

Fault in the vacuum system

Introduction

This document describes the components of the vacuum system and frequently occurring causes of faults on the vacuum system.

Vacuum hoses

The vacuum hoses transport the partial vacuum to the pressure converters / changeover valves and to the actuators. Leak-tightness and no blockage of the vacuum hoses are decisive for the function of the system.

The vacuum hoses must be checked for the following faults:

- **Kinks**

If the vacuum hoses are routed in radii that are too tight or over edges, kinks can occur.

- **Squashed vacuum hoses**

The vacuum hoses can be squashed by contacting components (for example acoustic cover).

- **Cracks**

Especially at the ends of the vacuum hoses, cracks can arise that lead to leaks.

Note: Cracks can be covered by the hose fabric!



Cracked hose.

Changeover valves, pressure converters

The changeover valves and pressure converters switch the desired partial vacuum to each actuator. The changeover valves and pressure converters are activated by the DDE control unit. On activation, a solenoid valve switches the partial vacuum from the vacuum supply to each actuator.

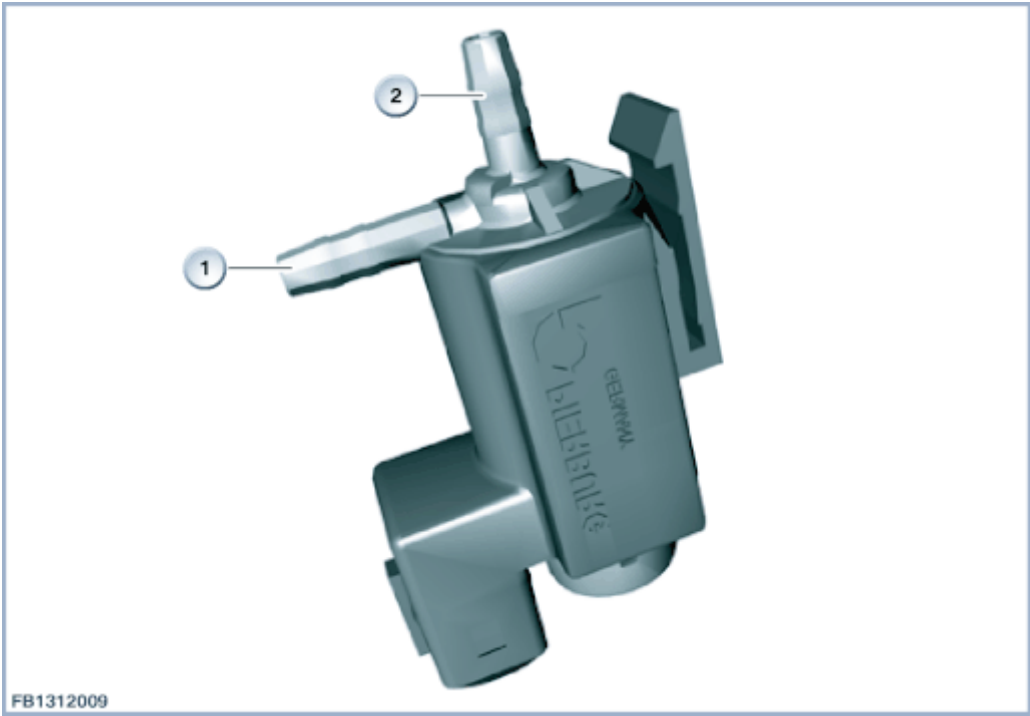
Changeover valves and pressure converters differ with regard to function as follows:

- **Changeover valve:** Switches the partial vacuum either fully off or on. There are no increments between ambient pressure and maximum partial vacuum.

If a changeover valve is **not** activated, it is sealed to the vacuum supply side.

- **Pressure converter:** Can be set steplessly between ambient pressure and maximum partial vacuum.

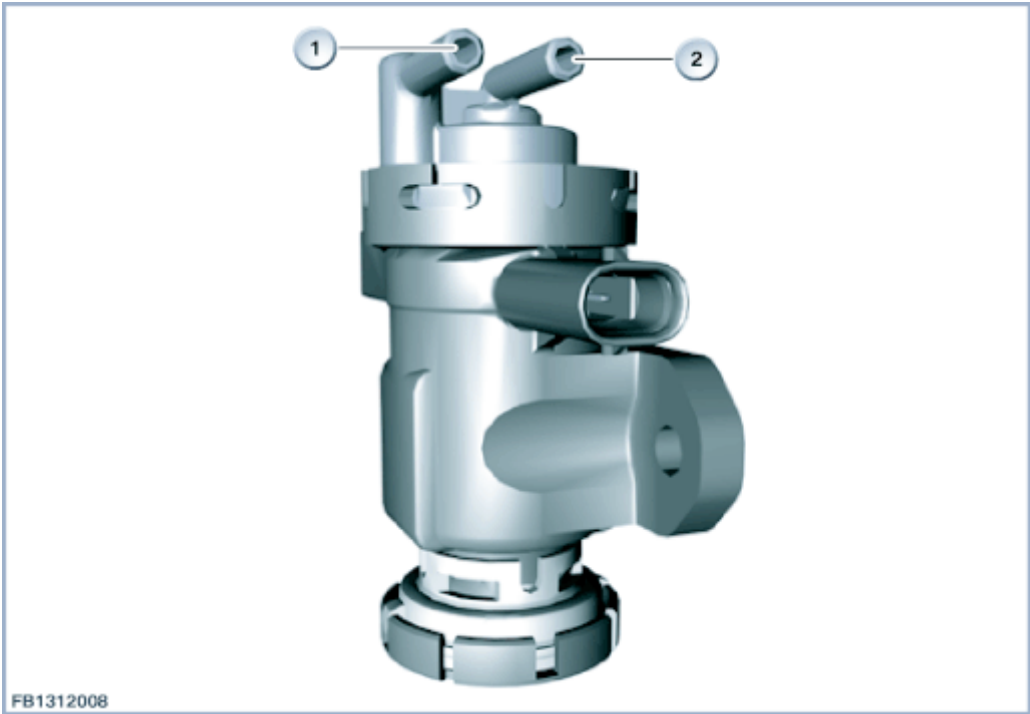
If a pressure converter is **not** activated, its is **not** sealed to the vacuum supply side. A pressure converter causes the vacuum system to lose around 10 mbar per second.



FB1312009

Changeover valve

1	Vacuum output to the partial-vacuum canister	2	Connection to vacuum supply
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FB1312008

Pressure converter

1	Vacuum output to the partial-vacuum canister	2	Connection to vacuum supply
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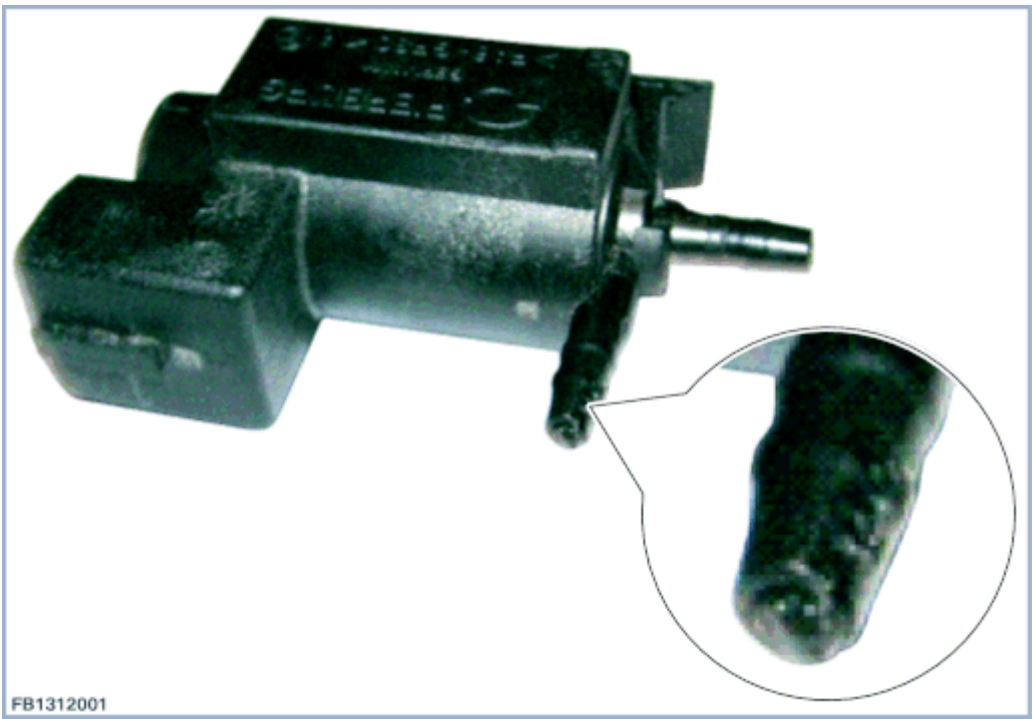
The changeover valves and pressure converters must be checked for the following faults:

- electrical fault**

The coil of the solenoid valve and the connections to the plug can have breaks or short circuits.
- Jamming solenoid valve**

The solenoid valve can become difficult to move, causing it to jam from time to time. Diagnosing a jamming solenoid valve is a problem, as the jamming often only occurs sporadically. The information under which conditions an actuator does not work must be taken into account.
- Defective vacuum connections**

The connections for the vacuum hoses can be broken or burned.



Burned connection.

Partial-vacuum canisters

Vacuum is applied to the partial-vacuum canisters by the changeover valves and pressure converters. The partial-vacuum canister contain membranes that are moved by the partial vacuum. The linkage attached to the membranes is connected to the actuators in each case and operates these.

The partial-vacuum canisters must be checked for the following faults:

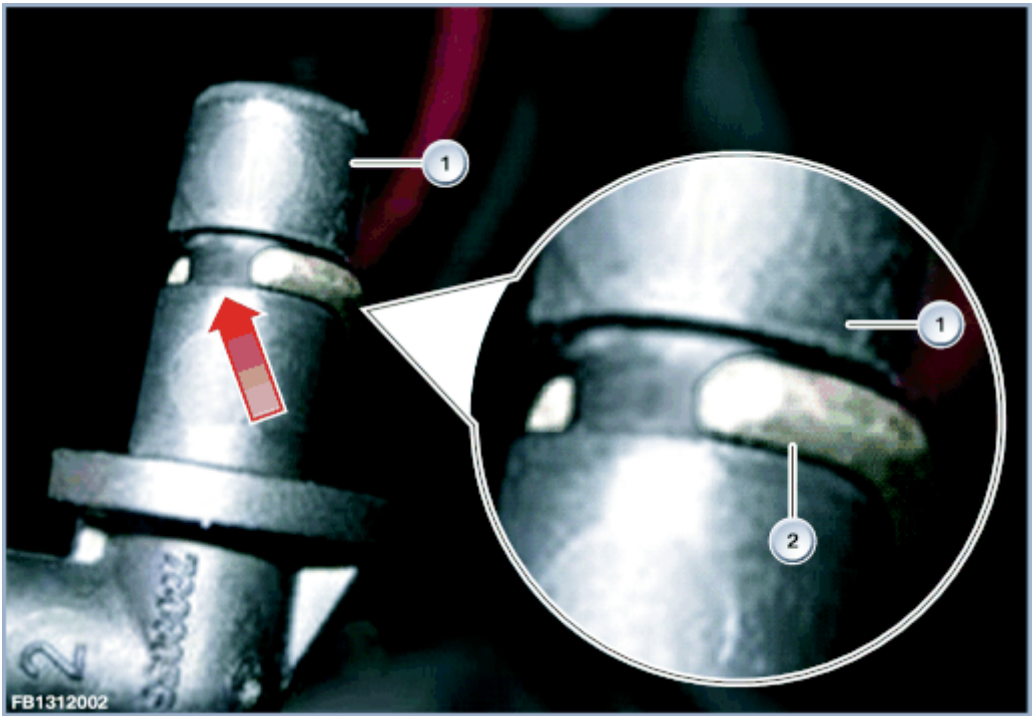
- **No transmission of force between membrane and linkage:**
Pull the linkage out of the partial-vacuum canister slightly. If the linkage can be pulled out without resistance, the partial-vacuum canister is defective.
- **Membrane is leaking**
Use a vacuum pump to apply 500 mbar of partial vacuum to a partial-vacuum canister. If the partial-vacuum canister does not maintain the partial vacuum, the partial-vacuum canister is defective.

Vacuum reservoir

During operation, the vacuum reservoir ensures a certain stored supply of partial vacuum.

The vacuum reservoir must be checked for the following faults:

- **Leak-tightness:**
Check the leak-tightness of the vacuum reservoir by applying a partial vacuum.
- **Leaking connections**
The O-rings of the connections can be defective and thus cause leaks.



Defective O-ring at the connection of the vacuum reservoir.

1	Connecting piece	2	Torn O-ring
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