



P024D

Charge Air Cooler Bypass Position Sensor A Circuit Range/Performance

P024D indicates that the powertrain control module has detected an out-of-range or performance fault in the signal circuit for the charge air cooler bypass position sensor on bank A. The sensor reports the physical position of the bypass valve that routes intake air around or through the charge air cooler, and the computer compares that signal against expected values under current operating conditions. When the voltage or rationality check falls outside the calibrated window, the module stores this code and may command a default actuator position.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Generic (all makes)	Medium	Intermediate	Fuel and air metering (injector circuits)

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms besides the warning light
- Reduced engine power or a limp-home mode triggered by the powertrain control module
- Poor throttle response or hesitation during acceleration when the bypass valve fails to move as commanded
- Decreased fuel economy or altered turbocharger boost behavior because charge air temperature control is compromised
- Intermittent rough running or surging under light load if the bypass valve sticks partway open
- A stored pending code or freeze-frame data showing the fault occurred during a specific boost and temperature condition

Common causes, most likely first

- 1 A faulty charge air cooler bypass position sensor that has drifted or failed internally
- 2 Damaged, corroded, or chafed wiring in the sensor signal or reference voltage circuit
- 3 A sticking or mechanically binding bypass valve actuator that prevents the sensor from reaching commanded positions
- 4 Poor electrical connection at the sensor harness connector due to water intrusion or terminal fretting
- 5 A failed or leaking vacuum or electronic actuator that moves the bypass valve, causing a position mismatch
- 6 An intake air restriction or boost leak that changes the expected bypass position under load
- 7 A software calibration issue or a faulty powertrain control module, though this is the least likely cause



How to diagnose and fix it

- 1 Connect a scan tool and record the freeze-frame data and any related codes to understand the exact conditions when P024D set
- 2 Visually inspect the bypass position sensor, its connector, and the actuator linkage for obvious damage, corrosion, or binding
- 3 Back-probe the sensor connector and check reference voltage, ground, and signal voltage against the manufacturer's specification
- 4 Command the bypass valve through its full range with the scan tool and watch the sensor signal for smooth, consistent movement
- 5 Check for intake leaks or restrictions between the turbocharger, charge air cooler, and throttle body that could skew expected position values
- 6 If the sensor signal is erratic or out of range, replace the charge air cooler bypass position sensor and clear the code
- 7 After repair, perform a road test with the scan tool monitoring bypass position and confirm the code does not return

What the bypass sensor signal really tells you

- A common misdiagnosis is replacing the bypass valve actuator when the actual fault is a worn sensor signal track that only drops out at a specific temperature or vibration frequency.
- The powertrain control module often sets P024D only after the bypass valve fails a commanded movement test, so a sensor that reads correctly at idle can still be faulty under boost.
- Charge air cooler bypass position sensors on some engines share a reference voltage with other sensors, so a short in a neighbouring circuit can pull down the signal and set this code.
- A sticking bypass valve can cause the sensor to report a plausible position that does not match the commanded position, which sets a range or performance code rather than a circuit low or high code.
- After any repair, the bypass valve may need a relearn or calibration procedure through the scan tool before the monitor will pass and the code will stay cleared.

Can I keep driving with P024D?

You can usually drive the vehicle to a repair shop, but avoid heavy acceleration and sustained high-load driving because the bypass valve may be stuck in a default position that affects charge air cooling and turbocharger efficiency. If the engine enters limp mode or you notice severe power loss, have the vehicle towed rather than continuing to drive.



Tools that help

- OBD-II scan tool with bidirectional control and live data capability
- Digital multimeter with back-probe pins
- Hand tools for removing intake components and sensor fasteners
- Manufacturer service information for wiring diagrams and sensor specifications
- Vacuum pump or smoke machine for checking actuator and intake integrity

Reading P024D

- P** Powertrain: engine, transmission and emissions.
- 0** Generic (SAE) code: it means the same thing on every OBD-II vehicle.
- 2** Fuel and air metering (injector circuits).
- 4D** The exact fault within that area.

Often seen with

P024A Charge Air Cooler Bypass Control A Range/Performance · **P024B** Charge Air Cooler Bypass Control A Stuck · **P024C** Charge Air Cooler Bypass Position Sensor A Circuit · **P024E** Charge Air Cooler Bypass Position Sensor A Circuit Low · **P0299** Turbo/Supercharger Underboost

See it working

Watch the animated explainer [Turbocharger Trainer: Boost, Wastegate and Intercooler](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p024d/>

