

Vacuum Pumps

Instrumentation

Fittings and Valves



LEYBOLD VACUUM

SH 01.206/3.02

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## TRIVAC BCS

Rotary vane pumps

D 16 - 25 BCS/PFPE  
S/D 40 - 65 BCS/PFPE

Safety information

A hazard analysis has been run for the pumps in accordance with European Standard EN 1012 Part 2. In order to prevent hazards, the safety information given in the following must be observed. The safety information provided here is supplementary to the information given in the Operating Instructions. For this reason please carefully also read the enclosed Operating Instructions. Should you have any further questions please contact one of our branch offices, subsidiaries or directly our factory in Cologne, Germany.

**Warning** Indicates procedures that must be strictly observed to prevent hazards to persons.

**Caution** Indicates procedures that must strictly be observed to prevent damage to, or destruction of the equipment.

## 1 Transportation

**Caution**

- Do not damage plugs and cables when moving the pump.
- Pumps which have been filled with operating agents must only be moved in the upright position. Otherwise oil may escape. Avoid any other orientations while moving the pump.

**Warning**



- Check the pump for the presence of any oil leaks, because there is the danger that someone may slip on the oil which has leaked from the pump.
- Only use the carrying handles and eyes which are provided on the pump to lift the pump with the specified lifting devices (see figure in the Operating Instructions).

Make sure that these have been installed safety. Use suitable lifting equipment. Make sure that all safety regulations are observed.

### 1.1 Storing

**Caution**

- Until the pump is put back in to service once more, the pump should be stored in a dry place, preferably at room temperature (20 °C). Before taking the pump out of service it should be properly disconnected from the vacuum system, purged with dry nitrogen and the oil should be exchanged too. The inlet and exhaust ports of the pump must be blanked off using the shipping seals which are included upon delivery of the pump. The gas ballast switch must be set to the  $\text{I}0\text{I}$  position and if the pump is to be shelved for a longer period of time it

should be sealed in a PE bag together with a desiccant (silica gel).

If the pump has been shelved for over one year, standard maintenance must be run and the oil must be exchanged too (see Operating Instructions) before the pump is put in to service once more. We recommend that you contact the service from LEYBOLD.

## 2 Installation

- The pump with any attached standard accessories may be tilted by no more than 10 °.

- The standard pump (with exception of those models with an explosion hazard rated motor) is not suitable for installation in explosion hazard areas. Please contact us, when you are planning such an application. Before installing the pump you must reliably disconnect it from the electrical power supply and prevent the pump from running up inadvertently. The pump must only be installed by suitably qualified and trained personnel.

Observe all safety regulations.

**Caution**

- After having installed the pump or put a pump in to operation after it has been shelved or subjected to maintenance, you must check the direction of rotation of the motor (see Operating Instructions).

**Warning**



When the pump is turning in the wrong direction the vacuum system may be pressurized by the pump.

- Do not operate the pump with a sealed or much narrowed exhaust line in order to avoid unacceptably high exhaust pressures. The maximum exhaust pressure must not exceed 1.5 bar (absolute). Also reliably prevent the occurrence of any blockages in the exhaust line. Exhaust filter, accessories and the tubing must be rated according to the maximum throughput. The maximum throughput is equivalent to the pumping speed of the pump (see technical data stated in the Operating Instructions).

- The maximum pressure at the inlet may not exceed atmospheric pressure (about 1013 mbar). Never operate the pump in the presence of overpressures at its intake.

- The exhaust gases must be reliably lead away and subjected to post-treatment, if required. In order to minimize the amount of oil vapour produced we recommend the additional installation of exhaust filters (LH accessories).

- Check the pump for the presence of any oil leaks which might have occurred. There is the danger that someone may slip on the oil which has leaked from the pump. For improved protection we recommend that you install suitable oil collection means as required.
- Only use operating agents which have been fully qualified by LH. Besides the operating agents specified in the Operating Instructions you may contact our technical sales department for advice on alternative types of oil and special types of oil which are suitable for your application.
- The air flow around air-cooled pumps must remain unobstructed. Observe the information provided in the Operating Instructions. The maximum amount of heat given off by the pump approximately corresponds to the amount of installed motor power.
- Make sure to keep the air intake of the motor clean.
- Before starting with any installation work the personnel must be informed early enough about potential hazards and dangers. All safety instructions must be observed.

The noise level of the TRIVAC pumps remains below 70 dB(A). Thus no additional silencing will have to be introduced.

### 3 Use

#### Warning



- Before starting the pump ensure that the attached accessories meet the requirements of your application and that safe operation is ensured.

- Never expose any parts of the body to the vacuum. There is the danger of injury. Never operate the pump with an open and thus accessible inlet. Vacuum connections as well as oil filling and oil draining openings must not be opened during operation of the pump.

- The safety regulations which apply to the specific application in each case must be observed. This applies in particular to installation, operation and maintenance (servicing) as well as waste disposal and transportation.

Our technical sales department will answer further questions concerning this aspect.

### 3.1 Areas of Application

**Warning** The pump is not suited for the following processes and for pumping of:



- ① - explosive gases and vapours
- ② - oxidants (except for the formblin versions; refer to Operating Instructions GA PFPE 07.009)
- ③ - pyrophorous gases

**Caution** ④ - The pumps are not suitable for pumping of liquids or media which contain a lot of dust. Corresponding protective measures must be introduced.

For more information contact our technical sales department.

### 3.2 Switching off through Monitoring Systems

**Warning** When the pump has been switched off due to overheating, initiated by the motor coil temperature detector, the pump must be left to cooled down to the ambient temperature and must only be switched on again manually after having eliminated the cause.



### 3.3 Failure of the Control System or the Mains Voltage

**Warning** In order to prevent the pump from running up unexpectedly after a mains power failure, the pump must be integrated in to the control system in such a way that the pump can only be started by a manually operated switch. This applies equally to emergency cut-off switches.



### 3.4 Operating Temperatures

**Warning** The surface temperature of TRIVAC pumps may rise to over 80 °C. There is the danger of becoming burnt.



Take note of the warning labels on the pump.

### 3.5 Shutdown

**Warning** In the case of switching processes in connection with a pump which has warmed up under operating conditions, the pump must then not be directly switched on again.



## 4 Maintenance

### 4.1 Disposal of Waste Oil

By law (in Germany and many other countries) the owners of waste materials are entirely self-responsible for proper disposal of their waste. In particular, owners of waste oil are responsible for proper disposal of this waste.

Waste oil from vacuum pumps must not be mixed with other substances.

Waste oil from vacuum pumps (LH oils on a mineral oil basis) which have only be contaminated due to natural wear, like exposure to the oxygen of the air, high temperatures or mechanical wear, must be disposed of through the official waste disposal system for waste oils.

Waste oil from vacuum pumps which is contaminated by other substances must be marked indicating the type of contamination, stored and properly disposed of as special waste.

### 4.2 Disposal of used Pump Materials

The corresponding regulations for the protection of the environment and safety regulations apply. This applies also to used filters and filter components (oil filters, exhaust filters and dust filters).

**Warning** - In the case of hazardous substances first determine the type of hazard and observe the applicable safety regulations. If there exists a potential hazard, the pump must be decontaminated before starting any maintenance work on the pump. We recommend our LH service for professional decontamination.



- Never exchange the oil or the filters while the pump is still warm; leave the pump to cool down to uncritical temperatures first. Use suitable protective clothing.

### LEYBOLD Service

If a pump is returned to LEYBOLD, indicate whether the pump is free of substances damaging to health or whether it is contaminated. If it is contaminated also indicate the nature of the hazard. For this you must use a form which has been prepared by us which we will provide upon request.

A copy of this form is reproduced at the end of the Operating Instructions: „Declaration of Contamination of Vacuum Instruments and Components“.

Please attach this form to the pump or enclose it with the pump.

This „Declaration of Contamination“ is required to meet German Law and to protect our personnel.

LEYBOLD must return any pumps without a „Declaration of Contamination“ to the sender's address.

**Warning** The pump must be packaged in such a way, that it will not be damaged during shipping and so that no harmful substances can escape from the packaging.



### Changed Shaft Seals

**Caution** Section 3.6 of the Operating Instructions „Replacing the Shaft Seals“ is **no longer correct**, because the shaft seals have been changed.

Prior to any work on the shaft seals ask the Leybold Service.

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