

GENERIC · POWERTRAIN

P022B

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P022B

Charge Air Cooler Bypass Control A Circuit Low

P022B indicates that the powertrain control module has detected a low-voltage condition on the control circuit for the charge air cooler bypass valve, circuit A. The computer expects a certain voltage range on the command wire to the bypass actuator, and the signal it sees is below the acceptable threshold, which can prevent proper regulation of intake air temperature.

SYSTEM

Powertrain

CODE TYPE

Generic (all makes)

SEVERITY

Medium

FIX DIFFICULTY

Intermediate

AREA

Fuel and air metering (injector circuits)

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- Reduced engine performance or power, especially under heavy load or during acceleration
- Poor fuel economy due to incorrect intake air temperature management
- Rough running or hesitation when the engine is cold or during turbocharger spool-up
- In rare cases, the engine may enter limp mode to protect the charge air system

Common causes, most likely first

- 1 Damaged or disconnected electrical connector at the charge air cooler bypass valve actuator
- 2 Open or shorted wire in the bypass control circuit A, including chafed or broken conductors
- 3 Failed charge air cooler bypass valve actuator solenoid or motor
- 4 Corroded or loose terminals in the bypass valve connector or at the powertrain control module
- 5 Faulty powertrain control module driver for the bypass control circuit, though this is less common
- 6 Intrusive water or debris in the connector causing a low-resistance path to ground



How to diagnose and fix it

- 1 Connect a scan tool and verify P022B is current, then check for any related codes in the charge air system
- 2 Visually inspect the bypass valve actuator connector and wiring for damage, corrosion, or loose pins
- 3 Disconnect the actuator and measure resistance across the actuator control terminals to compare with manufacturer specifications
- 4 Check the control circuit A wire for continuity to ground and for short-to-ground conditions using a multimeter
- 5 Backprobe the control circuit at the powertrain control module to verify the command signal is present and within range
- 6 If the actuator fails resistance or functional tests, replace the charge air cooler bypass valve actuator
- 7 Clear codes and perform a road test to confirm the repair and ensure the monitor runs without resetting the code

What the bypass circuit low code hides

- A low-voltage code on the bypass control circuit often results from a poor ground connection at the actuator rather than a failed actuator itself, so always check ground integrity before condemning parts.
- The charge air cooler bypass valve may be vacuum-operated on some engines, and a leaking vacuum line can mimic an electrical circuit fault by preventing the actuator from reaching its commanded position.
- P022B can set intermittently due to water intrusion into the connector after steam cleaning or driving through deep puddles, so inspect for moisture and corrosion even if the connector looks secure.
- Technicians sometimes replace the bypass valve when the real problem is a chafed wire harness near the turbocharger or exhaust manifold, where heat and vibration damage the insulation.
- This code does not always mean the bypass valve is stuck closed; a low circuit voltage can also occur if the powertrain control module detects an unexpected voltage drop during a self-test, so follow the diagnostic flow rather than guessing.

Can I keep driving with P022B?

You can usually continue driving with P022B, but avoid heavy acceleration and sustained high-load conditions because the bypass valve may not regulate intake air temperature properly, which can reduce performance and fuel economy. Have the fault diagnosed soon to prevent potential damage to the charge air system.

Tools that help

- OBD-II scan tool with live data capability
- Digital multimeter
- Wire piercing probes or backprobe pins
- Service information for connector pinouts and resistance specifications
- Basic hand tools for connector and actuator access



Reading P022B

- 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).
- 2B** The exact fault within that area.

Often seen with

P00AF Turbocharger/Supercharger Boost Control A Module Performance · **P022C** Charge Air Cooler Bypass Control A Circuit High · **P0235** Turbocharger Boost Sensor A Circuit Malfunction · **P0299** Turbo/Supercharger Underboost · **P2563** Turbocharger Boost Control Position Sensor Circuit Range/Per

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/p022b/>

