DTC P0116:00 [SKYACTIV-G 2.0, SKYACTIV-G 2.5]

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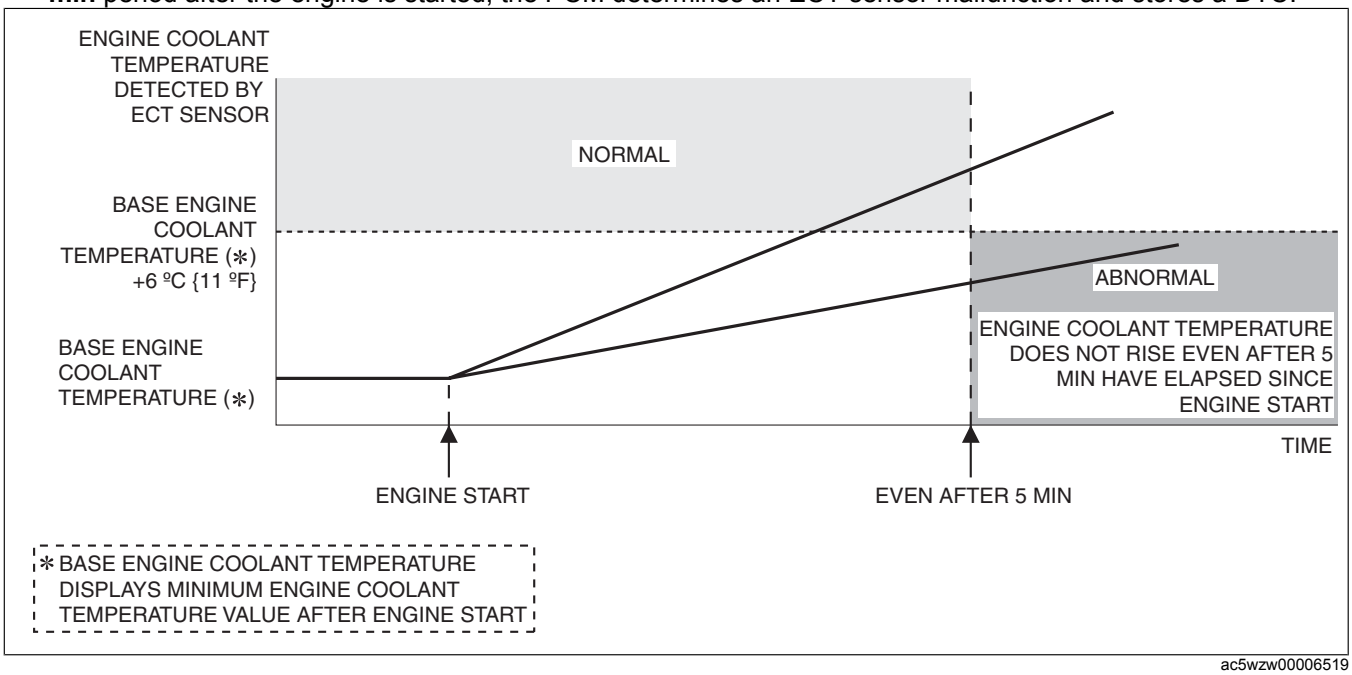
Note
- To determine the malfunctioning part, proceed with the diagnostics from “Function Inspection Using M-MDS”.

Details On DTCs

DESCRIPTION	ECT sensor circuit range/performance problem	
DETECTION CONDITION	Determination conditions	• During the **5 min** after the engine is started, the engine coolant temperature does not increase **above 6 °C {11 °F}**.
	Preconditions	• Before starting the engine, leave the vehicle with the engine turned off for **6 hours or more**. • The following DTCs are not detected: — ECT sensor: P0117:00, P0118:00
	Drive cycle	• 1
	Self test type	• CMDTC self test
	Sensor used	• ECT sensor
FAIL-SAFE FUNCTION	• Not applicable	
VEHICLE STATUS WHEN DTCs ARE OUTPUT	• Illuminates check engine light.	
POSSIBLE CAUSE	• ECT sensor connector or terminals malfunction • PCM connector or terminals malfunction • ECT sensor loose • ECT sensor malfunction • Poor assembly of engine coolant hose (engine coolant passage malfunction) • Poor engine coolant, leakage, or freezing • Use of unspecified engine coolant • Thermostat malfunction • PCM malfunction	

System Wiring Diagram
- Not applicable

Function Explanation (DTC Detection Outline)
- If the engine coolant temperature detected by the ECT sensor is not rising **6 °C {11 °F} or more** during a **5 min** period after the engine is started, the PCM determines an ECT sensor malfunction and stores a DTC.



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Repeatability Verification Procedure

1. Start the engine and leave it idling for **10 s**.
2. Switch the ignition off.
3. Leave the vehicle for **6 hours or more**.
4. Start the engine and leave it idling for **6 min**.

PID Item/Simulation Item Used In Diagnosis

PID/DATA monitor item table

Item	Definition	Unit/ Condition	Condition/Specification (Reference)
ECT	Engine coolant temperature	°C, °F	• 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

Function Inspection Using M-MDS

STEP	INSPECTION	RESULTS	ACTION
1	**PURPOSE: VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
2	**PURPOSE: RECORD VEHICLE STATUS AT TIME OF DTC DETECTION TO UTILIZE WITH REPEATABILITY VERIFICATION** • Has the FREEZE FRAME DATA (Mode 2)/ snapshot data been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 2)/snapshot data on the repair order, then go to the next step. **Note** • Recording can be facilitated using the screen capture function of the PC.
3	**PURPOSE: VERIFY CONNECTOR CONNECTIONS** • Start the engine. • Access the ECT PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) • Does the PID value fluctuate when the PCM and ECT sensor connectors are shaken?	Yes	Repair or replace the applicable connector parts. Go to the troubleshooting procedure to perform the procedure from Step 7.
		No	Go to the next step.
4	**PURPOSE: VERIFY ECT SENSOR INPUT SIGNAL** • Access the ECT PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) • Is the PID value within specification?	Yes	Go to the troubleshooting procedure to perform the procedure from Step 3.
		No	Go to the troubleshooting procedure to perform the procedure from Step 1.

Troubleshooting Diagnostic Procedure

Intention of troubleshooting procedure

- Step 1—2
  - — Perform an ECT sensor-related inspection.
- Step 3—5
  - — Perform an engine coolant-related inspection.
- Step 6
  - — Perform a unit inspection of the thermostat.
- Step 7—8
  - — Verify that the primary malfunction is resolved and there are no other malfunctions.

STEP	INSPECTION	RESULTS	ACTION
1	**PURPOSE: INSPECT INSTALLATION OF ECT SENSOR** • Inspect installation of ECT sensor. • Is the ECT sensor installed securely?	Yes	Go to the next step.
		No	Retighten the ECT sensor, then go to Step 7. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].)
2	**PURPOSE: DETERMINE INTEGRITY OF ECT SENSOR** • Inspect the ECT sensor. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) • Is there any malfunction?	Yes	Replace the ECT sensor, then go to Step 7. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].)
		No	Go to the next step.
3	**PURPOSE: VERIFY IF MALFUNCTION CAUSED BY POOR ENGINE COOLANT PASSAGE ASSEMBLY** • Verify the connection condition of the engine coolant passage (such as hoses). (See COOLING SYSTEM LOCATION INDEX [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) • Is there any malfunction?	Yes	Reconnect the engine coolant passage correctly. Replace the engine coolant, then go to Step 7. (See ENGINE COOLANT REPLACEMENT [SKYACTIV-G 2.0, SKYACTIV-G 2.5].)
		No	Go to the next step.
4	**PURPOSE: VERIFY IF MALFUNCTION RELATED TO ENGINE COOLANT AFFECTS DIAGNOSTIC RESULTS** • Inspect the following: — Is the system filled with the specified engine coolant? — Is there the possibility of freezing (low engine coolant concentration)? — Has foreign matter penetrated the engine coolant? • Are all items normal?	Yes	Go to the next step.
		No	Replace the engine coolant, then go to Step 7. (Advise the customer to use specified engine coolant used.) (See ENGINE COOLANT REPLACEMENT [SKYACTIV-G 2.0, SKYACTIV-G 2.5].)
5	**PURPOSE: VERIFY IF MALFUNCTION RELATED TO ENGINE COOLANT LEAKAGE FROM ENGINE COOLANT PASSAGE AFFECTS DIAGNOSTIC RESULTS** • Perform the “ENGINE COOLANT LEAKAGE INSPECTION”. (See ENGINE COOLANT LEAKAGE INSPECTION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) • Is there engine coolant leaking from the engine coolant passage?	Yes	Repair or replace the malfunctioning location and refill the system with engine coolant. (See ENGINE COOLANT REPLACEMENT [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) Go to Step 7.
		No	Go to the next step.
6	**PURPOSE: DETERMINE INTEGRITY OF THERMOSTAT** • Inspect the thermostat. (See THERMOSTAT INSPECTION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) • Is there any malfunction?	Yes	Replace the thermostat, then go to the next step. (See THERMOSTAT REMOVAL/INSTALLATION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].)
		No	Go to the next step.
7	**PURPOSE: VERIFICATION OF VEHICLE REPAIR COMPLETION** • Always reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See AFTER REPAIR PROCEDURE [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) • Implement the repeatability verification procedure. (See Repeatability Verification Procedure.) • Perform the DTC Reading Procedure. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) • Is the same DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) Go to the next step.
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
8	**PURPOSE: VERIFY IF THERE IS ANY OTHER MALFUNCTION** • Is any other DTC or pending code stored?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [SKYACTIV-G 2.0, SKYACTIV-G 2.5].)
		No	DTC troubleshooting completed.