

GENERIC · POWERTRAIN

P0509

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P0509

Idle Air Control System Circuit High

P0509 means the engine computer has detected an abnormally high voltage on the idle air control (IAC) circuit, which usually points to an open circuit, a short to voltage, or a failed IAC valve. The computer commands a certain idle speed but sees the feedback signal stuck high, so it cannot trust the idle control system.

SYSTEM

Powertrain

CODE TYPE

Generic (all makes)

SEVERITY

Medium

FIX DIFFICULTY

Intermediate

AREA

Vehicle speed, idle control and auxiliary inputs

Symptoms you may notice

- Often no symptoms besides the warning light, especially if the idle speed still feels normal
- Rough or fluctuating idle, sometimes surging up and down
- Engine stalls when you come to a stop or when the throttle is released
- Idle speed too high or too low compared with the normal hot idle
- Hard starting or stalling right after startup in cold weather
- Check engine light on with no other obvious driveability complaint

Common causes, most likely first

- 1 Open or broken wire in the IAC valve circuit, including a corroded or disconnected connector
- 2 Short to voltage on the IAC signal wire, often from chafed insulation near the throttle body
- 3 Failed idle air control valve with an open or shorted internal coil
- 4 Dirty or carbon-fouled IAC valve pintle or passage causing the valve to stick
- 5 Poor electrical connection at the IAC valve or engine computer harness
- 6 Faulty engine computer driver for the IAC circuit, though this is less common
- 7 Aftermarket or incorrect IAC valve installed previously that does not match the computer's expected resistance



How to diagnose and fix it

- 1 Scan all modules for stored and pending codes, then clear codes and verify whether P0509 returns immediately or only after a drive cycle
- 2 Inspect the IAC valve connector and wiring for corrosion, loose pins, chafing, or a short to voltage, and repair as needed
- 3 Measure resistance across the IAC valve terminals and compare with the manufacturer's specification to check for an open or shorted coil
- 4 Remove the IAC valve and inspect the pintle and passage for carbon buildup, then clean or replace the valve if it is sticking or out of spec
- 5 Back-probe the IAC circuit at the computer and check for the commanded voltage or duty cycle while the engine idles, looking for a stuck-high signal
- 6 Check for a short to voltage on the signal wire by wiggle-testing the harness while watching live data for the IAC command
- 7 If wiring and valve test good but the code persists, test the engine computer driver circuit or substitute a known-good computer only after all other steps

What a high IAC voltage really tells you

- A high voltage on the IAC circuit often means the computer is seeing an open circuit rather than a short, because many IAC drivers pull the signal up when the valve coil is disconnected.
- Carbon buildup on the IAC pintle can cause the valve to stick and set a high-voltage code even though the electrical circuit tests fine when the valve is cold.
- A short to voltage on the IAC signal wire can be intermittent and only appear when the engine harness moves under acceleration or over bumps, so wiggle-testing is essential.
- Some vehicles set P0509 when the IAC valve is unplugged during a repair and the code is not cleared afterward, so always check for recent service history before replacing parts.
- The engine computer may command a high IAC voltage during deceleration or after a cold start, so a scan tool live data graph is more useful than a simple voltage measurement.

Can I keep driving with P0509?

You can usually drive the car to a repair shop, but avoid long trips and be ready for stalling when you stop, which can be dangerous in traffic. If the engine stalls repeatedly or the idle is very unstable, stop driving and have it diagnosed.



Tools that help

- OBD-II scan tool with live data capability
- Digital multimeter
- Wire piercing probes or back-probe kit
- Basic hand tools for removing the IAC valve
- Carburetor or throttle body cleaner
- Manufacturer service information for IAC resistance specifications

Reading P0509

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.
09	The exact fault within that area.

Often seen with

P0505 Idle Control System Malfunction · **P0506** Idle Control System RPM Lower Than Expected · **P0507** Idle Control System RPM Higher Than Expected · **P0508** Idle Air Control System Circuit Low · **P0510** Closed Throttle Position Switch Malfunction

See it working

Watch the animated explainer [EV Powertrain Trainer: How an Electric Car Drives](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p0509/>

