P0261, P0264, P0267, P0270, P0273, or P0276 Injector Control Circuit Low Voltage

Circuit Description

The control module enables the appropriate fuel injector on the intake stroke for each cylinder. Ignition voltage is supplied directly to the fuel injectors. The control module controls each fuel injector by grounding the control circuit with a solid state device called a driver. The control module monitors the status of each driver. Each driver has a feedback voltage circuit which the engine control module (ECM) monitors. The injector control circuits are pulled-up to voltage within the ECM. The ECM can determine if a control circuit is open, shorted to ground, or shorted to a voltage by monitoring the feedback voltage. If the ECM detects the control circuit voltage is too low when the circuit is commanded OFF, this DTC sets.

DTC Descriptors

This diagnostic procedure supports the following DTCs.

- DTC P0261 Injector 1 Control Circuit Low Voltage
- DTC P0264 Injector 2 Control Circuit Low Voltage
- DTC P0267 Injector 3 Control Circuit Low Voltage
- DTC P0270 Injector 4 Control Circuit Low Voltage
- DTC P0273 Injector 5 Control Circuit Low Voltage
- DTC P0276 Injector 6 Control Circuit Low Voltage

Conditions for Running the DTC

- The engine speed is more than 80 RPM.
- The ignition 1 voltage is between 10–18 volts.
- DTCs P0261, P0264, P0267, P0270, P0273, and P0276 run continuously once the above conditions are met.

Conditions for Setting the DTC

- The ECM detects a grounded fuel injector circuit.

- The condition exists for more 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 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

- Use the J 35616-C Connector Test Adapter Kit for any test that requires probing the ECM harness connector or a component harness connector.
- The lower connector of the ECM is connector C1 and the upper connector of the ECM is connector C2. Refer to Engine Controls Component Views.
- Performing the fuel injector coil test may help isolate an intermittent condition. Refer to Fuel Injector Coil Test.
- If the condition is intermittent, move the related harnesses and connectors, with the engine operating, while monitoring the circuit status for the component with a scan tool. The circuit status parameter changes from OK or Indeterminate to Fault if there is a condition with the circuit or a connection. The ODM information is in the output driver module (ODM) data list.
- If the condition is intermittent, refer to Intermittent Conditions.

Test Description

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

2. This step determines if the condition is current.
3. This step determines if the ignition 1 voltage supply circuit is shorted to ground. The fuel injectors for each bank of the engine are fused separately. If the circuit is shorted to ground, all the injector low voltage DTCs will set for one bank of the engine.
5. This step isolates if the short to ground condition is on the injector side of the multi-way harness connector or the ECM side of the multi-way harness connector. If a low voltage DTC sets, the short to ground condition is between the multi-way harness connector and the ECM.
7. This step isolates the condition. If the test lamp illuminates the injector control circuit is shorted to ground between the multi-way harness connector and the fuel injectors.

P0261, P0264, P0267, P0270, P0273, or P0276

Step	Action	Yes	No
Schematic Reference: Engine Controls Schematics Connector End View Reference: Engine Control Module (ECM) Connector End Views or Engine Controls Connector End Views			
1	Did you perform the Diagnostic System Check–Engine Controls?	Go to Step 2	Go to Diagnostic System Check -Engine Controls
2	1. Turn ON the ignition, with the engine OFF. 2. Clear the DTCs with a scan tool. 3. Start the engine. 4. Observe the DTC Info with a scan tool. Is DTC P0261, P0264, P0267, P0270, P0273, or P0276 set?	Go to Step 3	Go to Step 4
3	Are DTCs P0261, P0267, and P0273 set at the same time, or are DTCs P0264, P0270, and P0276 set at the same time?	Go to Step 7	Go to Step 5

Step	Action	Yes	No
4	1. Observe the Freeze Frame/Failure Records for this DTC. 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 4	Go to Diagnostic Aids
5	1. Turn OFF the ignition. **Important: Disconnecting the multi-way harness connector** causes P0201–P0206 fuel injector circuit open DTCs to set. 2. Disconnect the fuel injector multi-way harness connector. 3. Turn ON the ignition, with the engine OFF. 4. Clear the DTCs with a scan tool. 5. Attempt to start the engine. 6. Observe the DTC Info with a scan tool. Is DTC P0261, P0264, P0267, P0270, P0273, or P0276 set?	Go to Step 6	Go to Step 10
6	Test the control circuit of the appropriate fuel injector for a short to ground between the multi-way connector and the engine control module (ECM). Refer to Circuit Testing on page 8-1184 and Wiring Repairs on page 8-1189 in Wiring Systems. Did you find and correct the condition?	Go to Step 12	Go to Step 11
7	1. Turn OFF the ignition. 2. Disconnect the fuel injector multi-way harness connector. 3. Probe the appropriate ignition 1 voltage supply circuit, fuel injector side of harness, with a test lamp connected to B+. Does the test lamp illuminate?	Go to Step 8	Go to Step 9

Step	Action	Yes	No
8	1. Remove the upper intake. Refer to Intake Manifold Replacement -Upper on page 6-108 in Engine Mechanical – 3.6L (LY7). 2. Repair the appropriate ignition 1 voltage supply circuit of the fuel injector for a short to ground between the multi-way connector and the fuel injectors. Refer to Circuit Testing on page 8-1184 and Wiring Repairs on page 8-1189 in Wiring Systems. 3. Replace the fuse as necessary. Did you complete the repair?	Go to Step 12	—
9	1. Repair the ignition 1 voltage supply circuit of the fuel injector for a short to ground between the multi-way connector and the fuse. Refer to Circuit Testing on page 8-1184 and Wiring Repairs on page 8-1189 in Wiring Systems. 2. Replace the fuse as necessary. Did you complete the repair?	Go to Step 12	—
10	1. Remove the upper intake. Refer to Intake Manifold Replacement -Upper on page 6-108 in Engine Mechanical – 3.6L (LY7). 2. Repair the appropriate control circuit of the fuel injector for a short to ground between the multi-way connector and the fuel injector. Refer to Circuit Testing on page 8-1184 and Wiring Repairs on page 8-1189 in Wiring Systems. Did you complete the repair?	Go to Step 12	—
11	Replace the ECM. Refer to Engine Control Module (ECM) Replacement on page 6-1648. Did you complete the replacement?	Go to Step 12	—

Step	Action	Yes	No
12	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 13
13	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