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1980 MAZDA RX-7 (SA/FB) OEM Service and Repair Workshop Manual

[Go to manual page](#)

STEP	INSPECTION	RESULTS	ACTION
7	INSPECT FUEL PRESSURE SENSOR No.2 CIRCUITS FOR SHORT TO EACH OTHER <ul style="list-style-type: none"> • Verify that the fuel injector No.2 and PCM connectors are disconnected. • Inspect for continuity fuel injector No.2 terminals D, B and A (wiring harness-side). • Is there continuity? 	Yes	Refer to the wiring diagram and verify whether or not there is a common connector between the following terminals: <ul style="list-style-type: none"> • Fuel injector No.2 terminal D–PCM terminal 1V • Fuel injector No.2 terminal B–PCM terminal 1BL • Fuel injector No.2 terminal A–PCM terminal 1DF If there is a common connector: <ul style="list-style-type: none"> • 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 each other. • Repair or replace the malfunctioning part. If there is no common connector: <ul style="list-style-type: none"> • Repair or replace the wiring harness which has a short to each other. Go to Step 9.
		No	Go to the next step.
8	INSPECT FUEL PRESSURE SENSOR No.2 <ul style="list-style-type: none"> • Inspect the fuel pressure sensor No.2. (See FUEL PRESSURE SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction? 	Yes	Replace the fuel injector No.2, then go to the next step. (See FUEL INJECTOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
9	VERIFY DTC TROUBLESHOOTING COMPLETED <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> • 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.
10	VERIFY AFTER REPAIR PROCEDURE <ul style="list-style-type: none"> • 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.

DTC P2138:00 [PCM (SKYACTIV-D 2.2)]

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DTC P2138:00	APP sensor voltage correlation
DETECTION CONDITION	<ul style="list-style-type: none">• With the following conditions met, the output voltage of APP sensors No.1 and No.2 is compared, and the difference in the voltage is 0.7 V or more for a continuous 1 s. MONITORING CONDITIONS <ul style="list-style-type: none">• When all of the following conditions are met:<ul style="list-style-type: none">— Battery voltage: 8 V or more— The following DTCs are not detected:<ul style="list-style-type: none">• APP sensor No.1: P2127:00, P2128:00• APP sensor No.2: P2122:00, P2123:00 Diagnostic support note <ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• Limits the engine torque or the upper limit of the engine speed.• Regulates the upper limit of the APP sensor output.• Inhibits the auto diesel particulate filter regeneration control.• Inhibits the DENOx/DESOx control.• Inhibits the EGR control.
POSSIBLE CAUSE	<ul style="list-style-type: none">• APP sensor connector or terminals malfunction• PCM connector or terminals malfunction• APP sensor No.1 signal circuit and APP sensor No.2 signal circuit are shorted to each other• APP sensor No.1 malfunction• APP sensor No.2 malfunction• Poor assembly of accelerator pedal• PCM malfunction

STEP	INSPECTION	ACTION
10	VERIFY DTC TROUBLESHOOTING COMPLETED <ul style="list-style-type: none"> • 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.
11	VERIFY AFTER REPAIR PROCEDURE <ul style="list-style-type: none"> • 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
5	INSPECT GENERATOR POWER SUPPLY CIRCUIT FOR SHORT TO GROUND OR OPEN CIRCUIT <ul style="list-style-type: none"> • Verify that the Generator connector is disconnected. • Measure the voltage at the Generator terminal 1A (wiring harness-side). • Is the voltage B+? 	Yes	Go to the next step.
		No	Inspect the STARTER 450 A fuse. <ul style="list-style-type: none"> • If the fuse is blown: <ul style="list-style-type: none"> — Repair or replace the wiring harness which has a short to ground. — Replace the fuse. • If the fuse is damaged: <ul style="list-style-type: none"> — Replace the fuse. • If the fuse is normal: <ul style="list-style-type: none"> — Repair or replace the wiring harness which has an open circuit. Go to Step 8.
6	INSPECT PCM CONNECTOR CONDITION <ul style="list-style-type: none"> • 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 8.
		No	Go to the next step.
7	INSPECT GENERATOR <ul style="list-style-type: none"> • Inspect the Generator. (See GENERATOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction? 	Yes	Replace the Generator, then go to the next step. (See GENERATOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
8	VERIFY DTC TROUBLESHOOTING COMPLETED <ul style="list-style-type: none"> • Make sure to 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	Repeat the inspection from Step 1. <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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.

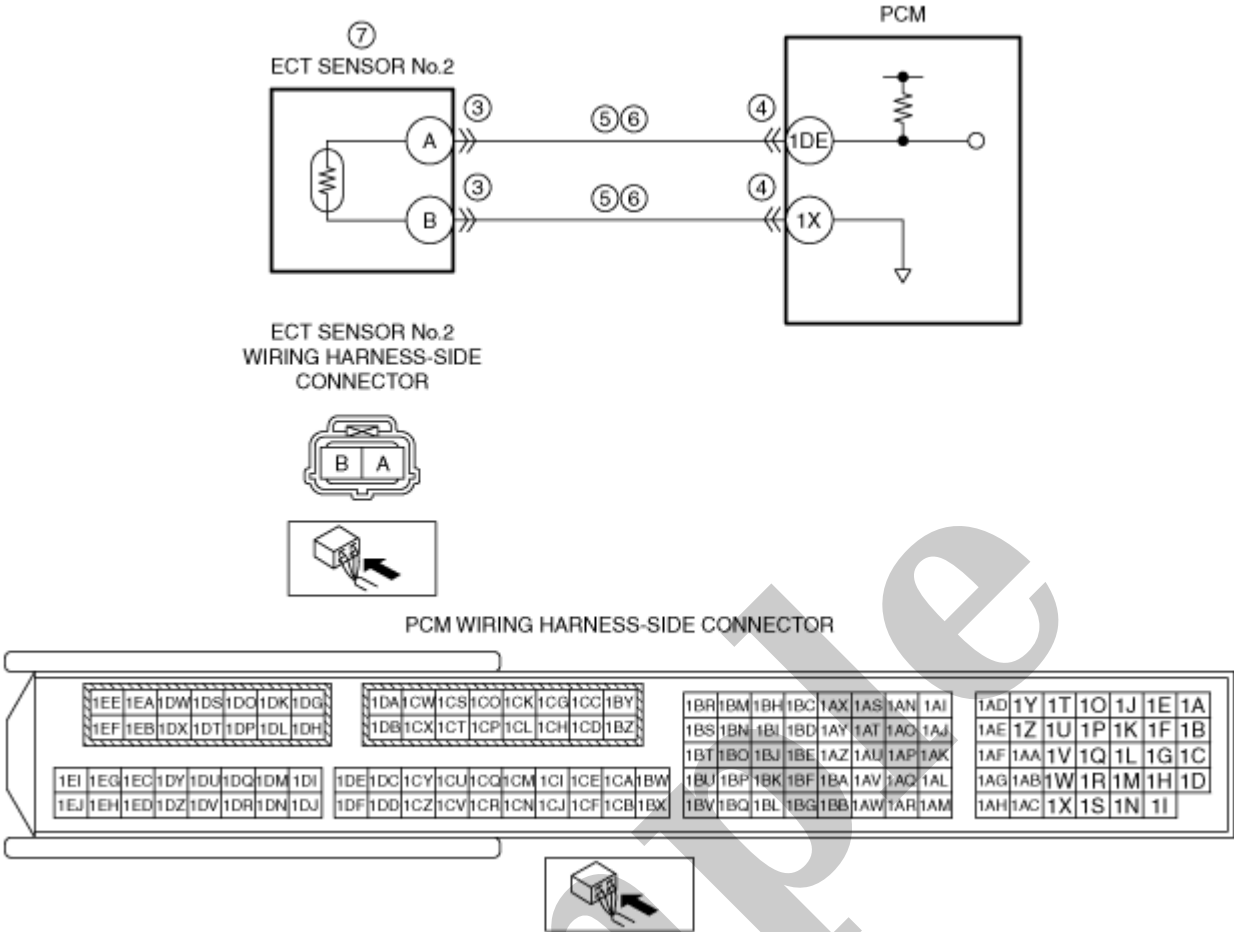
STEP	INSPECTION		ACTION
5	INSPECT GENERATOR CIRCUIT FOR SHORT TO GROUND <ul style="list-style-type: none"> • Verify that the Generator connector is disconnected. • Switch the ignition off. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: <ul style="list-style-type: none"> — Generator terminal 2B — Generator terminal 2A • Is there continuity? 	Yes	<p>If the short to ground circuit could be detected in the wiring harness:</p> <ul style="list-style-type: none"> • Repair or replace the wiring harness for a possible short to ground. <p>If the short to ground circuit could not be detected in the wiring harness:</p> <ul style="list-style-type: none"> • Replace the PCM (short to ground in the PCM internal circuit). (See PCM REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) <p>Go to Step 9.</p>
		No	Go to the next step.
6	INSPECT PCM CONNECTOR CONDITION <ul style="list-style-type: none"> • 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 9.
		No	Go to the next step.
7	INSPECT GENERATOR CIRCUIT FOR OPEN CIRCUIT <ul style="list-style-type: none"> • Verify that the Generator and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): <ul style="list-style-type: none"> — Generator terminal 2B–PCM terminal 1E1 — Generator terminal 2A–PCM terminal 1D • Is there continuity? 	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminals, then go to Step 9.
8	INSPECT GENERATOR <ul style="list-style-type: none"> • Inspect the Generator. (See GENERATOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction? 	Yes	Replace the Generator, then go to the next step. (See GENERATOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
9	VERIFY DTC TROUBLESHOOTING COMPLETED <ul style="list-style-type: none"> • Make sure to 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 the electrical loads (such as headlights, blower motor, rear window defroster, seat warmer) on for 5 s or more. • Perform the DTC Reading Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].) • Is the same DTC present? 	Yes	<p>Repeat the inspection from Step 1.</p> <ul style="list-style-type: none"> • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) <p>Go to the next step.</p>
		No	Go to the next step.
10	VERIFY AFTER REPAIR PROCEDURE <ul style="list-style-type: none"> • 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
4	INSPECT BACKUP VOLTAGE CIRCUIT FOR SHORT TO GROUND OR OPEN CIRCUIT <ul style="list-style-type: none"> • Reconnect all disconnected connectors. • Access the VPWR PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].) • Verify the VPWR PID value. • Is the VPWR PID value B+? 	Yes	Go to the next step.
		No	Inspect the MAIN 200 A fuse and ENG.+B 7.5 A fuse. <ul style="list-style-type: none"> • If the fuse is blown: <ul style="list-style-type: none"> — Refer to the wiring diagram and verify whether or not there is a common connector between MAIN 200 A fuse and PCM terminal 20. <p>If there is a common connector:</p> <ul style="list-style-type: none"> • 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. <p>If there is no common connector:</p> <ul style="list-style-type: none"> • Repair or replace the wiring harness which has a short to ground. • Replace the fuse. <ul style="list-style-type: none"> • If the fuse is damaged: <ul style="list-style-type: none"> — Replace the fuse. • If all fuses are normal: <ul style="list-style-type: none"> — Refer to the wiring diagram and verify whether or not there is a common connector between battery positive terminal and PCM terminal 20. <p>If there is a common connector:</p> <ul style="list-style-type: none"> • 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. <p>If there is no common connector:</p> <ul style="list-style-type: none"> • Repair or replace the wiring harness which has an open circuit. Go to Step 6.
5	INSPECT PCM CONNECTOR CONDITION <ul style="list-style-type: none"> • 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.
6	VERIFY DTC TROUBLESHOOTING COMPLETED <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> • 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.

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	VERIFY RELATED REPAIR INFORMATION AVAILABILITY <ul style="list-style-type: none"> • 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	VERIFY CONNECTION CONDITION OF PCM, GENERATOR, AND BATTERY <ul style="list-style-type: none"> • Switch the ignition off. • Inspect the connection condition of the PCM, generator, and battery. • Is the connection condition normal? 	Yes	Go to the next step.
		No	Connect the PCM, generator, and battery securely, then go to Step 7.
3	INSPECT GENERATOR CONNECTOR CONDITION <ul style="list-style-type: none"> • Disconnect the Generator 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 7.
		No	Go to the next step.
4	INSPECT PCM CONNECTOR CONDITION <ul style="list-style-type: none"> • 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 7.
		No	Go to the next step.
5	INSPECT GENERATOR CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY <ul style="list-style-type: none"> • Verify that the generator and PCM connectors are disconnected. • Switch the ignition ON (engine off). <p>Note</p> <ul style="list-style-type: none"> • Another DTC may be stored by the PCM detecting an open circuit. • Measure the voltage at the generator terminal 2B (wiring harness-side). • 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 generator terminal 2B and PCM terminal 1EI. If there is a common connector: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Repair or replace the wiring harness which has a short to power supply. Go to Step 7.
6	INSPECT GENERATOR <ul style="list-style-type: none"> • Inspect the Generator. (See GENERATOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction? 	Yes	Replace the Generator, then go to the next step. (See GENERATOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
1	RECORD VEHICLE STATUS AT TIME OF DTC DETECTION TO UTILIZE WITH REPEATABILITY VERIFICATION Note <ul style="list-style-type: none"> Recording can be facilitated using the screen capture function of the PC. Record the FREEZE FRAME DATA/snapshot data and DIAGNOSTIC MONITORING TEST RESULTS (engine cooling system related) on the repair order. 	–	Go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY <ul style="list-style-type: none"> 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 ENGINE CONDITION <ul style="list-style-type: none"> Verify the engine condition. Is the engine overheating? 	Yes	Perform the symptom troubleshooting “NO.22 COOLING SYSTEM CONCERNS-OVERHEATING”. (See NO.22 COOLING SYSTEM CONCERNS-OVERHEATING [SKYACTIV-D 2.2].)
		No	Go to the next step.
4	INSPECT ECT SENSOR No.2 CONNECTOR CONDITION <ul style="list-style-type: none"> Switch the ignition off. Disconnect the ECT sensor No.2 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 9.
		No	Go to the next step.
5	DETERMINE IF ECT SENSOR No.2 OR WIRING HARNESS MALFUNCTION <ul style="list-style-type: none"> Verify that the ECT sensor No.2 connector is disconnected. Switch the ignition ON (engine off). Note <ul style="list-style-type: none"> Another DTC may be stored by the PCM detecting an open circuit. Measure the voltage at the ECT sensor No.2 terminal A (wiring harness-side). Is the voltage approx. 5 V? 	Yes	Replace the ECT sensor No.2, then go to Step 9. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
6	INSPECT PCM CONNECTOR CONDITION <ul style="list-style-type: none"> 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 Step 9.
		No	Go to the next step.



Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	<p>RECORD VEHICLE STATUS AT TIME OF DTC DETECTION TO UTILIZE WITH REPEATABILITY VERIFICATION</p> <p>Note</p> <ul style="list-style-type: none">Recording can be facilitated using the screen capture function of the PC.Record the FREEZE FRAME DATA/snapshot data and DIAGNOSTIC MONITORING TEST RESULTS (engine cooling system related) on the repair order.	–	Go to the next step.
2	<p>VERIFY RELATED REPAIR INFORMATION AVAILABILITY</p> <ul style="list-style-type: none">Verify related Service Bulletins and/or on-line repair information availability.Is any related repair information available?	<div>Yes</div> <div>No</div>	<div>Perform repair or diagnosis according to the available repair information.<ul style="list-style-type: none">If the vehicle is not repaired, go to the next step.</div> <div>Go to the next step.</div>