

GENERIC · POWERTRAIN

P0416

OBD-II TROUBLE CODE

P0416

Secondary Air Injection System Switching Valve 'B' Circuit Open

P0416 means the engine computer has detected an open circuit on the electrical path that controls the secondary air injection (AIR) switching valve 'B', which is the valve that routes fresh air into the exhaust during cold starts. The computer commands the valve on or off and monitors the circuit for expected voltage or current; when the circuit stays open, the computer cannot confirm the valve moved and stores this code.

SYSTEM

Powertrain

CODE TYPE

Generic (all makes)

SEVERITY

Low

FIX DIFFICULTY

Intermediate

AREA

Auxiliary emission controls

Symptoms you may notice

- The check engine light is illuminated, and often there are no other symptoms the driver can feel.
- A slightly rough or elevated idle during the first minute or two after a cold start.
- A brief exhaust smell or visible exhaust smoke on cold starts as the air pump cannot divert air correctly.
- The engine may run slightly richer during warm-up, with a small drop in fuel economy on short trips.
- In some vehicles, a related AIR system code or a pending P0416 appears before the light latches.
- No noticeable performance change once the engine reaches normal operating temperature.

Common causes, most likely first

- 1 A broken, corroded, or disconnected wire in the switching valve 'B' control circuit.
- 2 A failed switching valve 'B' solenoid or vacuum actuator that has an open coil or stuck armature.
- 3 A blown fuse or failed relay that supplies power to the secondary air injection system.
- 4 A loose or damaged electrical connector at the switching valve or at the computer.
- 5 A failed secondary air injection pump that has seized and overloaded the circuit.
- 6 A corroded ground connection shared by the AIR system components.
- 7 A faulty engine computer driver circuit, which is rare but possible after other causes are ruled out.



How to diagnose and fix it

- 1 Inspect the switching valve 'B' connector and the wiring harness for corrosion, chafing, or a loose pin, and repair as needed.
- 2 Check the AIR system fuse and relay, and replace any blown fuse or failed relay after confirming there is no short circuit.
- 3 Measure resistance across the switching valve 'B' solenoid coil and compare it to the manufacturer's specification to confirm an open coil.
- 4 Command the switching valve on and off with a scan tool while watching for a change in voltage or current on the control circuit.
- 5 Back-probe the control wire at the computer and check for continuity to the valve, repairing any open in the harness.
- 6 Verify the secondary air injection pump runs when commanded and that it is not seized or drawing excessive current.
- 7 Clear the code and perform a cold-start drive cycle to confirm the repair and ensure P0416 does not return.

What an open AIR valve circuit really means

- An open circuit does not always mean the valve itself failed; a corroded connector pin or a chafed wire in the harness is a very common cause that technicians miss when they replace the valve first.
- Some vehicles use a vacuum-operated switching valve with an electrical solenoid, so a vacuum leak or a failed vacuum line can set a circuit code if the solenoid cannot move the valve as expected.
- A seized secondary air injection pump can blow the AIR system fuse and create an open circuit code for the switching valve, so always check the pump before condemning the valve.
- P0416 does not mean the catalytic converter is failing, even though the AIR system works with the converter during cold starts; replacing the converter for this code is a costly misdiagnosis.
- On vehicles with two switching valves, 'B' refers to a specific valve, and swapping parts between circuits without checking the wiring can move the fault and confuse diagnosis.

Can I keep driving with P0416?

It is generally safe to keep driving with P0416 because the secondary air injection system only affects emissions during cold starts and does not impair engine performance. Avoid ignoring the light for long periods, since a failed AIR system can eventually affect catalytic converter efficiency and increase cold-start emissions.



Tools that help

- OBD-II scan tool with bidirectional control capability
- Digital multimeter
- Test light
- Wiring diagram for the secondary air injection system
- Socket and ratchet set
- Vacuum pump

Reading P0416

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

Often seen with

P0410 Secondary Air Injection System Malfunction · **P0411** Secondary Air Injection System Incorrect Flow · **P0413** Secondary Air Injection System Switching Valve 'A' Circuit O · **P0414** Secondary Air Injection System Switching Valve 'A' Circuit S · **P0415** Secondary Air Injection System Switching Valve 'B' 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/p0416/>

