



2009 GMC Acadia 3.6L Eng VIN D SLT

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DTC P0201-P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P2146, P2149, P2152, P2155, P216A, Or P216D**Diagnostic Instructions**

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DTC Descriptors

DTC P0201

Injector 1 Control Circuit

DTC P0202

Injector 2 Control Circuit

DTC P0203

Injector 3 Control Circuit

DTC P0204

Injector 4 Control Circuit

DTC P0205

Injector 5 Control Circuit

DTC P0206

Injector 6 Control Circuit

DTC P0261

Injector 1 Control Circuit Low Voltage

DTC P0262

Injector 1 Control Circuit High Voltage

DTC P0264

Injector 2 Control Circuit Low Voltage

DTC P0265

Injector 2 Control Circuit High Voltage

DTC P0267

Injector 3 Control Circuit Low Voltage

DTC P0268

Injector 3 Control Circuit High Voltage

DTC P0270

Injector 4 Control Circuit Low Voltage

DTC P0271

Injector 4 Control Circuit High Voltage

DTC P0273

Injector 5 Control Circuit Low Voltage

DTC P0274

Injector 5 Control Circuit High Voltage

DTC P0276

Injector 6 Control Circuit Low Voltage

DTC P0277

Injector 6 Control Circuit High Voltage

DTC P2146

Injector Positive Voltage Control Circuit Group 1

DTC P2149

Injector Positive Voltage Control Circuit Group 2

DTC P2152

Injector Positive Voltage Control Circuit Group 3

DTC P2155

Injector Positive Voltage Control Circuit Group 4

DTC P216A

Injector Positive Voltage Control Circuit Group 5

DTC P216D

Injector Positive Voltage Control Circuit Group 6

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Fuel Injector 1 High Voltage Control	P2146	P0201	P2146	-
Fuel Injector 1 Low Voltage Control	P0261	P0201	P0262	-
Fuel Injector 2 High Voltage Control	P2149, P216A	P0202	P2149, P216A	-
Fuel Injector 2 Low Voltage Control	P0264	P0202	P0265	-
Fuel Injector 3 High Voltage Control	P2152, P216D	P0203	P2152, P216D	-
Fuel Injector 3 Low Voltage Control	P0267	P0203	P0268	-
Fuel Injector 4 High Voltage Control	P2155	P0204	P2155	-
Fuel Injector 4 Low Voltage Control	P0270	P0204	P0271	-
Fuel Injector 5 High Voltage Control	P2149, P216A	P0205	P2149, P216A	-
Fuel Injector 5 Low Voltage Control	P0273	P0205	P0274	-
Fuel Injector 6 High Voltage Control	P2152, P216D	P0206	P2152, P216D	-
Fuel Injector 6 Low Voltage Control	P0276	P0206	P0277	-

Circuit/System Description

The engine control module (ECM) supplies voltage to each fuel injector on the injector high voltage control circuits. The ECM energizes each fuel injector by enabling the high voltage control circuit of the fuel injector. The ECM monitors the status of the injector high voltage control circuits and the fuel injector low control circuits. When a fuel injector circuit condition is detected by the ECM, the affected fuel injector(s) is disabled.

Conditions For Running The DTC

- The engine speed is greater than 80 RPM.
- The ignition voltage is between 8-18 volts.
- The injector has been commanded ON and OFF at least once.
- The DTCs run continuously once the above conditions are met.

Conditions For Setting The DTC

P0201, P0202, P0203, P0204, P0205, Or P0206

The ECM detects the injector high voltage control circuit or the injector low voltage control circuit is open for greater than 4 seconds or for a cumulative of 30 seconds.

P0261, P0264, P0267, P0270, P0273, Or P0276

The ECM detects the injector low voltage control circuit is shorted to ground for greater than 4 seconds or for a cumulative of 30 seconds.

P0262, P0265, P0268, P0271, P0274, Or P0277

The ECM detects the injector low voltage control circuit is shorted to voltage for greater than 4 seconds or for a cumulative of 30 seconds.

P2146, P2149, P2152, P2155, P216A, Or P216D

The ECM detects the injector high voltage control circuit is shorted to ground or shorted to a voltage for greater than 4 seconds or for a cumulative of 30 seconds.

Action Taken When The DTC Sets

DTCs P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P2146, P2149, P2152, P2155, P216A, and P216D are Type B DTCs.

Conditions For Clearing The DTC

DTCs P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P2146, P2149, P2152, P2155, P216A, and P216D are Type B DTCs.

Diagnostic Aids

- The high voltage control circuits of injectors 2 and 5, and injectors 3 and 6, are paired together with a dual high side driver in the controller. A short to ground, or a short to voltage, on one of the paired circuits will set a DTC for the companion injector. The ECM will also disable the high side driver for the affected injectors.
- The high voltage circuits of injectors 1 and 4 are not paired together in the controller.
- Performing the fuel injector coil test may help isolate an intermittent condition. Refer to Fuel Injector Solenoid Coil Test (w/LLT) .
- If the condition is intermittent, move the related harnesses and connectors, with the engine operating, while monitoring the scan tool Fuel Injector Circuit Test Status parameters. A Fuel Injector Circuit Test Status parameter will change from OK or Not Run to Fault if there is a condition with the circuit or a connection.

Reference Information

Schematic Reference

Engine Controls Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Fuel System Description

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Observe the scan tool Misfire Current Counter parameters. The Misfire Current Counters should not increment.
2. Engine operating, observe the appropriate scan tool Fuel Injector Circuit Test Status parameters. Verify the Fuel Injector Circuit Test Status parameters display OK or Not Run.
3. Engine operating, observe the DTC information with a scan tool. DTC P0201, P0202, P0203, P0204, P0205, P0206, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P2146, P2149, P2152, P2155, P216A, or P216D should not set.
4. Operate the vehicle within the Conditions for Running the DTC to verify the DTC does not reset. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records data.

Circuit/System Testing

1. Ignition ON, clear the scan tool DTC information.
2. Ignition OFF, disconnect the appropriate multi-way harness connector X116 or X117, at the rear of the intake manifold.
3. Connect a test lamp between ground and the high voltage control circuit terminal of the appropriate injector listed below.

NOTE: Testing for steps 3 through 5 is performed on the ECM side of the multi-way harness connector.

1. Fuel Injector 1 terminal 8 X117
2. Fuel Injector 2 terminal 2 X116
3. Fuel Injector 3 terminal 9 X117
4. Fuel Injector 4 terminal 4 X116
5. Fuel Injector 5 terminal 10 X117
6. Fuel Injector 6 terminal 6 X116

4. Crank or start the engine while observing the test lamp. The test lamp should flash several times and then stop when the DTC sets.
 1. If the test lamp is always ON, test the circuit for a short to voltage. If the circuit tests normal, replace the ECM.

NOTE: *Four of the injector high voltage control circuits are paired in the controller with a dual driver, refer to Diagnostic Aids.*

2. If the test lamp is always OFF, test the circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the ECM.
5. Clear the DTC information with a scan tool, then cycle the ignition OFF.
6. Connect a test lamp between B+ and the low voltage control circuit terminal of the appropriate injector listed below.
 1. Fuel Injector 1 terminal 2 X117
 2. Fuel Injector 2 terminal 1 X116
 3. Fuel Injector 3 terminal 3 X117
 4. Fuel Injector 4 terminal 3 X116
 5. Fuel Injector 5 terminal 4 X117
 6. Fuel Injector 6 terminal 5 X116
7. Ignition ON, the test lamp should not illuminate.
 1. If the test lamp is ON, test the low control circuit for a short to ground. If the circuit tests normal, replace the ECM.
8. Connect a test lamp between ground and the low voltage control circuit terminal of the appropriate injector listed below.
 1. Fuel Injector 1 terminal 2 X117
 2. Fuel Injector 2 terminal 1 X116
 3. Fuel Injector 3 terminal 3 X117
 4. Fuel Injector 4 terminal 3 X116
 5. Fuel Injector 5 terminal 4 X117
 6. Fuel Injector 6 terminal 5 X116
9. Ignition ON, the test lamp should not illuminate.
 1. If the test lamp is ON, test the low control circuit for a short to voltage. If the circuit tests normal, replace the ECM.
10. Clear the DTC information with a scan tool, then cycle the ignition OFF.
11. Ignition OFF, connect a test lamp between the high voltage control circuit terminal and the low voltage control circuit terminal of the appropriate injector listed below.
 1. Fuel Injector 1 terminal 8 and terminal 2 X117
 2. Fuel Injector 2 terminal 2 and terminal 1 X116
 3. Fuel Injector 3 terminal 9 and terminal 3 X117
 4. Fuel Injector 4 terminal 4 and terminal 3 X116
 5. Fuel Injector 5 terminal 10 and terminal 4 X117

6. Fuel Injector 6 terminal 6 and terminal 5 X116

12. Crank or start the engine while observing the test lamp. The test lamp should flash several times and then stop when the DTC sets.

1. If the test lamp does not flash, test the low control circuit for an open/high resistance. If the circuit tests normal, replace the ECM.

13. Ignition OFF, measure the resistance between the appropriate high voltage control circuit and ground. The DMM should display OL Ω .

NOTE: Testing for the following steps is performed on the fuel injector side of the multi-way harness connector. It may be necessary to remove the intake manifold to isolate the condition.

1. If less than the specified range, test the high voltage control and the low voltage control circuit, for a short to ground. If the circuits/connections test normal, test or replace the appropriate fuel injector(s).

14. Test for 1.5-2.5 Ω between the appropriate high voltage control and low voltage control circuit.

1. If less than the specified range, test for a short between the high voltage and low voltage control circuit. If the circuits/connections test normal, test or replace the appropriate fuel injector(s).
2. If greater than the specified range, test the high voltage and low voltage control circuit, for an open/high resistance. If the circuits/connections test normal, test or replace the appropriate fuel injector(s).

Component Testing

1. Remove the intake manifold and disconnect the appropriate fuel injector.
2. Test for 1.5 Ω plus/minus 0.15 Ω at 20°C (68°F) between the high voltage control circuit terminal 2 and the low voltage control circuit terminal 1 at the fuel injector.
 1. If not within the specified range, replace the fuel injector.
3. Measure the resistance between each terminal at the fuel injector and the fuel injector housing/case. The DMM should display OL Ω .
 1. If less than the specified value, replace the fuel injector.

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Fuel Injector Replacement (LLT)
- Control Module References for engine control module replacement, setup, and programming