

DTC P0140:00 [SKYACTIV-G 2.0, SKYACTIV-G 2.5]

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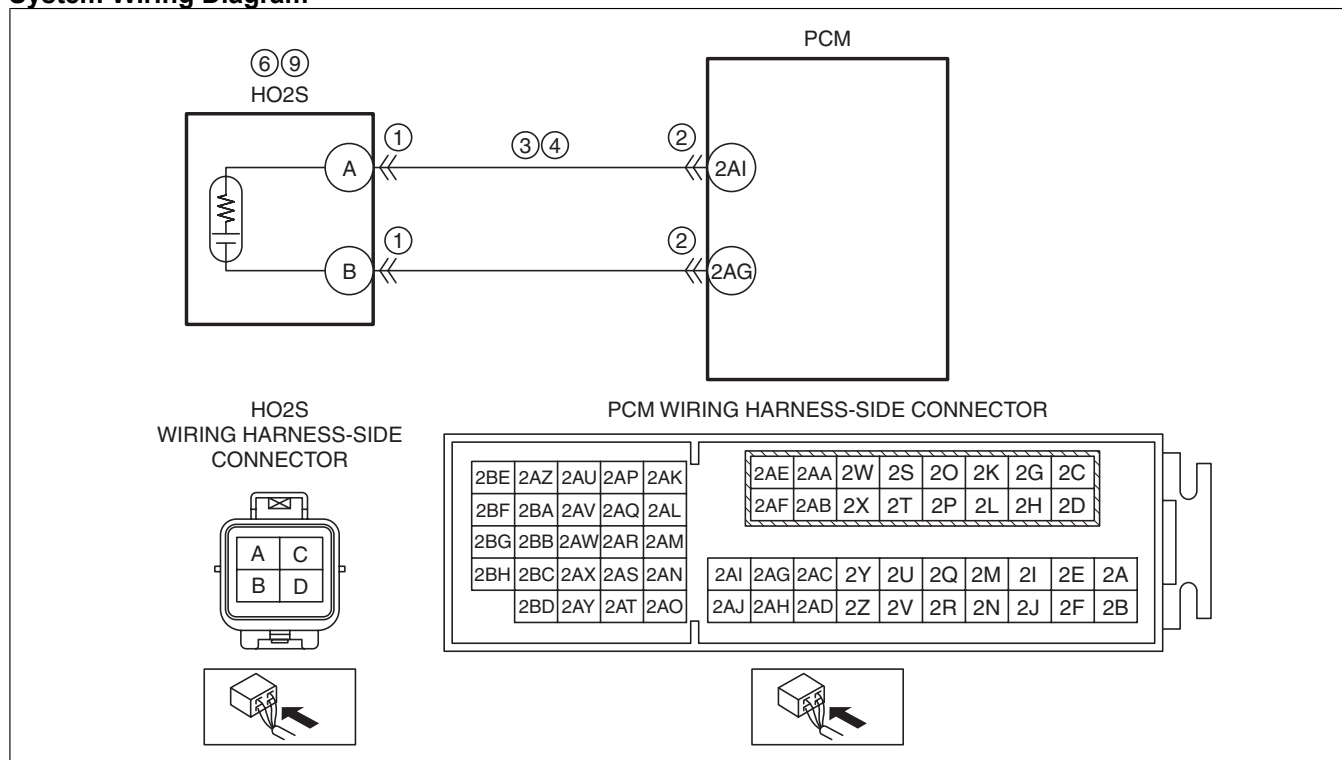
Note

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

Details On DTCs

DESCRIPTION	HO2S circuit no activity detected	
DETECTION CONDITION	Determination conditions	• With the estimated temperature of the HO2S element exceeding the specified value, a condition in which the HO2S signal voltage is less than the specified value continues for the specified period.
	Preconditions	• Battery voltage: above 11 V *1 • The following DTCs are not detected: <ul style="list-style-type: none">— HO2S: P0137:00, P0138:00— ECT sensor No.1: P0117:00, P0118:00— MAF sensor: P0101:00, P0102:00, P0103:00 *1: Value can be verified by displaying PIDs using M-MDS
	Drive cycle	• 2
	Self test type	• CMDTC self test
	Sensor used	• HO2S
FAIL-SAFE FUNCTION	• Not applicable	
VEHICLE STATUS WHEN DTCs ARE OUTPUT	• Illuminates check engine light.	
POSSIBLE CAUSE	• HO2S signal line error <ul style="list-style-type: none">— HO2S connector or terminals malfunction— PCM connector or terminals malfunction— Short to ground in wiring harness between HO2S terminal A and PCM terminal 2AI— Open circuit in wiring harness between HO2S terminal A and PCM terminal 2AI • HO2S loose • HO2S malfunction • Exhaust gas leakage from exhaust system (between A/F sensor and HO2S) • Insufficient engine compression • HO2S heater malfunction • PCM malfunction	

System Wiring Diagram



am6zzw00010984

Function Explanation (DTC Detection Outline)

- If the output voltage of the HO2S continues to be low for the specified time or more even though the estimated temperature of the HO2S element after the engine is started exceeds the specified value, the PCM determines that the HO2S is not activating, and stores a DTC. The malfunction determination time varies depending on the intake air amount.

Repeatability Verification Procedure

- Warm up the engine to allow the engine coolant temperature to reach **80 °C {176 °F} or more**.
- Start the engine and leave it idling for **1 min**.

Note

- Match the engine coolant temperature in the recorded FREEZE FRAME DATA (Mode 2)/snapshot data, the vehicle speed, and engine speed values to the best extent possible while driving the vehicle.
- Try to reproduce the malfunction by driving the vehicle for **5 min** based on the values in the FREEZE FRAME DATA (Mode 2)/snapshot data.

PID Item/Simulation Item Used In Diagnosis

PID/DATA monitor item table

Item	Definition	Unit/ Condition	Condition/Specification (Reference)
HTR12	HO2S heater control)	Off/On	<ul style="list-style-type: none"> Switch ignition ON (engine off): Off Idle (after warm up): On
		%	<ul style="list-style-type: none"> Switch ignition ON (engine off): 0% Idle (after warm up): Approx. 40%
O2S12	HO2S	V	<ul style="list-style-type: none"> Idle (after warm up): 0—1.0 V Deceleration fuel cut (accelerator pedal released from engine speed of 4,000 rpm or more): Approx. 0 V

Function Inspection Using M-MDS

STEP	INSPECTION	RESULTS	ACTION
1	PURPOSE: VERIFY RELATED SERVICE INFORMATION AVAILABILITY <ul style="list-style-type: none"> Verify related Service Information availability. Is any related Service Information available? 	Yes	Perform repair or diagnosis according to the available Service Information.
		No	Go to the next step.
2	PURPOSE: RECORD VEHICLE STATUS AT TIME OF DTC DETECTION TO UTILIZE WITH REPEATABILITY VERIFICATION <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Recording can be facilitated using the screen capture function of the PC.
3	PURPOSE: VERIFY CONNECTOR CONNECTIONS <ul style="list-style-type: none"> Start the engine. Access the following PIDs using the M-MDS: (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) <ul style="list-style-type: none"> HTR12 O2S12 When the following parts are shaken, does the PID value include a PID item which has changed? <ul style="list-style-type: none"> HO2S PCM 	Yes	Repair or replace the applicable connector parts. Go to the troubleshooting procedure to perform the procedure from Step 10.
		No	Go to the next step.
4	PURPOSE: VERIFICATION IF MALFUNCTION CAUSED BY HO2S <ul style="list-style-type: none"> Start the engine and idle it. Access the O2S12 PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) Is the O2S12 PID value normal? 	Yes	Go to the next step.
		No	Go to the troubleshooting procedure to perform the procedure from Step 1.
5	PURPOSE: VERIFICATION IF MALFUNCTION CAUSED BY HO2S HEATER <ul style="list-style-type: none"> Start the engine and idle it. Access the HTR12 PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) Is the HTR12 PID value normal? 	Yes	Go to the troubleshooting procedure to perform the procedure from Step 1.
		No	Go to the troubleshooting procedure to perform the procedure from Step 9.

Troubleshooting Diagnostic Procedure

Intention of troubleshooting procedure

- Step 1—4
 - Perform an inspection of the HO2S signal line-related parts.
- Step 5—6
 - Verify the condition of the HO2S installation and perform a unit inspection.
- Step 7
 - Perform an exhaust system parts inspection.
- Step 8
 - Perform an inspection of the engine compression.
- Step 9
 - Perform an inspection of the HO2S heater.
- Step 10—11
 - Verify that the primary malfunction is resolved and there are no other malfunctions.

STEP	INSPECTION	RESULTS	ACTION
1	PURPOSE: INSPECT HO2S CONNECTOR CONDITION <ul style="list-style-type: none"> • Switch the ignition off. • Disconnect the HO2S 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 10.
		No	Go to the next step.
2	PURPOSE: 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 10.
		No	Go to the next step.
3	PURPOSE: INSPECT HO2S SIGNAL CIRCUIT FOR SHORT TO GROUND <ul style="list-style-type: none"> • Verify that the HO2S and PCM connectors are disconnected. • Inspect for continuity between HO2S 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 HO2S terminal A and PCM terminal 2AI. 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 ground. • 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 ground. Go to Step 10.
		No	Go to the next step.
4	PURPOSE: INSPECT HO2S CIRCUIT FOR OPEN CIRCUIT <ul style="list-style-type: none"> • Verify that the HO2S and PCM connectors are disconnected. • Inspect for continuity between HO2S terminal A (wiring harness-side) and PCM terminal 2AI (wiring harness-side). • 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 HO2S terminal A and PCM terminal 2AI. 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 an open circuit. • 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 an open circuit. Go to Step 10.
5	PURPOSE: INSPECT INSTALLATION OF HO2S <ul style="list-style-type: none"> • Verify the installation condition of the HO2S (installation angle, tightening torque value). (See HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) • Is the HO2S installed securely? 	Yes	Go to the next step.
		No	Retighten the HO2S, then go to Step 10. (See HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].)
6	PURPOSE: DETERMINE INTEGRITY OF HO2S <ul style="list-style-type: none"> • Reconnect all disconnected connectors. • Inspect the HO2S. (See HEATED OXYGEN SENSOR (HO2S) INSPECTION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) • Is there any malfunction? 	Yes	Replace the HO2S, then go to Step 10. (See HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].)
		No	Go to the next step.
7	PURPOSE: VERIFY IF MALFUNCTION RELATED TO EMISSION SYSTEM AFFECTS HO2S SIGNAL <ul style="list-style-type: none"> • Inspect for exhaust gas leakage from the exhaust system. (between A/F sensor and HO2S) • Is there any malfunction? 	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 10.
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
8	PURPOSE: VERIFY IF MALFUNCTION RELATED TO ENGINE COMPRESSION AFFECTS DIAGNOSTIC RESULTS <ul style="list-style-type: none"> Inspect the engine compression. (See COMPRESSION INSPECTION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) Are compression pressures within specification? Specification: <ul style="list-style-type: none"> Compression [SKYACTIV-G 2.0, European (L.H.D. U.K.) specs.] <ul style="list-style-type: none"> Standard: 978 kPa {9.97 kgf/cm², 142 psi} (300 rpm) Minimum: 783 kPa {7.98 kgf/cm², 114 psi} (300 rpm) Maximum difference between cylinders: 166 kPa {1.69 kgf/cm², 24.1 psi} (300 rpm) Compression [SKYACTIV-G 2.0, Except European (L.H.D. U.K.) specs.] <ul style="list-style-type: none"> Standard: 885 kPa {9.02 kgf/cm², 128 psi} (300 rpm) Minimum: 708 kPa {7.22 kgf/cm², 103 psi} (300 rpm) Maximum difference between cylinders: 150 kPa {1.53 kgf/cm², 21.8 psi} (300 rpm) Compression [SKYACTIV-G 2.5] <ul style="list-style-type: none"> Standard: 954 kPa {9.73 kgf/cm², 138 psi} (300 rpm) Minimum: 763 kPa {7.78 kgf/cm², 111 psi} (300 rpm) Maximum difference between cylinders: 161 kPa {1.64 kgf/cm², 23.4 psi} (300 rpm) Note <ul style="list-style-type: none"> Because the SKYACTIV-G 2.0 and SKYACTIV-G 2.5 retards the intake valve closing timing, compression pressure is low. 	Yes	Go to the next step.
		No	Replace or overhaul the engine, then go to Step 10.
9	PURPOSE: DETERMINE INTEGRITY OF HO2S HEATER <ul style="list-style-type: none"> Inspect the HO2S heater. (See HEATED OXYGEN SENSOR (HO2S) INSPECTION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) Is there any malfunction? 	Yes	Replace the HO2S, then go to the next step. (See HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].)
		No	Go to the next step.
10	PURPOSE: VERIFICATION OF VEHICLE REPAIR COMPLETION <ul style="list-style-type: none"> 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 Pending Trouble Code Access Procedure. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) Is the PENDING CODE for this 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-G 2.0, SKYACTIV-G 2.5].) Go to the next step.
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
11	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.