

DTC P0120

CIRCUIT DESCRIPTION

The throttle position (TP) sensor incorporates 2 ratiometric TP sensors into one housing. TP sensor 1 and TP sensor 2 each have a **5-volt** reference circuit supplied by the throttle actuator control (TAC) module. The TAC module supplies each TP sensor with a low reference circuit. Each TP sensor supplies the TAC module with a signal voltage that is proportional to the throttle blade position. The TP signal voltages are opposite from one another. TP sensor 1 is pulled up to reference voltage as the throttle blade is opened. The TP sensor 2 is pulled down to low reference as the throttle blade is opened. The TP sensor 1 and the accelerator pedal position (APP) sensor 1 share a **5-volt** reference circuit that is bussed within the TAC module. The TP sensor 2 and the APP sensor 2 share a **5-volt** reference circuit that is also bussed within the TAC module. The APP sensor 3 has a dedicated **5-volt** reference circuit.

When this DTC sets, the Reduced Engine Power indicator will be displayed.

This DTC incorporates 3 different diagnostic tests:

- TP sensor 1 signal circuit voltage out of range
- Throttle blade minimum position for the TP sensor 1 out of range
- **5-volt** reference of the TP sensor 1 voltage out of range

DTC DESCRIPTOR

This diagnostic procedure supports the following DTC:
DTC P0120 Throttle Position (TP) Sensor 1 Circuit

CONDITIONS FOR RUNNING THE DTC

- DTCs P2108 or U0107 are not set.
- The ignition switch is in the crank or in the run position.
- The ignition voltage greater than **5.23 volts** .
- The TP sensor 1 signal voltage test runs continuously once the above conditions are met.
- The throttle blade minimum position for the TP sensor 1 test runs once when the ignition is turned ON and the above conditions are met.
- The **5-volt** reference of the TP sensor 1 voltage test runs continuously once the above conditions are met.

CONDITIONS FOR SETTING THE DTC

- TP sensor 1 signal voltage is less than **0.38 volts** or more than **4.50 volts** for more than **0.1 second** .OR
- The TP sensor 1 minimum throttle blade position is less than **0.38 volts** or more than **0.71 volts** for less than **1 second** .OR
- The **5-volt** reference circuit of the TP sensor 1 is shorted to ground for more than **0.01 second** .OR
- The **5-volt** reference circuit of the TP sensor 1 is less than **4.54 volts** or more than **5.21 volts** for more than **1 second** .

ACTION TAKEN WHEN THE DTC SETS

- The control module illuminates the malfunction indicator lamp (MIL) when the diagnostic runs and fails.
- The control module records the operating conditions at the time the diagnostic fails. The control module stores this information in the Freeze Frame and/or the Failure Records.
- The control module commands the TAC system to operate in the Reduced Engine Power mode.
- A message center or an indicator displays Reduced Engine Power.
- Under certain conditions the control module commands the engine OFF.

CONDITIONS FOR CLEARING THE MIL/DTC

- The control module turns OFF the malfunction indicator lamp (MIL) after 3 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

- Inspect the TAC module connectors for signs of water intrusion. When water intrusion occurs, multiple DTCs could be set with no DTC circuit or component conditions found during diagnostic testing.

- When the TAC module detects a condition within the TAC system, more than one TAC system related DTC may set. This is due to the many redundant tests that run continuously on this system. Locating and repairing 1 individual condition may correct more than 1 DTC. Disconnecting the components during testing may set additional DTCs. Keep this in mind when reviewing the Capture info.
- If this DTC is determined to be intermittent, refer to Intermittent Conditions. [See: Initial Inspection and Diagnostic Overview/Diagnostic Strategies/Intermittent Conditions](#)

TEST DESCRIPTION

| Step | Action | Values | Yes | No |
|------|---|-------------|---|--|
| 1 | Did you perform the Diagnostic System Check – Vehicle? | — | Go to Step 2 | Go to Diagnostic System Check - Vehicle in Vehicle DTC Information |
| 2 | Is DTC P1516, or U0107 also set? | — | Go to Diagnostic Trouble Code (DTC) List - Vehicle in Vehicle DTC Information | Go to Step 3 |
| 3 | <ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Remove the air inlet duct from the throttle body assembly. 3. Disconnect the throttle actuator motor harness connector. 4. Turn ON the ignition, with the engine OFF. 5. Manually close the throttle blade completely while observing the throttle position (TP) sensor 1 voltage on the scan tool. <p>Does the scan tool indicate TP sensor 1 voltage within the specified values?</p> | 0.38–0.71 V | Go to Step 4 | Go to Step 8 |
| 4 | <p>Manually open the throttle blade to wide open throttle (WOT) while observing the TP sensor 1 voltage parameter on the scan tool.</p> <p>Does the scan tool indicate that the TP sensor 1 voltage is within the specified values?</p> | 4.09–4.87 V | Go to Step 5 | Go to Step 8 |
| 5 | <ol style="list-style-type: none"> 1. Disconnect the TP sensor harness connector. 2. Disconnect the throttle actuator control (TAC) module harness connector containing the TP sensor circuits. 3. With a DMM, test the TP sensor low reference circuit for a short to ground. <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 6 |
| 6 | <ol style="list-style-type: none"> 1. Turn OFF the ignition for 15 seconds. 2. Reconnect the TAC module harness connector. 3. Reconnect the throttle actuator motor harness connector. 4. Reinstall the air inlet duct. 5. Turn ON the ignition, with the engine OFF. 6. Select the DTC Info on the scan tool. 7. Lightly touch and move the related engine wiring harnesses and connectors for the TP sensor while observing the DTC Info. The DTC will set if an intermittent condition is present. <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 7 |
| 7 | <ol style="list-style-type: none"> 1. Continue to observe DTC Info. 2. Slowly depress the accelerator pedal to WOT, and then slowly return the pedal to the released position 3 times. <p>Does the scan tool indicate this DTC failed this ignition?</p> | — | Go to Step 27 | Go to Diagnostic Aids |

| Step | Action | Values | Yes | No |
|------|---|-------------|---------------|---------------|
| 8 | <ol style="list-style-type: none"> 1. Disconnect the TP sensor harness connector. 2. Measure voltage at the TP sensor 1 signal circuit with a DMM connected to ground. <p>Does the DMM indicate voltage within the specified values?</p> | 3.94–6.06 V | Go to Step 13 | Go to Step 9 |
| 9 | <ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the TAC module harness connector containing the TP sensor circuits. 3. Turn ON the ignition with the engine OFF. 4. With a DMM, test the TP sensor 1 signal circuit for a short to voltage. <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 10 |
| 10 | <p>With a DMM, test the TP sensor 1 signal circuit for an open or high resistance.</p> <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 11 |
| 11 | <p>With a DMM, test the TP sensor 1 signal circuit for a short to ground.</p> <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 12 |
| 12 | <ol style="list-style-type: none"> 1. Disconnect the other TAC module harness connector. 2. With a DMM, test for a short between the TP sensor 1 signal circuit and all other TAC module circuits. <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 28 |
| 13 | <p>With a DMM, test the TP sensor 1, 5-volt reference circuit for voltage.</p> <p>Does the DMM indicate voltage within the specified values?</p> | 3.94–6.06 V | Go to Step 23 | Go to Step 14 |
| 14 | <p>Does the DMM indicate voltage greater than the specified value?</p> | 6.06 V | Go to Step 15 | Go to Step 17 |
| 15 | <ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the TAC module harness connector containing the TP sensor circuits. 3. Turn ON the ignition with the engine OFF. 4. With a DMM, test the TP sensor 1 5-volt reference circuit for a short to voltage. <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 16 |
| 16 | <ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the accelerator pedal position (APP) sensor harness connector. 3. Disconnect the other TAC module harness connector. 4. Turn ON the ignition, with the engine OFF. 5. With a DMM, test the APP sensor 1 5-volt reference circuit for a short to voltage. <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 21 |
| 17 | <p>Disconnect the APP sensor.</p> <p>Does the DMM indicate voltage less than the specified value?</p> | 3.94 V | Go to Step 18 | Go to Step 30 |

Steps 8-17

| Step | Action | Values | Yes | No |
|------|---|--------|---------------|---------------|
| 18 | <ol style="list-style-type: none"> 1. Disconnect the TAC module harness connector containing the TP sensor circuits. 2. With a DMM, test the TP sensor 1 5-volt reference circuit for an open or for high resistance. <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 19 |
| 19 | <p>With a DMM, test the TP sensor 1 5-volt reference circuit for a short to ground.</p> <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 20 |
| 20 | <p>With a DMM, test the APP sensor 1 5-volt reference circuit for a short to ground.</p> <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 21 |
| 21 | <p>With a DMM, test for a short between the TP sensor 1 5-volt reference circuit and all other TAC module circuits.</p> <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 22 |
| 22 | <p>With a DMM, test for a short between the APP sensor 1 5-volt reference circuit and all other TAC module circuits.</p> <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 28 |
| 23 | <ol style="list-style-type: none"> 1. Disconnect the TAC module connector containing the TP sensor circuits. 2. With a DMM, test the TP sensor 1 signal circuit for a short to any other TP sensor circuit. If a short is found <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 24 |
| 24 | <ol style="list-style-type: none"> 1. Reconnect the TAC module harness connector containing the TP sensor circuits. 2. Connect a fused jumper between the TP sensor 1 low reference circuit and the TP sensor 1 signal circuit. 3. With a scan tool, observe the TP sensor 1 voltage parameter. <p>Does the scan tool indicate voltage near the specified value?</p> | 0 V | Go to Step 26 | Go to Step 25 |
| 25 | <ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the TAC Module harness connector containing the TP sensor circuits. 3. With a DMM, test the TP sensor 1 low reference circuit for an open or high resistance. <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 28 |
| 26 | <p>Inspect for poor connections at the TP sensor harness connector.</p> <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 29 |
| 27 | <p>Inspect for poor connections at the APP module harness connector.</p> <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 30 |
| 28 | <p>Inspect for a poor connection at the TAC Module harness connector.</p> <p>Did you find and correct the condition?</p> | — | Go to Step 32 | Go to Step 31 |

Steps 18-28

| Step | Action | Values | Yes | No |
|------|--|--------|---|--------------|
| 29 | <p>Important</p> <p>The throttle position sensor is not a serviceable part and should only be replaced with the throttle body assembly.</p> <p>Replace the throttle body assembly.</p> <p>Did you complete the replacement?</p> | — | Go to Step 32 | — |
| 30 | <p>Replace the APP sensor.</p> <p>Did you complete the replacement?</p> | — | Go to Step 32 | — |
| 31 | <p>Replace the TAC module.</p> <p>Did you complete the replacement?</p> | — | Go to Step 32 | — |
| 32 | <ol style="list-style-type: none"> 1. Use the scan tool to clear the DTCs. 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. <p>Does the DTC run and pass?</p> | — | Go to Step 33 | Go to Step 2 |
| 33 | <p>Observe the Capture Info with a scan tool.</p> <p>Are there any DTCs that have not been diagnosed?</p> | — | Go to Diagnostic Trouble Code (DTC) List - Vehicle in Vehicle DTC Information | System OK |

Steps 29-33

The number below refers to the step number on the diagnostic table.

33. When the TAC module detects a condition within the TAC System, more than one TAC System related DTC may set. This is due to the many redundant tests that run continuously on this system. Locating and repairing 1 individual condition may correct more than 1 DTC. Disconnecting the components during testing may set additional DTCs. Keep this in mind when reviewing the Capture Info.