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FOCUS
Electric Vacuum Pump

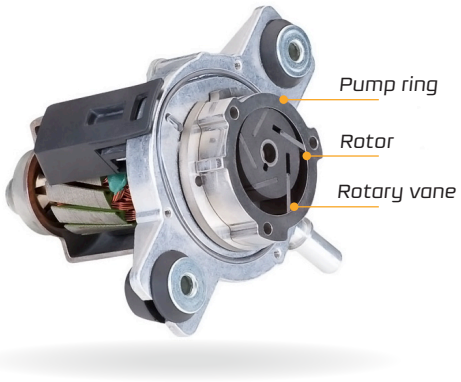
What it is

A rotary vane pump (also known as a rotary vane vacuum pump) is a **volumetric pump designed for suction and compression activities**. It is used in vehicles whose engines, due to their type, generate insufficient or no vacuum to operate the brake system, thus ensuring the functionality of the brake booster.

How it works

1 The electric motor imparts a rotary motion to the **pump shaft** and consequently to the **rotor**.

2 The **movable vanes** are pushed by centrifugal force against the inner wall of the pumping chamber, sealing the cells. The cells formed between the wall and two rotating vanes draw air from the suction side and push it towards the compression side.
As the cells increase in volume, a **vacuum** is generated, which draws air from the brake booster through the brake system's pneumatic conduits.



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Position and installation

The vacuum pump is typically mounted in the **engine compartment** on the body side. Depending on the type of vehicle, the pump can be attached to the left or right side of the engine or on the subframe (engine support box).
To prevent the spread of vibrations, **the pump is mounted on a support equipped with decoupling elements** (vibration dampers). The electric vacuum pump is connected to the brake system's pneumatic hoses via a **suction nozzle**. The aspirated and filtered air reaches the vacuum pump from the passenger compartment through the brake booster and the flexible hose system. The pneumatic conduits, valves, and brake booster must be free from particles and impurities to avoid damaging the pump.

Reasons for replacement

Possible failures of electric vacuum pumps can cause the following effects:

- Insufficient vacuum in the brake booster
- Reduced braking action
- Increased force required to operate the brake pedal
- Warning light activation (depending on the system)

Causes and effects

Possible failures of electric vacuum pumps can be attributed to the following causes:

- Insufficient voltage supply
- External damage
- Faulty electric motor
- Damaged or dirty vacuum lines

Fault Reporting

The operation of the electric vacuum pump is monitored by the ECU (Engine Control Unit).

- Any errors are logged in the ECU's **fault memory** and can be addressed using an updated **diagnostic tool**.
- In the event of a system error, the driver is notified with a **warning on the instrument cluster display**.

Fault Diagnosis

Before conducting a diagnosis through the ECU, it is advisable to perform a **visual inspection of individual components of the system**. During a fault search, it is necessary to check the **pneumatic and electrical connections** of the vacuum pump, as well as the condition of all other **brake booster vacuum lines**. This approach allows for the exclusion of certain errors before proceeding with a diagnosis based on the data provided by the ECU.

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