

DTC P0030 or P0050

Circuit Description

Heated oxygen sensors (HO2S) are used for fuel control and post catalyst monitoring. Each HO2S compares the oxygen content of the surrounding air with the oxygen content in the exhaust stream. The HO2S must reach operating temperature to provide an accurate voltage signal. A heating element inside the HO2S minimizes the time required for the sensor to reach operating temperature. Voltage is provided to the heater by the ignition 1 voltage circuit through a fuse. With the engine running, ground is provided to the heater by the HO2S heater low control circuit, through a low side driver within the engine control module (ECM).

The ECM commands the heater ON or OFF to maintain a specific HO2S operating temperature range. The ECM monitors the voltage on the HO2S heater low control circuit for heater fault diagnosis. If the ECM detects that the HO2S heater low control circuit voltage is not within a specified range, DTC P0030 sets for HO2S bank 1 sensor 1 or DTC P0050 sets for HO2S bank 2 sensor 1.

DTC Descriptors

This diagnostic procedure supports the following DTCs:

- DTC P0030 HO2S Heater Control Circuit Bank 1 Sensor 1
- DTC P0050 HO2S Heater Control Circuit Bank 2 Sensor 1

Conditions for Running the DTC

- The Ignition 1 Signal parameter is between 10-18 volts.
- This diagnostic runs continuously when the above condition is met.

Conditions for Setting the DTC

The ECM detects that the affected HO2S heater low control circuit is not within a specified range for 6 seconds.

Action Taken When the DTC Sets

- The control module illuminates the malfunction indicator lamp (MIL) on the second consecutive ignition cycle that the diagnostic runs and fails.
- The control module records the operating conditions at the time the diagnostic fails. The first time the diagnostic fails, the control module stores this information in the Failure Records. If the diagnostic reports a failure on the second consecutive ignition cycle, the control module records the operating conditions at the time of the failure. The control module writes the operating conditions to the Freeze Frame and updates the Failure Records.

Conditions for Clearing the MIL/DTC

- The control module turns OFF the malfunction indicator lamp (MIL) after 3 consecutive ignition cycles that the diagnostic runs and does not fail.
- A current DTC, Last Test Failed, clears when the diagnostic runs and passes.
- A history DTC clears after 40 consecutive warm-up cycles, if no failures are reported by this or any other emission related diagnostic.
- Clear the MIL and the DTC with a scan tool.

Test Description

The number below refers to the step number on the diagnostic table.

7. With no fault present, the test lamp will blink once per second.

Step	Action	Value (s)	Yes	No
Schematic Reference: Engine Controls Schematics				
Connector End View Reference: Engine Controls Connector End Views or Powertrain Control Module Connector End Views				
1	Did you perform the Diagnostic System Check - Vehicle?	--	Go to Step 2	Go to Diagnostic System Check - Vehicle
2	Important: Whenever the heated oxygen sensor (HO2S) heaters are commanded ON with a scan tool, they will continue to be pulsed ON once per second until the ignition is turned OFF for 30 seconds. 1. Turn ON the ignition, with the engine OFF. 2. Command the heated oxygen sensor (HO2S) heaters ON with a scan tool. 3. Wait 15 seconds to allow the HO2S heater current to stabilize. 4. Observe the affected HO2S Heater Current parameter with a scan tool. Is the HO2S Heater Current parameter within the specified range?	0.25-3.125 A	Go to Step 3	Go to Step 4
3	1. Observe the Freeze Frame/Failure Records for this DTC. 2. Turn OFF the ignition for 30 seconds. 3. Start the engine. 4. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records. Did the DTC fail this ignition?	--	Go to Step 4	Go to Testing for Intermittent Conditions and Poor Connections

4	Inspect the O2A or O2B fuse. Is the O2A or O2B fuse open?	--	Go to Step 5	Go to Step 6
5	Test the ignition 1 voltage circuit for a short to ground. Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	--	Go to Step 20	Go to Step 8
6	1. Disconnect the affected HO2S. 2. Turn ON the ignition, with the engine OFF. 3. Probe the ignition 1 voltage circuit of the HO2S harness connector on the engine harness side with a test lamp that is connected to a good ground. Refer to Probing Electrical Connectors . Does the test lamp illuminate?	--	Go to Step 7	Go to Step 17
7	Important: The test lamp may blink prior to commanding the heaters ON. This is because the heaters were commanded ON in a previous step. To command the heaters OFF, turn OFF the ignition for 30 seconds. 1. Connect a test lamp between the ignition 1 voltage circuit of the HO2S harness connector on the engine harness side and the HO2S heater low control circuit of the HO2S harness connector on the engine harness side. 2. Command the HO2S heaters ON with a scan tool. Does the test lamp blink once per second?	--	Go to Step 9	Go to Step 10
8	Important: Perform the following test on all HO2S which are supplied voltage by the suspect circuit. Test the ignition 1 voltage circuit on the sensor side of the HO2S connector for a short to ground. Refer to Circuit Testing . Is any sensor shorted to ground?	--	Go to Step 18	Go to Testing for Intermittent Conditions and Poor Connections
9	Measure the resistance of the following circuits with a DMM: - The HO2S heater low control circuit - The ignition 1 voltage circuit	3 ohms		

	Refer to Circuit Testing .			
	Is the resistance of either circuit more than the specified value?		Go to Step 16	Go to Step 14
10	Is the test lamp on steady?	--	Go to Step 11	Go to Step 12
11	Test the HO2S heater low control circuit for a short to ground. Refer to Circuit Testing and Wiring Repairs .	--		
	Did you find and correct the condition?		Go to Step 20	Go to Step 15
12	Test the HO2S heater low control circuit for a short to voltage. Refer to Circuit Testing and Wiring Repairs .	--		
	Did you find and correct the condition?		Go to Step 20	Go to Step 13
13	Test the HO2S heater low control circuit for an open or high resistance. Refer to Circuit Testing and Wiring Repairs .	--		
	Did you find and correct the condition?		Go to Step 20	Go to Step 15
14	Test for shorted terminals and for poor connections at the HO2S. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs .	--		
	Did you find and correct the condition?		Go to Step 20	Go to Step 18
15	Test for shorted terminals and for poor connections at the powertrain control module (PCM). Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs .	--		
	Did you find and correct the condition?		Go to Step 20	Go to Step 19
16	Repair the circuit with high resistance. Refer to Wiring Repairs .	--		
	Did you complete the repair?		Go to Step 20	--
17	Repair the open or high resistance in the ignition 1 voltage circuit. Refer to Wiring Repairs .	--		
	Did you complete the repair?		Go to Step 20	--
18	Replace the affected HO2S. Refer to the following: • Heated Oxygen Sensor Replacement - Bank 1 Sensor 1 • Heated Oxygen Sensor Replacement - Bank 2 Sensor 1	--		

	Did you complete the replacement?		Go to Step 20	--
19	Replace the PCM. Refer to Control Module References for replacement, setup, and programming.	--		
	Did you complete the replacement?		Go to Step 20	--
20	1. Replace the O2A or O2B fuse, if necessary. 2. Clear the DTCs with a scan tool. 3. Turn OFF the ignition for 30 seconds. 4. Start the engine. 5. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records.	--		
	Did the DTC fail this ignition?		Go to Step 2	Go to Step 21
21	Observe the Capture Info with a scan tool. Are there any DTCs that have not been diagnosed?	--	Go to Diagnostic Trouble Code (DTC) List - Vehicle	System OK