

GENERIC · POWERTRAIN

P0413

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P0413

Secondary Air Injection System Switching Valve 'A' Circuit Open

P0413 means the engine computer has detected an open circuit on the electrical path that controls the secondary air injection switching valve, often called the air pump check valve or diverter valve. The computer commands the valve to open or close during cold starts to route fresh air into the exhaust, but the circuit voltage stays outside the expected range, so the computer flags the circuit as open.

SYSTEM

Powertrain

CODE TYPE

Generic (all makes)

SEVERITY

Low

FIX DIFFICULTY

Intermediate

AREA

Auxiliary emission controls

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms.
- A slightly rough or uneven idle during the first minute after a cold start.
- A brief hissing or rushing air noise from the engine bay when the air injection system is commanded on.
- Delayed or failed readiness of the secondary air injection monitor, which can block an emissions inspection.
- In some vehicles, a temporary rich-running condition or elevated hydrocarbon emissions during warm-up.
- Rarely, a stumble or hesitation on acceleration while the engine is still cold.

Common causes, most likely first

- 1 Broken, corroded, or disconnected wiring in the switching valve control circuit.
- 2 A failed secondary air injection switching valve solenoid or vacuum actuator.
- 3 A blown fuse or faulty relay that supplies power to the switching valve circuit.
- 4 A poor ground connection at the valve body or engine block.
- 5 A damaged or disconnected vacuum line that operates a vacuum-actuated switching valve.
- 6 Corrosion or water intrusion at the valve electrical connector.
- 7 A failed engine computer driver circuit, which is uncommon but possible after other causes are ruled out.



How to diagnose and fix it

- 1 Inspect the switching valve electrical connector and wiring for corrosion, chafing, or loose pins, and repair as needed.
- 2 Check the fuse and relay that feed the secondary air injection circuit, replacing any failed component.
- 3 Measure resistance across the switching valve solenoid and compare it to the manufacturer's specification to confirm the valve is not open internally.
- 4 Test for battery voltage and ground at the valve connector while commanding the valve on with a scan tool, verifying the circuit can carry current.
- 5 Check vacuum supply and the integrity of vacuum lines if the valve is vacuum-actuated, repairing cracked or disconnected hoses.
- 6 Clear the code and run the secondary air injection monitor to confirm the repair, then verify the check engine light stays off.

What the open circuit really tells you

- An open circuit code does not automatically mean the switching valve itself has failed, because a broken wire or corroded connector can set the same code while the valve is still good.
- Many technicians replace the air pump when the real fault is a failed switching valve or a damaged vacuum line, so always test the control circuit before condemning the pump.
- On vehicles with a vacuum-operated switching valve, a cracked vacuum reservoir or a leaking check valve can cause the computer to see an unexpected circuit condition even though the electrical wiring is intact.
- A weak battery or low charging voltage can cause the computer to misreport an open circuit on the switching valve, so verify battery and charging system health before chasing wiring.
- The secondary air injection monitor often only runs during a cold start, so a repair may not clear the code until the vehicle sits overnight and is started from cold.

Can I keep driving with P0413?

The vehicle is safe to drive with P0413 because the fault affects only cold-start emissions and does not impair engine performance or safety. Avoid extended idling from cold and schedule diagnosis soon, since the check engine light will prevent an emissions test from passing.

Tools that help

- OBD-II scan tool with bidirectional control and monitor readiness capability
- Digital multimeter for voltage, resistance, and continuity checks
- Vacuum gauge and hand vacuum pump for vacuum-actuated valve testing
- Wire terminal pick and electrical contact cleaner
- Fuse puller and test light



Reading P0413

- P** Powertrain: engine, transmission and emissions.
- 0** Generic (SAE) code: it means the same thing on every OBD-II vehicle.
- 4** Auxiliary emission controls.
- 13** The exact fault within that area.

Often seen with

P0410 Secondary Air Injection System Malfunction · **P0411** Secondary Air Injection System Incorrect Flow · **P0412** Secondary Air Injection System Switching Valve 'A' Circuit · **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 [Four-Stroke Engine Cutaway: Intake to Exhaust](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p0413/>

