • Implement the repeatability verification procedure. (See -2 Repeatability Verification Procedure.) • Perform the Pending Trouble Code Access Procedure. (See ON-BOARD DIAGNOSTIC TEST [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].) • Is the same Pending DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the dosing control unit. (See DOSING CONTROL UNIT REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) Go to the next step.
		No	Go to the next step.
4	PURPOSE: VERIFY IF THERE IS ANY OTHER MALFUNCTION • Is any other DTC or pending code stored?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].)
		No	DTC troubleshooting completed.

STEP	INSPECTION	RESULTS	ACTION
4	PURPOSE: VERIFY IF THERE IS PID ITEM CAUSING DRASTIC CHANGES OF ACCELERATION FLUCTUATION BY INPUT SIGNAL TO PCM OR DOSING CONTROL UNIT • Access the following PIDs using the M-MDS: (See ON-BOARD DIAGNOSTIC TEST [DOSING CONTROL UNIT (SKYACTIV-D 2.2)] .) — NOX_C_B1S2 • Is there any signal that is far out of specification?	Yes	Go to the next step.
		No	Go to Troubleshooting Diagnostic Procedure to perform the procedure from step 1.
5	PURPOSE: VERIFY CONNECTOR CONNECTIONS • Access the following PIDs using the M-MDS: (See ON-BOARD DIAGNOSTIC TEST [DOSING CONTROL UNIT (SKYACTIV-D 2.2)] .) — NOX_C_B1S2 • When the following parts are shaken, does the PID value include a PID item which has changed? — NOx sensor No.2 — Dosing control unit	Yes	Inspect the related wiring harness and connector. • Repair or replace the malfunctioning part.
		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 NOx sensor No.2.
- Step 2–3
 - Verify that the primary malfunction is resolved and there are no other malfunctions.



Function Explanation (DTC Detection Outline)

- NOx sensor No.2 performs diagnosis independently and if it detects a power supply voltage malfunction, it sends a malfunction signal to the dosing control unit. When the malfunction signal is received from NOx sensor No.2, the dosing control unit stores a DTC.

Repeatability Verification Procedure

- 1.Perform the "COMPULSORY DIESEL PARTICULATE FILTER REGENERATION". (See [COMPULSORY DIESEL PARTICULATE FILTER REGENERATION \[SKYACTIV-D 2.2\].](#))
- 2.Idle the engine for 30 s.

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.
2	PURPOSE: IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA • Is the DTC P220B: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 [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].)

DTC P220E:00 [DOSING CONTROL UNIT (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

DESCRIPTION	NOx Sensor No.1 heater: performance problem	
DETECTION CONDITION	Determination conditions	• The heater built-into NOx sensor No.1 is not activating normally for a continuous 80 s or more.
	Preconditions	• Target heat amount: 8–1000 kJ • Battery voltage: 10.9–16 V • Exhaust gas temperature sensor No.5: 849.96 °C {1561.9 °F} or less • CAN communication is normal at engine start for a continuous 20 s or more • Ignition switched ON (engine run) • The following DTCs are not detected: — NOx sensor No.1: P2200:00, P2205:00, P220A:00, U029D:00
	Drive cycle	• 2
	Self test type	• CMDTC self test
	Sensor used	• NOx sensor No.1
FAIL-SAFE FUNCTION	• Restricts the maximum remaining distance to empty. • Limits the upper limit of the engine speed.	
VEHICLE STATUS WHEN DTCs ARE OUTPUT	• Illuminates selective catalytic reduction (SCR) warning light. • DTC P1640:00 is also stored in the PCM.	
POSSIBLE CAUSE	• NOx sensor No.1 connector or terminals malfunction • Dosing control unit connector or terminals malfunction • Short to ground or open circuit in NOx sensor No.1 power supply circuit — Short to ground in wiring harness between SCR4 15 A fuse and NOx sensor No.1 terminal E — SCR4 15 A fuse malfunction — Open circuit in wiring harness between selected catalytic relay No.2 terminal C and NOx sensor No.1 terminal E • Open or short circuit in wiring harness between the following terminals: — NOx sensor No.1 terminal B–dosing control unit terminal BK — NOx sensor No.1 terminal C–dosing control unit terminal BL — NOx sensor No.1 terminal D–body GND • NOx sensor No.1 malfunction — NOx sensor No.1 internal heater malfunction — NOx sensor No.1 control unit malfunction • Dosing control unit malfunction	

System Wiring Diagram