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1988 MAZDA 626 (Mk.3) Hatchback OEM Service and Repair Workshop Manual

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DTC P2A00:00 [PCM (SKYACTIV-D 2.2)]

SM2896184

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STEP	INSPECTION	RESULTS	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 SERVICE INFORMATION AVAILABILITY** • Verify related Service Bulletins and/or on-line repair information availability. • Is any related Service 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	**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 10.
		No	Go to the next step.
4	**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 10. (See NOx SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
5	**INSPECT EXHAUST SYSTEM FOR LEAKAGE** • Visually 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 Step 10.
		No	Go to the next step.
6	**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.

DTC P3301:00 [PCM (SKYACTIV-D 2.2)]

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DTC P3301:00	Glow plug No.1 malfunction (life determination)
DETECTION CONDITION	• After the estimated consumption of glow plug No.1 calculated by the PCM exceeds the specification, the remaining distance to empty is less than 966 km {600 miles}. Diagnostic support note • This is a continuous monitor (other). • The check engine light does not illuminate. • FREEZE FRAME DATA/Snapshot data is not available. • DTC is not stored in the PCM memory.
FAIL-SAFE FUNCTION	• Not applicable
POSSIBLE CAUSE	• Glow plug No.1 is used for long period in extremely cold region • 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	REPLACE GLOW PLUG No.1 • Replace the glow plug No.1. (See GLOW PLUG REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)	–	Go to the next step.
3	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)].) • Start the engine and warm it up completely. • Perform the DTC Reading Procedure. (See ON-BOARD DIAGNOSTIC 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.
4	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
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 Snapshot data on the repair order.	–	Go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Bulletins and/or on-line repair information availability. • Is any related Service 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	**VERIFY OTHER RELATED DTCs** • Switch the ignition OFF, and then switch it ON (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].) • Are any following DTCs present? — Exhaust gas temperature sensor No.4: P2471:00 — Exhaust gas temperature sensor No.5: P2482:00 — CAN: U010E:00 — Diesel exhaust fluid (DEF) quality sensor: P206C:00, P206D:00, P207F:00, P21CE:00	Yes	Repair the malfunctioning location according to the applicable DTC troubleshooting first, then go to the next step. (See DTC TABLE [PCM (SKYACTIV-D 2.2)].)
		No	Go to the next step.
4	**VERIFY DOSING CONTROL UNIT RELATED DTC** • Retrieve dosing control unit DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].) • Are any following DTCs present? — Diesel exhaust fluid (DEF) pump: P204F:00, P208A:00, P208B:00, P208C:00, P208D:00, P20E8:00, P20E9:00, P20FA:00, P20FC:00, P20FD:00 — Diesel exhaust fluid (DEF) quality sensor: P206C:00, P206D:00, U02A2:00 — NOx sensor No.1: P06EA:00, P2200:00, P2202:00, P2203:00, P2204:00, P2205:00, P220A:00, P220E:00, U029D:00 — NOx sensor No.2: U029E:00 — SCR system: P249C:00 — Urea hose heater: P20BD:00, P20BF:00, P20C0:00, P221C:00, P221D:00 — Urea injector: P202E:00, P2047:00, P2048:00, P2049:00 — Urea tank heater: P20B9:00, P20BB:00, P20BC:00, P214F:00, P21DD:00 — Urea temperature sensor: P205A:00, P205B:00 — Urea temperature sensor/Urea level sensor: P203B:00, P203C:00, P203D:00 — CAN: U0100:00	Yes	Go to the applicable DTC inspection. (See DTC TABLE [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].)
		No	Go to the next step.

STEP	INSPECTION		ACTION
3	VERIFY DOSING CONTROL UNIT RELATED DTC • Retrieve dosing control unit DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].)
		No	Go to the next step.
4	VERIFY DIESEL EXHAUST FLUID (DEF) AMOUNT IN UREA TANK • Access the RRDC_AG_RMN PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [DOSING CONTROL UNIT (SKYACTIV-D 2.2)].) • Is the RRDC_AG_RMN PID value 90% or less?	Yes	Go to the next step.
		No	Drain the diesel exhaust fluid (DEF) until it reaches 90% or less. (See DIESEL EXHAUST FLUID (DEF) REPLACEMENT [SKYACTIV-D 2.2].) Then go to Step7.
5	INSPECT UREA TEMPERATURE SENSOR • Inspect the urea temperature sensor. (See UREA TEMPERATURE SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the urea temperature sensor, then go to Step 7. (See UREA TEMPERATURE SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
6	INSPECT DEF QUALITY SENSOR (QUALITY SENSOR TEMPERATURE) • Inspect the DEF quality sensor (quality sensor temperature). (See DEF QUALITY SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the DEF quality sensor, then go to the next step. (See DEF QUALITY SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
7	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)].) • Maintain the following conditions for 20 s or more. — Switch the ignition ON (engine off). — Vehicle is stopped. (Vehicle speed: 1 km/h {0.6 mph} or less) — Wait for 5 s with the diesel exhaust fluid (DEF) temperature (PID: S_UR_TANK_TMP) at -3 °C {27 °F} or more. • Verify the instrument cluster display content. • Are SCR system related warnings displayed in the instrument cluster?	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.
8	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	RESULTS	ACTION
3	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 (Fuel system related) on the repair order.	–	Go to the troubleshooting procedure to perform the procedure from Step 1.

Troubleshooting Diagnostic Procedure

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.

Intention of troubleshooting procedure

• Step 1

— Perform a unit inspection of the suction control valve.

• Step 2

— Perform a unit inspection of the supply pump.

• Step 3

— Verify the fuel pipe installation condition.

• Step 4

— Inspect the fuel filter for clogging.

• Step 5

— Perform a unit inspection of the fuel pressure relief valve.

• Step 6

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

• Step 7

— Inspect the fuel pressure sensor No.2 and No.3.

• Step 8

— Inspect the fuel system pipes for fuel leakage and restriction.

• Step 9–10

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

STEP	INSPECTION	RESULTS	ACTION
1	PURPOSE: DETERMINE INTEGRITY OF SUCTION CONTROL VALVE • Inspect the suction control valve. (See SUCTION CONTROL VALVE INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the suction control valve, then go to Step 9. (See SUCTION CONTROL VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.

DESCRIPTION	Fuel pressure in common rail: Supply pump drive current is too high
POSSIBLE CAUSE	• Suction control valve malfunction • Supply pump malfunction • Fuel filter clogged • Fuel pressure relief valve malfunction • Fuel injector No.1−No.4 malfunction • Fuel pressure sensor/fuel temperature sensor No.2 (built-into fuel injector No.2) malfunction • Fuel pressure sensor/fuel temperature sensor No.3 (built-into fuel injector No.3) malfunction • PCM malfunction

System Wiring Diagram

• Not applicable

Function Explanation (DTC Detection Outline)

• The PCM monitors the supply pump drive current to diagnose the operation of the supply pump feedback control. If the supply pump drive current is high even though the fuel pressure in the common rail reaches the target value, the PCM determines that there is a malfunction in the supply pump feedback control.
• The PCM performs diagnosis when each of the preconditions during drive cycle is met. When a supply pump malfunction condition is met during 1 drive cycle, a malfunction is determined and a pending code is stored.
• If the PCM determines that the malfunction recurs from the next drive cycle and thereafter, it stores a DTC and turns on the check engine light.

Repeatability Verification Procedure

1. Start the engine and idle it for 10 s.
2. Repeat the following Step 1 and 2 operations 3 times in succession.
    1. Accelerate to approx. 100 km/h {62.1 mph} within 30 s.
    2. Decelerate the vehicle.

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 P310C: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)].)

DTC P3110:00 [PCM (SKYACTIV-D 2.2)]

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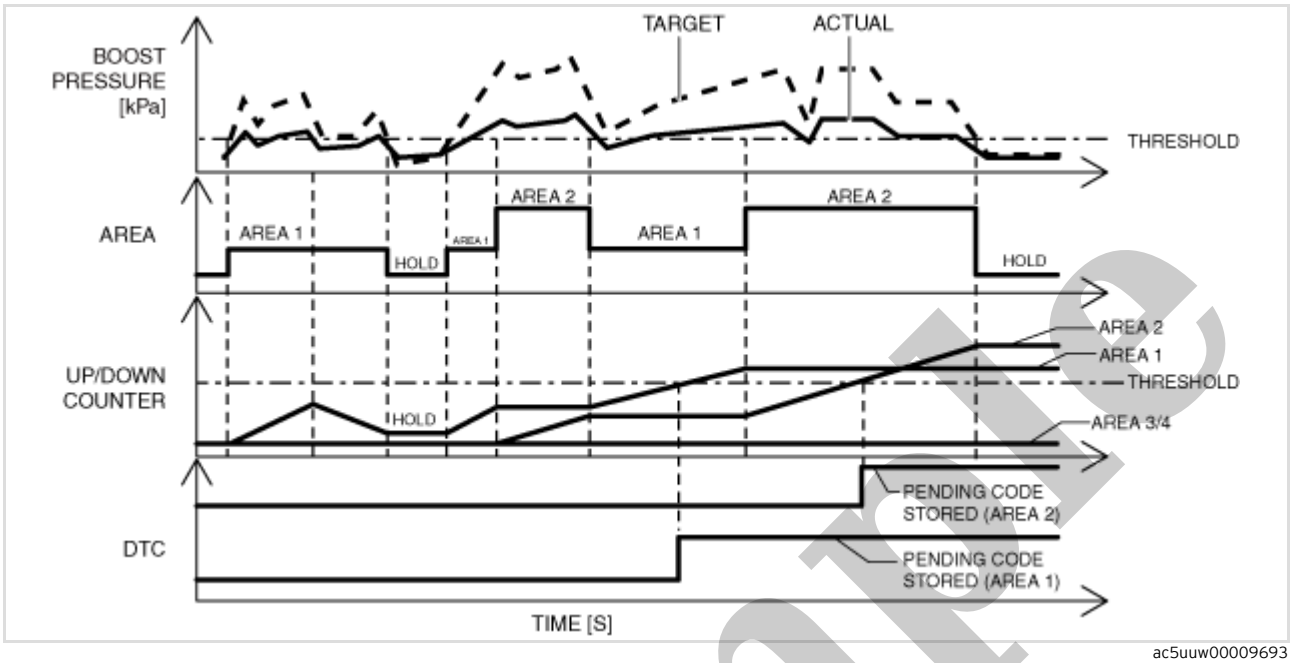
Note

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

Details On DTCs

• When the monitoring conditions are met in the small-type turbo operation range, the PCM compares the target boost pressure with the actual. If the actual boost pressure is lower than the specification for the target boost pressure, the PCM determines a charging deficiency malfunction.
• The PCM performs diagnosis independently when each of the preconditions in AREA1 and AREA2 is met. If a malfunction is detected, the malfunction detection counter begins counting up. If it is normal, the counter begins counting down. The value of the malfunction detection counter is maintained while the preconditions are not being met. If the cumulative value of the malfunction detection counter exceeds the threshold during the first drive cycle, a malfunction is determined. At this time, if the accumulated count-up number is above the set value, a pending code is stored as P3110:00.
• If the PCM determines that the malfunction recurs from the next drive cycle and thereafter, it stores a DTC and turns on the check engine light.



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Repeatability Verification Procedure

Warning

• When the M-MDS is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the M-MDS using the PID/DATA MONITOR AND RECORD capturing function and inspect later.
• While performing this step, always operate the vehicle in a safe and lawful manner.

1. Perform both of the following procedures:

Step1

1. Display PID MAP_DSD and MAP using the M-MDS.
2. Start the engine and warm it up.
3. Accelerate in 2nd gear to 40 km/h {25 mph}.
4. Accelerate in 2nd gear from 40 km/h {25 mph} to 55 km/h {34 mph} taking 5 s or more.
5. Verify that the difference of less than the threshold value does not continue for 18 s or more between the MAP and MAP_DSD while accelerating.

Step2

1. Access the PID/DATA monitor item MAP, MAP_DSD and REGVP using the M-MDS.
2. Start engine and run it at idle.
3. Accelerate in 2nd gear from engine speed of 2,000 rpm to 4,000 rpm taking 20 s.
4. Verify that the difference of less than the threshold value does not continue for 18 s or more between the MAP and MAP_DSD while accelerating with less than 5 mm {0.1 in} of REGVP.