Your Ultimate Source for OEM Repair Manuals

FactoryManuals.net is a great resource for anyone who wants to save money on repairs by doing their own work. The manuals provide detailed instructions and diagrams that make it easy to understand how to fix a vehicle.

2004 MAZDA 2 / Demio OEM Service and Repair Workshop Manual

Go to manual page

2.Remove the fuel-filler cap.

3.Switch the ignition ON (engine off).

4.Turn the fuel pump relay from off to on using the FP PID and inspect if the operation sound of the fuel pump is heard. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)

- If operation sound is heard, fuel pump is normal.
- If no operation sound is heard, proceed to the next step.

5.Measure the voltage at the wiring harness side fuel pump unit terminal A with the FP PID turned on.

- If the voltage is as specified, inspect the following:
  - — Fuel pump continuity
  - — Fuel pump ground
  - — Wiring harness between the fuel pump relay and PCM terminal 2AW
- If not as specified, inspect the following:
  - — Fuel pump relay (See RELAY INSPECTION.)
  - — Wiring harness connector (Battery—Fuel pump relay—Fuel pump control module—Fuel pump unit)

Specification

8.0—11.5 V (Ignition switched ON)

Fuel Pump (Low-pressure Side) Control System Inspection

If simulation function of M-MDS is used:

1.Connect the M-MDS to the DLC-2.

2.Switch the ignition ON (engine off).

3.Select the FP PID. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)

4.Turn the fuel pump relay from off to on and inspect if the operation sound of the fuel pump relay is heard.

- If no operation sound is heard, inspect the fuel pump relay. (See RELAY INSPECTION.)
- If the fuel pump relay is normal, inspect the following:
  - — Wiring harness and connectors (IG1 relay—Fuel pump relay—PCM terminal 2AW)

STEP	INSPECTION		ACTION
6	Switch the ignition off. Inspect for continuity between terminal D (wiring harness-side) in each ignition coils and body ground. Is there continuity?	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: • Ignition coil/ion sensor No.1 terminal D−Body ground • Ignition coil/ion sensor No.2 terminal D−Body ground • Ignition coil/ion sensor No.3 terminal D−Body ground • Ignition coil/ion sensor No.4 terminal D−Body ground **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:** • Inspect for the following: — Open circuit between ignition coil/ion sensor No.1 and body ground — Open circuit between ignition coil/ion sensor No.2 and body ground — Open circuit between ignition coil/ion sensor No.3 and body ground — Open circuit between ignition coil/ion sensor No.4 and body ground — Loose or lifting ground point • Repair or replace the malfunctioning part. Repeat from Step 1.
7	Inspect the connection of PCM and ignition coil/ion sensor connectors. Are the PCM connector or ignition coil/ion sensor connectors poorly connected?	Yes	Repair or replace the connector. Repeat from Step 1.
		No	Go to the next step.
8	Inspect the CKP sensor and crankshaft pulley. (See CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. (See CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
		No	Inspect for an open or short circuit in wiring harness and connector of the CKP sensor. Repair or replace the malfunctioning part according to the inspection results.

With coolant control valve

Warning

• Fuel is highly flammable and fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the [Fuel Line Safety Procedure], while referring to the [BEFORE SERVICE PRECAUTION]. (See BEFORE SERVICE PRECAUTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

Note

• For the spark inspection, determine the malfunctioning location using the following procedure.

• Inspect using the following methods.

Item (definition)	Unit/Condition	Definition	Condition/Specification (Reference)
APP2	%	APP sensor No.2	• Accelerator pedal released: Approx. 7.45% • Accelerator pedal depressed: Approx. 45.49%
	V		• Accelerator pedal released: Approx. 0.38 V • Accelerator pedal depressed: Approx. 2.26 V
EVAPCP	%	Purge solenoid valve duty value	• Racing (Engine speed 2,000 rpm): Approx. 4.7% • Racing (Engine speed 4,000 rpm): Approx. 35.35%
MAF	g/Sec	Mass air flow	• Displays MAF
	V		• Ignition switched ON (engine off) (MAF: 0.00 g/s {0 lb/min}): Approx. 1.69 V (ECT is 53 °C {127 °F}) • Idle (after warm up) (MAF: 2.50 g/s {0.331 lb/min}): Approx. 1.89 V (ECT is 93 °C {199 °F}) • Racing (engine speed is 2,000 rpm) (MAF: 3.80 g/s {0.503 lb/min}): Approx. 2.02 V (ECT is 95 °C {203 °F})
LOAD	%	Engine load	• Idle (after warm up): Approx. 16.07% • Racing (engine speed is 2,000 rpm): Approx. 13.33% • Racing (engine speed is 4,000 rpm): Approx. 15.29%
TP_REL	%	Throttle position signal (relative value)	• Accelerator pedal released: Approx. 12% • Accelerator pedal depressed: Approx. 82%

If simulation function of M-MDS is not used:

1.Start the engine.

2.Remove the plug hole plate. (See PLUG HOLE PLATE REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

3.Disconnect the vacuum hose between the purge solenoid valve and the charcoal canister.

4.Put a finger to the purge solenoid valve and verify that there is no vacuum applied when the engine is cold.

- If there is a vacuum, inspect the following:
  - — Wiring harness and connectors (Purge solenoid valve–PCM terminal 1AW)
  - — Purge solenoid valve (See PURGE SOLENOID VALVE INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

5.Set the vehicle on a dynamometer or chassis roller.

Warning

• When the dynamometer or chassis roller is operating, there is a possibility that the operator may come into contact with or be caught up in the rotating parts, leading to serious injuries or death. When performing work while the dynamometer or chassis roller is operating, be careful not to contact or be caught up in any of the rotating parts.

6.Drive the vehicle at an engine speed to approx. 2000 rpm for 30 s or more.

Hydraulic Variable Valve Timing Control System Operation Inspection

When idling cannot be continued

1.Connect the M-MDS to the DLC-2 and verify that DTC P2090:00 or P2091:00 is displayed. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)

- Perform the DTC inspection. (See DTC P2090:00 [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) (See DTC P2091:00 [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)

2.Remove the OCV and verify that the spool valve is at maximum advanced position. (See OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

3.Connect the OCV.

4.Switch the ignition ON (engine off).

5.Verify that the spool valve is at the maximum advanced position.

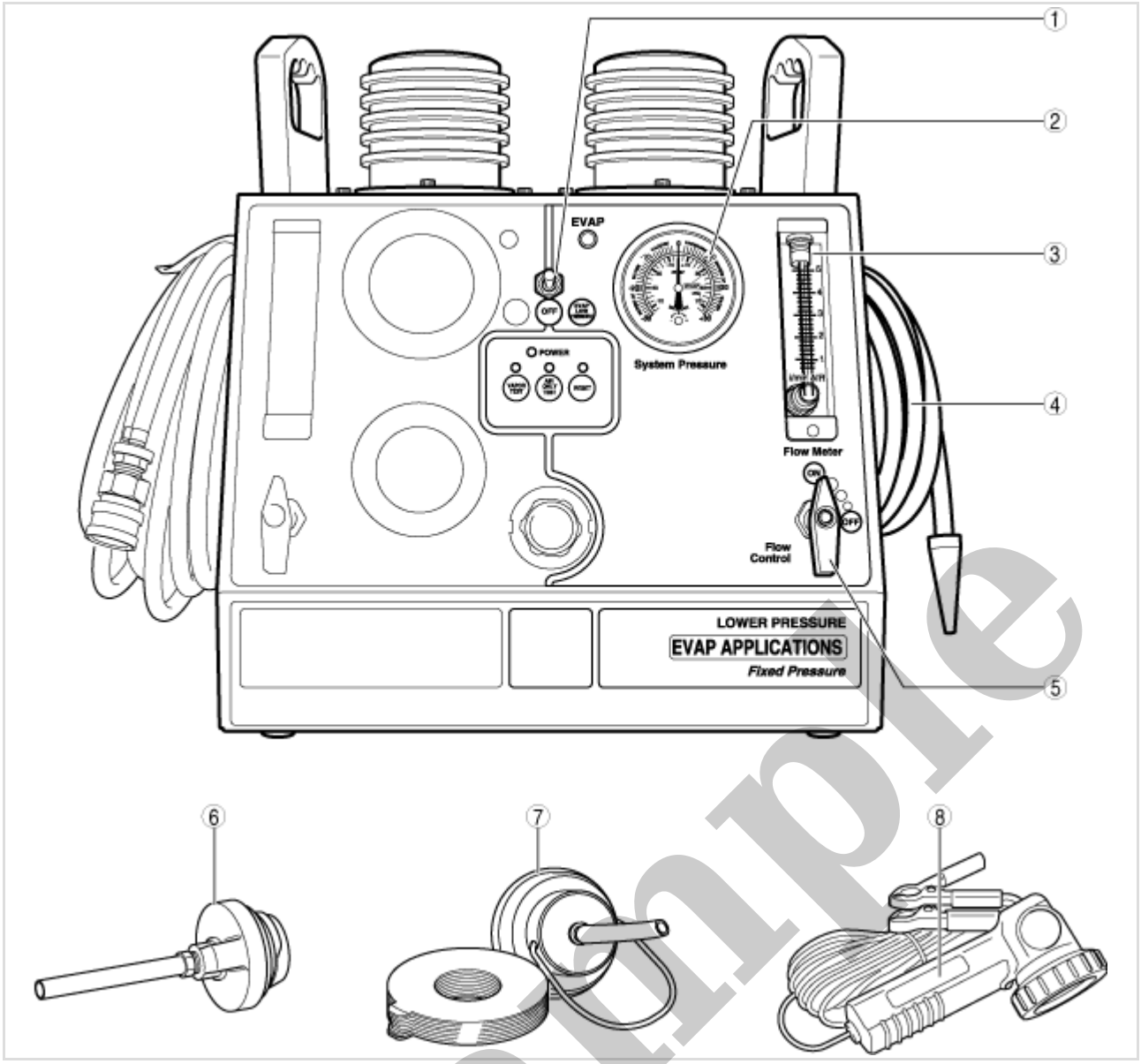
- If the spool valve is stuck in the retard direction, inspect for the following:
  - — Short circuit in wiring harnesses or connectors between OCV and PCM

6.Inspect the hydraulic variable valve timing actuator. (See HYDRAULIC VARIABLE VALVE TIMING ACTUATOR INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

When idling can be continued

If simulation function of M-MDS is used:

1. Warm up the engine to normal operating temperature.
2. Connect the M-MDS to the DLC-2.
3. Verify that DTC P2090:00 or P2091:00 is displayed. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)
   - — Perform the DTC inspection. (See DTC P2090:00 [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) (See DTC P2091:00 [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)
4. Start the engine and let it idle.
5. Access the simulation item VT_EX_DES using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)
6. Increase the OCV duty value and verify that the engine idles rough or stalls.
   - If the engine idles rough or stalls, inspect the timing chain component (valve timing deviation). (See HYDRAULIC VARIABLE VALVE TIMING ACTUATOR INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
   - If the engine does not idle rough or stalls, go to the next step.
7. Remove the OCV while the connector is connected. (See OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)



ac3uuw00002556

1	EVAP testing indicator
2	System pressure
3	Flow meter
4	EVAP/low pressure vapor output hose
5	EVAP/low pressure flow control valve
6	Gas cap single thread [tool No.: 96-0092]
7	Universal filler neck connector [tool No.: 95-0011]
8	Halogen inspection light [tool No.: 96-0011]

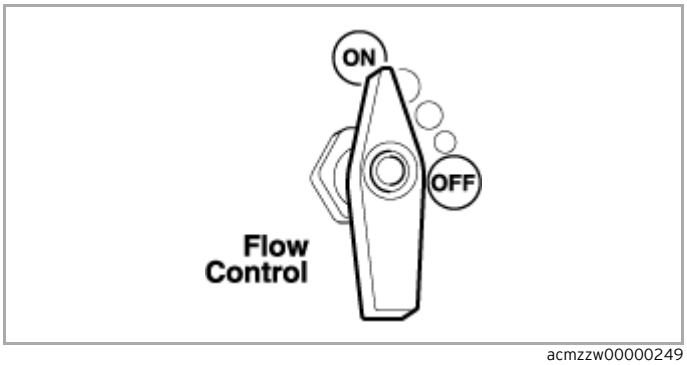
Air only test

- Test the EVAP system using the decay or leak down testing method with "Air only test".

Note

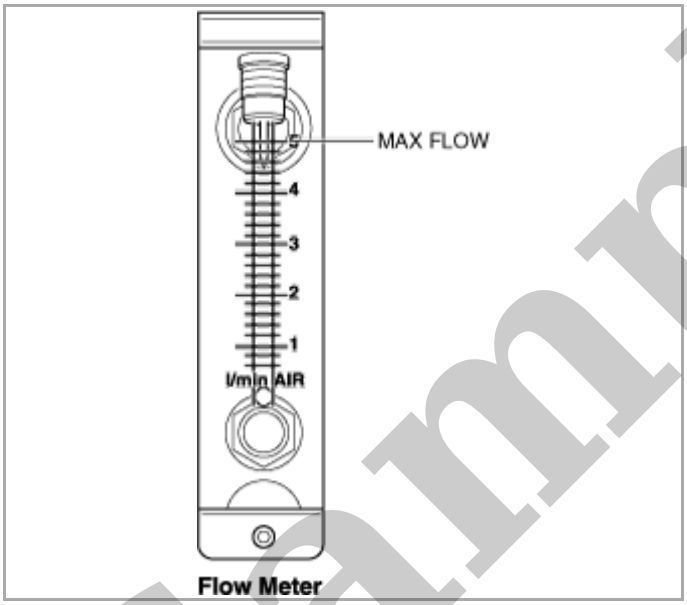
• Using the low-pressure or right side of the machine, determine if the system leaks by pressurizing the system with air using the Air only test.
• On low-pressure, the fixed pressure is less than one half of one percent.

10.Turn the EVAP/low pressure flow control valve for the EVAP/low pressure testing (right side of tester) to ON to send air to the EVAP system.



acmzzw00000249

11.Verify that the flow meter for the EVAP/low pressure testing (right side of tester) indicates the maximum flow rate.



acmzzw00000250

12.Set the CV solenoid valve (simulation item: EVAPCV) to ON using the M-MDS.

13.Verify that the indication of the flow meter for the EVAP/low pressure testing (right side of tester) decreases to the minimum flow rate.

Note

• The vapor flow can be adjusted between the minimum and maximum levels.
• The value indicated by the flow meter indicates the flow rate of the vapor supplied to the EVAP system.
• The value indicated by the system pressure gauge indicates the internal pressure of the EVAP system.

6.Set the value for simulation item EVAPCP to 50% duty cycle.

7.Remove the evaporative hose inside the engine compartment. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

8.Verify that vapor comes out from the evaporative hose.

9.Set the CV solenoid valve (simulation item: EVAPCV) to ON using the M-MDS.

10.Set the value for simulation item EVAPCP to 0% duty cycle.

11.Leave for 2 min with the EVAP/low pressure flow control valve ON.

12.Monitor the indication of the flow meter for the EVAP/low pressure testing (right side of tester).

Flow meter value decreases to the minimum flow rate

• The EVAP system is normal in the passage between the fuel-filler cap installation surface and the purge solenoid valve, or between the charcoal canister and the CV solenoid valve.

— Perform inspections of the following part because malfunctions can be considered with them.

• Fuel-filler cap (See FUEL-FILLER CAP INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

Flow meter value does not decrease to the minimum flow rate

• The EVAP system has a malfunction between the fuel-filler cap and the purge solenoid valve, or between the charcoal canister and the CV solenoid valve.

— Proceed to the next step.

13.Verify that vapor is leaking from the evaporative hose.

Vapor is leaking

• A malfunction can be considered with the purge solenoid valve. Perform the purge solenoid valve inspection. (See PURGE SOLENOID VALVE INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)

Vapor is not leaking

• Verify if vapor is leaking from between the fuel-filler cap and the purge solenoid valve using the halogen inspection light.

— If vapor is leaking, replace the malfunctioning part, and perform the Air only test again. (See Air only test.)

NO.25 FUEL FILLING SHUT OFF CONCERNS [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)]

SM3066004

id0103s380580

25	FUEL FILLING SHUT OFF CONCERNS
DESCRIPTION	• Fuel does not shut off properly.
POSSIBLE CAUSE	• PCM DTC is stored. • Nonreturn valve malfunction • Check valve malfunction (except U.S.A., CANADA and Israel) • Fuel nozzle is not inserted correctly. • Fuel nozzle malfunction • Fuel shut-off valve malfunction Warning • The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before servicing the fuel system: — Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. — Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual. (See BEFORE SERVICE PRECAUTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) (See AFTER SERVICE PRECAUTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) Caution • Disconnecting/connecting the quick release connector without cleaning it may cause damage to the fuel pipe and the quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign matter.

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	VERIFY PCM DTC • Retrieve PCM DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [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	Go to the next step.

Item (definition)	Unit/Condition	Definition	Condition/Specification (Reference)
BARO	KPa {MPA}, mBar {BAR}, psi, in H20	Barometric pressure	• Displays BARO
ECT	°C, °F	Engine coolant temperature	• Displays ECT
	V		• ECT is 20 °C {68 °F}: Approx. 3.10 V • ECT is 40 °C {104 °F}: Approx. 2.16 V • ECT is 60 °C {140 °F}: Approx. 1.40 V • ECT is 80 °C {176 °F}: Approx. 0.87 V • ECT is 100 °C {212 °F}: Approx. 0.54 V
IAT2	°C, °F	IAT sensor No.2 voltage	• Displays IAT (No.2)
	V		• IAT2 is 20 °C {68 °F}: Approx. 3.57 V • IAT2 is 40 °C {104 °F}: Approx. 2.70 V • IAT2 is 60 °C {140 °F}: Approx. 1.87 V
MAF	g/Sec	Mass air flow	• Displays MAF
	V		• Ignition switched ON (engine off) (MAF: 0.00 g/s {0 lb/min}): Approx. 1.69 V (ECT is 53 °C {127 °F}) • Idle (after warm up) (MAF: 2.50 g/s {0.331 lb/min}): Approx. 1.89 V (ECT is 93 °C {199 °F}) • Racing (engine speed is 2,000 rpm) (MAF: 3.80 g/s {0.503 lb/min}): Approx. 2.02 V (ECT is 95 °C {203 °F})
MAP	KPa {MPA}, mBar {BAR}, psi, in H20	Manifold absolute pressure	• Displays MAP

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	VERIFY PCM DTC • Retrieve PCM DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [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	Go to the next step.
2	REPLACE FUEL • Drain the remaining fuel in the fuel tank and add the specified fuel. • Leave idling for approx. 15 min to refill the hose with fuel. • Does the symptom disappear?	Yes	Symptom troubleshooting completed. (If customer has used fuel additive, give them advice not to use it)
		No	Go to the next step.
3	VERIFY IF MALFUNCTION CAUSE IS OVERHEATING • Access the ECT PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) **Caution** **• While performing this step, always operate the vehicle in a safe and lawful manner.** **• 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.** • Is the ECT PID value less than 116 °C {241 °F} during driving?	Yes	Go to the next step.
		No	The cause of this concern could be from the cooling system overheating. • Perform the symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS-OVERHEATING". (See NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)