

P0301-P0306 ECM is able to determine that a specific cylinder is misfiring

Description

The engine control module (ECM) uses information from the crankshaft position (CKP) sensor and the camshaft position (CMP) sensor in order to determine when an engine misfire is occurring. By monitoring variations in the crankshaft rotation speed for each cylinder, the ECM is able to detect individual misfire events. A misfire rate that is high enough can cause 3-way catalytic converter damage. The malfunction indicator lamp (MIL) will flash ON and OFF when the conditions for catalytic converter damage are preset. DTCs P0301–P0306 correspond to cylinders 1–6. If the ECM is able to determine that a specific cylinder is misfiring, the DTC for that cylinder sets.

Conditions for Running the DTC

- DTCs P0008, P0009, P0010, P0011, P0013, P0014, P0016, P0017, P0018, P0019, P0020, P0021, P0023, P0024, P0121, P0122, P0123, P0221, P0222, P0223, P0335, P0336, P0337, P0338, P0341, P0342, P0343, P0346, P0347, P0348, P0366, P0367, P0368, P0391, P0392, P0393, P0442, P0443, P0455, P0458, P0459, P2088, P2089, P2090, P2091, P2092, P2093, P2094, or P2095 are not set.
- The engine speed is between 400–7,000 RPM and steady.
- The delivered torque signal is more than 12 percent at idle with the transmission in neutral.
- The delivered torque signal is between 4–30 percent with the transmission in drive.
- The intake air temperature (IAT) is more than 30°C (22°F).
- The engine run time is more than 45 seconds.
- The fuel level is more than 10 percent.
- The torque management is not active.
- The antilock brake/traction control (ABS/TC) system is not active.
- The ECM is not receiving a rough road signal.
- The fuel cut-off is not active, including the traction control, the deceleration, the high vehicle speed, and the high engine speed.

Conditions for Setting the DTC

The ECM detects a crankshaft rotation speed variation indicating a single cylinder misfire rate sufficient to cause emissions levels to exceed mandated standard.

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

- 1). A misfire DTC could be caused by an excessive vibration from sources other than the engine. Check for the following possible sources:
 - Tire or wheel out of round or balance
 - Variable thickness brake rotor or drum
 - Drive shaft not balanced
 - Certain rough road conditions
 - Damaged accessory drive belt
- 2). For an intermittent condition, refer to Intermittent Conditions.

DTC P0301-P0306

Step	Action	Yes	No
Schematic Reference: Engine Controls Schematics on page 6-1196			
1	Did you perform the Diagnostic System Check—Engine Controls?	Go to Step 2	Go to Diagnostic System Check—Engine Controls
2	Were you sent here from DTC P0300?	Go to Step 3	Go to DTC P0300
3	<p>1. Turn OFF the ignition.</p> <p>2. Remove the ignition coil of the misfiring cylinder, but leave the electrical connector connected. Refer to the appropriate procedure:</p> <ul style="list-style-type: none"> • Ignition Coil(s) Replacement -Bank 1 on page 6-1708 • Ignition Coil(s) Replacement -Bank 2 on page 6-1710 <p>3. Inspect the ignition coil boot for the following conditions:</p> <ul style="list-style-type: none"> • Holes • Tears • Carbon tracking • Oil contamination or water intrusion <p>Did you find a condition with the ignition coil boot?</p>	Go to Step 12	Go to Step 4
4	<p>Important: The fuel pump fuse is located under the right rear seat. The carpet must be lifted up to access the rear fuse block.</p> <p>1. Remove the fuel pump fuse from the right rear fuse block.</p> <p>2. Install the J 26792 Spark Tester to the ignition coil boot and a good ground.</p> <p>3. Crank the engine while observing the J 26792.</p> <p>Does the spark tester spark and is the spark consistent?</p>	Go to Step 5	Go to Electronic Ignition (EI) System Diagnosis

Step	Action	Yes	No
5	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Remove the spark plug from the cylinder that indicated a misfire. 3. Inspect the spark plug. Refer to Spark Plug Inspection on page 6-1713. Does the spark plug appear to be OK?	Go to Step 9	Go to Step 6
6	Is the spark plug oil or coolant fouled?	Go to Symptoms - Engine Mechanical in Engine Mechanical – 3.6L (LY7)	Go to Step 7
7	Is the spark plug gas fouled?	Go to Step 10	Go to Step 8
8	Does the spark plug show any signs of being cracked, worn, or incorrectly gap?	Go to Step 11	Go to Step 9
9	<ol style="list-style-type: none"> 1. Swap the suspected spark plug with another cylinder that is operating correctly. 2. Start the engine. 3. Operate the engine within the conditions that the misfire occurred. 4. Monitor the Misfire Current Counters with a scan tool. Did the misfire move with the spark plug?	Go to Step 11	Go to Step 10
10	Important: <ul style="list-style-type: none"> • Make sure all the fuel injectors operate. High resistance in an fuel injector circuit causes the fuel injector to be inoperative without setting a fuel injector DTC. • Return to this diagnostic after you complete the Fuel Injector Coil Test. Perform the fuel injector coil test. Refer to Fuel Injector Coil Test. Did you find and correct the condition? 	Go to Step 13	Go to Symptoms -Engine Mechanical in Engine Mechanical – 3.6L (LY7)

Step	Action	Yes	No
11	Replace the spark plug. Refer to Spark Plug Replacement. Did you complete the replacement?	Go to Step 13	—
12	Replace the ignition coil. Refer to Ignition Coil(s) Replacement -Bank 1 and Ignition Coil(s) Replacement -Bank 2. Did you complete the replacement?	Go to Step 13	—
13	Was the customer's concern that the MIL is flashing?	Go to DTC P0420 or P0430	Go to Step 14
14	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 15
15	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