

DTC P1133

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. Heating elements inside the HO2S minimize the time required for the sensors to reach operating temperature. The powertrain control module (PCM) supplies the HO2S with a reference, or bias, voltage of about **450 mV**. When the engine is first started the PCM operates in open loop, ignoring the HO2S voltage signal. Once the HO2S reaches operating temperature and closed loop is achieved, the HO2S generates a voltage within a range of **0-1,000 mV** that fluctuates above and below bias voltage. High HO2S voltage indicates a rich exhaust stream; low HO2S voltage indicates a lean exhaust stream. This diagnostic will only run once per ignition cycle. The PCM monitors the number of rich-to-lean and lean-to-rich transitions. If the PCM detects that the number of transitions were less than a specified value, DTC P1133 sets for HO2S bank 1 sensor 1, or DTC P1153 sets for HO2S bank 2 sensor 1.

DTC DESCRIPTORS

This diagnostic procedure supports the following DTCs:

- DTC P1133 HO2S Insufficient Switching Bank 1 Sensor 1
- DTC P1153 HO2S Insufficient Switching Bank 2 Sensor 1

CONDITIONS FOR RUNNING THE DTC

- DTCs P0053, P0054, P0068, P0101, P0102, P0103, P0106, P0107, P0108, P0112, P0113, P0116, P0117, P0118, P0120, P0128, P0131, P0132, P0134, P0135, P0151, P0152, P0154, P0155, P0200, P0220, P0442, P0446, P0452, P0453, P0455, P0496, P1125, P1258, P1516, P2101, P2108, P2135, U0107 are not set.
- The ECT Sensor parameter is more than **60°C (140°F)**.
- The EVAP Purge Solenoid Command parameter is more than **1 percent**.
- The MAF Sensor parameter is between **20-55 g/s**.
- The Engine Speed parameter is between **1,200-3,000 RPM**.
- The TP Indicated Angle parameter is **5 percent** more than the value observed at idle.
- The Loop Status parameter is closed.
- The Ignition 1 Signal parameter is between **10-18 volts**.
- The **Fuel Tank** Level Remaining parameter is more than **10 percent**.
- The Engine Run Time parameter is more than **160 seconds**.
- This diagnostic runs one time per drive cycle once the above conditions are met.

CONDITIONS FOR SETTING THE DTC

The PCM detects that the affected HO2S lean-to-rich or rich-to-lean transitions are less than a calibrated value for a **100 second** monitoring period.

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

Step	Action	Value(s)	Yes	No
1	Did you perform the Diagnostic System Check – Vehicle?	—	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	<ol style="list-style-type: none"> 1. Start the engine. 2. Allow the engine to reach operating temperature. Refer to Scan Tool Data List. 3. Operate the engine at 1,500 RPM for 30 seconds. 4. Observe the affected heated oxygen sensor (HO2S) voltage parameter with a scan tool. <p>Is the HO2S voltage parameter varying above and below the specified range?</p>	250-625 mV	Go to Step 3	Go to Step 4
3	<ol style="list-style-type: none"> 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. <p>Did the DTC fail this ignition?</p>	—	Go to Step 4	Go to Intermittent Conditions
4	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the affected HO2S. 3. Turn ON the ignition, with the engine OFF. 4. Observe the HO2S voltage parameter with a scan tool. <p>Is the HO2S voltage parameter less than the specified value?</p>	100 mV	Go to Step 6	Go to Step 5
5	<ol style="list-style-type: none"> 1. Connect a 3-amp fused jumper wire between the high signal circuit of the HO2S harness connector on the engine harness side and a good ground. 2. Observe the HO2S voltage parameter with a scan tool. <p>Is the HO2S voltage parameter less than the specified value?</p>	100 mV	Go to Step 8	Go to Step 7
6	<p>Test the HO2S high signal circuit for a short to the HO2S low signal circuit.</p> <p>Did you find and correct the condition?</p>	—	Go to Step 14	Go to Step 11
7	<p>Test the HO2S high signal circuit for an open or high resistance.</p> <p>Did you find and correct the condition?</p>	—	Go to Step 14	Go to Step 11
8	<ol style="list-style-type: none"> 1. Remove the jumper wire from the previous step. 2. Connect a 3-amp fused jumper wire between the high signal circuit of the HO2S harness connector on the engine harness side and the low signal circuit of the HO2S harness connector on the engine harness side. 3. Observe the HO2S voltage parameter with a scan tool. <p>Is the HO2S voltage parameter less than the specified value?</p>	100 mV	Go to Step 10	Go to Step 9

Steps 1-8

Step	Action	Value(s)	Yes	No
9	Test the HO2S low signal circuit for an open, or high resistance. Did you find and correct the condition?	—	Go to Step 14	Go to Step 11
10	Test for shorted terminals and for poor connections at the HO2S. Did you find and correct the condition?	—	Go to Step 14	Go to Step 12
11	Test for shorted terminals and for poor connections at the powertrain control module (PCM). Did you find and correct the condition?	—	Go to Step 14	Go to Step 13
12	<p>Notice</p> <p>Refer to Silicon Contamination of Heated Oxygen Sensors Notice in Service Precautions.</p> <p>Important</p> <p>The HO2S may be damaged due to contamination. Prior to replacing the HO2S inspect for the following sources of contamination:</p> <ul style="list-style-type: none"> • A silicon contaminated HO2S • Fuel contamination—Refer to Alcohol Contaminants-in-Fuel Diagnosis (without Special Tool) Alcohol Contaminants-in-Fuel Diagnosis (with Special Tool) . • Engine oil consumption—Refer to Oil Consumption Diagnosis in Engine. • Engine coolant consumption—Refer to Loss of Coolant (w/Automatic Transmission) Loss of Coolant (w/Manual Transmission) in Cooling System. <p>Replace the affected HO2S.</p> <p>Did you complete the replacement?</p>	—	Go to Step 14	—
13	Replace the PCM. Did you complete the replacement?	—	Go to Step 14	—
14	<ol style="list-style-type: none"> 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. <p>Did the DTC fail this ignition?</p>	—	Go to Step 2	Go to Step 15
15	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 in Vehicle DTC Information	System OK

Steps 9-15

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

2. If the voltage is varying above and below the specified value, the condition is not present.