

FORD · POWERTRAIN

P1413

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P1413 · Ford

Secondary Air Injection System Monitor Circuit Low Voltage

P1413 on Ford vehicles means the powertrain control module (PCM) has detected a low-voltage condition on the secondary air injection (SAI) system monitor circuit, which is the feedback line that reports whether the air pump and diverter valve are functioning. The PCM expects a specific voltage range on this circuit when the system is commanded on, and a reading below the calibrated threshold sets this code. In plain terms, the computer sees the air injection monitor signal stuck low or shorted to ground.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Ford specific	Low	Intermediate	Auxiliary emission controls

Symptoms you may notice

- Illumination of the check engine light, often with no other symptoms besides the warning light
- Slight hesitation or stumble during the first minute of cold engine operation
- A brief rich-exhaust smell from the tailpipe right after a cold start
- Failed emissions inspection due to the check engine light being on
- In rare cases, a noticeable delay in catalytic converter light-off causing poor cold-driveability

Common causes, most likely first

- 1 A short to ground or chafed wire in the secondary air injection monitor circuit between the PCM and the air pump or valve
- 2 A failed secondary air injection pump or diverter valve that drags the monitor signal low
- 3 Corroded or loose electrical connector at the air pump, diverter valve, or PCM
- 4 A faulty air injection pressure sensor or monitor switch that incorrectly pulls the circuit low
- 5 Water intrusion into the air pump or valve connector causing a low-voltage short
- 6 A PCM internal driver fault on the monitor circuit (less common)



How to diagnose and fix it

- 1 Inspect the secondary air injection pump and diverter valve connectors for corrosion, water intrusion, or loose pins, and clean or repair as needed
- 2 Disconnect the monitor circuit connector and measure resistance from the signal wire to ground to check for a short to ground
- 3 Command the secondary air injection system on with a scan tool and observe the monitor circuit voltage to confirm whether the PCM or the component is pulling the signal low
- 4 Check the air pump and diverter valve for proper operation by applying battery voltage and listening for pump run and valve movement
- 5 Repair any chafed or shorted wiring in the monitor circuit, then clear the code and verify the monitor voltage returns to the expected range during a cold-start test
- 6 If the circuit and components test good, substitute a known-good PCM only after confirming all other possibilities, then reprogram if required

What the low-voltage monitor circuit really means

- A low-voltage reading on the monitor circuit does not automatically mean the air pump has failed; a shorted signal wire or a faulty pressure sensor can pull the voltage down while the pump still runs correctly.
- Ford secondary air injection systems often use a pressure sensor rather than a simple switch, and a contaminated sensor can bias the monitor voltage low without setting a pump-specific code.
- Water and road salt commonly collect in the air pump connector on Ford trucks and SUVs, creating a partial short to ground that mimics a failed pump and leads to unnecessary pump replacement.
- The PCM may set P1413 only after a cold-start monitor runs, so a warm-engine scan showing normal voltage does not rule out the fault; the test must be repeated from a cold soak.
- A weak battery or charging system fluctuation during cold cranking can momentarily drop the monitor circuit voltage below threshold and set a false P1413, so check battery health before chasing wiring.

Can I keep driving with P1413?

The vehicle remains safe to drive because the secondary air injection system only operates briefly after a cold start to reduce emissions, but avoid long-term neglect since the check engine light will prevent an emissions test pass. Have the circuit inspected soon, especially if cold-start driveability worsens.

Tools that help

- OBD-II scan tool with bidirectional control and live data
- Digital multimeter with back-probing pins
- Wiring diagram for the specific Ford model and engine
- Basic hand tools and connector pick set
- Vacuum pump or smoke machine for checking air pump integrity (if applicable)



Reading P1413

- P** Powertrain: engine, transmission and emissions.
- 1** Manufacturer-specific code (Ford): its meaning depends on the make.
- 4** Auxiliary emission controls.
- 13** The exact fault within that area.

Often seen with

P1414 Secondary Air Injection System Bank 2 Leak Detected · **P1414** Secondary Air Injection System Monitor Circuit High Voltage · **P1414** Secondary Air Injection System Monitor Circuit High · **P0410** Secondary Air Injection System Malfunction · **P0411** Secondary Air Injection System Incorrect Flow · **P0412** Secondary Air Injection System Switching Valve 'A' Circuit · **P0413** Secondary Air Injection System Switching Valve 'A' Circuit O

See it working

Watch the animated explainer [How a Turbocharger Works, Step by Step](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/ford-p1413/>

