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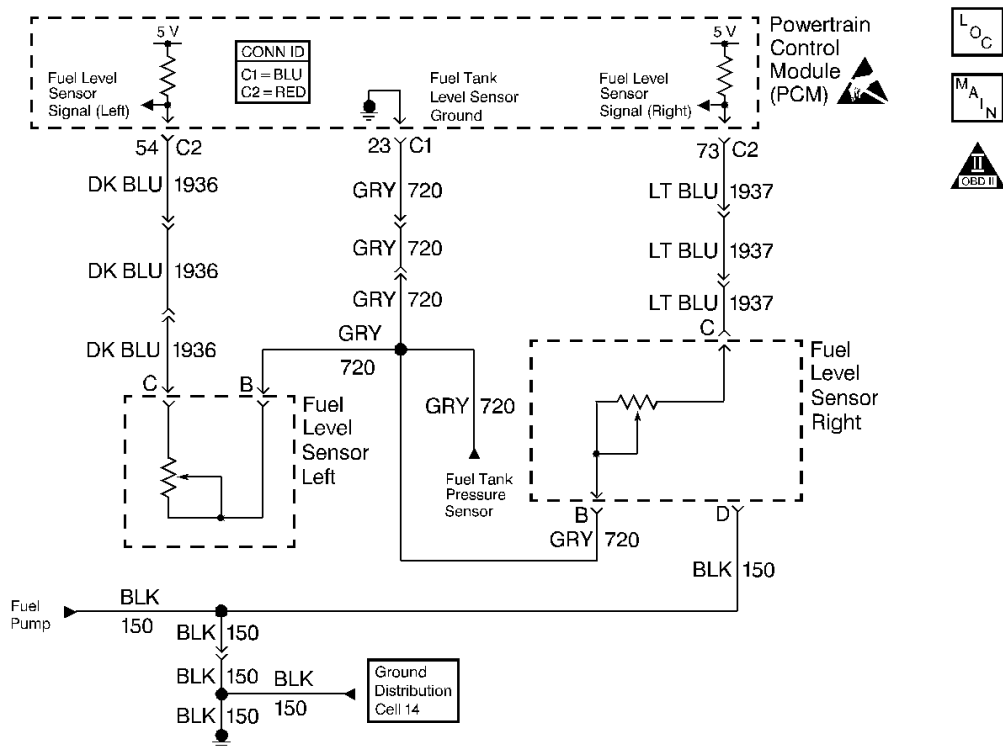
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2000 Chevrolet Corvette

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DTC P1431 Fuel Level Sensor 2 Performance



Circuit Description

The right fuel level sensor 2, mounted in the rear side of the right fuel tank, measures fuel level changes within the right fuel tank. The Fuel Level sensor 2 has a signal and a ground circuit.

When the fuel level is high the sensor signal voltage is high. When the fuel level is low the sensor signal voltage is low.

The PCM uses inputs from the fuel level sensor 1 and the fuel level sensor 2 in order to calculate the total fuel remaining in both fuel tanks. The system sends this information via the serial data to the IPC. This information displays on the fuel gauge.

This diagnostic tests for a stuck fuel level sensor 2 signal. If the PCM determines that the fuel level (right tank) signal appears to be stuck based on a lack of signal variation expected during normal operation, this DTC sets.

The following is a description on how the fuel pump/system functions: An electric high pressure fuel pump attaches to the fuel sender assembly inside the left fuel tank. The in-tank fuel pump supplies fuel through an in pipe fuel filter/pressure regulator assembly to the fuel rail. The fuel pressure supplied by the fuel pump exceeds the fuel injectors required pressure. The fuel pressure regulator, which is part of the fuel filter assembly, regulates the fuel pressure supplied to the fuel injectors. Excess fuel returns from the fuel filter/regulator, through a separate fuel return pipe, to the left fuel tank. The fuel pump delivers a constant flow of fuel to the engine even during low fuel conditions and aggressive vehicle maneuvers. The PCM controls the electric fuel pump operation through a fuel pump relay.

The left tank fuel pump also supplies a small amount of pressurized fuel to the right fuel tank siphon jet pump through the auxiliary fuel feed rear pipe. The pressurized fuel creates a venturi action inside the siphon jet pump. The venturi action causes the fuel to be drawn out of the right fuel tank. Fuel is then transferred from the right fuel tank to the left fuel tank through the auxiliary fuel return rear pipe. The fuel system is designed to maintain a greater level in the left fuel tank than the right fuel tank when the electric fuel pump is operating. The fuel transfer rate from the left fuel tank to the right fuel tank is less than the transfer rate from the right fuel tank to the left fuel tank. Therefore, with the electric fuel pump operating, the left fuel tank level should be higher than the right fuel tank level.

The fuel level in the fuel tanks equalize when the following occur:

- The electric fuel pump is not operating.
- The fuel level is greater than 50 percent.

Conditions for Running the DTC

The engine is operating.

Conditions for Setting the DTC

- The secondary fuel tank is not empty.
- More than 241 km (150 miles) have been accumulated.
- The PCM does not detect that the fuel level in the right fuel tank moved by at least 3.0 liters (0.80 gallons).

OR

- The secondary fuel tank is not empty.
- The primary fuel tank is not full.
- Engine operating greater than 60 minutes.
- The primary tank does not achieve the top of its range. Observe, after operating the engine for greater than 60 minutes the fuel in the right fuel tank will transfer to the left fuel tank.

OR

- The secondary fuel tank is empty.
- The primary fuel tank is full.

- The fuel level in both fuel tanks does not change after traveling more than 284 km (200 miles). Observe, if the secondary fuel tank is empty, the primary fuel level should decrease after 284 km (200 miles).

Action Taken When the DTC Sets

- The PCM stores the DTC information into memory when the diagnostic runs and fails.
- The malfunction indicator lamp (MIL) will not illuminate.
- The PCM records the operating conditions at the time the diagnostic fails. The PCM stores this information in the Failure Records.
- The vehicle fuel gauge displays empty.
- The Check Gauge lamp illuminates.
- The Driver Information Center displays a message.

Conditions for Clearing the DTC

- A last test failed, or current DTC, clears when the diagnostic runs and does not fail.
- A history DTC will clear after 40 consecutive warm-up cycles, if no failures are reported by this or any other non-emission related diagnostic.
- Use a scan tool in order to clear the DTC.

Diagnostic Aids

Important:

- Remove any debris from the PCM connector surfaces before servicing the PCM. Inspect the PCM connector gaskets when diagnosing/replacing the module. Ensure that the gaskets are installed correctly. The gaskets prevent contaminate intrusion into the PCM.
- For any test that requires probing the PCM or a component harness connector, use the Connector Test Adapter Kit [J 35616](#) . Using this kit prevents damage to the harness/component terminals. Refer to [Using Connector Test Adapters](#) in Wiring Systems.

Depending on the current fuel level, it may be difficult to locate a malfunctioning sending unit. The malfunction may only occur when the fuel level is full or near empty. The fuel sending unit may need to be removed for further diagnosis. A fuel level sensor that has an intermittent condition causes this DTC to set. Remove the fuel level sensor. Refer to [Fuel Sender Assembly Replacement](#) in order to test the resistance of the sensor. The resistance of the sensor should change from 40 to 250 ohms. Replace the sensor if the resistance did not change or was out of range.

Important: When inspecting for a deformed or warped fuel tank, measure the resistance of the suspect fuel level sensor at empty, with the sensor in the fuel tank, and again with the sensor removed from the fuel tank. The measured resistance values should be same empty. If the measured resistance values are not the same, refer to [Fuel Tank Replacement](#) in Engine Controls.

The following occurs with this DTC set:

- The vehicle fuel gauge displays empty.

- The Check Gauge lamp illuminates.
- The driver information center (DIC) displays a message.
- The voltages in the Fuel Level Conversion Table are approximate values. Use this table to aid in diagnosis.

Fuel Level Conversion Table		
Approximate Values		
Fuel Level	Left Tank voltage	Right Tank Voltage
100%	2.5V	2.5
75%	2.5V	1.5V
50%	2.5V	Less than 1V
25%	1.7V	Less than 1V
0%	Less than 1V	Less than 1V

- If the fuel level sensor is operating OK, test the operation of the Jet Pump.
- For an intermittent condition, refer to [Symptoms](#).

Test Description

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

2. Use DTC P0461 table if DTCs P0461 and P1431 set.
3. This step determines if a circuit condition is causing the fuel level signal to be at a fixed value.
4. This step determines if a circuit condition is causing the fuel level signal to be at a fixed value.
5. This step determines if fuel is being delivered to the right fuel tank jet pump.

The fuel pump will run for 2 seconds each time it is commanded ON with the scan tool. The fuel pump must be enabled several times to achieve the time specified in the diagnostic table.

6. This step verifies that the left fuel level sender voltage is not above the specified value. If the left fuel level sender voltage is above the specified value, the left fuel tank will have to be drained.
7. Drain the left fuel tank until the left fuel sender voltage is within the specified range in order to keep fuel from leaking from the left fuel tank.
8. This step determines if fuel is being transferred to the left fuel tank.

The fuel pump runs for 2 seconds each time it is commanded ON with the scan tool. The fuel pump must be enabled several times to achieve the time specified in the diagnostic table.

9. Foreign material in the fuel tank may cause the sensor to stick. Inspect the strainer for interfering with the float arm. A stuck sensor may not be apparent when the sensor is removed from the fuel tank. The following may have caused the DTCs to set:

- The fuel tanks over filled.
- Fuel level that is almost empty and then re-fueled with only a couple gallons.
- The Fuel Level sender un-stuck while re-fueling.
- The Fuel Level sender un-stuck on rough road or going around a corner.

18. The PCM will not reset the mileage for this diagnostic if the fuel tanks are re-fueled to the same level as before the repair was made. Perform the following procedure in order to re-fuel the vehicle after replacing a sending unit or fuel tank.

- A. Add 25 percent of the fuel that you removed before the repair.
- B. Start and idle the engine for 5 minutes.
- C. Turn OFF the engine.
- D. Add the remainder of the fuel.

Step	Action	Values	Yes	No
1	Did you perform the Powertrain On-Board Diagnostic (OBD) System Check?	--	Go to Step 2	Go to Powertrain On Board Diagnostic (OBD) System Check
2	Is DTC P0461 also set?	--	Go to DTC P0461 Fuel Level Sensor Performance	Go to Step 3
3	1. Disconnect the right fuel level sensor electrical connector. 2. Jumper the fuel level signal circuit to battery ground. 3. Monitor the right fuel level sensor voltage parameter with a scan tool. Is the right fuel level sensor voltage at the specified value?	0.0V	Go to Step 4	Go to Step 11
4	1. Jumper the fuel level signal circuit and ground circuit together. 2. Monitor the right fuel level sensor voltage parameter with a scan tool. Is the right fuel level sensor voltage at the specified value?	0.0V	Go to Step 5	Go to Step 12
	Caution: Gasoline or gasoline vapors are highly flammable. A fire could occur if an ignition source is present. Never drain or store gasoline or diesel fuel in an open container, due to the possibility of fire or explosion. Have a dry chemical (Class B) fire extinguisher nearby.			

<p>5</p>	<p>1. Monitor the fuel level in the left tank with a scan tool.</p> <p>Important: If the left fuel tank is empty DO NOT add more than 15 liters (4 gallons) of fuel.</p> <p>2. Add fuel if the left fuel tank is empty.</p> <p>3. Disconnect the auxiliary fuel feed rear pipe from the right fuel tank. Refer to Y car fuel system .</p> <p>4. Insert the auxiliary fuel feed rear pipe into an approved gasoline container.</p> <p>5. Command the fuel pump ON for the specified time with a scan tool.</p> <p>6. Measure the volume of fuel.</p> <p>Is the volume of fuel greater than the specified value?</p>	<p>10 seconds</p> <p>300 ml (0.633 pt)</p>	<p>Go to Step 6</p>	<p>Go to Step 13</p>
<p>6</p>	<p>Observe the left fuel level sender voltage with a scan tool.</p> <p>Is the left fuel level sender voltage above the specified value?</p>	<p>1.25V</p>	<p>Go to Step 7</p>	<p>Go to Step 8</p>
<p>7</p>	<p>Drain the left fuel tank until the left fuel sender voltage is within the specified range. Refer to Fuel Tank Draining Procedure .</p> <p>Did you complete the action?</p>	<p>1.0-1.25V</p>	<p>Go to Step 8</p>	<p>--</p>
<p>8</p>	<p>Important: Inspect the auxiliary fuel feed rear pipe if the right fuel tank is empty. Fuel flow to the right fuel tank is decreased during fueling if the crossover hose is collapsed or restricted.</p> <p>1. Connect the auxiliary fuel feed rear pipe to the right fuel tank.</p> <p>2. Disconnect the auxiliary fuel return rear pipe from the left fuel tank. Refer to Y car fuel system .</p> <p>3. Insert the auxiliary fuel return rear pipe into an approved gasoline container.</p> <p>4. Command the fuel pump ON for the specified time with the scan tool.</p> <p>5. Measure the volume of fuel.</p> <p>Is the volume of fuel greater than the specified value?</p>	<p>8 seconds</p> <p>332.6 ml (0.703 pt)</p>	<p>Go to Step 9</p>	<p>Go to Step 14</p>
	<p>1. Remove the right tank fuel level sensor.</p>			

9	<p>Refer to Fuel Sender Assembly Replacement .</p> <p>2. Inspect for the following:</p> <ul style="list-style-type: none"> - A stuck Fuel Level sensor (i.e. the fuel strainer interfering with the sender float arm) - Fuel tank deformed - Foreign material in the fuel tank (ice) <p>Did you find and correct the condition?</p>	--		<p>Go to Step 18</p> <p>Go to Step 10</p>
10	<p>1. Connect the DMM between the fuel level sensor signal circuit and the fuel level sensor ground circuit (sensor side).</p> <p>2. Set the DMM to the 400ohms range.</p> <p>3. Sweep the fuel level sensor from stop to stop.</p> <p>Does the resistance vary between the specified values?</p>	<p>40ohms (±1ohms) to 250ohms (±2.4ohms)</p>	<p>Go to Diagnostic Aids</p>	<p>Go to Step 15</p>
11	<p>1. Disconnect the PCM connector C2 located on the opposite side of the manufacturer's logo. Refer to Powertrain Control Module (PCM) Replacement .</p> <p>2. Test the right tank fuel level signal circuit for high resistance.</p> <p>3. If you find a condition, repair the condition as necessary. Refer to Wiring Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	--		<p>Go to Step 18</p> <p>Go to Step 16</p>
12	<p>1. Disconnect the PCM connector C1 located on the same side as the manufacturer's logo. Refer to Powertrain Control Module (PCM) Replacement .</p> <p>2. Test the right tank fuel level ground circuit for an open or for high resistance.</p> <p>3. If you find a condition, repair the condition as necessary. Refer to Wiring Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	--		<p>Go to Step 18</p> <p>Go to Step 16</p>
13	<p>Inspect the auxiliary fuel feed rear pipe for restrictions and repair as necessary.</p> <p>Is the action complete?</p>	--		<p>Go to Step 18</p> <p>--</p>
	<p>Inspect the auxiliary fuel return rear pipe for</p>			

14	restrictions and repair as necessary. Did you find and correct the condition?	--	Go to Step 18	Go to Step 15
15	Replace the right tank fuel level sensor. Refer to Fuel Sender Assembly Replacement . Is the action complete?	--	Go to Step 18	--
16	1. Inspect for a poor connection at the PCM. Refer to Testing for Intermittent Conditions and Poor Connections in Wiring Systems. 2. If you find a poor connection, repair as necessary. Refer to Repairing Connector Terminals in Wiring Systems. Did you find and correct the condition?	--	Go to Step 18	Go to Step 17
17	Important: Program the replacement PCM. Replace the PCM. Refer to Powertrain Control Module (PCM) Replacement . Is the action complete?	--	Go to Step 18	--
18	1. Select the Diagnostic Trouble Code (DTC) option and the Clear Information option with the scan tool. 2. Start the engine and idle at the normal operating temperature. 3. Select the Diagnostic Trouble Code (DTC) option and the Specific DTC option, then enter the DTC number with the scan tool. 4. Operate vehicle within the Conditions for Running this DTC as specified in the supporting text, if applicable. Does the scan tool indicate that this test ran and passed?	--	Go to Step 19	Go to Step 2
19	Select the Capture Info option and the Review Info option with the scan tool. Are any DTCs displayed that have not been diagnosed?	--	Go to Applicable DTC Table	System OK