P0033: TURBO CHARGER BYPASS VALVE CONTROL CIRCUIT

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Advanced
Repair Cost	:	**$100-$400**
Can I Still Drive?	:	No

What Does The P0033 Code Mean?

If this code has been stored it means that the powertrain control module (PCM) has received an input signal from the turbocharger bypass valve control circuit that is not within programmed specifications.

The turbocharger bypass valve is usually controlled by the PCM or boost controller. The boost controller is sometimes a stand-alone controller but more frequently it is an integrated part of the PCM. Input data from various turbocharger and engine control sensors is calculated by the PCM to determine the desired position of the turbocharger bypass valve. The turbocharger bypass valve is used to (electronically) regulate boost pressure before it enters the engine intake manifold.

The bypass control valve is actuated using a small electronic motor (or vacuum control valve). The motor receives output voltage/ground signals from the boost controller or PCM. The signal wire of the turbo boost control circuit enables the PCM to monitor system voltage. If voltage is not within a predetermined range, the PCM detects it and this code is stored. A service/check engine lamp may also be illuminated.

Since the conditions for causing this code to be stored could lead to excessive turbocharger boost pressure, it should be addressed with some degree of urgency.

What Are The Symptoms Of The P0033 Code?

Symptoms of a P0033 engine code may include:

- Reduced engine performance
- Whining or rattling noises from the turbocharger or turbo pipes
- Excessive smoke from the exhaust
- Fouled spark plugs
- Elevated engine and/or transmission temperature
- Abnormal hissing noises from the turbocharger wastegate and/or hoses
- Additional codes may also be stored, including turbocharger boost related codes, engine misfire codes, or knock sensor codes
- Due to elevated engine temperatures, cylinder detonation is also a distinct possibility
- If applicable, the boost pressure gauge may also exhibit abnormal levels of boost pressure.

What Are The Potential Causes Of The P0033 Code?

Potential causes for this code to set are:

- Bad turbocharger bypass valve actuator
- Defective turbocharger bypass valve
- Disconnected, cracked, or collapsed vacuum line (vacuum actuated bypass valve)
- Faulty boost pressure sensor
- Shorted or open wiring in the boost sensor circuit
- Loose, corroded, or disconnected electrical connectors in the boost sensor reference circuit
- Defective PCM or boost controller.

How Can You Fix The P0033 Code?

A good starting point is always to check for technical service bulletins (TSB) for your particular vehicle. Your issue may be a known issue with a known fix put out by the manufacturer and can save you time and money during diagnosis.

Factory turbocharger boost pressure usually ranges between nine and fourteen pounds but check manufacturer's specifications for your vehicle. Test boost pressure to make sure that it is sufficient. If boost pressure is low, internal turbocharger repair or turbocharger replacement may be necessary. Also check turbo hoses and exhaust components for leakage.

There are two basic designs of turbo boost control valves. In the first design, the valve is actuated using engine vacuum. An electronically controlled vacuum control valve provides vacuum to open the boost control valve, which is closed after vacuum is restricted. Typically, the vacuum control valve (or solenoid) is supplied with battery voltage and the PCM (or boost controller) provides a ground signal when applicable. In this type of system, engine vacuum must be checked prior to

testing system electrical circuitry, components, and connectors. You may quick check the boost control valve using a hand-held vacuum pump. Simply apply vacuum directly to the valve and check operation.

The other turbo boost pressure control valve design utilizes an electronic valve. The valve receives a voltage signal from the PCM (or boost controller) when applicable. The voltage signal causes the valve to open and close proportionally as required to maintain optimum boost pressure.

Notes:

- Professional technicians report that the boost control valve is often condemned in error, when the boost pressure sensor is the defective part
- Using a digital volt/ohmmeter, test system circuit voltage and continuity to ensure that it is within manufacturer's specifications. A system wiring diagram or manufacturer's service manual (with diagnostic flow charts) will be required
- Disconnect system components and controllers prior to testing circuit continuity to prevent damage

Reference Sources

P0033: Turbo Charger Bypass Valve Control Circuit, OBD-Codes.