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1981 MAZDA RX-7 (SA/FB) OEM Service and Repair Workshop Manual

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DTC P0653:00 [PCM (SKYACTIV-D 2.2)]

SM2896004

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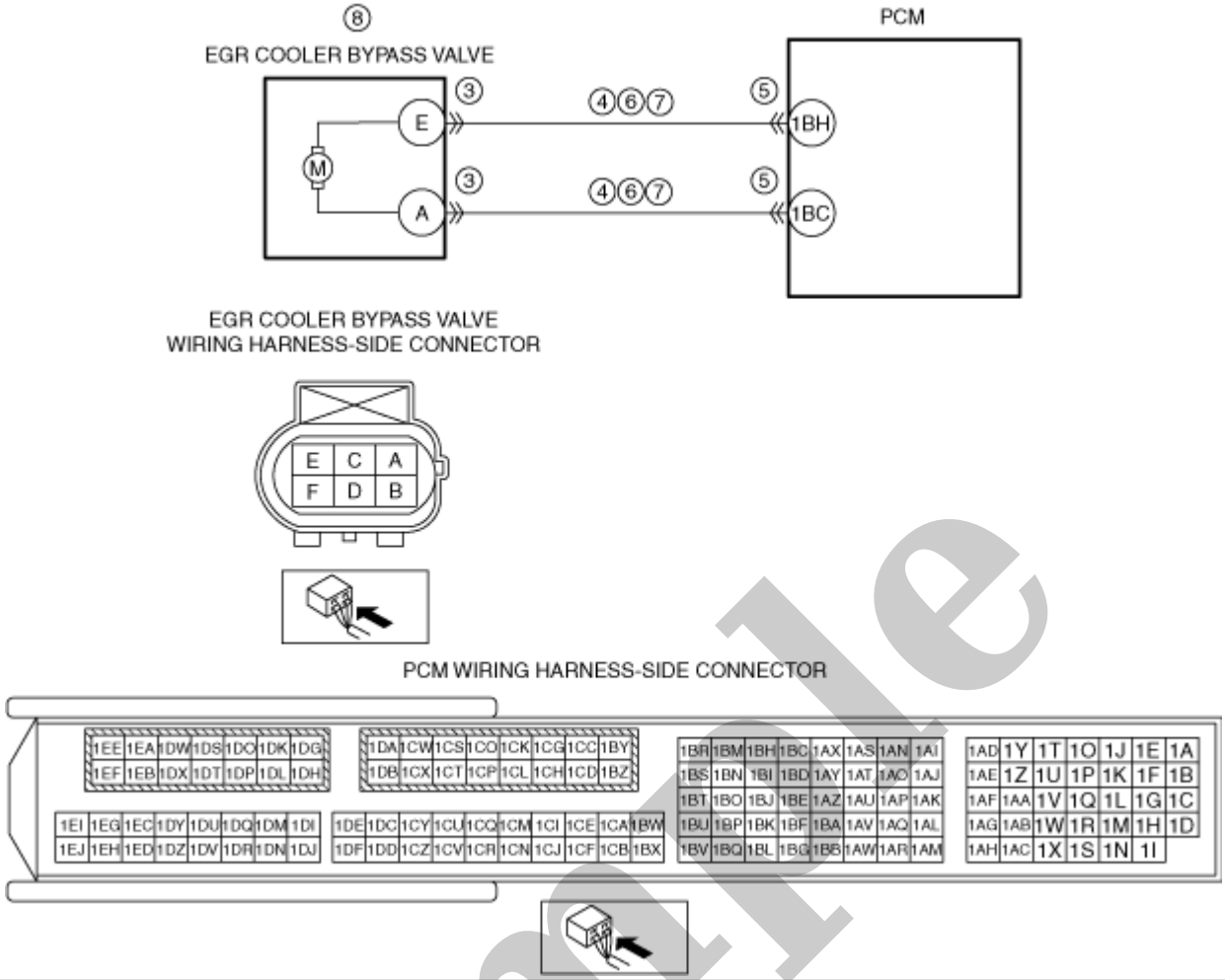
DTC P0653:00	Constant voltage power supply control circuit high input
DETECTION CONDITION	• When the following condition is met, the output voltage of the 5 V power supply terminal exceeds 5.14 V for a continuous 0.5 s: MONITORING CONDITIONS — Battery voltage: 8 V or more Diagnostic support note • This 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. • Inhibits the automatic diesel particulate filter regeneration control and compulsory diesel particulate filter regeneration control. • Inhibits the DENOx/DESOx control. • Stops activation of the A/F sensor heater. • Fully opens the intake shutter valve opening angle. • Inhibits the EGR control. • PCM restricts engine-transaxle integration control.
POSSIBLE CAUSE	• APP sensor connector or terminals malfunction • CMP sensor connector or terminals malfunction • EGR cooler bypass valve connector or terminals malfunction • EGR valve connector or terminals malfunction • Intake shutter valve connector or terminals malfunction • Exhaust gas pressure sensor No.1 connector or terminals malfunction • Exhaust gas pressure sensor No.2 connector or terminals malfunction • MAP sensor No.1 connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between the following terminals: — APP sensor terminal F—PCM terminal 2AR — CMP sensor terminal C—PCM terminal 1K — EGR cooler bypass valve terminal B—PCM terminal 1AU — EGR valve terminal B—PCM terminal 1AP — Intake shutter valve terminal E—PCM terminal 1AZ — Exhaust gas pressure sensor No.1 terminal A—PCM terminal 1CJ — Exhaust gas pressure sensor No.2 terminal A—PCM terminal 1AK — MAP sensor No.1 terminal A—PCM terminal 1BJ • PCM malfunction

STEP	INSPECTION		ACTION
9	INSPECT EXHAUST GAS PRESSURE SENSOR No.1 CONNECTOR CONDITION • Disconnect the exhaust gas pressure sensor No.1 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.
10	INSPECT EXHAUST GAS PRESSURE SENSOR No.2 CONNECTOR CONDITION • Disconnect the exhaust gas pressure 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 14.
		No	Go to the next step.
11	INSPECT MAP SENSOR No.1 CONNECTOR CONDITION • Disconnect the MAP sensor No.1 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.
12	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 14.
		No	Go to the next step.

DTC P245A:00	EGR cooler bypass valve control: drive circuit malfunction



Diagnostic Procedure

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.

STEP	INSPECTION		ACTION
10	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.

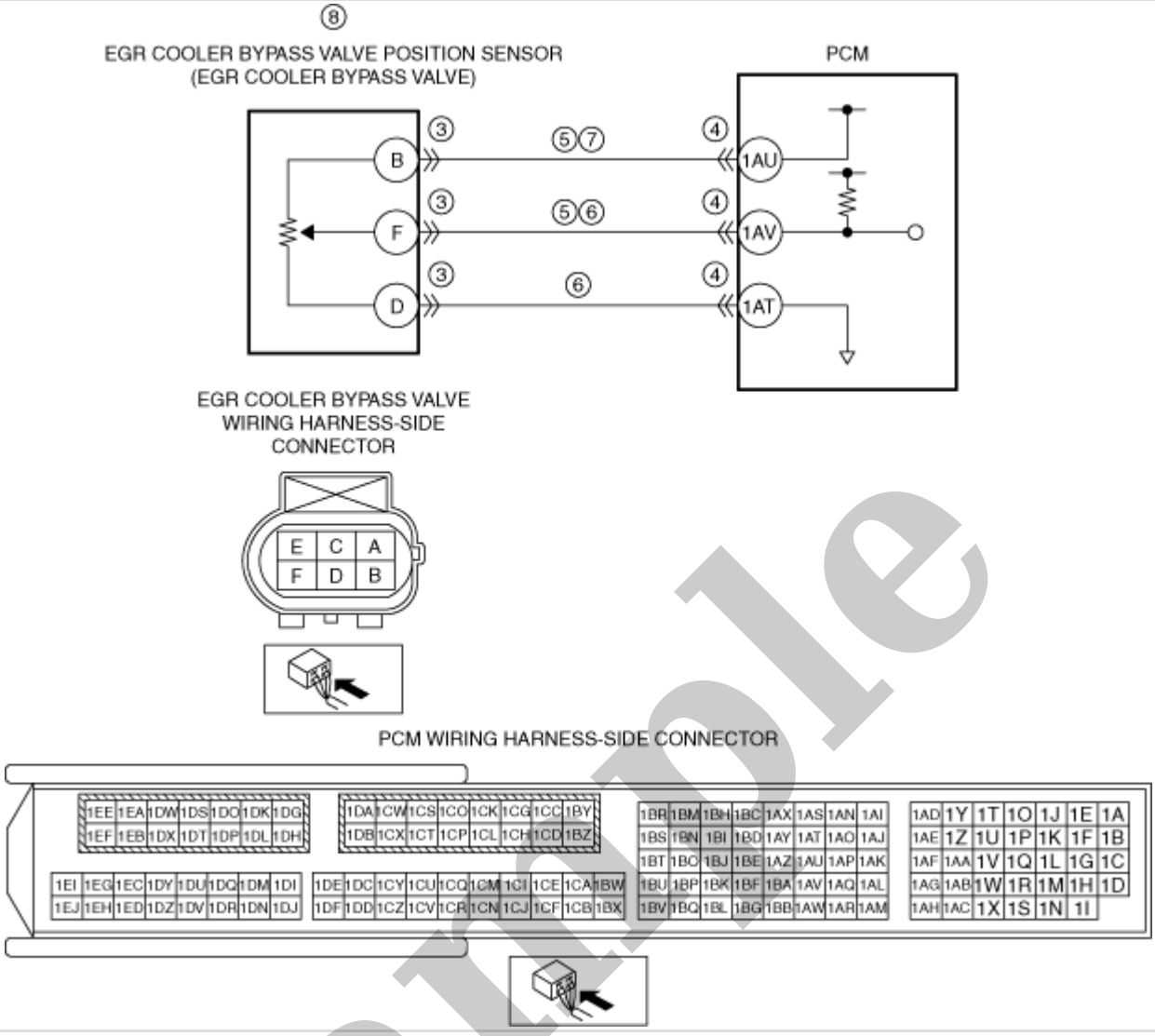
STEP	INSPECTION		ACTION
7	**PERFORM FUEL INJECTOR INJECTION AMOUNT CORRECTION** • Perform the "FUEL INJECTOR INJECTION AMOUNT CORRECTION". (See FUEL INJECTOR INJECTION AMOUNT CORRECTION [SKYACTIV-D 2.2].) • Is the fuel injection amount learning completed?	Yes	Go to Step 9.
		No	Verify that the implementation conditions for fuel injection amount learning are met, and re-implement the fuel injection amount learning. **Fuel injection amount learning is completed:** • Go to Step 9. **Fuel injection amount learning cannot be implemented:** • Go to the next step.
8	**VERIFY IF EGR VALVE MALFUNCTION IS AFFECTED** • Access the following PIDs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].) — EGRP — EGRP_ACT • Start the engine, race it at 3,000 rpm, and idle it. • Does the monitor value of the PID item EGRP conform to the EGRP_ACT PID value?	Yes	Go to the next step.
		No	Inspect the EGR valve. (See EGR VALVE INSPECTION [SKYACTIV-D 2.2].) **If there is any malfunction:** • Replace the EGR valve, then go to Step 11. (See EGR VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) **If there is no malfunction:** • Go to the next step.
9	**VERIFY IF INTAKE SHUTTER VALVE MALFUNCTION IS AFFECTED** • Access the following PIDs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].) — ISV_POS — ISV_DSD • Start the engine, race it at 3,000 rpm, and idle it. • Does the monitor value of the PID item ISV_POS conform to the ISV_DSD PID value?	Yes	Go to the next step.
		No	Inspect the intake shutter valve. (See INTAKE SHUTTER VALVE INSPECTION [SKYACTIV-D 2.2].) **If there is any malfunction:** • Replace the intake shutter valve, then go to Step 11. (See INTAKE SHUTTER VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) **If there is no malfunction:** • Go to the next step.
10	**INSPECT ENGINE COMPRESSION PRESSURE** • Inspect the engine compression pressure. (See COMPRESSION INSPECTION [SKYACTIV-D 2.2].) • Is the engine compression pressure normal?	Yes	Regard it as a temporary decrease in compression pressure, then go to the next step.
		No	Repair or replace the malfunctioning location, then go to the next step.
11	**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)].) • Access the following PIDs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-D 2.2)].) — PM_ACC_DSD — PM_GEN • Start the engine and race it at 3,000 rpm. • Is the PM_ACC_DSD monitored value twice that of the PM_GEN monitored value or more?	Yes	Repeat the inspection from Step 2. • If the malfunction recurs, replace the fuel injector. (See FUEL INJECTOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) Go to the next step.
		No	Go to the next step.
12	**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
10	**VISUALLY INSPECT CAMSHAFT PLATE AND CRANKSHAFT PLATE FOR DAMAGE** • Visually inspect the camshaft plate and crankshaft plate for damage. • Is there any malfunction?	Yes	Replace the camshaft plate or crankshaft plate, then go to the next step.
		No	Go to the next step.
11	**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 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.
12	**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
6	**INSPECT AMBIENT TEMPERATURE SENSOR SIGNAL CIRCUIT FOR SHORT TO GROUND** • Verify that the ambient temperature sensor and PCM connectors are disconnected. • Inspect for continuity between ambient temperature sensor terminal A (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 ambient temperature sensor terminal A and PCM terminal 2AX. **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 8.
		No	Go to the next step.
7	**INSPECT AMBIENT TEMPERATURE SENSOR SIGNAL CIRCUIT AND GROUND CIRCUIT FOR SHORT TO EACH OTHER** • Verify that the ambient temperature sensor and PCM connectors are disconnected. • Inspect for continuity between ambient temperature sensor terminals A and B (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: • Ambient temperature sensor terminal A—PCM terminal 2AX • Ambient temperature sensor terminal B—PCM terminal 2AY **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 each other. • Repair or replace the malfunctioning part. **If there is no common connector:** • Repair or replace the wiring harness which has a short to each other. Go to the next step.
		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 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.

STEP	INSPECTION		ACTION
6	INSPECT INSTALLATION OF REGULATING VALVE POSITION SENSOR • Inspect installation of regulating valve actuator. (See TURBOCHARGER REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) • Is the regulating valve position sensor installed securely?	Yes	Go to the next step.
		No	Retighten the regulating valve actuator, then go to Step 14. (See TURBOCHARGER REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
7	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 14.
		No	Go to the next step.
8	INSPECT REGULATING SOLENOID VALVE CONNECTOR CONDITION • Disconnect the regulating solenoid 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.
9	INSPECT VACUUM PIPING OF REGULATING SOLENOID VALVE • Inspect the vacuum piping of regulating solenoid valve. (See REGULATING SOLENOID VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) • Is there hose leakage or damage in the vacuum piping?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 14.
		No	Go to the next step.
10	INSPECT VACUUM PIPING AND POSITIVE PRESSURE PIPING OF REGULATING SOLENOID VALVE FOR CLOGGING • Inspect the vacuum piping and positive pressure piping of regulating solenoid valve for clogging. (See REGULATING SOLENOID VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) • Is the vacuum piping and positive pressure piping clogged?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 14.
		No	Go to the next step.
11	INSPECT REGULATING VALVE POSITION SENSOR • Reconnect all disconnected connectors. • Inspect the regulating valve position sensor. (See REGULATING VALVE POSITION SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the regulating valve actuator, then go to Step 14. (See TURBOCHARGER REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
12	INSPECT REGULATING SOLENOID VALVE • Inspect the regulating solenoid valve. (See REGULATING SOLENOID VALVE INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the regulating solenoid valve, then go to Step 14. (See REGULATING SOLENOID VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
13	INSPECT VACUUM PUMP • Inspect the vacuum pump. (See VACUUM PUMP INSPECTION.) • Is there any malfunction?	Yes	Replace the vacuum pump, then go to the next step. (See VACUUM PUMP REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.

DTC P2494:00	EGR cooler bypass valve position sensor circuit low input



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.