DTC P0418

Circuit Description

The powertrain control module (PCM) controls the relay by grounding the control circuit via an internal switch called a driver. The primary function of the driver is to supply the ground for the controlled component. Each driver has a fault line which the PCM monitors. When the PCM commands a component ON, the voltage of the control circuit should be low, near 0 volts. When the PCM commands the control circuit to a component OFF, the voltage potential of the circuit should be high, near the battery voltage. If the fault detection circuit senses a voltage other than what the PCM expects, the fault line status changes causing the diagnostic trouble code (DTC) to set.

The relay controls the high current flow to the secondary air injection (AIR) pump and the AIR solenoid. This allows the PCM driver to only have to control the relatively low current used by the relay.

Conditions for Running the DTC

- The engine speed is more than 400 RPM.
- The ignition voltage is between 6-18 volts.

Conditions for Setting the DTC

- The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.
- All of the above conditions are present for a minimum of 5 seconds.

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.

Diagnostic Aids

Important

Remove any debris from the PCM connector surfaces before servicing the PCM. Inspect the PCM connector gaskets when diagnosing or replacing the PCM. Ensure that the gaskets are installed correctly. The gaskets prevent water intrusion into the PCM.

Using Freeze Frame/Failure Records data can help to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame/Failure Records data can help to determine how many miles have occurred since the DTC set. The Fail Counter and the Pass Counter can also help to determine how many ignition cycles have occurred since the diagnostic reported a pass or a fail. Operate the vehicle within the same Freeze Frame conditions that you observed, such as the RPM, the load, the vehicle speed, and the temperature. This procedure will isolate when the DTC failed.

For an intermittent, refer to Intermittent Conditions .

Test Description

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

2. Listen for a click when the relay operates. Command both the ON and OFF states. Repeat the commands as necessary.

3. This test can detect a partially-shorted coil which can cause an excessive current flow. Leaving the circuit energized for 2 minutes allows the coil to warm up. When the coil is warm the coil can open, and the current drops to 0. The coil can short, and the current goes above 0.75 amp.

4. The AIR pump relay is located on the AIR pump assembly.

5. Identify and test the relay coil terminals in order to avoid improper diagnosis.

13. If no trouble is found in the control circuit or the connection at the PCM, the PCM may be faulty. This failure is extremely unlikely.

14. The repair is not complete if the scan tool indicates that the diagnostic ran and failed.

Step	Action	Value (s)	Yes	No
Schematic Reference: Engine Controls Schematics				
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. Command the relay ON and OFF using a scan tool. Does the relay turn ON and OFF when commanded?	--	Go to Step 3	Go to Step 5

3	1. Turn OFF the ignition. 2. Disconnect the PCM connector C2 located opposite the manufacturer's logo. Refer to Powertrain Control Module (PCM) Replacement . 3. Install 5-amp fused jumper wire to the control circuit at the PCM harness connector. 4. Turn ON the ignition, with the engine OFF. **Important** Replace the relay if the DMM goes to 0 during the current draw test. 5. Measure the current from the relay control circuit in the PCM harness connector to ground for 2 minutes using the DMM on 40-amp scale. Does the current draw measure less than the specified value shown?	0.75 A	Go to Diagnostic Aids	Go to Step 4
4	1. Turn OFF the ignition. 2. Disconnect the AIR pump relay. 3. Measure resistance from the relay control circuit in the PCM harness connector to ground using the DMM . Does the DMM display infinite resistance or OL?	--	Go to Step 12	Go to Step 10
5	1. Turn OFF the ignition. 2. Disconnect the relay. 3. Connect the test lamp between the AIR pump relay control circuit and the AIR pump relay ignition feed circuit, on the coil side of the relay, at the AIR pump relay harness connector. 4. Turn ON the ignition, with the engine OFF. 5. Command the relay ON and OFF using a scan tool. Does the test lamp turn ON and OFF when commanded?	--	Go to Step 8	Go to Step 6
6	Probe the ignition feed circuit, located on the coil side of the relay, at the AIR pump relay harness connector with the test lamp connected to ground. Is the test lamp illuminated?	--	Go to Step 7	Go to Step 11
	1. Turn OFF the ignition. 2. Reconnect the relay. 3. Disconnect the PCM connector C2, located			

7	opposite the manufacturer's logo. Refer to Powertrain Control Module (PCM) Replacement . 4. Turn ON the ignition, with the engine OFF. 5. Momentarily probe the relay control circuit in the PCM harness connector with a fused jumper wire connected to ground. Refer to Using Fused Jumper Wires in Wiring Systems. Does the relay turn ON when the circuit is grounded and turn OFF when the circuit is opened?	--	Go to Step 9	Go to Step 10
8	1. Inspect the connections at the relay. Refer to Testing for Intermittent and Poor Connections in Wiring Systems. 2. If you find a poor connection, repair the terminal as necessary. Refer to Connector Repairs in Wiring Systems. Did you find and correct the condition?	--	Go to Step 14	Go to Step 12
9	1. Inspect the connections at the PCM. Refer to Testing for Intermittent and Poor Connections in Wiring Systems. 2. If you find a poor connection, repair the terminal as necessary. Refer to Connector Repairs in Wiring Systems. Did you find and correct the condition?	--	Go to Step 14	Go to Step 13
10	Repair the faulty relay control circuit. Refer to Wiring Repairs in Wiring Systems. Is the action complete?	--	Go to Step 14	--
11	Repair the faulty relay ignition feed circuit. Refer to Wiring Repairs in Wiring Systems. Is the action complete?	--	Go to Step 14	--
12	Replace the relay. Refer to Secondary Air Injection (AIR) Pump Replacement . Is the action complete?	--	Go to Step 14	--
13	Replace the PCM. Refer to Powertrain Control Module (PCM) Replacement . Is the action complete?	--	Go to Step 14	--
	1. Use the scan tool in order to clear the DTCs. 2. Turn the ignition OFF for 30 seconds. 3. Start the engine. 4. Operate the vehicle within the Conditions for			

14	Running the DTC as specified in the supporting text. Does the DTC run and pass?	--	Go to Step 15	Go to Step 2
15	With a scan tool review the Stored Information, Capture Info. Does the scan tool display any DTCs that you have not diagnosed?	--	Go to Diagnostic Trouble Code (DTC) List	System OK

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