DTC P0130:00 [SKYACTIV-G 2.0, SKYACTIV-G 2.5]

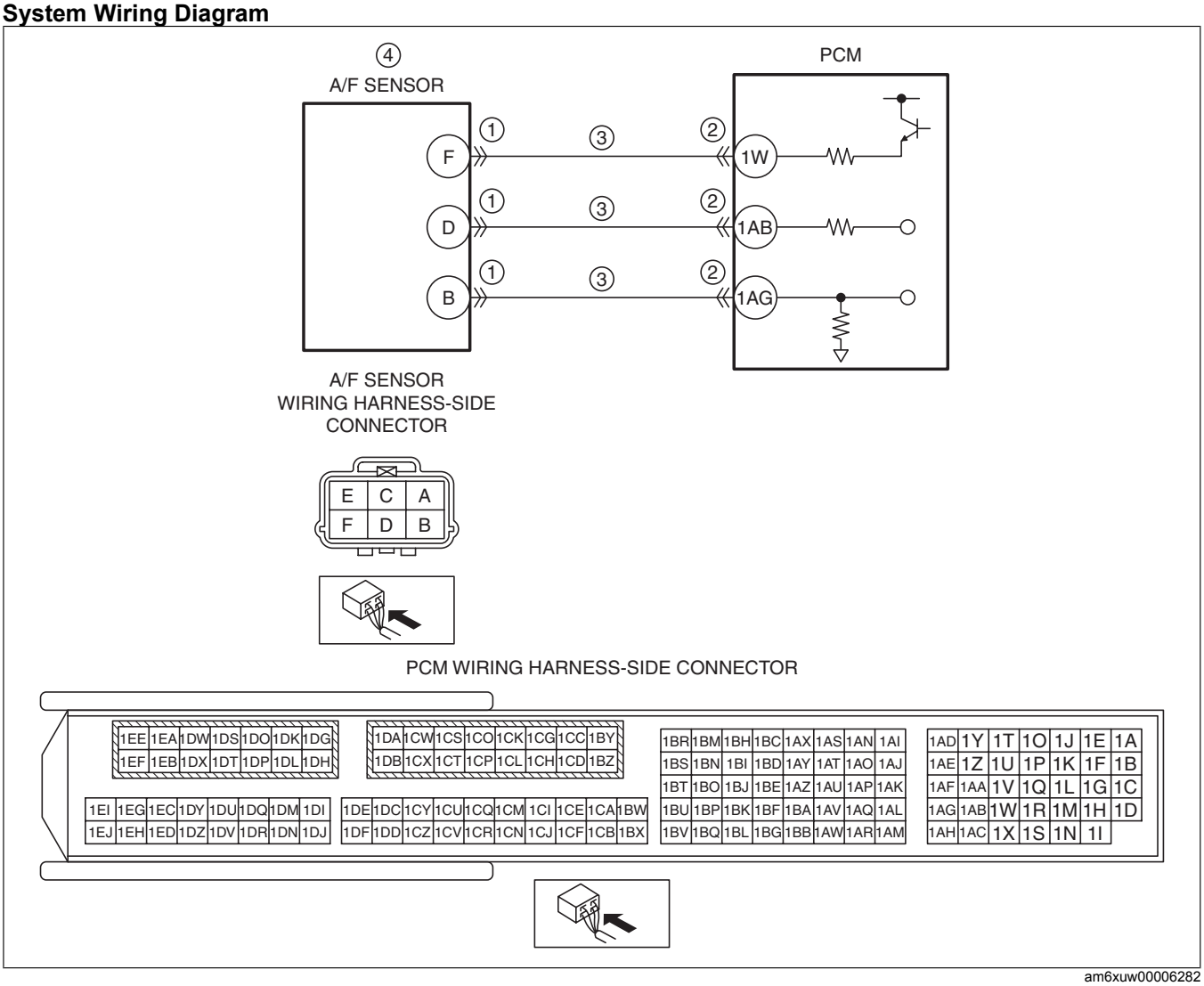
id0102h4702100

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

Details On DTCs

DESCRIPTION	**Voltage problem between PCM terminal 1AB and PCM terminal 1AG**	
DETECTION CONDITION	Determination conditions	• A condition in which the voltage between PCM terminals 1AB and 1AG exceeds the specified range continues for the specified period or more.
	Preconditions	• Switch the ignition ON (engine off) • Battery voltage: **11—18 V** *1 • The following DTC is not detected: — Internal PCM malfunction: P064D:00 *1: Value can be verified by displaying PIDs using M-MDS
	Drive cycle	• 2
	Self test type	• CMDTC self test, KOER self test
	Sensor used	• A/F sensor
FAIL-SAFE FUNCTION	• Fixes duty value of A/F sensor heater • Stops fuel feedback control of A/F sensor	
VEHICLE STATUS WHEN DTCs ARE OUTPUT	• Illuminates check engine light.	
POSSIBLE CAUSE	• A/F sensor connector or terminals malfunction • PCM connector or terminals malfunction • Deterioration in wiring harness between the following terminals: — A/F sensor terminal F—PCM terminal 1W — A/F sensor terminal D—PCM terminal 1AB — A/F sensor terminal B—PCM terminal 1AG • A/F sensor malfunction • PCM malfunction	

System Wiring Diagram



am6xuw00006282

Function Explanation (DTC Detection Outline)

- If the voltage between PCM terminal 1AB and PCM terminal 1AG exceeds the specified range with the A/F sensor activated, the element in the A/F sensor could deteriorate. To prevent this, the PCM stops control of the A/F sensor and stores a DTC.

Repeatability Verification Procedure

1. Warm up the engine to allow the engine coolant temperature to reach **80 °C {176 °F} or more**.
2. 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.

3. 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)
O2S11	A/F sensor	μA	• Idle (after warm up): Approx. -39 μA • Deceleration fuel cut (accelerator pedal released from engine speed of 4,000 rpm or more): Approx. 3.84 mA

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 troubleshooting procedure to perform the procedure from Step 1.
		No	Record the FREEZE FRAME DATA (Mode 2)/snapshot data on the repair order. **Note** • Recording can be facilitated using the screen capture function of the PC. Go to the troubleshooting procedure to perform the procedure from Step 1.

Troubleshooting Diagnostic Procedure
Intention of troubleshooting procedure

- Step 1—2
  - — Perform an inspection of the A/F sensor and PCM-related connectors.
- Step 3
  - — Inspect the wiring harness between the A/F sensor and PCM for deterioration.
- Step 4
  - — Perform a unit inspection of the A/F sensor.
- Step 5—6
  - — Verify that the primary malfunction is resolved and there are no other malfunctions.

STEP	INSPECTION	RESULTS	ACTION
1	**PURPOSE: INSPECT A/F SENSOR CONNECTOR CONDITION** • Switch the ignition off. • Disconnect the A/F sensor 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 5.
		No	Go to the next step.
2	**PURPOSE: 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 5.
		No	Go to the next step.
3	**PURPOSE: INSPECT WIRING HARNESS BETWEEN A/F SENSOR AND PCM FOR DETERIORATION** • Inspect for deterioration between the following terminals (wiring harness-side): — A/F sensor terminal F—PCM terminal 1W — A/F sensor terminal D—PCM terminal 1AB — A/F sensor terminal B—PCM terminal 1AG • Is there any malfunction?	Yes	Repair or replace the wiring harness which has deteriorated, then go to Step 5.
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
4	**PURPOSE: DETERMINE INTEGRITY OF A/F SENSOR** • Start the engine and warm it up completely. • Access the O2S11 PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) • Drive the vehicle under the following conditions. **Warning** **• 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.** **• While performing this step, always operate the vehicle in a safe and lawful manner.** — After increasing the engine speed to **3,000 rpm**, decelerate using engine braking. • Is the displayed PID value as follows? — O2S11: **0.25 mA or more**	Yes	Go to the next step.
		No	Replace the A/F sensor, then go to the next step. (See AIR FUEL RATIO (A/F) SENSOR REMOVAL/ INSTALLATION [SKYACTIV-G 2.0, SKYACTIV-G 2.5].)
5	**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].) • Perform the KOER self test. (See KOEO/KOER SELF TEST [SKYACTIV-G 2.0, SKYACTIV-G 2.5].) • Is the PENDING CODE for this 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.
6	**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.