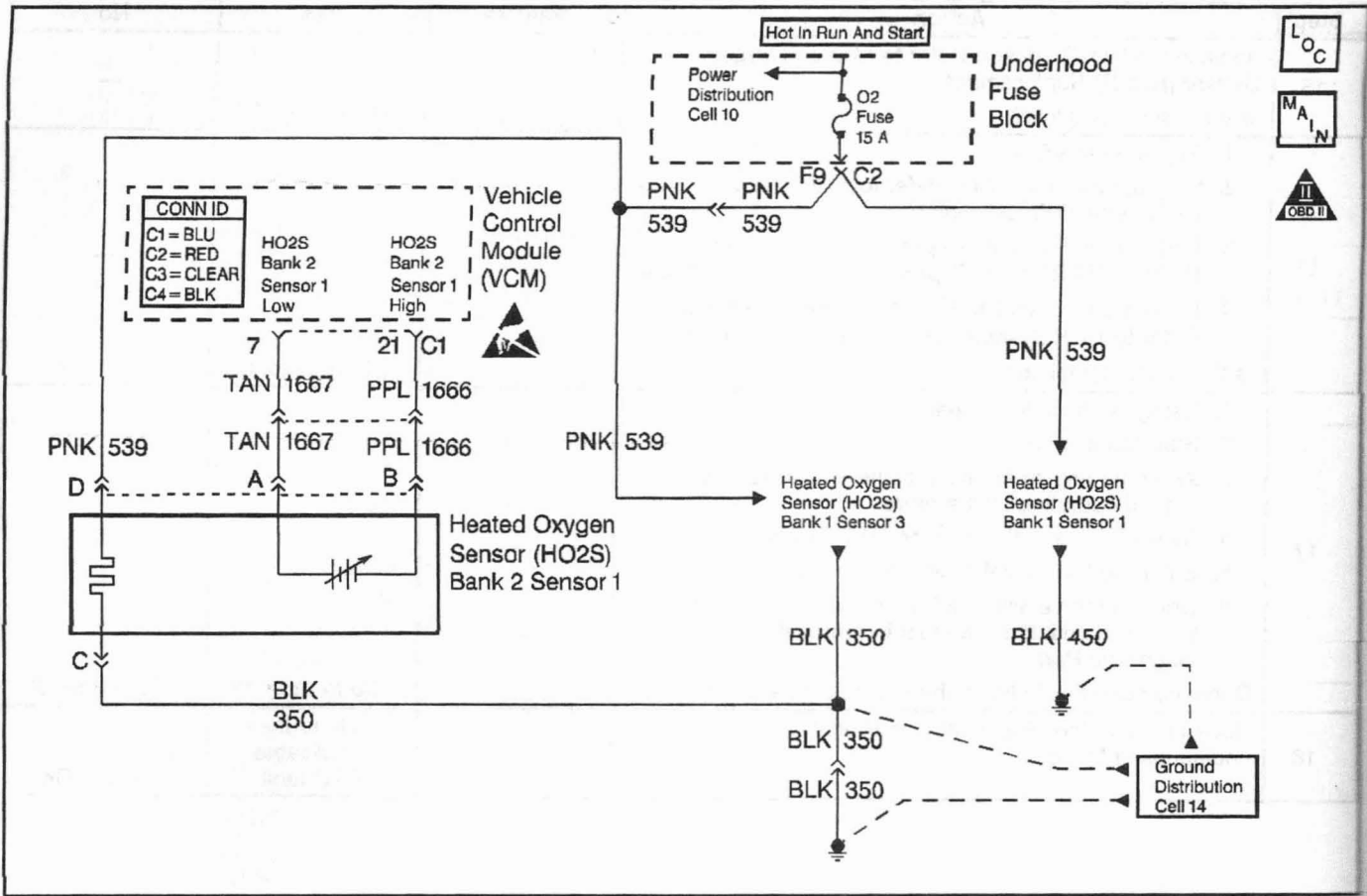


## DTC P0155 HO2S Heater Performance Bank 2 Sensor 1



3958

## Circuit Description

The Heated Oxygen Sensor (HO2S) is a sensor designed to create a voltage relative to the oxygen content in the engine exhaust stream. The Control Module (PCM/VCM) supplies the HO2S with signal High and Low circuits. Ignition voltage and ground is supplied to the HO2S heater by independent circuits. The oxygen content of the exhaust indicates when the engine is operating lean or rich. When the HO2S detects that the engine is operating rich, the signal voltage is high, and decreases the signal voltage as the engine runs leaner. This oscillation above and below the bias voltage, sometimes referred to as activity or switching, can be monitored with the HO2S signal voltage.

The HO2S contains a heater that is necessary in order to quickly warm the sensor to operating temperature and maintain the operating temperature during extended idle conditions. The HO2S needs to be at a high temperature in order to produce a voltage. Once the HO2S has reached operating temperature, the Control Module monitors the HO2S bias, or reference, voltage as well as the HO2S signal voltage for closed loop fuel control. During normal Closed Loop fuel control operation, the Control Module will add fuel (enriches the mixture) when the HO2S detects a lean exhaust content and subtract fuel (leans-out the mixture) when the HO2S detects a rich exhaust condition.

Certain vehicle models utilize an oxygen sensor after the catalyst converter in order to monitor catalyst efficiency.

This DTC determines if the HO2S is functioning properly by checking for an adequate number of HO2S voltage transitions above and below the bias range of 300–600 mV. This DTC sets when the VCM fails to detect a minimum number of voltage transitions above and below the bias range during the test period. Possible causes of this DTC are listed below.

- An open or a short to voltage on either the HO2S signal or HO2S low circuits.
- A malfunctioning HO2S.
- A problem in the HO2S heater or its circuit.
- A poor HO2S ground.

This DTC determines if the HO2S heater circuit is functioning properly by monitoring the amount of time required for the HO2S to reach operating temperature. This DTC sets when the VCM fails to detect HO2S voltage transitions above and below the bias range within a specified amount of time. Possible cause of this DTC are listed below.

- An open circuit in either the HO2S ignition positive or the HO2S heater ground circuits
- An HO2S heater element problem

**Conditions for Running the DTC**

**Important:** This test is void for this cold start if the system voltage remains outside the specified range for more than 4 seconds.

- The system voltage is between 11.7–18 volts
- The MAF is less than 27 g/s
- The engine run time is more than 2 seconds
- The ECT is less than 33°C (91°F)
- The IAT is less than 33°C (91°F)
- The difference between the ECT sensor and the IAT sensor is no more than 5°C (9°F)

**Conditions for Setting the DTC**

The O2 sensor voltage remains within 150 mV of its startup voltage for 130 seconds after cold start.

**Action Taken When the DTC Sets**

- The Control Module illuminates the Malfunction Indicator Lamp (MIL) if a failure is detected during 2 consecutive key cycles.
- The Control Module will set the DTC and records the operating conditions at the time the diagnostic fails. The Control Module stores the failure information in the scan tools Freeze Frame and/or the Failure Records.

**Conditions for Clearing the MIL/DTC**

- The Control Module turns OFF the MIL after 3 consecutive drive trips when the test has Run and Passed.
- A history DTC will clear if no fault conditions have been detected for 40 warm-up cycles (coolant temperature has risen 22°C (40°F) from the startup coolant temperature and the engine coolant temperature is more than 70°C (158°F) during the same ignition cycle).
- Use the scan tool Clear Information function.

**Diagnostic Aids**

Check for the following conditions:

An intermittent may be caused by any of the following conditions:

- A poor connection
- Rubbed through wire insulation
- A broken wire inside the insulation

Thoroughly check any circuitry that is suspected of causing the intermittent complaint. Refer to *Intermittents and Poor Connections Diagnosis* in Wiring Systems.

If a repair is necessary, refer to *Wiring Repairs or Connector Repairs* in Wiring Systems.

**Test Description**

The number(s) below refer to the step number(s) on the Diagnostic Table.

2. As the heater warms the oxygen sensor to operating temperature, the HO2S will output a voltage in relation to the amount of oxygen in the exhaust. With the ignition ON and the engine OFF the exhaust usually contains a high oxygen content. With the engine OFF the HO2S voltage will usually decrease from the initial (bias) voltage due to the high oxygen content.
4. This step checks for proper HO2S heater ignition feed and ground supply.
5. This step checks for proper VCM and signal circuit operation.

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Step	Action	Value(s)	Yes	No
1	<p><b>Important:</b> Before clearing the DTCs, use the scan tool in order to record the Freeze Frame and the Failure Records for reference. The control module's data is deleted once the Clear Info function is used.</p> <p>Was the Powertrain On-Board Diagnostic (OBD) System Check performed?</p>	—	Go to Step 2	Go to the A Powertrain On Board Diagnostic (OBD) System Check
2	<p><b>Important:</b> The HO2S must be cool before proceeding with diagnosis. The Ignition must remain OFF for at least one half hour before proceeding with diagnosis.</p> <ol style="list-style-type: none"> <li>1. Connect the scan tool.</li> <li>2. Set-up the scan tool with the tool with the proper vehicle identification information prior to turning the ignition ON.</li> <li>3. Turn the ignition ON leaving the engine OFF.</li> <li>4. As quickly as possible, observe and record the HO2S voltage for the sensor that applies to this DTC.</li> <li>5. Monitor the HO2S voltage for two minutes.</li> </ol> <p>Does the HO2S voltage increase or decrease from the initial voltage by at least the value specified?</p>	150 mV	Go to Step 3	Go to Step 4
3	<ol style="list-style-type: none"> <li>1. The condition that set this DTC is not present. This DTC may have been set by one of the following conditions: <ul style="list-style-type: none"> <li>• An intermittently open or high resistance HO2S HIGH signal circuit or LOW circuit</li> <li>• An intermittently open or high resistance HO2S heater ignition feed or ground circuit</li> <li>• Poor HO2S or VCM connector terminal contact</li> <li>• A damaged HO2S</li> </ul> </li> <li>2. Repair any of the above conditions as necessary.</li> </ol> <p>Did you find a problem?</p>	—	Go to Step 14	Go to Diagnostic Aids
4	<ol style="list-style-type: none"> <li>1. Turn the ignition OFF.</li> <li>2. Disconnect the HO2S connector for the sensor that applies to this DTC.</li> <li>3. Connect a test lamp between the HO2S heater ignition feed and ground circuit terminals (engine harness side).</li> <li>4. Turn the ignition ON while leaving the engine OFF.</li> </ol> <p>Is the test lamp ON?</p>	—	Go to Step 5	Go to Step 6
5	<ol style="list-style-type: none"> <li>1. Disconnect the test lamp.</li> <li>2. Jumper the HO2S LOW circuit terminal to a known good ground.</li> <li>3. Jumper the HO2S HIGH signal circuit terminal to a known good ground.</li> <li>4. Using a scan tool monitor the HO2S voltage for the sensor that applies to this DTC.</li> </ol> <p>Ensure the ignition is ON while the engine is OFF.</p> <p>Is the HO2S voltage less than the specified value?</p>	20 mV	Go to Step 8	Go to Step 7
6	<p>Connect the test lamp between the HO2S heater ignition feed circuit terminal (engine harness side) and a known good ground.</p> <p>Ensure the ignition is ON while the engine is OFF.</p> <p>Is the test lamp ON?</p>	—	Go to Step 9	Go to Step 10

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Step	Action	Value(s)	Yes	No
7	<ol style="list-style-type: none"> <li>Turn the ignition OFF.</li> <li>Remove the jumpers from the VCM connector containing the HO2S HIGH and LOW circuits.</li> <li>Using a J 39200 DMM measure the continuity of the HO2S HIGH signal circuit and then the HO2S LOW circuit between the VCM connector terminal and the HO2S connector terminal (engine harness side).</li> </ol> <p>Is the resistance less than the specified value?</p>	5 ohms	Go to Step 12	Go to Step 11
8	<p>Replace the HO2S. Refer to <i>Heated Oxygen Sensor (HO2S) Replacement</i>.</p> <p>Is the action complete?</p>	—	Go to Step 14	—
9	<p>Repair the open HO2S heater ground circuit. Refer to <i>Wiring Repairs</i> in <i>Wiring Systems</i>.</p> <p>Is the action complete?</p>	—	Go to Step 14	—
10	<ol style="list-style-type: none"> <li>Repair the lack of voltage on the HO2S heater ignition feed circuit. Refer to <i>Wiring Repairs</i> in <i>Wiring Systems</i>.</li> <li>If the fuse is blown repair the short to ground on the circuit. A blown fuse or lack of voltage to the fuse may cause other DTCs or symptoms to be present.</li> </ol> <p>Is the action complete?</p>	5 ohms	Go to Step 14	—
11	<p>Repair the circuit that measured high resistance. Refer to <i>Wiring Repairs</i> in <i>Wiring Systems</i>.</p> <p>Is the action complete?</p>	—	Go to Step 14	—
12	<ol style="list-style-type: none"> <li>Check for proper VCM terminal contact.</li> <li>Repair VCM terminals as necessary. Refer to <i>Connector Repairs</i> in <i>Wiring Systems</i>.</li> </ol> <p>Did you find a problem?</p>	—	Go to Step 14	Go to Step 13
13	<ol style="list-style-type: none"> <li>Replace the VCM.</li> <li>Program the new VCM. Refer to <i>VCM Replacement/Programming</i>.</li> <li>Perform the Passlock Reprogramming Procedure. Refer to <i>PASSLOCK Reprogramming Seed and Key</i> in <i>Theft Deterrent</i>.</li> <li>Perform the CKP System Variation Learning Procedure. Refer to <i>CKP System Variation Learn Procedure</i>.</li> </ol> <p>Is the action complete?</p>	—	Go to Step 14	—
14	<p><b>Important:</b> The HO2S must be cool before proceeding with diagnosis. The Ignition must remain OFF for at least one half hour before proceeding with diagnosis.</p> <ol style="list-style-type: none"> <li>Connect the scan tool.</li> <li>Set-up the scan tool with the tool with the proper vehicle identification information prior to turning the ignition ON.</li> <li>Turn the ignition ON leaving the engine OFF.</li> <li>As quickly as possible, observe and record the HO2S voltage for the sensor that applies to this DTC.</li> <li>Monitor the HO2S voltage for two minutes.</li> </ol> <p>Does the HO2S voltage increase or decrease from the initial voltage by at least the value specified?</p>	150 mV	Go to Step 15	Go to Step 4
15	<p>Does the scan tool display any additional undiagnosed DTCs?</p>	—	Go to the Applicable DTC Table	System OK