

GENERIC · POWERTRAIN

P0540

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P0540

Intake Air Heater 'A' Circuit

P0540 indicates that the engine control module (ECM) has detected a fault in the electrical circuit for intake air heater 'A', which is used on diesel engines to warm incoming air for easier cold starts and reduced white smoke. The ECM monitors the heater circuit for expected voltage or current and sets this code when the signal falls outside the programmed range.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Generic (all makes)	Low	Intermediate	Vehicle speed, idle control and auxiliary inputs

Symptoms you may notice

- Illuminated check engine light, often with no other noticeable symptoms
- Hard starting or rough idle when the engine is cold
- Excessive white smoke from the exhaust after a cold start
- Reduced engine performance or hesitation during warm-up
- Possible heater circuit-related fuse blowing repeatedly

Common causes, most likely first

- 1 Failed intake air heater element (open or shorted)
- 2 Damaged or corroded wiring and connectors in the heater circuit
- 3 Blown fuse or faulty relay supplying power to the heater
- 4 Faulty intake air temperature sensor giving incorrect readings
- 5 Engine control module (ECM) internal fault or software issue
- 6 Poor ground connection for the heater circuit

How to diagnose and fix it

- 1 Scan all modules for stored codes and freeze-frame data to confirm P0540 is active.
- 2 Visually inspect the intake air heater, its connectors, and wiring for damage or corrosion.
- 3 Check the heater circuit fuse and relay, and test for power and ground at the heater connector.
- 4 Measure the resistance of the intake air heater element and compare to specifications.
- 5 Test the intake air temperature sensor signal for accuracy and replace if out of range.
- 6 Repair or replace any damaged wiring, connectors, or the heater element as needed.
- 7 Clear codes and perform a road test to verify the repair and ensure the code does not return.



Intake heater faults that mislead technicians

- A failed intake air heater often causes no driveability symptoms in warm weather, so the code may be ignored until cold-start problems appear.
- Corroded ground connections at the heater can mimic a failed heater element, leading to unnecessary replacement.
- Some vehicles use the intake air heater for emissions control during regeneration, so a fault can affect diesel particulate filter (DPF) performance.
- A weak battery or charging system can cause voltage drops that trigger P0540 without any fault in the heater circuit itself.
- Aftermarket accessories wired into the heater circuit can introduce resistance and set this code intermittently.

Can I keep driving with P0540?

You can generally continue driving with P0540, but cold-start performance and emissions may be affected. Avoid prolonged driving with the check engine light on and address the fault before winter or if you notice hard starting or excessive smoke.

Tools that help

- OBD-II scan tool
- Digital multimeter
- Test light
- Wiring diagram for the vehicle
- Basic hand tools

Reading P0540

P	Powertrain: engine, transmission and emissions.
0	Generic (SAE) code: it means the same thing on every OBD-II vehicle.
5	Vehicle speed, idle control and auxiliary inputs.
40	The exact fault within that area.

Often seen with

P0113 Intake Air Temperature Circuit High Input · **P0380** Glow Plug/Heater Circuit A Malfunction · **P0541** Intake Air Heater 'A' Circuit Low · **P0542** Intake Air Heater 'A' Circuit High · **P0543** Intake Air Heater 'A' Circuit Open



See it working

Watch the animated explainer [How a Gyroscope Works: Gimbals and Precession](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p0540/>

