P050F: BRAKE ASSIST VACUUM TOO LOW

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$100-$200**
Can I Still Drive?	:	**Yes**

What Does The P050F Code Mean?

A stored code P050F means that the powertrain control module (PCM) has received an input signal from the vacuum brake sensor (VBS) that indicates an insufficient vacuum condition at the brake power assist booster.

Even though there are several different types (including hydraulic and electronic) of brake power assist systems, this code applies only to those which utilize engine vacuum and a vacuum brake booster.

The vacuum brake booster is located between the brake pedal and the master cylinder. It is bolted to the firewall of the passenger compartment (usually in front of the driver seat). It can be accessed with the hood open.

One end of the actuator rod of the booster protrudes through the firewall and attaches to the brake pedal arm. The other end of the actuator rod depresses the piston of the master cylinder which forces brake fluid through the brake lines and initiates braking at each wheel.

The brake booster is composed of a metal housing with a pair of large vacuum diaphragms inside. This type of booster is called a dual-diaphragm vacuum brake booster. There are some vehicles which use a single diaphragm booster but it is rare.

With the engine running, a constant supply of vacuum is supplied to the diaphragm, which draws slightly on the brake pedal arm. A one-way check valve (in the vacuum supply hose) prevents

vacuum loss when the engine is placed under a load.

While most diesel vehicle applications use a hydra-boost system, others use a vacuum brake booster. Since diesel engines do not make vacuum, a belt-driven pump is used as a vacuum source. The rest of the vacuum booster system works in much the same manner as that of the gas engine system.

Typical VBS configuration involves a pressure sensitive resistor inside a small vacuum diaphragm, enclosed in an airtight plastic housing. Vacuum pressure (air density) is measured in kilopascal units (kPa) or inches of mercury (Hg). The VBS is inserted through a thick rubber grommet and into the housing of the vacuum brake booster.

As vacuum pressure increases, VBS resistance decreases. This results in increased VBS circuit voltage. When vacuum pressure decreases, a reverse action occurs. The PCM receives these variations in voltage as changes in vacuum brake booster pressure and reacts accordingly.

If the PCM detects a level of vacuum at the brake booster that is not within a set parameter, a code P050F will be stored and a malfunction indicator lamp (MIL) may be illuminated.

What Are The Symptoms Of The P050F Code?

Symptoms of a P050F engine code may include:

- Audible hissing when depressing the brake pedal
- Increased effort required to depress brake pedal
- Other codes could be stored, including manifold absolute pressure (MAP) codes
- Engine drivability issues created by a vacuum leak

What Are The Potential Causes Of The P050F Code?

Causes for this code may include:

- Internal leak in the vacuum brake booster
- Bad vacuum brake sensor
- Cracked or disconnected vacuum hose
- Faulty one-way check valve in the vacuum supply hose
- Insufficient engine vacuum

How Can You Fix The P050F Code?

First, if there is a hissing sound when depressing the brake pedal and depressing the pedal requires increased effort, the brake booster is defective and will need to be replaced. A loaded booster (sold with the master cylinder included) is recommended because master cylinder leakage is the chief contributing factor in booster failure.

You will need a diagnostic scanner, a manual vacuum gauge, a digital volt/ohmmeter, and a reliable source of vehicle information to diagnose a code P050F.

Diagnosing a code P050F would begin (for me) with a visual inspection of the vacuum supply hose to the vacuum booster. If the hose is connected and in good working order, start the engine (KOER) and secure the vehicle in park or neutral.

Carefully remove the one-way check valve (in the end of the vacuum supply hose) from the booster and make sure there is sufficient vacuum reaching the booster. You may use the manual vacuum pressure gauge to test for sufficient vacuum if you are in doubt.

Engine vacuum requirements can be found in the vehicle information source. If the engine is not producing enough vacuum, it will need to be repaired before continuing your diagnosis.

If there is enough vacuum at the booster and it seems to be in working order, explore your source of vehicle information for component testing procedures and specifications. You should also find wiring diagrams, connector face views, and connector pin-out charts. These resources will be necessary to a correct diagnosis.

Step 1

With the key on and engine off (KOEO), unplug the connector from the VBS and use the positive test lead of the DVOM to probe for reference voltage at the appropriate pin of the connector. Test for a ground using the negative test lead. If reference voltage and a ground are present, proceed to Step 2.

Step 2

Use the DVOM (on the ohms setting) to check the VBS. Follow the manufacturer's testing procedure and specifications for testing the VBS. If the sensor fails to comply with specifications, it is no good. If the sensor is good, proceed to Step 3.

Step 3

With the KOER, use the positive teat lead of the DVOM to probe signal voltage at the VBS connector. Ground the negative test lead to a known good battery ground. Signal voltage should reflect a similar degree to that displayed by the MAP sensor on the scanner data display. A vacuum pressure to voltage chart can also be found in your vehicle information resource. Compare the voltage discovered at the signal circuit to the appropriate entry on the chart. Suspect that the VBS is defective if it does not coincide with the chart. If the voltage is within specs, proceed to Step 4.

Step 4

Locate the PCM and use the DVOM to make sure that VBS signal circuit voltage is present there. Probe the VBS signal circuit using the positive test lead of the DVOM. Connect the negative test lead to a good ground. If the VBS signal that you found at the VBS connector is not present at the corresponding circuit of the PCM connector, suspect that you have an open circuit between the PCM and the VBS.If all circuits are in order and the VBS is within specifications; you may have a PCM problem or a PCM programming error.

- Check technical service bulletins (TSB) for entries that have the same code and symptoms. The right TSB may aid you dramatically in your diagnosis
- Condemn the PCM only after all other possibilities are exhausted

Severity Description

Low vacuum pressure at the brake booster can result in increased effort required to activate braking. This could lead to a vehicle collision. A P050F should be addressed with urgency.

Reference Sources

P050F Brake Assist Vacuum Too Low, OBD-Codes.