

# P0137 or P0157 HO2S Circuit Low Voltage

## Circuit Description

The engine control module (ECM) supplies a voltage near 450 mV between the heated oxygen sensor (HO2S) high signal circuit and the low reference circuit. The HO2S varies the voltage over a range from about 1,000 mV when the exhaust is rich, down through about 10 mV when the exhaust is lean.

The ECM monitors and stores the HO2S voltage information. The ECM evaluates the HO2S voltage samples in order to determine the amount of time that the HO2S voltage was out of range. The ECM compares the stored HO2S voltage samples taken within each sample period and determines if the majority of the samples are out of the operating range. The ECM monitors the HO2S voltage for being fixed below a predetermined voltage. If the ECM detects the voltage is too low, this DTC sets.

## DTC Descriptors

This diagnostic procedure supports the following DTCs.

- DTC P0137 HO2S Circuit Low Voltage Bank 1 Sensor 2
- DTC P0157 HO2S Circuit Low Voltage Bank 2 Sensor 2

## Conditions for Running the DTC

- DTCs P0117, P0118, P0125, and P0128 are not set.
- The HO2S heater is at operating temperature.
- The engine is operating for more than 2 minutes.
- The ignition 1 voltage is more than 10.5 volts.
- The engine coolant temperature (ECT) is less than 40°C (104°F) at start-up and the ECT was more than 60°C (140°F) when the ignition was turned OFF last ignition cycle.
- The calculated exhaust temperature is between 250–800°C (482–1,472°F).
- The fuel tank level is more than 25 percent.
- DTC P0137 and P0157 run continuously once the above conditions are met.

## Conditions for Setting the DTC

- The ECM detects that the HO<sub>2</sub>S signal voltage is less than 60 mV.
- The condition exists for less than 1 second.

## 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 4 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.

## Diagnostic Aids

- Use the J 35616-C Connector Test Adapter Kit for any test that requires probing the ECM harness connector or a component harness connector.
- The lower connector of the ECM is connector C1 and the upper connector of the ECM is connector C2. Refer to Engine Controls Component Views.
- The rear HO<sub>2</sub>S will not go into closed loop when the engine is idling. Once the HO<sub>2</sub>S are at operating temperature, and the vehicle is moving, the rear HO<sub>2</sub>S will go into closed loop.
- For an intermittent condition, refer to Intermittent Conditions.

## DTC P0137 or P0157

Step	Action	Values	Yes	No
<b>Schematic Reference: Engine Controls Schematics</b> <b>Connector End View Reference: Engine Control Module (ECM) Connector</b> <b>End Views or Engine Controls Connector End Views</b>				
1	Did you perform the Diagnostic System Check–Engine Controls?	—	Go to Step 2	Go to Diagnostic System Check -Engine Controls
2	<p><b>Important:</b></p> <ul style="list-style-type: none"> <li>• DTC P0137 is for bank 1 sensor 2 and DTC P0157 is for bank 2 sensor 2.</li> <li>• Inspect the heated oxygen sensor (HO2S) for being secure before proceeding with this DTC. A sensor that is loose could cause this DTC to set.</li> </ul> <ol style="list-style-type: none"> <li>1. Allow the engine to reach operating temperature.</li> <li>2. Operate the engine above 1,200 RPM for 30 seconds.</li> <li>3. Observe the appropriate HO2S voltage parameter with a scan tool.</li> </ol> <p>Is the voltage less than the specified value?</p>	60 mV	Go to Step 4	Go to Step 3
3	<ol style="list-style-type: none"> <li>1. Observe the Freeze Frame/Failure Records for this DTC.</li> <li>2. Turn OFF the ignition for 30 seconds.</li> <li>3. Start the engine.</li> <li>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.</li> </ol> <p>Did the DTC fail this ignition?</p>	—	Go to Step 4	Go to Diagnostic Aids

Step	Action	Values	Yes	No
4	<ol style="list-style-type: none"> <li>1. Turn OFF the ignition.</li> <li>2. Disconnect the appropriate HO<sub>2</sub>S.</li> <li>3. Turn ON the ignition, with the engine OFF.</li> <li>4. Observe the HO<sub>2</sub>S voltage parameter with a scan tool.</li> </ol> Is the HO <sub>2</sub> S voltage within the specified range?	350–550 mV	Go to Step 6	Go to Step 5
5	<ol style="list-style-type: none"> <li>1. Turn OFF the ignition.</li> <li>2. Disconnect the engine control module (ECM) connector.</li> <li>3. Test the appropriate HO<sub>2</sub>S signal circuit for a short to ground. Refer to Circuit Testing and Wiring Repairs.</li> </ol> Did you find and correct the condition?	—	Go to Step 9	Go to Step 8
6	Test or inspect for the following conditions: <ul style="list-style-type: none"> <li>• An injector that is too lean—Refer to Fuel Injector Balance Test with Special Tool on page 6-1623.</li> <li>• A fuel system that is contaminated—Refer to Alcohol/Contaminants-in-Fuel Diagnosis (w/o Special Tool) on page 6-1629 or Alcohol/Contaminants-in-Fuel Diagnosis (w/ Special Tool).</li> <li>• A fuel pressure that is too low—Refer to Fuel System Diagnosis on page 6-1617.</li> <li>• An exhaust leak near the HO<sub>2</sub>S—Refer to Symptoms -Engine Exhaust on page 6-2288 in Engine Exhaust.</li> <li>• A vacuum or crankcase leak</li> </ul> Did you find and correct the condition?	—	Go to Step 9	Go to Step 7

Step	Action	Values	Yes	No
7	Replace the HO2S. Refer to the appropriate procedure: <ul style="list-style-type: none"> <li>• Heated Oxygen Sensor (HO2S) Replacement Bank 1 Sensor 2 on page 6-1659</li> <li>• Heated Oxygen Sensor (HO2S) Replacement Bank 2 Sensor 2</li> </ul> Did you complete the replacement?	—	Go to Step 9	—
8	Replace the ECM. Refer to Engine Control Module (ECM) Replacement on page 6-1648. Did you complete the replacement?	—	Go to Step 9	—
9	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 10
10	Observe the Capture Info with a scan tool. Are there any DTCs that have not been diagnosed?	—	Go to Diagnostic Trouble Code (DTC) List on page 6-1246	System OK