



**SI 0109**  
For technical personnel only!  
1/2

# SERVICE INFORMATION

## VACUUM PUMPS

### BASIC INFORMATION

**Vacuum pumps are often located directly on the cylinder head, and are driven by the camshaft. Due to these "interfaces", the engine repairer should possess fundamental knowledge of vacuum pumps.**

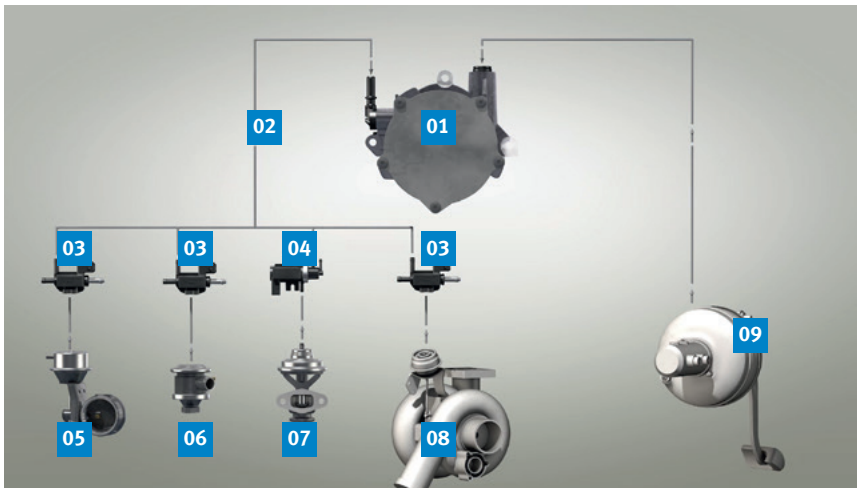
Vacuum pumps are used in motor vehicles in which the necessary vacuum cannot be generated in the intake manifold. These may include direct injection

engines, turbocharged engines and engines with a variable valve control system, to name just a few examples.

The increasing number of pneumatic actuators can also render the use of a vacuum pump necessary. With pneumatic devices, high adjusting forces can be achieved in a small installation space. Brake boosters, secondary air valves, EGR valves, intake manifold switches,

turbocharger control and comfort devices are just some examples.

Since failure of the brake boosters can lead to dangerous situations, the vacuum pump is considered to be a safety component.



Vacuum pumps: Applications (extract)

- |                            |                                |                            |
|----------------------------|--------------------------------|----------------------------|
| <b>01</b> Vacuum pump      | <b>04</b> Pressure transducers | <b>07</b> VTG turbocharger |
| <b>02</b> Vacuum system    | <b>05</b> Exhaust gas flap     | <b>08</b> EGR valve        |
| <b>03</b> Switchover valve | <b>06</b> Secondary air valve  | <b>09</b> Brake booster    |



Vacuum pump in the Opel Vectra C (highlighted)

All content including pictures and diagrams is subject to change. For assignment and replacement, refer to the current catalogues or systems based on TecAlliance.

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2/2

### METHOD OF OPERATION/TYPES

The vacuum pumps used in motor vehicles generate a vacuum of approx. 0.7 – 0.9 bar.

They suck the air out of the vacuum system and generally channel it to the cylinder head or the crankcase.

In many cases, vacuum pumps are located directly on the cylinder head, are supplied with lubricating oil and driven by the camshaft.

A vacuum pump's method of operation depends on its design and is not visible from the outside.

In the past, the most common types were piston or diaphragm vacuum pumps, which were driven by the cam, tappet, chain, belt or cam disc.

The latest development in this field is vane-type vacuum pumps, which are usually mounted on the end of the camshaft.

New developments tend to combine pumps supplying different media (tandem pumps):

- Combined fuel/vacuum pumps are situated on an axle shared with the camshaft.
- Combined vacuum/oil pumps are installed in the oil pan.



A traditional piston vacuum pump (cutaway model)



Latest development: Single-vane vacuum pump (cutaway model)

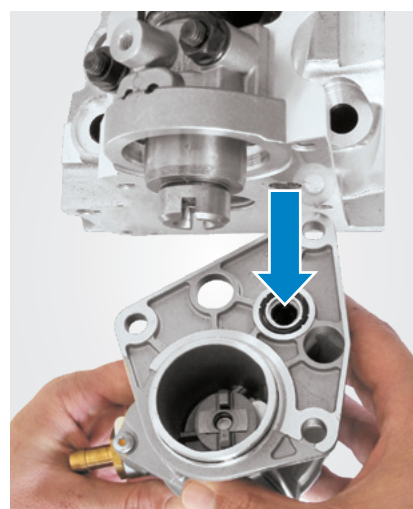
Continued use of a used vacuum pump in a reconditioned engine: Vacuum pumps are connected to the engine and, depending on their design, are incorporated in the engine oil circuit. The following may occur following engine damage:

- Chips may have got into the vacuum pump together with the engine oil.
- The vacuum pump may have been damaged by overheating.
- The vacuum pump may have been damaged.

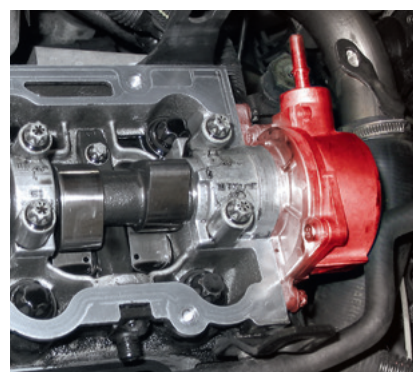


#### NOTE

To prevent consequential damage following engine repair, we recommend also replacing the vacuum pump following engine damage.



Oil supply via the flange, e.g. Peugeot, Citroën with 1.8/1.9 l diesel engine



Vacuum pump and camshaft in the Opel Vectra B (in red)