

P0123 Throttle Position (TP) Sensor 1 Circuit High Voltage

Circuit Description

The throttle body assembly contains 2 throttle position (TP) sensors. The TP sensors are mounted to the throttle body assembly and are not serviceable. The TP sensors provide a signal voltage that changes relative to throttle blade angle. The engine control module (ECM) supplies the TP sensors with a common 5-volt reference circuit, a common low reference circuit, and 2 independent signal circuits. The TP sensors have opposite functionality. The TP sensor 1 signal voltage increases from below 1 volt at idle to above 4 volts at wide open throttle (WOT). The TP sensor 2 signal voltage decreases from above 4 volts at idle to below 1 volt at WOT. If the ECM detects TP sensor 1 signal voltage is too high, this DTC sets.

DTC Descriptor

This diagnostic procedure supports the following DTC. DTC P0123 Throttle Position (TP) Sensor 1 Circuit High Voltage

Conditions for Running the DTC

- The ignition is ON, with the engine OFF or the engine is operating.
- The ignition 1 voltage is more than 7 volts.
- DTC P0123 runs continuously once the above conditions are met.

Conditions for Setting the DTC

The ECM detects the TP sensor 1 signal voltage is more than 4.6 volts 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 on page 6-1209.
- If there is a condition with the TP sensors the ECM defaults to reduced power mode for the entire ignition cycle, even if the condition is corrected.
- For an intermittent condition, refer to Intermittent Conditions on page 6-1587.

Test Description

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

2. This step verifies that a condition exists.
5. This step tests the signal circuit for a short to voltage. If the scan tool displays a voltage after the TP sensor is disconnected, the circuit is shorted to a voltage.
7. This step tests for high resistance in the low reference circuit of the TP sensor. The ECM must be completely powered down to obtain an accurate resistance reading. It may take up to 30 minutes for the ECM to power down after the ignition key is removed. Removal of the ECM/TCM fuse allows the ECM to power down completely.

8. This step tests the low reference circuit for a short to voltage.

DTC P0123

Step	Action	Values	Yes	No
Schematic Reference: Engine Controls Schematics Connector End View Reference: Engine Control Module (ECM) Connector End Views or Engine Controls Connector End Views				
1	Did you perform the Diagnostic System Check–Engine Controls?	—	Go to Step 2	Go to Diagnostic System Check–Engine Controls
2	1. Turn ON the ignition, with the engine OFF. 2. Observe the TP sensor 1 voltage parameter with a scan tool. Is the voltage more than the specified value?	4.5 V	Go to Step 5	Go to Step 3
3	Observe the DTC information with a scan tool. Did DTC P0223 fail this ignition?	—	Go to Step 5	Go to Step 4
4	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 5	Go to Diagnostic Aids

Step	Action	Values	Yes	No
5	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the throttle body harness connector. Refer to Throttle Body Assembly Replacement on page 6-1664. 3. Turn ON the ignition, with the engine OFF. 4. Observe the TP sensor 1 voltage parameter with a scan tool. Is the voltage less than the specified value?	0.1 V	Go to Step 6	Go to Step 9
6	Measure the voltage between the 5-volt reference circuit of the throttle position (TP) sensor and the engine control module (ECM) housing with a DMM. Is the voltage more than the specified value?	5.2 V	Go to Step 10	Go to Step 7
7	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Remove the ECM/TCM fuse from the underhood fuse block. 3. Measure the resistance from the low reference circuit of the TP sensor to the ECM housing, with a DMM. Is the resistance less than the specified value?	5 W	Go to Step 12	Go to Step 8
8	<ol style="list-style-type: none"> 1. Install the ECM/TCM fuse into the underhood electrical center. 2. Turn ON the ignition with the engine OFF. 3. Measure the voltage between the low reference circuit of the TP sensor and the ECM housing, with a DMM. Refer to Circuit Testing in Wiring Systems. Is the voltage less than the specified value?	1.0 V	Go to Step 11	Go to Step 14

Step	Action	Values	Yes	No
9	Test the signal circuit of the TP sensor 1 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 17	Go to Step 13
10	Important: The 5-volt reference circuits are internally connected within the controller. Other sensors that share the 5-volt reference circuit may also have DTCs set. Disconnecting a sensor on the shared 5-volt reference circuit may isolate a shorted sensor. Review the electrical schematic and diagnose the shared circuits and sensors. Test the 5-volt reference circuit of the TP sensor and all shared 5-volt reference circuits 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 17	Go to Step 13
11	1. Turn OFF the ignition. 2. Disconnect the ECM. 3. Test the low reference circuit of TP sensor for an open or a high resistance. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	—	Go to Step 17	Go to Step 13
12	Test for shorted terminals and for poor connections at the TP sensor. Refer to Testing for Intermittent and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	—	Go to Step 17	Go to Step 15
13	Test for shorted terminals and for poor connections at the ECM. Refer to Circuit Testing and Connector Repairs in Wiring Systems. Did you find and correct the condition?	—	Go to Step 17	Go to Step 16

Step	Action	Values	Yes	No
14	Important: The control module and/or the TP sensor may be damaged if the circuit is shorted to battery positive voltage. Repair the short voltage in the low reference circuit of TP sensor. Refer to Wiring Repairs on page 8-1189 in Wiring Systems. Did you complete the repair?	—	Go to Step 17	—
15	Replace the throttle body assembly. Refer to Throttle Body Assembly Replacement on page 6-1664. Did you complete the replacement?	—	Go to Step 17	—
16	Replace the ECM. Refer to Engine Control Module (ECM) Replacement on page 6-1648. Did you complete the replacement?	—	Go to Step 17	—
17	<ol style="list-style-type: none"> 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 18
18	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