P0132 or P0152 Circuit High Voltage

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.

DTC Descriptors

This diagnostic procedure supports the following DTCs.

- DTC P0132 HO2S Circuit High Voltage Bank 1 Sensor 1
- DTC P0152 HO2S Circuit High Voltage Bank 2 Sensor 1

Conditions for Running the DTC

- The engine is operating.
- The ignition 1 voltage is between 10.7–18 volts.
- DTC P0132 and P0152 run continuously once the above conditions are met.

Conditions for Setting the DTC

- The internal ECM HO2S voltage is more than a threshold.
- The above condition exists for less than 2 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 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 front wide band sensors do not toggle or switch like a switching HO2S. The front HO2S signals will be relatively stable for an idling engine.
- For an intermittent condition, refer to Intermittent Conditions
- This DTC sets if the heater control circuit is shorted to any other HO2S circuit. The followingtable illustrates the typical voltages for the HO2S circuits.

HO2S Voltages

• Ignition On, Engine Off • HO2S Disconnected	
HO2S Circuit	**Voltage**
Heater Control	4.6–5.0 V
Heater Supply Voltage	B+
Reference Voltage	2.6–3.1 V
Low Reference	2.2–2.7 V
Pump Current	Less than 0.5 V
Input Pump Current	Less than 0.5 V

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2. This step determines if the condition exists. If there is a short to voltage condition with the HO2S circuits, the ECM commands open loop for the applicable sensor.

4. This step tests for a bias voltage across the reference voltage circuit and the low reference circuit of the HO2S. The bias voltage that you are measuring, is the voltage difference between the reference voltage circuit and the low reference circuit. If the reference voltage circuit or the low reference circuit of the HO2S is shorted to a voltage, the bias voltage will be more than the specified value, which indicates there is a condition with the circuits.

5. This step tests for a short to voltage on the input pumping current circuit and the pump current circuit of the HO2S. The input pumping current circuit and the pump current circuit are connected internally within the ECM. If one of the circuits are shorted to voltage, the other circuit will be affected.

7. This step isolates if the condition is with the reference voltage circuit or the low reference circuit. If the voltage is less than the specified value, the condition is with low reference circuit.

11. This step inspects the harness connector for water intrusion, corrosion, and bent or damaged pins.
12. This step inspects the harness connector for water intrusion, corrosion, and bent or damaged pins.

DTC P0132 or P0152

Step	Action	Values	Yes	No
Schematic Reference: Engine Controls Schematics on page 6-1196 Connector End View Reference: Engine Control Module (ECM) Connector End Views on page 6-1220 or Engine Controls Connector End Views on page 6-1223				
1	Did you perform the Diagnostic System Check–Engine Controls?	—	Go to Step 2	Go to Diagnostic System Check -Engine Controls
2	**Important: DTC P0132 is for bank 1 sensor 1 and** DTC P0152 is for bank 2 sensor 1. 1. Allow the engine to reach operating temperature. 2. Observe the Loop Status Bn. 1 Sen. 1 or Loop Status Bn. 2 Sen. 1 with a scan tool. Does the scan tool display Closed Loop?	—	Go to Step 3	Go to Step 4
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 Diagnostic Aids

Step	Action	Values	Yes	No
4	1. Turn OFF the ignition. 2. Disconnect the appropriate heated oxygen sensor (HO2S). 3. Turn ON the ignition, with the engine OFF. 4. Measure the voltage between the reference voltage circuit and the low reference circuit of the HO2S with a DMM. Is the voltage within the specified range?	350–550 mV	Go to Step 5	Go to Step 7
5	Measure the voltage between the input pump current circuit and a good ground with a DMM. Is the voltage less than the specified value?	1.0 V	Go to Step 10	Go to Step 6
6	1. Turn OFF the ignition. 2. Disconnect the engine control module (ECM) harness connectors. 3. Test the input pump current circuit and the pump current circuit for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	—	Go to Step 15	Go to Step 12
7	Measure the voltage between the reference voltage circuit of the HO2S and a good ground with a DMM. Refer to Circuit Testing in Wiring Systems. Is the voltage more than the specified value?	3.5 V	Go to Step 8	Go to Step 9
8	Test the reference voltage circuit of the HO2S for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	—	Go to Step 15	Go to Step 12

Step	Action	Values	Yes	No
9	Test the low reference circuit of the HO2S for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	—	Go to Step 15	Go to Step 12
10	Test for the following conditions: • Fuel injectors that are operating rich—Refer to Fuel Injector Balance Test with Special Tool. • Incorrect fuel pressure—Refer to Fuel System Diagnosis. • Contaminated fuel—Refer to Alcohol/Contaminants-in-Fuel Diagnosis (w/o Special Tool) or Alcohol/Contaminants-in-Fuel Diagnosis (w/ Special Tool). • For fuel-contaminated engine oil Did you find and correct the condition?	—	Go to Step 15	Go to Step 11
11	Test for shorted terminals and poor connections at the HO2S. Refer to Testing for Intermittent and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	—	Go to Step 15	Go to Step 13
12	Test for shorted terminals and poor connections at the ECM. Refer to Testing for Intermittent and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	—	Go to Step 15	Go to Step 14
13	Replace the HO2S. Refer to the appropriate procedure: • Heated Oxygen Sensor (HO2S) Replacement Bank 1 Sensor 1 • Heated Oxygen Sensor (HO2S) Replacement Bank 2 Sensor 1 Did you complete the replacement?	—	Go to Step 15	—
14	Replace the ECM. Refer to Engine Control Module (ECM) Replacement on page 6-1648. Did you complete the replacement?	—	Go to Step 15	—
Step	**Action**	**Values**	**Yes**	**No**

Step	Action	Values	Yes	No
15	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 16
16	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