

GENERIC · POWERTRAIN

# P0111

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

## P0111

### Intake Air Temperature Circuit Range/Performance

P0111 means the engine computer has determined that the intake air temperature (IAT) sensor signal is outside the range of plausible values for the current operating conditions, or that the signal is not changing as expected. The computer compares the IAT reading against a model of what the temperature should be based on engine coolant temperature, run time, and ambient conditions, and flags the code when the correlation fails.

| SYSTEM     | CODE TYPE           | SEVERITY | FIX DIFFICULTY | AREA                  |
|------------|---------------------|----------|----------------|-----------------------|
| Powertrain | Generic (all makes) | Low      | Intermediate   | Fuel and air metering |

### Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- Rough idle or hesitation when the engine is cold, because the computer may be using a default intake air temperature
- Poor fuel economy or slightly elevated emissions due to incorrect air density calculations
- In rare cases, a no-start condition or stalling if the sensor signal is shorted or open
- Erratic operation of the intake air temperature gauge or display, if the vehicle has one

### Common causes, most likely first

- 1 Faulty intake air temperature sensor that is biased or intermittent
- 2 Damaged or corroded wiring or connector at the IAT sensor
- 3 Intake air temperature sensor signal circuit shorted to ground or to voltage
- 4 Open circuit in the IAT sensor signal or ground circuit
- 5 Contamination or physical damage to the sensor element from oil, dirt, or debris
- 6 A problem with the mass airflow sensor (MAF) that incorporates the IAT sensor, if combined
- 7 Extreme ambient temperature conditions that briefly exceed the sensor's expected range, though this usually sets a different code



## How to diagnose and fix it

- 1 Connect a scan tool and record the IAT sensor reading with the key on, engine off, and compare it to ambient temperature; a reading that is far off indicates a sensor or circuit problem.
- 2 Inspect the IAT sensor and its connector for corrosion, loose pins, or damaged wiring, and repair as needed.
- 3 Backprobe the sensor signal and ground circuits to check for reference voltage and continuity, looking for opens or shorts.
- 4 Remove the IAT sensor and inspect the element for contamination or damage; clean or replace if necessary.
- 5 If the sensor is integrated into the mass airflow sensor, test the MAF sensor output and replace the assembly if faulty.
- 6 Clear the diagnostic trouble codes and perform a road test to verify the repair, ensuring the IAT reading changes realistically as the engine warms up.

## What the IAT correlation test really checks

- The computer does not simply check for an open or short circuit; it compares the IAT signal to a model based on coolant temperature and run time, so a sensor that reads plausibly but slowly drifts can still set P0111.
- A common misdiagnosis is replacing the IAT sensor when the real fault is a corroded connector or a chafed wire in the harness, so always perform a voltage drop test on the circuit.
- On many vehicles the IAT sensor is part of the mass airflow sensor, and a dirty or failing MAF can skew the IAT reading, leading to unnecessary replacement of the wrong part.
- Extreme cold starts or heat soak after a hot shutdown can momentarily push the IAT signal out of range, but a persistent P0111 indicates a real circuit or sensor issue rather than a transient condition.
- The IAT signal influences fuel injection and ignition timing, so a faulty reading can cause driveability symptoms that mimic other sensor failures, making it important to verify the IAT data before condemning other components.

## Can I keep driving with P0111?

The vehicle is generally safe to drive with P0111 because the computer substitutes a default intake air temperature, but you may notice slightly reduced fuel economy or rough running when cold. Avoid heavy acceleration or towing until the fault is repaired, and address it promptly to prevent potential long-term emissions or driveability issues.

## Tools that help

- OBD-II scan tool with live data capability
- Digital multimeter
- Backprobe pins or breakout box
- Socket set and screwdrivers for sensor removal
- Contact cleaner and dielectric grease



## Reading P0111

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

## Often seen with

**P0101** Mass/Volume Air Flow Circuit Range/Performance · **P0110** Intake Air Temperature Circuit Malfunction · **P0112** Intake Air Temperature Circuit Low Input · **P0113** Intake Air Temperature Circuit High Input · **P0128** Coolant Thermostat (Coolant Temperature Below Thermostat Reg

## See it working

Watch the animated explainer [How the EVAP System Works: Fuel Vapour and Leak Test](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p0111/>

