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1978 MAZDA RX-7 (SA/FB) OEM Service and Repair Workshop Manual

Go to manual page

STEP	INSPECTION	RESULTS	ACTION
11	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 GLOW CONTROL MODULE CONNECTOR CONDITION** • Switch the ignition off. • Disconnect the glow control module 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 11.
		No	Go to the next step.
4	**INSPECT GLOW CONTROL MODULE POWER SUPPLY CIRCUIT FOR SHORT TO GROUND OR OPEN CIRCUIT** • Verify that the glow control module connector is disconnected. • Switch the ignition ON (engine off). **Note** **• Another DTC may be stored by the PCM detecting an open circuit.** • Measure the voltage at the glow control module terminal H (wiring harness-side). • Is the voltage B+?	Yes	Go to the next step.
		No	Inspect the ENGINE1 15 A fuse. • If the fuse is blown: — Refer to the wiring diagram and verify whether or not there is a common connector between ENGINE1 15 A fuse and glow control module terminal H. **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. • Replace the fuse. • If the fuse is damaged: — Replace the fuse. • If all fuses are normal: — Refer to the wiring diagram and verify whether or not there is a common connector between main relay terminal C and glow control module terminal H. **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 11.

DTC P2471:00 [PCM (SKYACTIV-D 2.2)]

SM2895999

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DTC P2471:00	Exhaust gas temperature sensor No.4 circuit high input
DETECTION CONDITION	• If the PCM detects that the exhaust gas temperature sensor No.4 voltage at the PCM terminal 1DU is above 4.88 V for 5 s with the following condition met, the PCM determines that the exhaust gas temperature sensor No.4 circuit voltage is high. 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. Note • When this DTC is detected, inducement DTC P2BAF:00 is also detected. • This DTC is established to record that the inducement warning has been activated with the remaining distance to empty at 402 km {250 miles} or less due toan inducement malfunction.
FAIL-SAFE FUNCTION	• Not applicable
POSSIBLE CAUSE	• Exhaust gas temperature sensor No.4 connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between exhaust gas temperature sensor No.4 terminal A and PCM terminal 1DU • Open circuit in wiring harness between the following terminals: — 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.4 malfunction • PCM malfunction

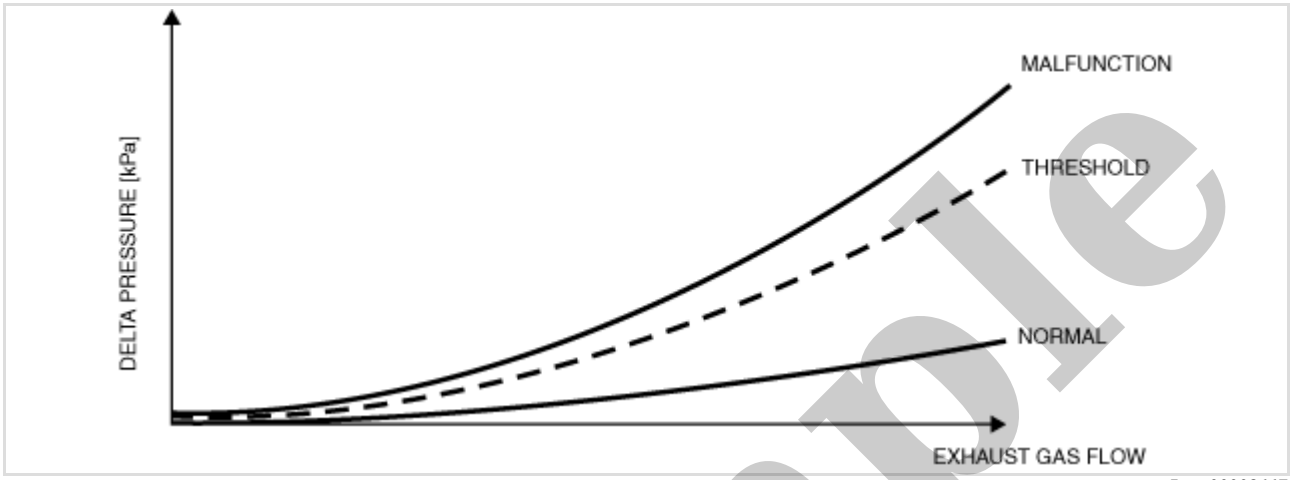
STEP	INSPECTION	RESULTS	ACTION
8	VERIFY DTC TROUBLESHOOTING COMPLETED • Always reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See CLEARING DTC [PCM (SKYACTIV-D 2.2)].) • Perform the KOEO or KOER self test. (See KOEO/KOER SELF TEST [PCM (SKYACTIV-D 2.2)].) • Is the same DTC present?	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.
9	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.

System Wiring Diagram

• Not applicable

Function Explanation (DTC Detection Outline)

• The PCM diagnoses whether the diesel particulate filter regeneration is completed normally by monitoring the diesel particulate filte before and after pressure difference after diesel particulate filter regeneration is completed.
• The PCM monitors the diesel particulate filter before and after pressure difference using exhaust gas pressure sensor No.2.
• If the diesel particulate filter before and after pressure difference is higher than the standard, the PCM determines that the diesel particulate filter regeneration is incomplete.
• When the PCM determines that the diesel particulate filter regeneration is incomplete during 1 drive cycle, it determines a malfunction, stores a pending code and DTC, and turns on the check engine light.



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Repeatability Verification Procedure

1. After diesel particulate filter regeneration is completed, maintain an engine speed of 2,000 rpm or more for 5 s or more.

PID Item/Simulation Item Used In Diagnosis

PID/DATA monitor item table

Item	Definition	Unit	Condition/Specification
PM_ACC_DSD	PM accumulation amount desired	–(g/l, lb/ft ^{3})i	• Displays the PM accumulation amount desired

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.

DTC P24A4:00 [PCM (SKYACTIV-D 2.2)]

SM2896001

id0102j505870

DTC P24A4:00	**Diesel particulate filter restriction - Soot accumulation too high**
DETECTION CONDITION	• The PCM detects any of the following for a continuous 125 s. — PM accumulation amount calculated by exhaust gas pressure sensor No.2: 13 g/L or more — PM accumulation amount calculated from fuel injection amount: 13 g/L 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 auto diesel particulate filter regeneration control. • Inhibits the DENOx/DESOx control. • Inhibits the EGR control.
POSSIBLE CAUSE	• Pipe between exhaust gas pressure sensor No.2 and catalytic converter restriction and/or damaged • Exhaust gas pressure sensor No.2 malfunction • Diesel particulate filter restriction and/or damaged • PCM malfunction
SYSTEM WIRING DIAGRAM	Not applicable

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA** • Perform the Freeze Frame PID Data Access Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].) • Is the DTC P24A4:00 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)].)
2	**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.
3	**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.

STEP	INSPECTION		ACTION
4	**INSPECT EGR COOLER BYPASS VALVE/EGR COOLER BYPASS VALVE POSITION SENSOR CONNECTOR CONDITION** • Switch the ignition off. • Disconnect the EGR cooler bypass valve/EGR cooler bypass 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 8.
		No	Go to the next step.
5	**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 malfunctioning part according to the inspection results, then go to Step 7.
		No	Go to the next step.
6	**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 8. (See EGR COOLER BYPASS VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
7	**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 the next step. (See EGR COOLER BYPASS VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
8	**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)].) • Start the engine and warm it up completely. • Drive the vehicle under the snapshot data condition or. **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.** **Note** **• Snapshot data, the vehicle speed, and engine speed values to the best extent possible while driving the vehicle.** • Perform the DTC Reading Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].) • Is the same DTC present?	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.
9	**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 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	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 [PCM (SKYACTIV-D 2.2)].) • Are any other PENDING CODEs and/or DTCs present?	Yes	Go to the applicable PENDING CODE or DTC inspection. (See DTC TABLE [PCM (SKYACTIV-D 2.2)].)
		No	Go to the next step.
4	INSPECT APP SENSOR CONNECTOR CONDITION • Switch the ignition off. • Disconnect the APP 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 14.
		No	Go to the next step.
5	INSPECT CMP SENSOR CONNECTOR CONDITION • Disconnect the CMP 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 14.
		No	Go to the next step.
6	INSPECT EGR COOLER BYPASS VALVE CONNECTOR CONDITION • 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 14.
		No	Go to the next step.
7	INSPECT EGR VALVE CONNECTOR CONDITION • Disconnect the EGR 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 14.
		No	Go to the next step.
8	INSPECT INTAKE SHUTTER VALVE CONNECTOR CONDITION • Disconnect the intake shutter 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 14.
		No	Go to the next step.

DTC P06DB:00 [PCM (SKYACTIV-D 2.2)]

SM2896079

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DTC P06DB:00	Engine oil solenoid valve circuit low input
DETECTION CONDITION	• If the PCM detects that the engine oil solenoid valve voltage at the PCM terminal 1CH is below specified value for 5 s with the following condition met, the PCM determines that the engine oil solenoid valve 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	• Limits the engine torque or the upper limit of the engine speed.
POSSIBLE CAUSE	• Engine oil solenoid valve connector or terminals malfunction • Short to ground or open circuit in engine oil solenoid valve power supply circuit — Short to ground in wiring harness between ENGINE1 15 A fuse and engine oil solenoid valve terminal A — ENGINE1 15 A fuse malfunction — Open circuit in wiring harness between main relay terminal C and engine oil solenoid valve terminal A • PCM connector or terminals malfunction • Short to ground in wiring harness between engine oil solenoid valve terminal B and PCM terminal 1CH • Open circuit in wiring harness between engine oil solenoid valve terminal B and PCM terminal 1CH • Engine oil solenoid valve malfunction • PCM malfunction