

DTC P0171**CIRCUIT DESCRIPTION**

The powertrain control module (PCM) controls the air/fuel metering system in order to provide the best possible combination of driveability, fuel economy, and emission control. Fuel delivery is controlled differently during Open and Closed Loop. During Open Loop, the PCM determines fuel delivery based on sensor signals without oxygen sensor input. During Closed Loop, the PCM adds oxygen sensor inputs and level of purge to calculate short and long term fuel trim adjustments. If the oxygen sensors indicate a lean condition, fuel trim values will be above 0 percent. If the oxygen sensors indicate a rich condition, fuel trim values will be below 0 percent. The values for the short term fuel trim change rapidly in response to the heated oxygen sensor (HO2S) voltage signals. Long term fuel trim makes course adjustments in order to maintain an air/fuel ratio of 14.7:1. A block of cells contain information arranged in combinations of engine RPM and engine load for a full range of vehicle operating conditions. The long term fuel trim diagnostic is based on an average of cells currently being used. The PCM selects the cells based on the engine speed and engine load. If the PCM detects an excessively lean condition, DTC P0171 or P0174 sets.

DTC DESCRIPTORS

This diagnostic procedure supports the following DTCs:

- DTC P0171 Fuel Trim System Lean Bank 1
- DTC P0172 Fuel Trim System Lean Bank 2

CONDITIONS FOR RUNNING THE DTC

- DTCs P0053, P0054, P0059, P0060, P0101, P0102, P0103, P0106, P0107, P0108, P0131, P0132, P0133, P0134, P0135, P0137, P0138, P0140, P0141, P0151, P0152, P0153, P0154, P0155, P0157, P0158, P0160, P0161, P0200, P0300, P0442, P0443, P0446, P0449, P0452, P0453, P0455, P0496, P0506, P0507, P1133, P1134, P1153, P1154, P2A01, or P2A04 are not set.
- The engine coolant temperature (ECT) is between **-40 and +140°C (-40 and +284°F)**.
- The intake air temperature (IAT) is between **-20 and +152°C (-4 and +304°F)**.
- The manifold absolute pressure (MAP) is between **15-105 kPa (2.2-15.2 psi)**.
- The vehicle speed is less than **132 km/h (82 mph)**.
- The engine speed is between **400-6,500 RPM**.
- The barometric pressure (BARO) is more than **74 kPa (10.7 psi)**.
- The mass airflow (MAF) is between **1-250 g/s**.
- The fuel level is more than **10 percent**.
- The throttle position (TP) is less than **90 percent**.
- This diagnostic runs continuously once the above conditions are met.

CONDITIONS FOR SETTING THE DTC

The long term fuel trim weighted average value is more than a calibrated threshold for **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 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

- The system may become lean if an injector is not supplying enough fuel.
- Excessive resistance in the **fuel injector** control and/or ignition 1 voltage circuits may cause the following symptoms:
- Lean condition
- Misfire
- Rough idle Refer to DTC P0200. [See: P0200](#)
- A lean condition could be present during high fuel demand.
- Use a scan tool in order to review the Failure Records. If an intermittent condition is suspected, refer to Intermittent Conditions. [See: Initial Inspection and Diagnostic Overview/Diagnostic Strategies/Intermittent Conditions](#)

TEST

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	Are any DTCs other than DTC P0171 or P0174 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. Install the scan tool. 2. Start and idle the engine at the normal operating temperature in Closed Loop. 3. Record the long term fuel trim. 4. Turn OFF the engine. 5. Turn ON ignition, with engine OFF. 6. Review the Freeze Frame/Failure Records and record the displayed data for this DTC. <p>Does the scan tool indicate that the long term fuel trim is greater than the specified value?</p>	23%	Go to Step 4	Go to Diagnostic Aids
4	<ol style="list-style-type: none"> 1. Operate engine at idle. 2. Observe the HO2S parameters with a scan tool. <p>Does the scan tool indicate that the parameter is within the specified range and fluctuating?</p>	200–800 mV	Go to Step 5	Go to Step 6
5	<ol style="list-style-type: none"> 1. Turn OFF the engine. 2. Visually and physically inspect the following items: <ul style="list-style-type: none"> o The vacuum hoses for splits, kinks, and proper connections o Ensure that the vehicle has sufficient fuel in tank. If fuel pressure is too low this DTC may set. Refer to Fuel System Diagnosis. o Fuel contamination—Refer to Fuel Contaminants-in-Fuel Diagnosis (without Special Tool) or Fuel Contaminants-in-Fuel Diagnosis (with Special Tool). o Any lean fuel injectors—Refer to Injector Balance Test with Tech 2. <p>Did you find and correct the condition?</p>	—	Go to Step 8	Go to Step 7
6	<ol style="list-style-type: none"> 1. Turn OFF the engine. 2. Inspect the heated oxygen sensor (HO2S) for proper installation. 3. Verify the electrical connectors and the wires are secure, and not contacting the exhaust system. 4. Test for continuity between the HO2S signal circuit and the low reference circuit. <p>Did you find and correct the condition?</p>	—	Go to Step 8	Go to Fuel System Diagnosis

Step	Action	Values	Yes	No
7	<ol style="list-style-type: none"> 1. Operate the engine at idle. 2. Inspect for any missing, loose, or leaking exhaust components forward of the HO2S. 3. Inspect for vacuum leaks at the intake manifold, throttle body, and injector O-rings. 4. Inspect the air induction system and the air intake ducts for leaks. 5. Inspect the secondary air injection (AIR) system for leaks, improper air delivery, and for the shut-off valves not closing. 6. Inspect the crankcase ventilation system for leaks. Refer to Crankcase Ventilation System Inspection/Diagnosis in Engine. 7. The evaporative emissions (EVAP) lines and components for damage or blockage. Refer to Evaporative Emissions (EVAP) Hose Routing Diagram. <p>Did you find and correct the condition?</p>	—	Go to Step 8	Go to Symptoms - Engine – 5.7L
8	<p>Important</p> <p>After repairs, use the scan tool Fuel Trim Reset function in order to reset the Long Term Fuel Trim.</p> <ol style="list-style-type: none"> 1. Turn ON the ignition, with the engine OFF. 2. Clear the DTCs with a scan tool. 3. Turn OFF the ignition for 30 seconds. 4. Start the engine. 5. 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>Did the DTC fail this ignition?</p>	—	Go to Step 2	Go to Step 9
9	<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