P0053 HO2S Internal Heater Resistance Bank 1 Sensor 1

Circuit Description

The wide band heated oxygen sensor (HO2S) measures the amount of oxygen in the exhaust system and provides more information than the switching style HO2S. The wide band sensor consists of an oxygen sensing cell, an oxygen pumping cell, and a heater. The exhaust gas sample passes through a diffusion gap between the sensing cell and the pumping cell. The engine control module (ECM) supplies a voltage to the HO2S and uses this voltage as a reference to the amount of oxygen in the exhaust system. An electronic circuit within the ECM controls the pump current through the oxygen pumping cell in order to maintain a constant voltage in the oxygen sensing cell. The ECM monitors the voltage variation in the sensing cell and attempts to keep the voltage constant by increasing or decreasing the amount of current flow, or oxygen ion flow, to the pumping cell. By measuring the amount of current required to maintain the voltage in the sensing cell, the ECM can determine the concentration of oxygen in the exhaust. The HO2S voltage is displayed as a lambda value. A lambda value of 1 is equal to a stoichiometric air fuel ratio of 14.7:1. Under normal operating conditions, the lambda value will remain around 1. When the fuel system is lean, the oxygen level will be high and the lambda signal will be high or more than 1. When the fuel system is rich, the oxygen level will be low, and the lambda signal will be low or less than 1. The ECM uses this information to maintain the correct air/fuel ratio. If there is an internal ECM condition with the integrated circuits for the heated oxygen sensor, this DTC sets.

DTC Descriptor

This diagnostic procedure supports the following DTC. DTC P0053 HO2S Internal Heater Resistance Bank 1 Sensor 1

Conditions for Running the DTC

- Before the ECM can report DTC P0053 failed, DTCs P0030, P0031, P0032, P0101, P0121, P0122, P0123, P0131, P0132, P0133, P0221, P0222, P0223, P0336, P0338, P2237, P2243, and P2626 must run and pass.

- The calculated exhaust temperature is more than 400°C (752°F).
- The engine is not misfiring.
- The engine speed is more than 25 RPM.
- The ignition 1 voltage is between 10.5–18 volts.
- The HO2S heater is commanded ON.
- DTC P0053 runs continuously once the above conditions are met for 60 seconds.

Conditions for Setting the DTC

There is an internal ECM condition with the integrated circuits for HO2S bank 1 sensor 1.

Action Taken When the DTC Sets

- The control module stores the DTC information into memory when the diagnostic runs and fails.
- The malfunction indicator lamp (MIL) will not illuminate.
- The control module records the operating conditions at the time the diagnostic fails. The control module stores this information in the Failure Records.
- The driver information center, if equipped, may display a message.

Conditions for Clearing the DTC

- 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 non-emission related diagnostic.
- Clear the DTC with a scan tool.

DTC P0053

Step	Action	Yes	No
Schematic Reference: Engine Controls Schematics Connector End View Reference: Engine Control Module (ECM) Connector End Views or Engine Controls Connector End Views			
1	Did you perform the Diagnostic System Check–Engine Controls?	Go to Step 2	Go to Diagnostic System Check -Engine Controls
2	1. Start the engine. 2. Allow the engine to reach the operating temperature. 3. Observe the DTC information with a scan tool. Does the scan tool display DTC P0053 failed?	Go to Step 4	Go to Step 3
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 Intermittent Conditions
4	Are there any other DTCs set?	Go to Diagnostic Trouble Code (DTC) List	Go to Step 5
5	Replace the engine control module (ECM). Refer to Engine Control Module (ECM) Replacement. Did you complete the replacement?	Go to Step 6	—

Step	Action	Yes	No
6	1. Clear the DTCs with a scan tool. 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 2	Go to Step 7
7	Observe the Capture Info with a scan tool. Are there any DTCs that have not been diagnosed?	Go to Diagnostic Trouble Code (DTC) List	System OK