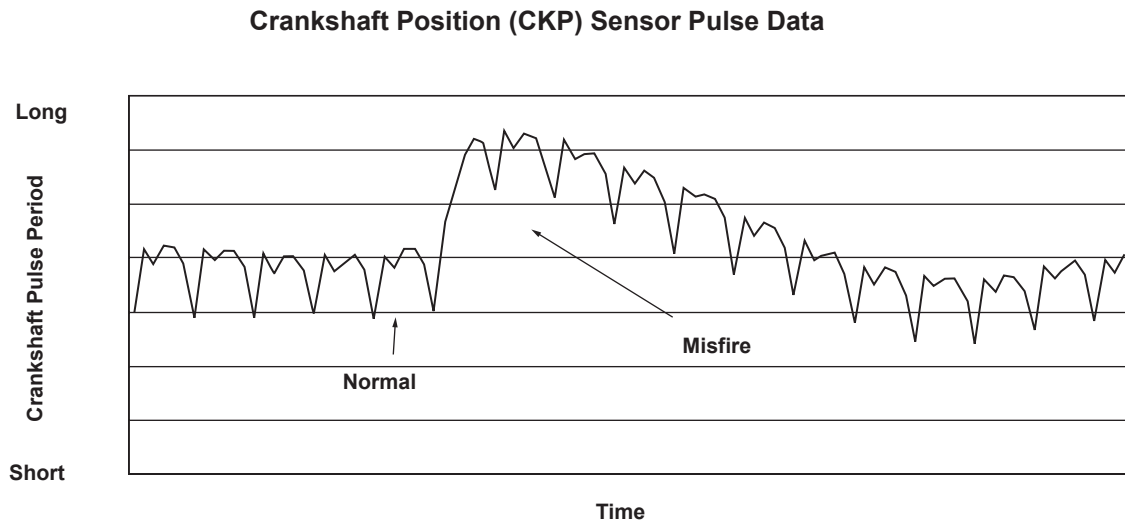


# Advanced Diagnostics

## DTC P0300: Random Misfire



P0301-9671

### General Description

The crankshaft vibrates slightly when each cylinder fires. If a misfire occurs, the crankshaft rotation speed changes rapidly. The engine control module (ECM) monitors the crankshaft rotation speed based on the output pulses from the crankshaft position (CKP) sensor. By monitoring changes in the crankshaft rotation speed, the ECM counts the number of misfires and determines which cylinder is misfiring. If more than one DTC from P0301 through P0303 has been stored simultaneously while misfires in multiple cylinders are detected, a malfunction is detected and a DTC is stored.

There are two types of misfire detection.

Type 1 (1 drive cycle): When the number of misfires per 200 engine revolutions reaches the level that damages the three way catalyst (TWC), a DTC is stored and the MIL blinks. When the misfire ceases, the MIL remains on steady instead of blinking.

Type 2 (2 drive cycles): When the number of misfires per 1,000 engine revolutions reaches the level that affects exhaust emissions, a DTC is stored and the MIL illuminates.

### Monitor Execution, Sequence, Duration, DTC Type

|           |                                  |
|-----------|----------------------------------|
| Execution | Continuous                       |
| Sequence  | None                             |
| Duration  | —                                |
| DTC Type  | One or two drive cycles, MIL ON* |

\* : See diagnosis details.

## Enable Conditions

| Condition                  |                                | Minimum                                           | Maximum                                     |   |   |
|----------------------------|--------------------------------|---------------------------------------------------|---------------------------------------------|---|---|
| Engine coolant temperature |                                | 14°F (-10°C)                                      | —                                           |   |   |
| Intake air temperature     |                                | 14°F (-10°C)                                      | —                                           |   |   |
| Engine speed               |                                | 500 rpm* <sup>1</sup>                             | 6,000 rpm                                   |   |   |
|                            |                                | 750 rpm* <sup>2</sup>                             |                                             |   |   |
| MAP value                  | Stopped                        | 500 rpm                                           | 22 kPa (161 mmHg, 6.4 in.Hg)* <sup>1</sup>  | — |   |
|                            |                                |                                                   | 26 kPa (191 mmHg, 7.6 in.Hg)* <sup>2</sup>  |   |   |
|                            |                                | 3,000 rpm                                         | 20 kPa (148 mmHg, 5.9 in.Hg)* <sup>1</sup>  |   |   |
|                            |                                |                                                   | 24 kPa (175 mmHg, 6.9 in.Hg)* <sup>2</sup>  |   |   |
|                            | Driving (other than lean burn) | 500 rpm                                           | 51 kPa (376 mmHg, 14.8 in.Hg)* <sup>1</sup> |   | — |
|                            |                                |                                                   | 25 kPa (188 mmHg, 7.4 in.Hg)* <sup>2</sup>  |   |   |
|                            |                                | 3,000 rpm                                         | 30 kPa (220 mmHg, 8.7 in.Hg)* <sup>1</sup>  |   |   |
|                            |                                |                                                   | 34 kPa (253 mmHg, 10.0 in.Hg)* <sup>2</sup> |   |   |
| Driving (lean burn)        | 500 rpm                        | 51 kPa (376 mmHg, 14.8 in.Hg)* <sup>1</sup>       | —                                           |   |   |
|                            | 2,500 rpm                      | 51 kPa (379 mmHg, 15.0 in.Hg)* <sup>1</sup>       |                                             |   |   |
| Fuel feedback              |                                | Other than during fuel cut-off operation          |                                             |   |   |
| No active DTCs             |                                | ECM, MAP, ECT, CKP, TP, IAT, BARO                 |                                             |   |   |
| Others                     |                                | Test-drive on a flat road to avoid misdetection   |                                             |   |   |
|                            |                                | Avoid abrupt acceleration, deceleration and turns |                                             |   |   |

\*1: M/T

\*2: CVT

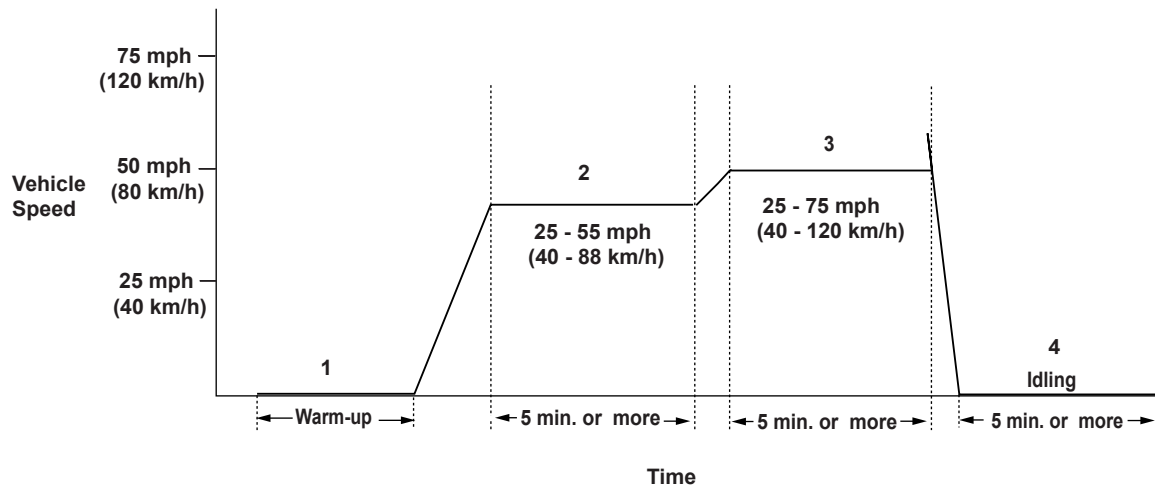
## Malfunction Threshold

The number of misfires versus the number of engine revolutions is equal to or greater than the value in the table.

| Misfire Type   | The number of engine revolutions | The number of misfires                                                            |
|----------------|----------------------------------|-----------------------------------------------------------------------------------|
| Misfire Type 1 | Per 200 revolutions              | 20* <sup>1</sup> , 23* <sup>2</sup> - 90* <sup>2</sup> , 95* <sup>1</sup> times** |
| Misfire Type 2 | Per 1,000 revolutions            | 30* <sup>2</sup> , 50* <sup>1</sup> times                                         |

\*\* : Depending on engine speed and load.

## Driving Pattern



P0301-9650

1. Start the engine. Hold the engine at 3,000 rpm with no load (in park or neutral) until the radiator fan comes on.
2. Drive the vehicle at a speed between 25 - 55 mph (40 - 88 km/h) for at least 5 minutes.
3. To test while driving, drive at a steady speed between 25 - 75 mph (40 - 120 km/h) for at least 5 minutes.
4. To test at idle, stop the vehicle after step 2, and let the engine idle for at least 5 minutes.

- When freeze frame data is stored, drive the vehicle under those conditions instead of Driving Patterns 3 or 4.
- If you have difficulty duplicating the DTC, retest after turning off electrical components such as the audio system and A/C, and try a different gear position.
- Drive the vehicle in this manner only if the traffic regulations and ambient conditions allow.

## Diagnosis Details

### Conditions for illuminating the MIL

**Misfire Type 1:** Under high rpm or high load conditions: The MIL blinks once per second if a type 1 misfire (catalyst damaging) occurs, and a Temporary DTC is stored. If the type 1 misfire ceases, the MIL goes off. If a type 1 misfire occurs during the next (second) drive cycle, the MIL blinks at the first misfire occurrence, and the DTC and the freeze frame data are stored. The MIL remains on steady if the type 1 misfire ceases.

Under normal driving conditions: The MIL blinks once per second if a type 1 misfire occurs the third time, and a Temporary DTC is stored. If a type 1 misfire occurs during the next (second) drive cycle, the MIL blinks during the third time of the type 1 misfire occurrence, and the DTC and the freeze frame data are stored. If the type 1 misfire ceases, the MIL remains on steady.

**Misfire Type 2:** When a type 2 misfire (emission-related but not severe enough to immediately damage the TWC) occurs within the first 1,000 crankshaft revolutions of engine start-up, a Temporary DTC is stored.

If a type 2 misfire occurs after the first 1,000 crankshaft revolutions of engine start-up, a Temporary DTC is stored during the fourth time of the type 2 misfire occurrence.

If a type 2 misfire occurs during the next (second) drive cycle, the MIL comes on and the DTC and the freeze frame data are stored.

### Conditions for clearing the MIL

The MIL will be cleared if the malfunction does not recur during three consecutive drive cycles in which the engine conditions are similar to the first time the malfunction was detected.

The MIL, the DTC, the Temporary DTC, and the freeze frame data can be cleared by using the scan tool Clear command or by disconnecting the battery.