

GENERIC · POWERTRAIN

P0640

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P0640

Intake Air Heater Control Circuit

P0640 indicates that the engine control module (ECM) has detected a fault in the electrical circuit controlling the intake air heater, which is a grid or element that warms incoming air on certain diesel engines to aid cold starting and reduce white smoke. The ECM monitors the circuit for expected voltage or current and sets the code when the signal falls outside the normal range, often due to an open circuit, short, or failed heater element.

SYSTEM

Powertrain

CODE TYPE

Generic (all makes)

SEVERITY

Low

FIX DIFFICULTY

Intermediate

AREA

Computer and output circuits

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- Hard starting or rough idle when the engine is cold, especially in low ambient temperatures
- Excessive white smoke from the exhaust after a cold start
- Reduced engine performance or poor fuel economy during warm-up
- In rare cases, a no-start condition in very cold weather if the heater is completely inoperative

Common causes, most likely first

- 1 Failed intake air heater element (open or shorted internally)
- 2 Damaged or corroded wiring harness or connector at the heater
- 3 Blown fuse or faulty relay in the intake air heater circuit
- 4 Poor ground connection for the heater circuit
- 5 Faulty intake air temperature sensor providing incorrect data to the ECM
- 6 ECM internal driver failure (less common)

How to diagnose and fix it

- 1 Scan all modules for stored codes and freeze-frame data to confirm P0640 is active and not history
- 2 Visually inspect the intake air heater, its connectors, and wiring for damage, corrosion, or loose connections
- 3 Check the fuse and relay associated with the intake air heater circuit and replace if faulty
- 4 Measure resistance of the heater element with a multimeter and compare to manufacturer specifications
- 5 Test for voltage and ground at the heater connector with the key on and during commanded heater activation
- 6 Perform a voltage drop test on the power and ground circuits to identify excessive resistance
- 7 If all external circuits test good, follow the diagnostic flow chart to test the ECM driver or command the heater on with a scan tool and observe current draw



Intake Air Heater Circuit Quirks

- Many vehicles set P0640 only in cold ambient temperatures when the ECM commands the heater on, so the code may not reappear in warm weather and can be mistaken for a intermittent fault.
- A failed intake air heater often does not affect driveability in mild climates, leading owners to ignore the code until winter starting problems appear.
- Corrosion inside the heater connector pins is a frequent cause that can mimic a failed heater element, so always inspect connectors before replacing parts.
- The intake air heater circuit is sometimes confused with the glow plug circuit, but they are separate systems; P0640 does not indicate glow plug faults.
- On some vehicles, a weak battery or charging system fault can cause the ECM to disable the heater and set P0640 as a secondary code, so check system voltage first.

Can I keep driving with P0640?

You can generally continue driving with P0640, but cold-start performance and emissions may be affected, and in freezing conditions the engine may be harder to start. Avoid extended driving in very cold weather without addressing the fault, and have the circuit inspected before winter.

Tools that help

- OBD-II scan tool with live data and bidirectional control
- Digital multimeter
- Test light
- Wiring diagram for the intake air heater circuit
- Basic hand tools (sockets, screwdrivers, pliers)

Reading P0640

P	Powertrain: engine, transmission and emissions.
0	Generic (SAE) code: it means the same thing on every OBD-II vehicle.
6	Computer and output circuits.
40	The exact fault within that area.

Often seen with

P0113 Intake Air Temperature Circuit High Input · **P0380** Glow Plug/Heater Circuit A Malfunction · **P0540** Intake Air Heater 'A' Circuit · **P0641** Sensor Reference Voltage 'A' Circuit/Open · **P2609** Intake Air Heater System Performance



See it working

Watch the animated explainer [How Variable Valve Timing Works: Cam Phaser and VVT Solenoid](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p0640/>

