

P0531, P0532, or P0533 the A/C refrigerant pressure sensor

Circuit Description

The following DTCs are for the A/C refrigerant pressure sensor:

- DTC P0531 – A/C refrigerant pressure sensor performance
- DTC P0532 – A/C refrigerant pressure sensor circuit low voltage
- DTC P0533 – A/C refrigerant pressure sensor circuit high voltage

The engine control module (ECM) monitors the high side refrigerant pressure through an A/C refrigerant pressure sensor. When the pressure is high the signal voltage is high. When the pressure is low, the signal voltage is low. When the pressure is high, the ECM commands the cooling fans ON. When the pressure is too high or too low, the ECM will not allow the A/C compressor clutch to engage.

Conditions for Running the DTC

- The engine is running.
- A/C OFF when DTC P0531 is set.

Conditions for Setting the DTC

DTC P0531: The ECM detects the A/C pressure signal circuit is more than 4.5 volts for 4 minutes.

DTC P0532: The ECM detects an A/C pressure of less than 0.1 volt for 1.6 seconds.

DTC P0533: The ECM detects an A/C pressure of more than 4.9 volts for 1.6 seconds.

Action Taken When the DTC Sets

- The ECM will not illuminate the malfunction indicator lamp (MIL).
- The ECM stores the failure records.
- The A/C compressor clutch is disabled.
- SERVICE A/C SYSTEM displays on the DIC.
- A/C OFF displays on the HVAC control module.

- The A/C compressor clutch will not be disabled if only DTC P0531 is set.

Conditions for Clearing the DTC

- The ECM will not store failure records if only DTC P0531 is set.
- The DTC will become history if the ECM no longer detects a failure.
- The history DTC will clear after 40 fault-free ignition cycles.
- Clear the DTC with a scan tool then cycle the ignition.

Diagnostic Aids

If the condition is not present, refer to Testing for Intermittent and Poor Connections on page 8-1187 in Wiring Systems.

Test Description

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

4. Tests for the proper operation of the circuit in the low voltage range.
5. Tests for the proper operation of the circuit in the high voltage range. If the fuse in the jumper opens when you perform this test, the signal circuit is shorted to ground.
6. Tests for a short to voltage in the 5-volt reference circuit.
7. Tests for a high resistance or an open in the low reference circuit.
16. Perform the recalibration procedure for the engine control module.

| Step | Action | Values | Yes | No |
|--|---|--------|--------------|--|
| Schematic Reference: HVAC Schematics on page 1-150 Connector End View Reference: HVAC Connector End Views on page 1-161 | | | | |
| 1 | Did you perform the HVAC Diagnostic System Check? | — | Go to Step 2 | Go to Diagnostic System Check - HVAC Systems - Automatic on page 1-167 |

| Step | Action | Values | Yes | No |
|------|---|----------------|---|---------------|
| 2 | <p>Important: The ambient air temperature must be above 3°C (38°F).</p> <ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Inspect the A/C compressor for free rotation operation. 3. Start the engine. 4. Place the HVAC Control Module in the OFF position. <p>Does the A/C compressor operate?</p> | — | Go to HVAC Compressor Clutch Does Not Disengage | Go to Step 3 |
| 3 | <ol style="list-style-type: none"> 1. Install a scan tool. 2. Start the engine. 3. Run the engine with the engine OFF for 4 minutes. 4. With the scan tool, observe the A/C High Side Pressure parameter in the Engine control module, Data list. <p>Does the scan tool indicate that the A/C High Side Pressure parameter is within the specified range?</p> | 0.09–4.50 V | Go to Diagnostic Aids | Go to Step 4 |
| 4 | <ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the A/C Refrigerant Pressure Sensor. 3. Turn ON the ignition, with the engine OFF. 4. With a scan tool, observe the A/C High Side Pressure parameter. <p>Does the scan tool indicate that the A/C High Side Pressure parameter is less than the specified value?</p> | 0.09 V | Go to Step 5 | Go to Step 11 |
| 5 | <ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. With a test lamp connected to a battery positive, probe the low reference circuit of the A/C refrigerant pressure sensor connector. <p>Does the test lamp illuminate?</p> | — | Go to Step 6 | Go to Step 9 |

| Step | Action | Values | Yes | No |
|------|--|--------|---------------|---------------|
| 6 | <p>1. Disconnect the fused jumper wire.</p> <p>2. Measure the voltage between the 5-volt reference circuit of the A/C refrigerant pressure sensor and the low reference circuit of the A/C refrigerant pressure sensor.</p> <p>Does the voltage measure less than the specified value?</p> | 5.1 V | Go to Step 7 | Go to Step 8 |
| 7 | <p>1. Turn OFF the ignition.</p> <p>2. Disconnect the negative battery cable.</p> <p>3. Measure the resistance from the low reference circuit of the A/C refrigerant pressure sensor to a good ground.</p> <p>Does the resistance measure less than the specified value?</p> | 5 W | Go to Step 13 | Go to Step 12 |
| 8 | <p>Test the 5-volt reference circuit of the A/C refrigerant pressure sensor for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p> | — | Go to Step 17 | Go to Step 14 |
| 9 | <p>Test the 5-volt reference circuit of the A/C refrigerant pressure sensor for a short to ground, a high resistance, or an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?</p> | — | Go to Step 17 | Go to Step 10 |

| Step | Action | Values | Yes | No |
|------|--|--------|---------------|---------------|
| 10 | Test the signal circuit of the A/C refrigerant pressure sensor for a short to ground, a high resistance, or an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition? | — | Go to Step 17 | Go to Step 14 |
| 11 | Test the signal circuit of the A/C refrigerant pressure sensor for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition? | — | Go to Step 17 | Go to Step 14 |
| 12 | 1. Disconnect the engine control module. 2. Test the low reference circuit of the A/C refrigerant pressure sensor for a high resistance or an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition? | — | Go to Step 17 | Go to Step 14 |
| 13 | Inspect for poor connections at the harness connector of the A/C refrigerant pressure sensor. Refer to Testing for Intermittent and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition? | — | Go to Step 17 | Go to Step 15 |
| 14 | Inspect for poor connections at the harness connector of the engine control module. Refer to Testing for Intermittent and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition? | — | Go to Step 17 | Go to Step 16 |

| Step | Action | Values | Yes | No |
|------|---|--------|---------------|-----------|
| 15 | Replace the A/C refrigerant pressure sensor. Refer to Air Conditioning (A/C) Refrigerant Pressure Sensor Replacement in Heating, Ventilation, and Air Conditioning. Did you complete the replacement? | — | Go to Step 17 | — |
| 16 | Replace the engine control module (ECM). Refer to Engine Control Module (ECM) Replacement in Engine Controls-3.6L (LY7) or Engine Control Module (ECM) Replacement in Engine Controls-4.6L (LH2). Did you complete the replacement? | — | Go to Step 17 | — |
| 17 | 1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset? | — | Go to Step 2 | System OK |