

GM · POWERTRAIN

P1105

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P1105 · GM

## Secondary Vacuum Sensor Circuit

P1105 on GM vehicles indicates that the powertrain control module (PCM) has detected an abnormal signal from the secondary vacuum sensor circuit, which typically monitors the operation of the secondary air injection system. The computer compares the sensor's voltage to expected values and sets this code when the signal falls outside the normal range, suggesting a circuit fault or a mechanical issue with the secondary air system.

| SYSTEM     | CODE TYPE   | SEVERITY | FIX DIFFICULTY | AREA                  |
|------------|-------------|----------|----------------|-----------------------|
| Powertrain | GM specific | Low      | Intermediate   | Fuel and air metering |

### Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms.
- Slight hesitation or stumble during the first few minutes after a cold start, especially in cold weather.
- A faint hissing or rushing air sound from the engine bay during cold start-up, indicating a possible vacuum leak.
- Rough idle or unstable idle quality immediately after starting the engine.
- In some cases, a noticeable decrease in fuel economy if the secondary air system remains active longer than intended.

### Common causes, most likely first

- 1 Failed secondary vacuum sensor (also called the secondary air injection sensor) sending an erratic or out-of-range signal.
- 2 Damaged or disconnected vacuum hose between the secondary air injection valve and the sensor, causing a loss of vacuum signal.
- 3 Corroded, loose, or damaged electrical connector or wiring at the secondary vacuum sensor.
- 4 Faulty secondary air injection valve (diverter valve) that fails to hold vacuum or leaks, affecting sensor readings.
- 5 Clogged or carbon-fouled secondary air passages in the cylinder head or exhaust manifold, altering vacuum characteristics.
- 6 Failed secondary air injection pump that does not produce sufficient airflow, indirectly affecting sensor voltage.
- 7 PCM software calibration issue or internal driver fault, though this is less common and usually requires a reflash or replacement.



## How to diagnose and fix it

- 1 Inspect all vacuum hoses connected to the secondary vacuum sensor and the secondary air injection valve for cracks, splits, or disconnections; replace any damaged hose.
- 2 Check the electrical connector and wiring at the secondary vacuum sensor for corrosion, loose pins, or chafed wires; clean or repair as needed.
- 3 Measure the sensor's reference voltage and signal voltage with a digital multimeter (DMM) and compare to GM specifications; replace the sensor if readings are out of range.
- 4 Test the secondary air injection valve for proper vacuum operation using a hand vacuum pump; replace the valve if it does not hold vacuum or fails to move.
- 5 Verify that the secondary air injection pump runs during cold start and delivers airflow; replace the pump if it is seized or weak.
- 6 Inspect the secondary air passages for carbon buildup and clean them if restricted, especially on higher-mileage engines.
- 7 Clear the diagnostic trouble codes (DTCs) and perform a cold-start drive cycle to confirm the repair; if the code returns, re-evaluate the circuit with a scan tool and oscilloscope.

## Secondary vacuum sensor circuit pitfalls

- A common misdiagnosis is replacing the secondary vacuum sensor when the real problem is a leaking vacuum hose or a faulty secondary air injection valve, so always test the entire vacuum circuit before condemning the sensor.
- The secondary air injection system only operates during the first few minutes after a cold start, so the code may not set during a warm-engine test drive; a proper cold soak and start is required to reproduce the fault.
- On some GM engines, a clogged secondary air passage in the cylinder head can mimic a sensor failure by altering the vacuum signal, and this mechanical restriction is often overlooked.
- The PCM may set P1105 in conjunction with other secondary air injection codes such as P0410 or P0412, and diagnosing those first can save time.
- A weak or failing battery or charging system can cause voltage spikes that affect sensor readings, so always verify battery and ground integrity before replacing components.

## Can I keep driving with P1105?

You can generally continue driving with this code because the secondary air injection system only affects emissions during cold starts and does not compromise engine safety or performance. Avoid extended idling and schedule a diagnosis soon to prevent potential long-term damage to the secondary air pump or catalytic converter.



## Tools that help

- OBD-II scan tool with live data capability
- Digital multimeter (DMM)
- Hand vacuum pump
- Basic socket and wrench set
- Inspection mirror and flashlight

## Reading P1105

**P** Powertrain: engine, transmission and emissions.

**1** Manufacturer-specific code (GM): its meaning depends on the make.

**1** Fuel and air metering.

**05** The exact fault within that area.

## Often seen with

**P0410** Secondary Air Injection System Malfunction · **P0412** Secondary Air Injection System Switching Valve 'A' Circuit · **P0413** Secondary Air Injection System Switching Valve 'A' Circuit O · **P0414** Secondary Air Injection System Switching Valve 'A' Circuit S · **P0418** Secondary Air Injection System Control 'A' Circuit

## See it working

Watch the animated explainer [Excavator Simulator: Hydraulics You Can Operate](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/gm-p1105/>

