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2001 MAZDA RX-7 (FD) OEM Service and Repair Workshop Manual

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STEP	INSPECTION	RESULTS	ACTION
9	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 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Perform the KOEO or KOER self test. (See KOEO/KOER SELF TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • 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 2.5 (WITHOUT CYLINDER DEACTIVATION)].) Go to the next step.
		No	Go to the next step.
10	VERIFY AFTER REPAIR PROCEDURE • Perform the "AFTER REPAIR PROCEDURE". (See AFTER REPAIR PROCEDURE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)
		No	DTC troubleshooting completed.

DTC P0454:00 [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))]

SM2896899

id0102t330100

DTC P0454:00	Fuel tank pressure sensor intermittent malfunction
DETECTION CONDITION	• Any one of the following conditions is met: — The difference between the currently detected fuel tank pressure sensor input voltage and the previously detected input voltage is large. — The input voltage of the fuel tank pressure sensor remains low or high. **Diagnostic support note** • This is a continuous monitor (CCM). • The check engine light illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA/Snapshot data is available. • DTC is stored in the PCM memory.
FAIL-SAFE FUNCTION	• Not applicable
POSSIBLE CAUSE	• Wiring harness malfunction between PCM and fuel tank pressure sensor • Fuel tank pressure sensor malfunction — Intermittent open or short circuit in the fuel tank pressure sensor or fuel tank pressure sensor signal • PCM malfunction
SYSTEM WIRING DIAGRAM	• Not applicable

Diagnostic Procedure

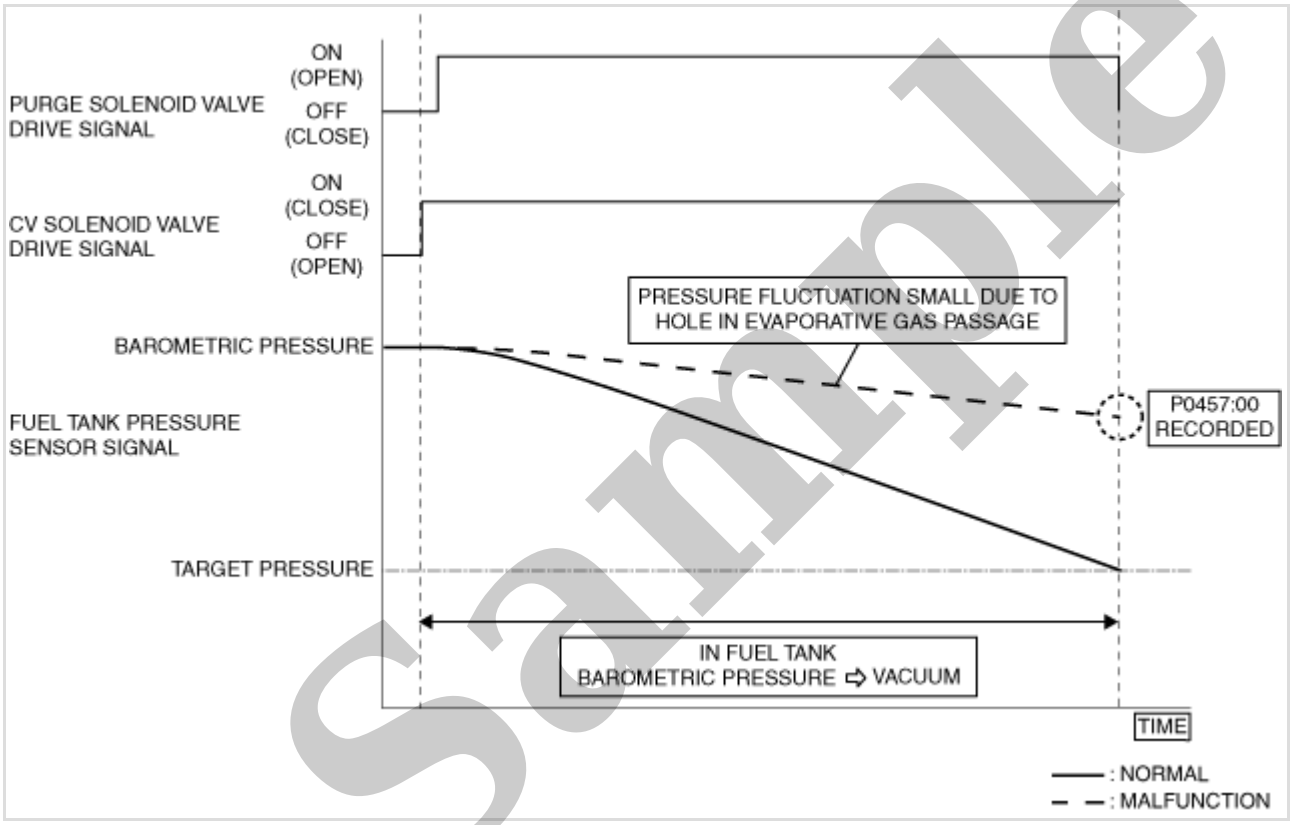
STEP	INSPECTION	RESULTS	ACTION
1	**RECORD VEHICLE STATUS AT TIME OF DTC DETECTION TO UTILIZE WITH REPEATABILITY VERIFICATION** **Note** **• Recording can be facilitated using the screen capture function of the PC.** • Record the FREEZE FRAME DATA/snapshot data on the repair order.	–	Go to the next step.
2	**VERIFY RELATED 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.

System Wiring Diagram

• Not applicable

Function Explanation (DTC Detection Outline)

• The PCM closes the purge solenoid valve and CV solenoid valve while the vehicle is being driven, and seals the fuel tank. By opening the purge solenoid valve after sealing the fuel tank, evaporative gas in the fuel tank is inducted into the intake manifold, fuel tank pressure is reduced, and the pressure change of the fuel tank is measured by the fuel tank pressure sensor. If the pressure of the fuel tank does not reach the target vacuum after the specified time has elapsed since the pressure was measured, the PCM determines that there is an evaporative gas leakage. If the PCM determines that refueling was performed before the engine starts, according to the result of the refueling determination, the PCM determines that the fuel-filler cap is open and stores DTC P0457:00 (if PCM determines that refueling is not performed, it stores DTC P0455:00).
• If the fuel tank level increases after the engine starts, the PCM determines that refueling is performed by comparing the fuel tank level before one drive cycle with the fuel tank level after engine start.



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Repeatability Verification Procedure

1. Set the remaining fuel quantity in the fuel tank between 30–85 %.
2. Verify that OBD-II information (such as FREEZE FRAME DATA) has been obtained and recorded.
3. Clear the DTC from the PCM memory using the M-MDS. (See CLEARING DTC [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)
4. Start the engine and switch the ignition off after 5 s have elapsed.
5. Leave the vehicle for 6 h or more.
6. Start the engine and leave it idling for 2 min.
7. Drive the vehicle for 30 min at a speed of 50 km/h {31 mph} or more (to increase temperature in fuel tank and generate evaporative gas).

Note

DTC P0460:00 [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))]

SM2896901

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DTC P0460:00	Fuel level sensor circuit malfunction
DETECTION CONDITION	• The PCM monitors the fuel tank level sensor output signal. If the difference between maximum and minimum value of input signal is 25 % or more for 14 s, the PCM determines that there is a fuel level sensor circuit malfunction. MONITORING CONDITIONS — The following DTCs are not detected: • Fuel gauge sender unit: P0462:00, P0463:00 Diagnostic support note • This is a continuous monitor (CCM). • The check engine light illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA/Snapshot data is available. • DTC is stored in the PCM memory.
FAIL-SAFE FUNCTION	• Not applicable
POSSIBLE CAUSE	• Instrument cluster malfunction — Incorrectly installed fuel gauge — Fuel level input signal circuit malfunction • Fuel gauge sender unit (main) connector or terminals malfunction • Fuel gauge sender unit (sub) connector or terminals malfunction (AWD) • Rear body control module (RBCM) connector or terminals malfunction • Short to power supply in wiring harness between the following terminals: — Fuel gauge sender unit (main) terminal D—Rear body control module (RBCM) terminal 3I — Fuel gauge sender unit (main) terminal C—Rear body control module (RBCM) terminal 3C — Fuel gauge sender unit (sub) terminal A—Rear body control module (RBCM) terminal 3K (AWD) — Fuel gauge sender unit (sub) terminal B—Rear body control module (RBCM) terminal 3C (AWD) • Short to ground in wiring harness between the following terminals: — Fuel gauge sender unit (main) terminal D—Rear body control module (RBCM) terminal 3I — Fuel gauge sender unit (main) terminal C—Rear body control module (RBCM) terminal 3C — Fuel gauge sender unit (sub) terminal A—Rear body control module (RBCM) terminal 3K (AWD) — Fuel gauge sender unit (sub) terminal B—Rear body control module (RBCM) terminal 3C (AWD) • Fuel gauge sender unit (main) signal circuit and ground circuit are shorted to each other • Fuel gauge sender unit (sub) signal circuit and ground circuit are shorted to each other (AWD) • Open circuit in wiring harness between the following terminals: — Fuel gauge sender unit (main) terminal D—Rear body control module (RBCM) terminal 3I — Fuel gauge sender unit (main) terminal C—Rear body control module (RBCM) terminal 3C — Fuel gauge sender unit (sub) terminal A—Rear body control module (RBCM) terminal 3K (AWD) — Fuel gauge sender unit (sub) terminal B—Rear body control module (RBCM) terminal 3C (AWD) • Fuel gauge sender unit (main) malfunction • Fuel gauge sender unit (sub) malfunction (AWD) • Rear body control module (RBCM) malfunction • PCM malfunction

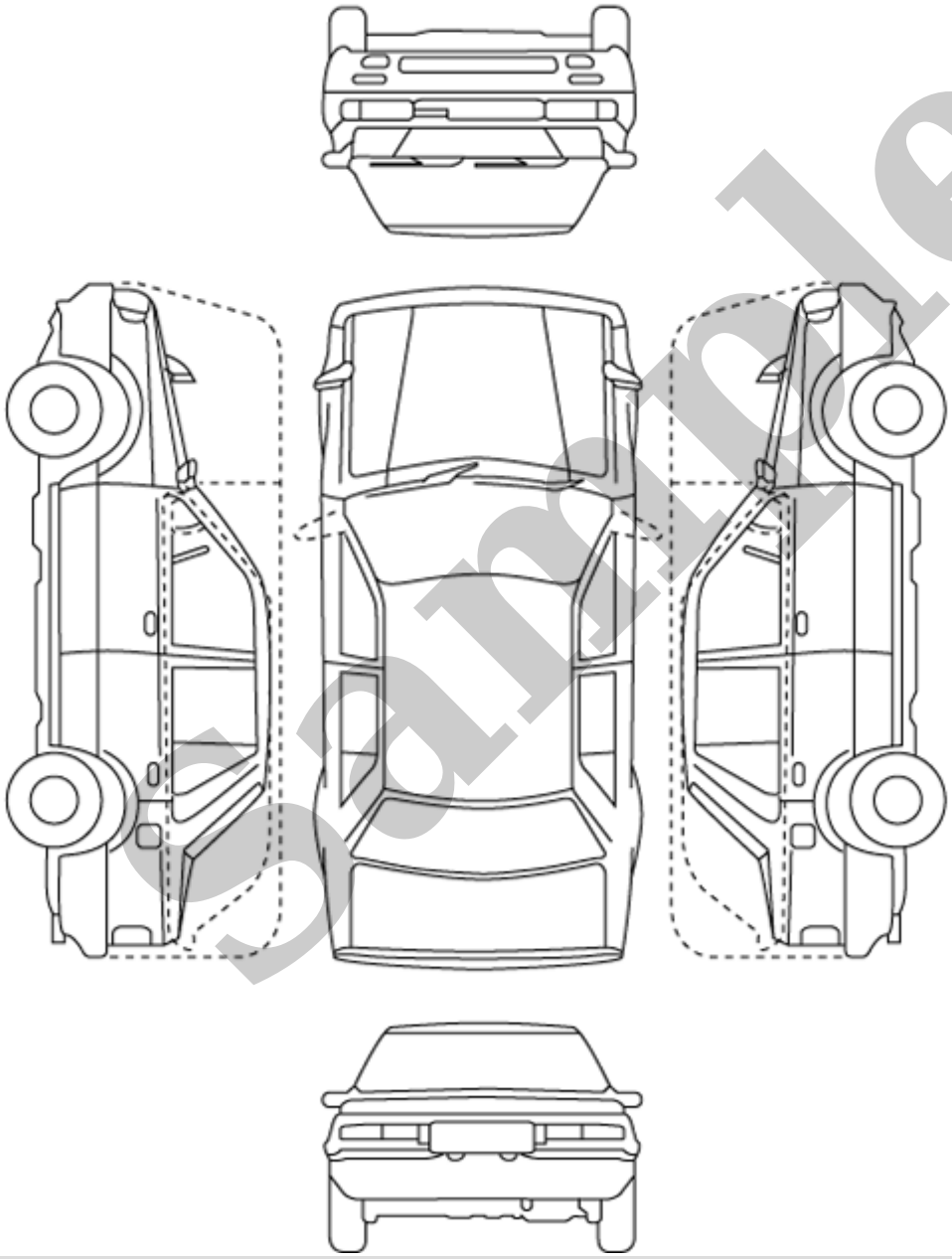
STEP	INSPECTION	RESULTS	ACTION
8	**INSPECT FUEL GAUGE SENDER UNIT (MAIN) CIRCUIT FOR SHORT TO POWER SUPPLY** • Verify that the fuel gauge sender unit (main) and rear body control module (RBCM) connectors are disconnected. • Switch the ignition ON (engine off). **Note** **• Another DTC may be stored by the PCM detecting an open circuit.** • Measure the voltage at the following terminals (wiring harness-side): — Fuel gauge sender unit (main) terminal D — Fuel gauge sender unit (main) terminal C • Is the voltage 0 V?	Yes	**2WD:** • Go to Step 10. **AWD:** • 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: • Fuel gauge sender unit (main) terminal D—Rear body control module (RBCM) terminal 3I • Fuel gauge sender unit (main) terminal C—Rear body control module (RBCM) terminal 3C **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 power supply. • Repair or replace the malfunctioning part. **If there is no common connector:** • Repair or replace the wiring harness which has a short to power supply. Go to Step 18.
9	**INSPECT FUEL GAUGE SENDER UNIT (SUB) CIRCUIT FOR SHORT TO POWER SUPPLY** • Verify that the fuel gauge sender unit (sub) and rear body control module (RBCM) connectors are 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 following terminals (wiring harness-side): — Fuel gauge sender unit (sub) terminal A — Fuel gauge sender unit (sub) terminal B • Is the voltage 0 V?	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: • Fuel gauge sender unit (sub) terminal A—Rear body control module (RBCM) terminal 3K • Fuel gauge sender unit (sub) terminal B—Rear body control module (RBCM) terminal 3C **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 power supply. • Repair or replace the malfunctioning part. **If there is no common connector:** • Repair or replace the wiring harness which has a short to power supply. Go to Step 18.
10	**INSPECT FUEL GAUGE SENDER UNIT (MAIN) SIGNAL CIRCUIT FOR SHORT TO GROUND** • Verify that the fuel gauge sender unit (main) and rear body control module (RBCM) connectors are disconnected. • Switch the ignition off. • Inspect for continuity between fuel gauge sender unit (main) terminal D (wiring harness-side) and body ground. • Is there continuity?	Yes	Refer to the wiring diagram and verify whether or not there is a common connector between fuel gauge sender unit (main) terminal D and rear body control module (RBCM) terminal 3I. **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 18.
		No	**2WD:** • Go to Step 12. **AWD:** • Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
18	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 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Perform the KOER self test. (See KOEO/KOER SELF TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Is the PENDING CODE for this DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) Go to the next step.
		No	Go to the next step.
19	VERIFY AFTER REPAIR PROCEDURE • Perform the "AFTER REPAIR PROCEDURE". (See AFTER REPAIR PROCEDURE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)
		No	DTC troubleshooting completed.

Dealer name:	Vehicle body number:	Odometer reading:
Vehicle-in date:	Estimated repair completion date:	Person in-charge:
Subject (Content):		

Audio memory

	1	2	3	4	5	6	Fuel level
FM1							E F
FM2							
AM							



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Action for Non-repeatable Malfunction

• If the malfunction does not recur, verify the malfunction cause by performing the following actions:

— Based on the repair order form, attempt to drive the vehicle or perform tests to replicate the malfunction, record the data at that time, and detect the malfunction cause.

No.	TROUBLESHOOTING ITEM	DESCRIPTION
15	Low idle/stalls during deceleration	• Engine speed decreases when the accelerator pedal is released. • Stalls during deceleration with the accelerator pedal fully released. • When the accelerator pedal is fully released, vehicle stalls directly after vehicle stops.
16	Engine stalls/quits, engine runs rough, misses, buck/jerk, hesitation/stumble, surges	• Stalling occurs while driving with the intake shutter valve open.
17	Lack/loss of power-acceleration/cruise	• Engine speed increase delays when the accelerator pedal is fully depressed.
18	Knocking/pinging-acceleration/cruise	• Knocking sound occurs from the engine.
19	Poor fuel economy	• Fuel economy is unsatisfactory.
20	Emission compliance	• Fails emissions test.
21	High oil consumption/leakage	• Oil consumption is excessive.
22	Cooling system concerns-overheating	• The engine coolant temperature is abnormally high.
23	Cooling system concerns-runs cold	• Engine does not reach normal operating temperature.
24	Excessive black smoke	• Compared to previously, black smoke in the exhaust gas abnormally high.
25	Fuel odor (in engine compartment)	• Fuel odor from inside/outside of cabin or engine compartment.
26	Engine noise	• Engine noise from under hood.
27	Vibration concerns (engine)	• Vibration from under hood or driveline.
28	Sulphuric odor	• There is a sulphuric odor from the cabin interior/exterior.
29	Ammonia odor	• There is an ammonia odor from the cabin interior/exterior.
30	SCR system warning indication turned on or flashes/message related to SCR system indicated in display	• The following messages are indicated in the display. — "Refill DEF Speed Will Be Limited to 50MPH in 200 Miles" — "Refill DEF Speed Will Be Limited to 30MPH in 200 Miles" — "Refill DEF Now Engine Will Go into Forced Idle Mode in 200 Miles" — "Forced Idle Mode On: DEF Empty Refill Now" — "Forced Idle Mode On: DEF Empty Refill Now" — "SCR Malfunction Engine Will Go into Forced Idle Mode in 125 Miles" — "Forced Idle Mode On: SCR Malfunction"
31	SCR system warning indication turned on/[Overfilled DEF] indicated in display	• The following messages are indicated in the display. — "Overfilled DEF. Drain excess DEF as soon as possible"

Troubleshooting item		Intake air system						
		Intake air system part		Air cleaner			Intake shutter valve	
		Air suction/Leakage/ Perforation	Restriction	Deformation	Air cleaner element restricted	Non-genuine part installation	Does not fully close (Does not conform to target value)	Clogging, sticking
11	Engine stalls-after start/at idle	–	–	–	–	–	–	–
12	Cranks normally but will not start	–	–	–	–	–	–	–
13	Engine runs rough/rollin g idle	–	–	–	–	–	–	–
14	Fast idle/runs on	–	–	–	–	–	–	–
15	Low idle/stalls during deceleration	–	–	–	–	–	–	–
16	Engine stalls/quits, engine runs rough, misses, buck/jerk, hesitation/st umble, surges	–	–	–	–	–	–	–
17	Lack/loss of power-acceleration /cruise	×	×	–	–	×	–	×
18	Knocking/pi nging-acceleration /cruise	–	–	–	–	–	–	–
19	Poor fuel economy	–	–	–	–	×	–	–
20	Emission compliance	–	–	–	–	×	–	–
21	High oil consumptio n/leakage	–	–	–	–	–	–	–
22	Cooling system concerns-overheating	–	–	–	–	–	–	–
23	Cooling system concerns-runs cold	–	–	–	–	–	–	–
24	Excessive black smoke	–	–	–	–	–	–	–