

## DTC P0351

### CIRCUIT DESCRIPTION

The ignition system on this engine uses an individual ignition coil for each cylinder. The powertrain control module (PCM) controls the spark event for each cylinder through 8 individual ignition control (IC) circuits. When the PCM commands the IC circuit ON, electrical current will flow through the primary winding of the ignition coil, creating a magnetic field. When a spark event is requested, the PCM will command the IC circuit OFF, interrupting current flow through the primary winding. The magnetic field created by the primary winding will collapse across the secondary coil winding, producing a high voltage across the spark plug electrodes. The PCM uses information from the crankshaft position (CKP) and the camshaft position (CMP) sensor for sequencing and timing of the spark events. Each ignition coil/module has the following circuits:

- An ignition 1 voltage circuit
- A ground circuit
- An IC circuit
- A low reference circuit

If the PCM detects that the IC circuit has an incorrect voltage level, DTC P0351-P0358 will set.

### DTC DESCRIPTORS

This diagnostic procedure supports the following DTCs:

- DTC P0351 Ignition Coil 1 Control Circuit
- DTC P0352 Ignition Coil 2 Control Circuit
- DTC P0353 Ignition Coil 3 Control Circuit
- DTC P0354 Ignition Coil 4 Control Circuit
- DTC P0355 Ignition Coil 5 Control Circuit
- DTC P0356 Ignition Coil 6 Control Circuit
- DTC P0357 Ignition Coil 7 Control Circuit
- DTC P0358 Ignition Coil 8 Control Circuit

### CONDITIONS FOR RUNNING THE DTC

- The engine is running.
- DTC P0351-P0358 runs continuously once the above condition is met.

### CONDITIONS FOR SETTING THE DTC

The PCM detects the IC circuit is grounded, open, or shorted to voltage 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 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.

### TEST DESCRIPTION

Step	Action	Values	Yes	No
1	Did you perform the Diagnostic System Check – Vehicle?	—	Go to Step 2	Go to <a href="#">diagnostic</a> System Check - Vehicle in Vehicle DTC Information
2	<ol style="list-style-type: none"> <li>1. Observe the Freeze Frame/Failure Records for this DTC.</li> <li>2. Turn OFF the ignition for 30 seconds.</li> <li>3. Start the engine.</li> <li>4. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions you observed from the Freeze Frame/Failure Records.</li> </ol> Did the DTC fail this ignition?	—	Go to Step 3	Go to <a href="#">measurement</a> Conditions
3	<ol style="list-style-type: none"> <li>1. Turn OFF the engine.</li> <li>2. Disconnect the respective ignition coil.</li> <li>3. Start the engine.</li> <li>4. Measure the frequency at the ignition circuit (IC) with the DMM set to DC Hertz.</li> </ol> Is the frequency within the specified range?	3–20 Hz	Go to Step 7	Go to Step 4
4	Measure the voltage from the IC circuit of the ignition coil to a good ground with the DMM. Is the voltage more than the specified value?	1 V	Go to Step 13	Go to Step 5
5	<ol style="list-style-type: none"> <li>1. Turn OFF the ignition.</li> <li>2. Disconnect the powertrain control module (PCM) connector.</li> <li>3. Test the IC circuit between the ignition coil connector and the PCM connector for continuity with the DMM.</li> </ol> Does the DMM indicate continuity?	—	Go to Step 6	Go to Step 14
6	Test the respective IC circuit for a short to ground. Did you find and correct the condition?	—	Go to Step 17	Go to Step 10
7	<ol style="list-style-type: none"> <li>1. Turn ON the ignition, with the engine OFF.</li> <li>2. Probe the ignition 1 voltage circuit of the ignition coil with a test lamp that is connected to battery ground.</li> </ol> Does the test lamp illuminate?	—	Go to Step 8	Go to Step 11
8	Probe the ground circuit of the ignition coil with a test lamp connected to battery voltage. Does the test lamp illuminate?	—	Go to Step 9	Go to Step 12
9	Test for an intermittent and for a poor connection at the ignition coil. Did you find and correct the condition?	—	Go to Step 17	Go to Step 15
10	Test for an intermittent and for a poor connection at the PCM. Did you find and correct the condition?	—	Go to Step 17	Go to Step 16
11	Repair the open in the ignition 1 voltage circuit. Did you complete the repair?	—	Go to Step 17	—

## Steps 1-11

Step	Action	Values	Yes	No
12	Repair the open in the ground circuit for the ignition coil. Did you complete the repair?	—	Go to Step 17	—
13	Repair the IC circuit for a short to voltage. Did you complete the repair?	—	Go to Step 17	—
14	Repair open in the IC circuit. Did you complete the repair?	—	Go to Step 17	—
15	Replace the ignition coil. Did you complete the replacement?	—	Go to Step 17	—
16	Replace the PCM. Did you complete the replacement?	—	Go to Step 17	—
17	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 <a href="#">Diagnostic Trouble Code (DTC) List - Vehicle in Vehicle DTC Information</a>	System OK

### Steps 12-18

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

- This step verifies the integrity of the IC circuit and the PCM output.

This step tests for a short to ground on the IC circuit.