

GENERIC · POWERTRAIN

P009A

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P009A

Intake Air Temperature/Ambient Air Temperature Correlation

P009A indicates that the powertrain control module (PCM) has detected a mismatch between the intake air temperature (IAT) sensor and the ambient air temperature (AAT) sensor readings after the engine has been off long enough for both to equalize. The computer expects these two temperatures to be nearly identical during a cold start, and it sets this code when the difference exceeds a calibrated threshold.

SYSTEM

Powertrain

CODE TYPE

Generic (all makes)

SEVERITY

Low

FIX DIFFICULTY

Intermediate

AREA

Fuel and air metering and auxiliary emission controls

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- Rough idle or hesitation during the first few minutes after a cold start
- Poor fuel economy or slightly reduced engine performance
- Erratic or inaccurate outside temperature display on the dashboard
- Hard starting or stalling when the engine is cold in extreme cases
- No drivability issues at all, with the code found only during a scan

Common causes, most likely first

- 1 Faulty intake air temperature (IAT) sensor or its wiring connector
- 2 Faulty ambient air temperature (AAT) sensor or its wiring
- 3 Corroded, chafed, or open wiring in the IAT or AAT sensor circuits
- 4 A dirty or contaminated IAT sensor element causing a biased reading
- 5 A PCM software calibration issue or internal fault in the temperature input circuit
- 6 Aftermarket air intake or sensor replacement that does not match factory calibration
- 7 Extreme underhood heat soak affecting the IAT sensor after shutdown



How to diagnose and fix it

- 1 Use an OBD-II scan tool to read live IAT and AAT values after an overnight cold soak and compare them with a known-good thermometer.
- 2 Visually inspect the IAT and AAT sensors, connectors, and wiring for damage, corrosion, or loose pins.
- 3 Check the resistance of each sensor with a multimeter and compare it to the manufacturer's temperature-resistance chart.
- 4 Perform a voltage drop test on the sensor signal and ground circuits to rule out wiring resistance.
- 5 Verify that the air intake system is stock and that the correct sensors are installed.
- 6 If the sensors and wiring test good, check for a PCM calibration update or reflash from the dealer.
- 7 Clear the code and perform a cold-start drive cycle to confirm the repair before returning the vehicle.

Why a cold soak is critical for P009A

- This code only sets after a true cold soak, so clearing it and immediately test-driving will not reproduce the fault; the vehicle must sit for several hours with the engine off.
A common misdiagnosis is replacing the IAT sensor when the actual problem is the ambient temperature sensor mounted in the front bumper or mirror, which is often damaged in minor collisions.
- Aftermarket air intakes frequently cause this code because the new IAT sensor location reads hotter than the factory design intended, even when both sensors are functioning correctly.
- A weak battery or poor ground can cause the PCM to lose its learned ambient temperature value, leading to a false correlation fault on the next cold start.
Some vehicles use a shared reference voltage for both sensors, so a short in one circuit can pull down the other reading and set P009A without either sensor being faulty.

Can I keep driving with P009A?

The vehicle is safe to drive with P009A because the fault mainly affects cold-start fuel calculations and does not cause a dangerous condition. Avoid heavy acceleration or towing until the code is repaired, and address it promptly to prevent long-term fuel trim issues or catalytic converter damage.

Tools that help

- OBD-II scan tool with live data capability
- Digital multimeter with temperature probe
- Infrared thermometer
- Wiring diagram for the IAT and AAT circuits
- Basic hand tools for sensor and connector access



Reading P009A

- P** Powertrain: engine, transmission and emissions.
- 0** Generic (SAE) code: it means the same thing on every OBD-II vehicle.
- 0** Fuel and air metering and auxiliary emission controls.
- 9A** The exact fault within that area.

Often seen with

P0071 Ambient Air Temperature Sensor Range/Performance · **P0095** Intake Air Temperature Sensor 2 Circuit · **P0096** Intake Air Temperature Sensor 2 Circuit Range/Performance · **P0097** Intake Air Temperature Sensor 2 Circuit Low · **P0098** Intake Air Temperature Sensor 2 Circuit High

See it working

Watch the animated explainer [How a Rotary Engine Works: Wankel in X-Ray](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p009a/>

