

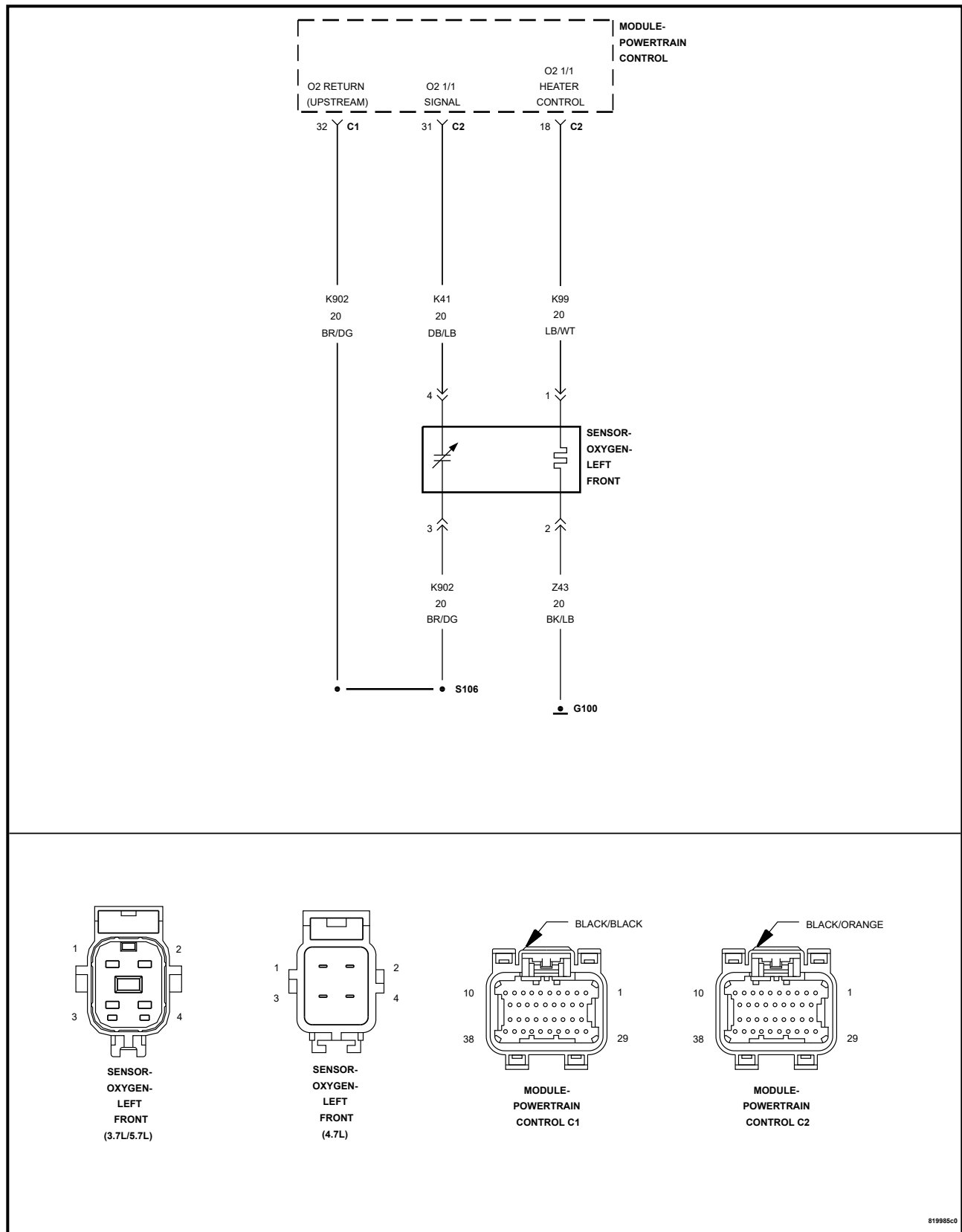
28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM), NGC/Diagnosis and Testing

P0032-O2 SENSOR 1/1 HEATER CIRCUIT HIGH

 **Special Tools:** Click to hide the list of tools used in this procedure

[Click here to launch the form to order any tools you need.](#)

	8815A - Kit, NGC, 38 Position Originally Shipped In Kit Number(s) 8718, 8718CC, 8815A.
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For a complete wiring diagram, **refer to the Wiring Information.**

- **When Monitored:**

Continuously during O2 heater operation with battery voltage between 10.4 and 15.75 Volts.

- **Set Condition:**

The Powertrain Control Module (PCM) detects the O2 sensor heater element input is above the maximum acceptable voltage. One trip fault. Three good trips to turn off the Malfunction Indicator Lamp (MIL).

Possible Causes

(K99) O2 1/1 HEATER CONTROL CIRCUIT OPEN
(Z43) O2 1/1 HEATER GROUND CIRCUIT OPEN
(K99) O2 1/1 HEATER CONTROL CIRCUIT SHORTED TO VOLTAGE
1/1 O2 SENSOR
POWERTRAIN CONTROL MODULE (PCM)

Always perform the Pre-Diagnostic Troubleshooting procedure before proceeding. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

1. ACTIVE DTC

WARNING:

When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts, or fan. Do not wear loose clothing. Failure to follow these instructions can result possible serious or fatal injury.

NOTE: If P0688-AUTO SHUTDOWN RELAY SENSE CIRCUIT LOW has set along with any of the O2 SENSOR HEATER CIRCUIT HIGH DTCs, all of the O2 Sensor Heater Control circuits need to be checked for a short to battery voltage.

1. Start the engine and allow it to idle for at least 60 seconds.
2. With the scan tool, select View DTCs.

Is the DTC Active at this time?

Yes

- Go To **2**

No

- Refer to the INTERMITTENT CONDITION Diagnostic Procedure. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

2. O2 HEATER ELEMENT

1. Turn the ignition off.

NOTE: Allow the O2 Sensor to cool down to room temperature.

2. Disconnect the 1/1 O2 Sensor harness connector.
3. Measure the resistance across the O2 Sensor Heater element between the O2 Heater Control terminal and the O2 Heater ground terminal at the component.

NOTE: O2 Heater Element resistance values should be measured at 21.1° C (70° F). The resistance value will vary with different temperature values.

Is the O2 Sensor Heater Element resistance between 2.0 and 30.0 ohms?

Yes

- Go To **3**

No

- Replace the O2 Sensor. (Refer to 14 - Fuel System/Fuel Injection/SENSOR, Oxygen - Removal) .
- Perform the POWERTRAIN VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

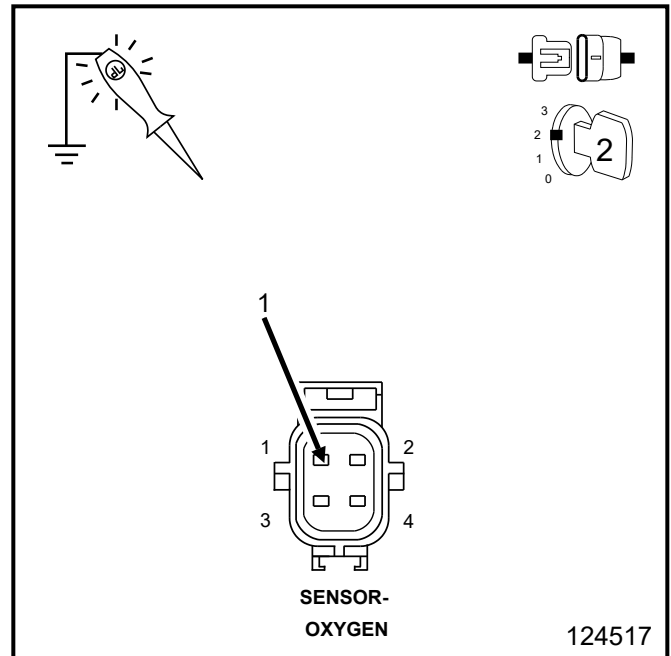
3.(K99) O2 1/1 HEATER CONTROL CIRCUIT

1. Ignition on, engine not running.
2. Using a 12 Volt test light connected to ground, probe the (K99) O2 1/1 Heater Control circuit in the O2 Sensor harness connector.

NOTE: The DTC needs to be cleared before actuating the Heater Test, if the DTC is not cleared, the Heater Test may not be allowed to actuate.

3. With the scan tool, actuate the O2 1/1 Heater Test with the Sensorharness connector still disconnected.

NOTE: The test light should be illuminated and bright proportional to the maximum duty cycle allowed by the scan tool. For example, if the scan tool allows 100% actuation, the brightness should be as bright as a direct connection to the battery. If the scan tool allows a maximum 25% actuation, the brightness should be 25% as bright as a direct connection to the battery.



Does the test light illuminate brightly and flash on and off during the actuation?

Yes

- Go To **4**

No

- Go To **5**

4.(Z43) O2 HEATER GROUND CIRCUIT OPEN

1. Turn the ignition off.
2. Measure the resistance between an engine ground and the (Z43) O2 1/1 Heater ground circuit in the O2 Sensor harness connector.

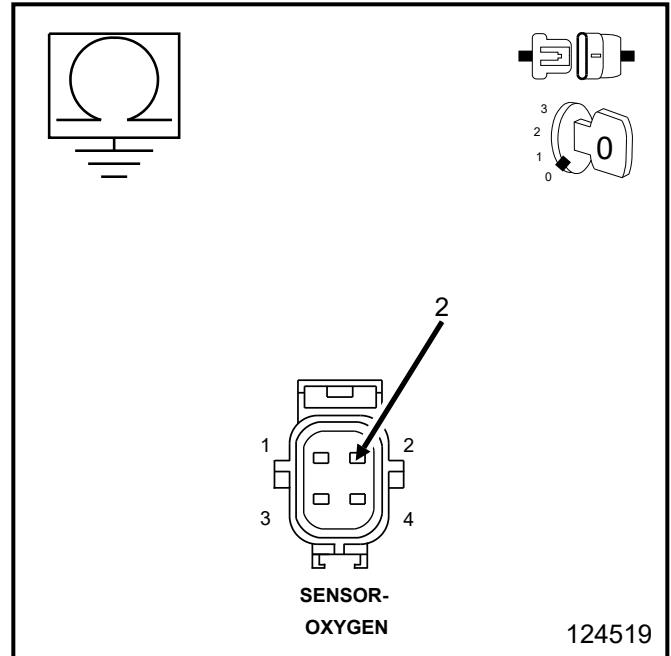
Is the resistance below 5.0 ohms?

Yes

- Replace the O2 Sensor. (Refer to 14 - Fuel System/Fuel Injection/SENSOR, Oxygen - Removal) .
- Perform the POWERTRAIN VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

No

- Repair the open in the (Z43) O2 1/1 Heater ground circuit.
- Perform the POWERTRAIN VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).



5.(K99) O2 1/1 HEATER CONTROL CIRCUIT SHORTED TO VOLTAGE

1. Turn the ignition off.
2. Disconnect the C2 PCM harnessconnector.
3. Ignition on, engine not running.
4. Measure the voltage of the (K99) O2 1/1 Heater Control circuit in the 1/1 Oxygen Sensor harness connector.

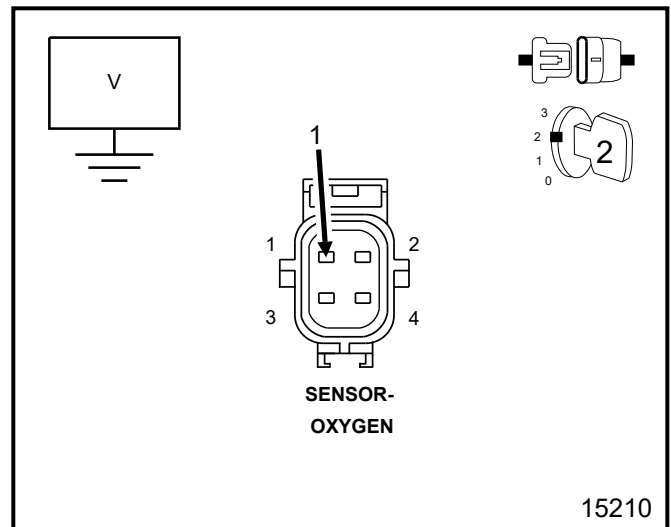
Is there any voltage present?

Yes

- Repair the short to voltage in the (K99) O2 1/1 Heater Control circuit.
- Perform the POWERTRAIN VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

No

- Go To 6



6.(K99) O2 1/1 HEATER CONTROL CIRCUIT OPEN

1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install the PCM Pinout Box Kit, NGC, 38 Position 8815A to perform diagnosis.

2. Measure the resistance of the (K99) O2 1/1 Heater Control circuit from the O2 Sensor harness connector to the appropriate terminal of special tool # 8815A .

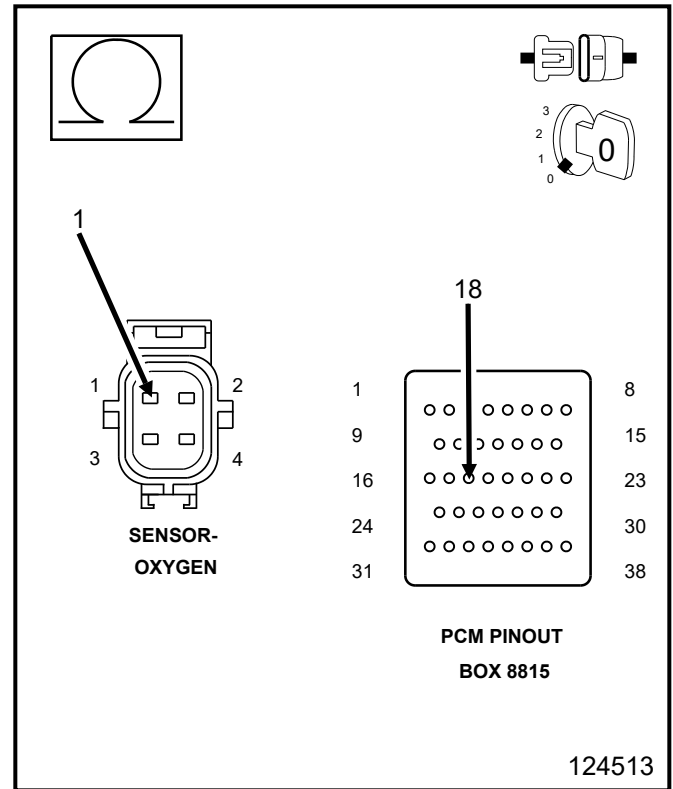
Is the resistance below 5.0 ohms?

Yes

- Go To **7**

No

- Repair the open in the (K99) O2 1/1 Heater Control circuit.
- Perform the POWERTRAIN VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).



7. POWERTRAIN CONTROL MODULE (PCM)

1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Oxygen Sensor 1/1 and the Powertrain Control Module (PCM).
2. Look for any chafed, pierced, pinched, or partially broken wires.
3. Look for broken, bent, pushed out or corroded terminals. Verify there is good pin to terminal contact in the 1/1 O2 Sensor and Powertrain Control Module connectors.
4. Refer to any Technical Service Bulletins (TSBs) that may apply.

Were there any problems found?

Yes

- Repair as necessary.
- Perform the POWERTRAIN VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

No

- Replace and program the Powertrain Control Module in accordance with the Service Information.
- Perform the POWERTRAIN VERIFICATION TEST. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).