

DTC P0135

CIRCUIT DESCRIPTION

The heated oxygen sensor (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 3 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 powertrain control module (PCM). The PCM commands the heater ON or OFF to maintain a specific HO2S operating temperature range. The PCM determines the temperature by measuring the current flow through the heater. When the heater is in the ON state, the PCM will pulse the heater OFF for a duration of 50 ms, once per second. When the heater is in the OFF state, the PCM will pulse the heater ON for a duration of 50 ms, once per second. The PCM monitors the heater current with the engine running. This diagnostic will only run once per ignition cycle. If the PCM detects that the heater current is not within the expected range, the following DTCs will set:

- DTC P0135 for HO2S bank 1 sensor 1
- DTC P0141 for HO2S bank 1 sensor 2
- DTC P0155 for HO2S bank 2 sensor 1
- DTC P0161 for HO2S bank 2 sensor 2

DTC DESCRIPTORS

This diagnostic procedure supports the following DTCs:

- DTC P0135 HO2S Heater Performance Bank 1 Sensor 1
- DTC P0141 HO2S Heater Performance Bank 1 Sensor 2
- DTC P0155 HO2S Heater Performance Bank 2 Sensor 1
- DTC P0161 HO2S Heater Performance Bank 2 Sensor 2

CONDITIONS FOR RUNNING THE DTC

- DTCs P0053, P0054, P0059, P0060, P0068, P0101, P0102, P0103, P0106, P0107, P0108, P0112, P0113, P0116, P0117, P0118, P0120, P0128, 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 50°C (122°F) .
- The Ignition 1 Signal parameter is between 10-18 volts .
- The MAF Sensor parameter is between 3-40 g/s .
- The Engine Speed parameter is between 500-3,000 RPM .
- The Engine Run Time parameter is more than 120 seconds .
- The above conditions are met for 2 seconds .
- This diagnostic runs one time per drive cycle once the above conditions are met.

CONDITIONS FOR SETTING THE DTC

- DTCs P0135 or P0155
- The PCM detects that the affected HO2S Heater Current parameter is more than 3.125 amps or less than 0.25 amps .
- The above condition is met for 10 seconds .
- DTCs P0141 or P0161
- The PCM detects that the affected HO2S Heater Current parameter is more than 1.375 amps or less than 0.25 amps .
- The above condition is met for 10 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

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	Is DTC P0135 or P0155 set?	—	Go to Step 4	Go to Step 3
3	<p>Important</p> <p>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.</p> <ol style="list-style-type: none"> 1. Turn ON the ignition, with the engine OFF. 2. Command the 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. <p>Is the HO2S heater current parameter within the specified range?</p>	0.25–1.375 A	Go to Step 5	Go to Step 6
4	<p>Important</p> <p>Whenever the 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.</p> <ol style="list-style-type: none"> 1. Turn ON the ignition, with the engine OFF. 2. Command the 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. <p>Is the HO2S heater current parameter within the specified range?</p>	0.25–3.125 A	Go to Step 5	Go to Step 6
5	<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 6	Go to Laboratory Conditions
6	Inspect the PRE O2/CAM or POST O2 fuse. Is the PRE O2/CAM or POST O2 fuse open?	—	Go to Step 7	Go to Step 8
7	Test the ignition 3 voltage circuit for a short to ground. Did you find and correct the condition?	—	Go to Step 22	Go to Step 10

Step	Action	Value(s)	Yes	No
8	<ol style="list-style-type: none"> 1. Disconnect the affected HO2S. 2. Turn ON the ignition, with the engine OFF. 3. Probe the ignition 3 voltage circuit of the HO2S harness connector on the engine harness side with a test lamp that is connected to a good ground. <p>Does the test lamp illuminate?</p>	—	Go to Step 9	Go to Step 19
9	<p>Important</p> <p>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.</p> <ol style="list-style-type: none"> 1. Connect a test lamp between the ignition 3 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. <p>Does the test lamp blink once per second?</p>	—	Go to Step 11	Go to Step 12
10	<p>Important</p> <p>Perform the following test on all HO2S which are supplied voltage by the suspect circuit.</p> <p>Test the ignition 3 voltage circuit on the sensor side of the HO2S connector for a short to ground.</p> <p>Is any sensor shorted to ground?</p>	—	Go to Step 20	Go to Troubleshooting Conditions
11	<p>Measure the resistance of the following circuits with a DMM.</p> <ul style="list-style-type: none"> • The HO2S heater low control circuit • The ignition 3 voltage circuit <p>Is the resistance of either circuit more than the specified value?</p>	3 ohm	Go to Step 18	Go to Step 16
12	<p>Is the test lamp on steady?</p>	—	Go to Step 13	Go to Step 14
13	<p>Test the HO2S heater low control circuit for a short to ground.</p> <p>Did you find and correct the condition?</p>	—	Go to Step 22	Go to Step 17
14	<p>Test the HO2S heater low control circuit for a short to voltage.</p> <p>Did you find and correct the condition?</p>	—	Go to Step 22	Go to Step 15
15	<p>Test the HO2S heater low control circuit for an open or high resistance.</p> <p>Did you find and correct the condition?</p>	—	Go to Step 22	Go to Step 17

Step	Action	Value(s)	Yes	No
16	Test for shorted terminals and for poor connections at the HO2S.	—		
	Did you find and correct the condition?		Go to Step 22	Go to Step 20
17	Test for shorted terminals and for poor connections at the powertrain control module (PCM).	—		
	Did you find and correct the condition?		Go to Step 22	Go to Step 21
18	Repair the circuit with high resistance.	—		
	Did you complete the repair?		Go to Step 22	—
19	Repair the open or high resistance in the ignition 3 voltage circuit.	—		
	Did you complete the repair?		Go to Step 22	—
20	Replace the affected HO2S.	—		
	Did you complete the replacement?		Go to Step 22	—
21	Replace the PCM.	—		
	Did you complete the replacement?		Go to Step 22	—
22	Were you sent to this diagnostic from DTC P0134 or P0154?	—	Go to Step 17 in DTC P0134P or P0154P	Go to Step 23
23	Were you sent to this diagnostic from DTC P0140 or P0160?	—	Go to Step 17 in DTC P0140P or P0160P	Go to Step 24
24	<ol style="list-style-type: none"> 1. Replace the PRE O2/CAM or POST O2 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 25
25	Observe the Capture Info with a scan tool.	—	Go to Diagnostic Trouble Code (DTC) List - Vehicle in Vehicle DTC Information	
	Are there any DTCs that have not been diagnosed?			System OK

Steps 16-25

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

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