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1992 MAZDA 626 (Mk.5) Sedan OEM Service and Repair Workshop Manual

Go to manual page

Sample

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DESCRIPTION	NOx sensor No.2: NOx concentration is too low
POSSIBLE CAUSE	• NOx sensor No.2 connector or terminals malfunction • Dosing control unit connector or terminals malfunction • NOx sensor No.2 malfunction • Dosing control unit malfunction

System Wiring Diagram

• Not applicable

Function Explanation (DTC Detection Outline)

• The dosing control unit detects the NOx concentration in the exhaust gas based on the NOx sensor No.2 signal.
• If the NOx value detected by NOx sensor No.2 during deceleration fuel cut is too low, 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.Perform acceleration/deceleration 5 times or more repeatedly at a vehicle speed of 80 km/h {50 mph} or less.

PID Item/Simulation Item Used In Diagnosis

PID/DATA monitor item table

–: Not applicable

Item	Definition	Unit	Condition/Specification
NOX_C_B1S2	NOx sensor No.2	– (ppm)	• Displays the exhaust gas NOx concentration after SCR converter

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.

Sample

DTC P22A1:00 [DOSING CONTROL UNIT (SKYACTIV-D 2.2)]

SM2896387

id0102k172750

Details On DTCs

DESCRIPTION	NOx sensor No.2 circuit high input	
DETECTION CONDITION	Determination conditions	• When any of the following conditions is met: — The NOx concentration output by NOx sensor No.2 is more than 2,900 ppm for a continuous 8 s. — The oxygen concentration output by NOx sensor No.2 is more than 0.29 lambda for a continuous 0.5 s.
	Preconditions	• CAN communication condition is normal • Diesel particulate filter regeneration control is not operating for a continuous 5 min or more. • Battery voltage: 10.9–16 V • Ignition switched ON (engine off or on) • Catalytic converter internal temperature 320 °C or less • The following DTCs is not detected: — P229E:00, U029E:00
	Drive cycle	• 1
	Self test type	• CMDTC self test
	Sensor used	• NOx sensor No.2 • 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 P1640:00 is also stored in the PCM.	
POSSIBLE CAUSE	• NOx sensor No.2 connector or terminals malfunction • Dosing control unit connector or terminals malfunction • CAN communication line between NOx sensor No.2 and dosing control unit malfunction — NOx sensor No.2 terminal B–dosing control unit terminal BK — NOx sensor No.2 terminal C–dosing control unit terminal BL • NOx sensor No.2 malfunction • Dosing control unit malfunction	

System Wiring Diagram

• Not applicable

Function Explanation (DTC Detection Outline)

• The dosing control unit receives the NOx concentration and oxygen concentration based on the NOx sensor No.1 signal.
• If the NOx concentration or the oxygen concentration exceeds the threshold estimated from the engine performance, the dosing control unit stores a DTC.

Repeatability Verification Procedure

Sample

STEP	INSPECTION	RESULTS	ACTION
2	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 contro unit. (See DOSING CONTROL UNIT REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) Go to the next step.
		No	Go to the next step.
3	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.

Sample

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: 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 (NOx sensor No.2) on the repair order.	–	Go to the next step.
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 P220B:00 or U029E:00 also present?	Yes	Go to the applicable DTC inspection. (See DTC P220B:00 [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].) (See DTC U029E: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 5.
		No	Go to the next step.
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_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.
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_B1S1 • 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 2–4

Sample

DTC P229F:00 [DOSING CONTROL UNIT (SKYACTIV-D 2.2)]

SM2896385

id0102k172730

Note

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

Details On DTCs

DESCRIPTION	**NOx sensor No.2 system: NOx concentration malfunction**	
DETECTION CONDITION	Determination conditions	• With the following conditions met, the value of the NOx sensor No.2 on-board diagnostic result is not within the specified value 2 times.
	Preconditions	• Exhaust gas temperature sensor No.5: 849.96 °C {1561.9 °F} or less for 30 s or more • Engine speed: 0−1,500 rpm for 4 s or more • Diesel particulate filter regeneration control is performed for 10 min or more • Vehicle speed: 1 km/h {0.6 mph} • Diesel particulate filter regeneration control is not operating • DeNOx control is not operating (After DeNOx control is completed, diagnostics are stopped for 30 s period at maximum) • DeSOx control is not operating • Condition in which exhaust gas flow amount is within specified value and diesel exhaust fluid (DEF) dosing amount is specified value or more for specified time or more does not occur. • NOx sensor No.2 heater temperature is normal • NOx sensor No.2 supply voltage is normal • Battery voltage: 10.9−16 V • The following DTCs are not detected: — NOx sensor No.2: P220B:00, P220F:00, P229E:00, P22A0:00, P22A1:00, U029E:00 — Urea injector: P202E:00, P2047:00, P2048:00, P2049:00 — DEF pump: P20FA:00, P20FB:00, P20FC:00, P20FD:00
	Drive cycle	• 2
	Self test type	• CMDTC self test
	Sensor used	• NOx sensor No.2
FAIL-SAFE FUNCTION	• Not applicable	
VEHICLE STATUS WHEN DTCs ARE OUTPUT	• Illuminates selective catalytic reduction (SCR) warning light.	
POSSIBLE CAUSE	• NOx sensor No.2 connector or terminals malfunction • Dosing control unit connector or terminals malfunction • NOx sensor No.2 loose • Exhaust gas leakage from exhaust system • NOx sensor No.2 malfunction — NOx sensor No.2 control unit malfunction — Deterioration due to soot/moisture adhering to PM sensor — Characteristics malfunction • Dosing control unit malfunction	

System Wiring Diagram

Sample

STEP	INSPECTION	RESULTS	ACTION
1	**PURPOSE: INSPECT INSTALLATION OF NOx SENSOR NO.2** • Inspect installation of NOx sensor No.2. • Is the NOx sensor No.2 installed securely?	Yes	Go to the next step.
		No	Retighten the NOx sensor No.2, then go to Step 3. (See NOx SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
2	**PURPOSE: VERIFY IF MALFUNCTION RELATED TO EMISSION SYSTEM AFFECTS NOx SENSOR NO.2 SIGNAL** • Inspect for exhaust gas leakage from the exhaust system. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to the next step.
		No	Replace the NOx sensor No.2, then go to the next step. (See NOx SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
3	**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.
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.

Sample

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: 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 (NOx sensor No.2) on the repair order.	–	Go to the next step.
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 P220B:00 or U029E:00 also present?	Yes	Go to the applicable DTC inspection. (See DTC P220B:00 [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].) (See DTC U029E: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 5.
		No	Go to the next step.
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

Sample

STEP	INSPECTION	RESULTS	ACTION
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.

Sample

STEP	INSPECTION	RESULTS	ACTION
13	**INSPECT EXHAUST CMP SENSOR PULSE WHEEL** • Visually inspect the exhaust CMP sensor pulse wheel. • Is there any damage or scratching on the exhaust CMP sensor pulse wheel?	Yes	Replace the exhaust CMP sensor pulse wheel, then go to Step 16.
		No	Go to the next step.
14	**INSPECT EXHAUST CMP SENSOR** • Reconnect all disconnected connectors. • Inspect the exhaust CMP sensor. (See CAMSHAFT POSITION (CMP) SENSOR INSPECTION [SKYACTIV-G 2.5T].) • Is there any malfunction?	Yes	Replace the exhaust CMP sensor, then go to Step 16. (See CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].)
		No	Go to the next step.
15	**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 the next step.
		No	Go to the next step.
16	**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-G 2.5T)].) • Start the engine and warm it up completely. • Perform the Pending Trouble Code Access Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5T)].) • Is the same Pending DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5T].) Go to the next step.
		No	Go to the next step.
17	**VERIFY AFTER REPAIR PROCEDURE** • Perform the "AFTER REPAIR PROCEDURE". (See AFTER REPAIR PROCEDURE [PCM (SKYACTIV-G 2.5T)].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5T)].)
		No	DTC troubleshooting completed.

Sample