DTC P0135: HO2S HEATER CIRCUIT-SENSOR 1 (3.1L "N" & "W" BODIES & 3.4L "N" BODY & "U" SERIES)

NOTE: For circuit reference, see appropriate wiring diagram in WIRING DIAGRAMS article.

Circuit Description

Powertrain Control Module (PCM) runs heater test only after a cold start and only once during an ignition cycle. When engine is started, PCM monitors HO2S 1 voltage. When HO2S 1 voltage indicates a sufficiently active sensor, PCM looks at how much time has elapsed since start-up. If PCM determines that too much time was required for HO2S 1 to become active, DTC P0135 will set.

For duplication of DTC, ensure:

- No active misfire, fuel injector circuit, TP sensor, EVAP system, IAT sensor, MAP sensor, fuel trim, EGR, ECT sensor, MAF sensor or CKP sensor DTCs are set.
- ECT and IAT is less than 95°F (35°C) at start-up.
- ECT and IAT are within 42°F (6°C) of each other at start-up.
- Average MAF for the sample period is less than 20 gm/s.
- Battery voltage is greater than 8 volts and less than 18 volts.
- HO2S 1 signal voltage remains within 150 mV of bias voltage (about 450 mV) for a greater amount of time than it should.

Diagnostic Procedures

1. Perform On-Board Diagnostic (OBD) system check. See **ON-BOARD DIAGNOSTIC (OBD) SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM in SELF-DIAGNOSTICS INTRODUCTION article. After performing OBD system check, go to next step.
2. Allow engine to completely cool down before proceeding. Turn ignition on, with engine off. Using scan tool, monitor HO2S 1 voltage. If voltage changes from about 450 mV to greater than 600 mV or from about 450 mV to less than 300 mV, see **DIAGNOSTIC AIDS**. If voltage does not change as indicated, go to next step.
3. Remove and inspect fuse for HO2S 1 ignition feed circuit. If fuse is blown, go to step 15. If fuse is okay, go to next step.
4. Turn ignition off. Disconnect HO2S 1 connector. With test light connected to ground, probe ignition feed circuit terminal at HO2S 1 harness connector. If test light illuminates, go to next step. If test light does not illuminate, go to step 7.
5. Connect a test light between heater ground circuit and ignition feed circuit terminals at HO2S 1 harness connector. If test light illuminates, go to next step. If test light does not illuminate, go to step 8.
6. Allow HO2S 1 to cool for a minimum of 10 minutes. Using DVOM, measure resistance between ignition feed circuit and heater ground circuit terminals at HO2S 1 pigtail. If resistance is 3-10 ohms, go to step 9. If resistance is not 3-10 ohms, go to step 14.
7. Repair open in HO2S 1 ignition feed circuit. After repairs, go to step 16.

8. Repair open in HO2S 1 heater ground circuit. After repairs, go to step 16.
9. Check for poor connection at HO2S 1 harness terminals. Repair as necessary. After repairs, go to step 16. If terminals are okay, go to next step.
10. Turn ignition off. Disconnect PCM harness connectors. Measure resistance of signal circuit and ground circuit between PCM and HO2S 1 harness connector. If both readings are less than 5 ohms, go to next step. If one or both readings are 5 ohms or greater, repair open in appropriate circuit. After repairs, go to step 16.
11. Check for poor signal circuit or ground circuit terminal connection at HO2S 1 harness connector. Repair as necessary. After repairs, go to step 16. If terminals are okay, go to next step.
12. Check for poor HO2S 1 ground circuit terminal at PCM. Repair as necessary. After repairs, go to step 16. If terminal is okay, go to next step.
13. Check for poor HO2S 1 signal circuit terminal at PCM. Repair as necessary. After repairs, go to step 16. If terminal is okay, go to next step.
14. Replace HO2S 1. After repairs, go to step 16.
15. Locate and repair short to ground in HO2S 1 ignition feed circuit. Replace fuse. After repairs, go to next step.
16. Allow engine to completely cool down before proceeding. Using scan tool, clear DTCs. Turn ignition on, with engine off. Using scan tool, monitor HO2S 1 voltage. If voltage changes from about 450 mV to greater than 600 mV or from about 450 mV to less than 300 mV, system is okay. If voltage does not change as indicated, go to step 2.

Diagnostic Aids

Check for poor connection at PCM. Check for damaged wiring harness. An intermittent problem can be caused by a poor connection, rubbed-through wire insulation or broken wire inside insulation. Reviewing FAILURE RECORDS vehicle mileage since diagnostic test last failed may help determine how often condition that caused DTC to be set occurs.