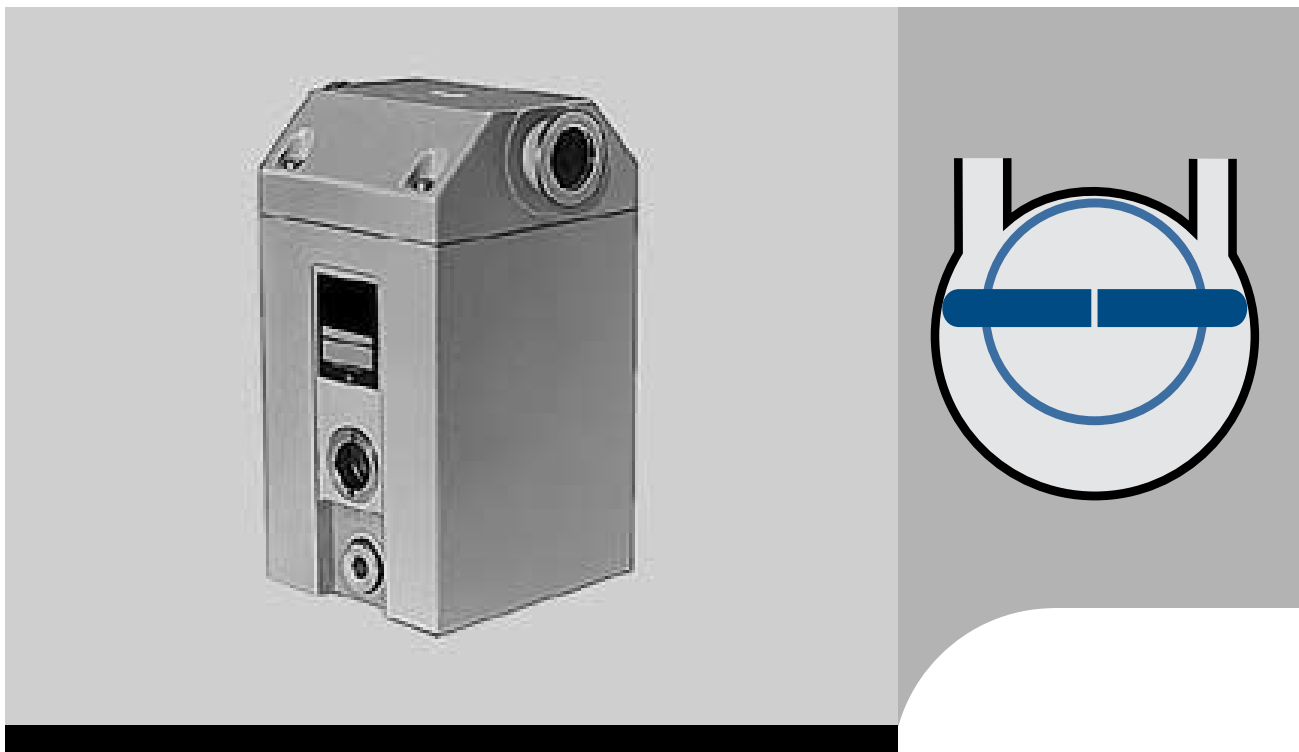


# OPERATING INSTRUCTIONS

GA01299\_0802



**AF 1,6/4-8/16-25/40-65**  
**AK 1,6/4-8/16-25/40-65**

**Exhaust Filters**

**Condensate Trap**

**Cat.-No.**

189 02/06/11/16

188 02/06/11/16

**Leybold**  
vacuum

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**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. Leybold must return any pumps without a "Declaration of Contamination" to the sender's address.

**Disposal of Waste Oil**

Owners of waste oil are entirely self-responsible for proper disposal of this waste.

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

Waste oil from vacuum pumps (Leybold oils which are based on mineral oils) which are subject to normal wear and which are contaminated due to the influence of oxygen in the air, high temperatures or mechanical wear must be disposed of through the locally available waste oil disposal system.

Waste oil from vacuum pumps which is contaminated with other substances must be marked and stored in such a way that the type of contamination is apparent. This waste must be disposed of as special waste.

European, national and regional regulations concerning waste disposal need to be observed. Waste must only be transported and disposed of by an approved waste disposal vendor.

**Figures** The references to diagrams, e.g. (1/2) consist of the Fig. No. and the Item No. in that order.

We reserve the right to modify the design and the specified data. The illustrations are not binding.

The icon indicates procedures that must be strictly observed to prevent hazards to persons.

**Warning**



This special icon warns about dangers caused by high electric voltages. Touching parts at a high voltage can result in immediate death. Covers which are marked with this icon must only be removed by trained electricians after having reliably disconnected the electric power source.

**Warning**



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

**Caution**

Emphasises additional application information and other useful information provided within these Operating Instructions.

**Note**

# 1 Description

## 1.1 Design and Function

### Exhaust-Filter

In the exhaust filters oil mist and aerosols are trapped, whereas easily volatile substances and aromatics pass through the filter.

The gas discharged by the vacuum pump flows through the filter element where smallest oil drops and dirt particles contained in the gas are trapped. The separated oil drops are collected in the exhaust filter.

In the exhaust filter AF 40-65 two filter elements are arranged in parallel.

Filter elements may get clogged in the long run due to crack products in the oil, and this may cause overpressure to build up in the pump. In order to make sure that the pressure will not exceed an admissible value (approx. 1.5 bar) a pressure relief valve is provided on the exhaust filter.

If the filterelement should have become clogged,the builtin pressure relief valve opens so that the oil mist expelled by the pump is conducted into the open air. In this way any damage which might be caused by overpressure is safely excluded.

## Description

### Warning



An exhaust line fulfilling the safety requirements concerned is imperative if poisonous gases or vapours are filtered.

Observe the applicable safety regulations for the media which are pumped.

### Condensate Traps

Condensate traps mounted into the intake line protect the pump from condensates which might result from the pumped vapors and gases.

Condensate traps mounted into the exhaust line protect against backflow of liquids which might condense in the outlet line.

Condensate traps can be fitted optionally on the intake and/or exhaust side of a TRIVAC pump.

## 1.2 Technical Data

<b>Exhaust-Filter</b>	<b>AF 1,5</b>	<b>AF 4-8</b>	<b>AF 16-25</b>	<b>AF 40-65</b>
Used on pump	S/D 1,6 B	S/D 4 B S/D 8 B	S/D 16 B/BCS S/D 25 B/BCS	S/D 40 B/BCS S/D 65 B/BCS
Connecting flanges	DN 16 KF	DN 16 KF	DN 25 KF	DN 40 KF
Max. capacity	0.1 l	0.37 l	0.48 l	1.0 l
Weight	0.9 kg	2.4 kg	2.4 kg	6.5 kg
Exhaust filter, cat. no.	189 02	189 06	189 11	189 16
Spare filter element, cat. no.	189 70	189 71	189 72	189 73 (2x)
<b>Seperator</b>	<b>AK 1,5</b>	<b>AK 4-8</b>	<b>AK 16-25</b>	<b>AK 40-65</b>
Used on pump	S/D 1,6 B	S/D 4 B S/D 8 B	S/D 16 B/BCS S/D 25 B/BCS	S/D 40 B/BCS S/D 65 B/BCS
Connecting flanges	DN 16 KF	DN 16 KF	DN 25 KF	DN 40 KF
Max. capacity	0.16 l	0.66 l	1.2 l	3.0 l
Weight	0.7 kg	1.7 kg	2.4 kg	5.5 kg
Spare, cat. no.	188 02	188 06	188 11	188 16
<b>Accessories</b>				
Drain tap	188 90	188 90	188 90	188 90
Drain tap, vacuum-tight	188 91	188 91	188 91	188 91
Centering ring	183 26	183 26	183 27	183 28
Clamping ring	183 41	183 41	183 42	183 43

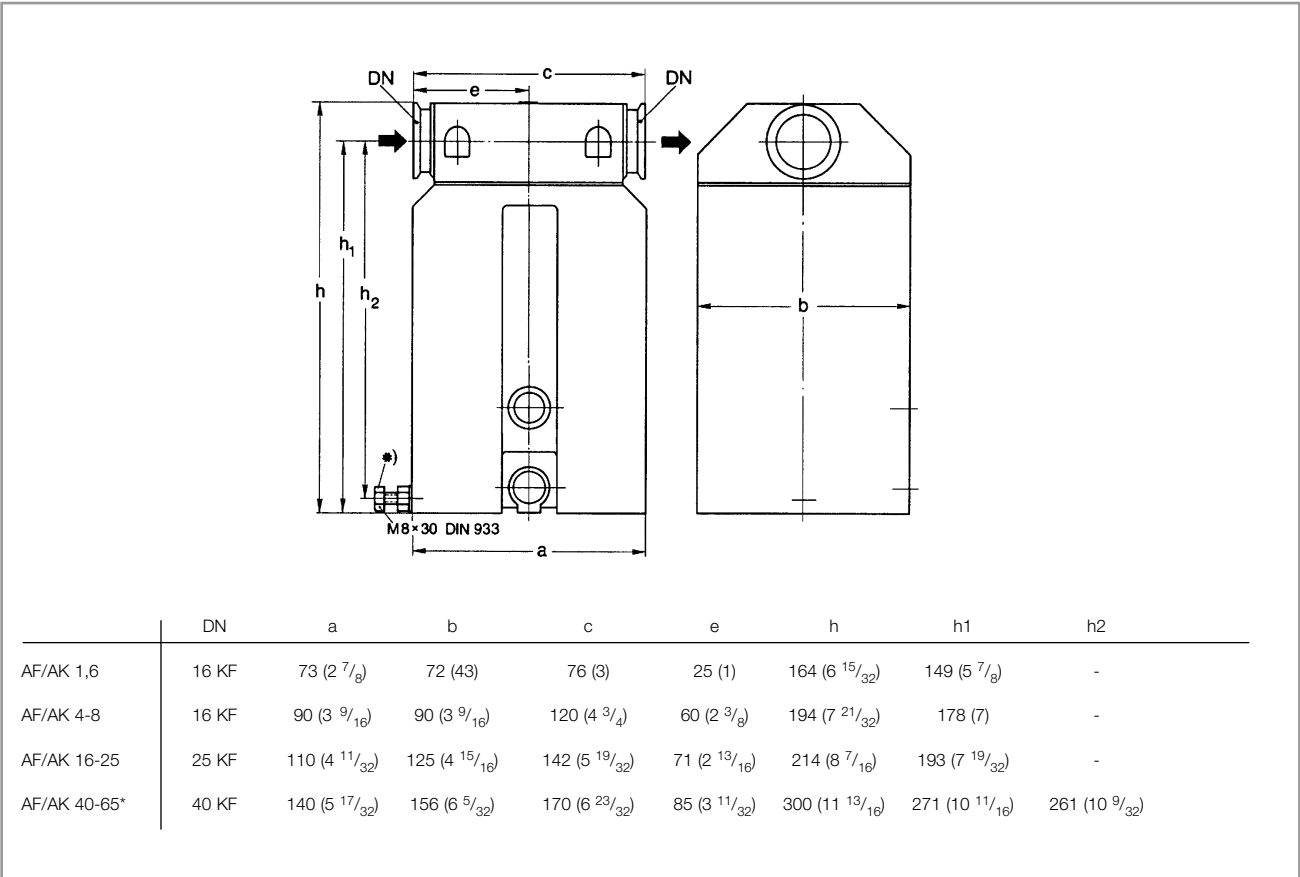


Fig. 1 Dimensional drawings of the exhaust filters, separator similar, dimensions in mm (inch)

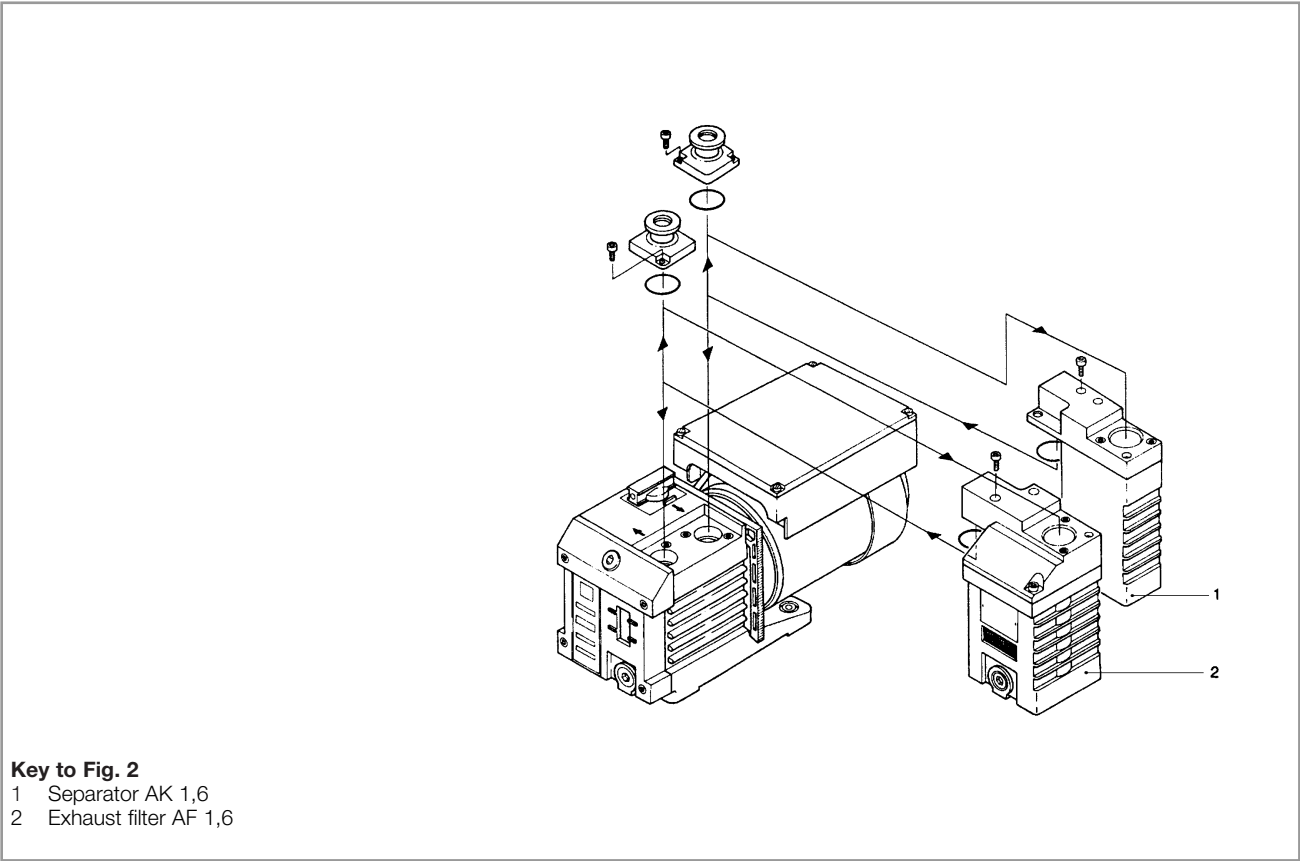


Fig. 2 Connection of the separator AK 1.6 and the exhaust filter AF 1.6 to TRIVAC S/D 1.6 B

# 2 Installation

## 2.1 Mounting AK 1.6 and AF 1.6

Remove inlet and/or outlet port connection, as required, on top of pump body, undoing two each hex socket head screws (Allen screws).

The same connection are then fitted on top of connected intake-side condensate trap or exhaust-side filter. Mount trap and/or filter on the pump by the counter flange at the underside of the connecting yoke.

The necessary O-ring and two additional Allen screws are supplied with the trap and filter.

If the TRIVAC S/D 1.6 B pump is used with condensate trap only, the lower part of the AK 1.6 may be turned round to facilitate condensate-level-checking, un-screwing the two Allen screws through the upper yoke.

The cooling ribs of the AK 1.6 are thereby placed directly opposite to those of the pump, while the inspection window, together with the oil level indicator of the pump, can be checked at a glance.

## 2.2 Mounting AK/AF 4-8, 16-25 and 40-65

### Caution

The direction of flow is marked by an arrow and must be observed when connecting the filter.

As shown in Fig. 3, fit the exhaust filter or the separator directly on the horizontally mounted flange of the TRIVAC. For connection fittings refer to Section 1.2.

When aromatic vapors are pumped, we recommend fitting an exhaust line even in case of optionally mounted exhaust filters.

### Warning



When toxic gases or vapors are pumped, an exhaust line must be fitted in accordance with the safety regulations relating to protection against poisonous vapors.

After mounting to the pump, adjust the supporting screw of AF 40-65 exhaust filter and AK 40-65 condensate trap so that it is firmly positioned on the pump housing, thus supporting the connected component.

### Caution

The connecting flange faces must be in parallel to each other - no tilting !

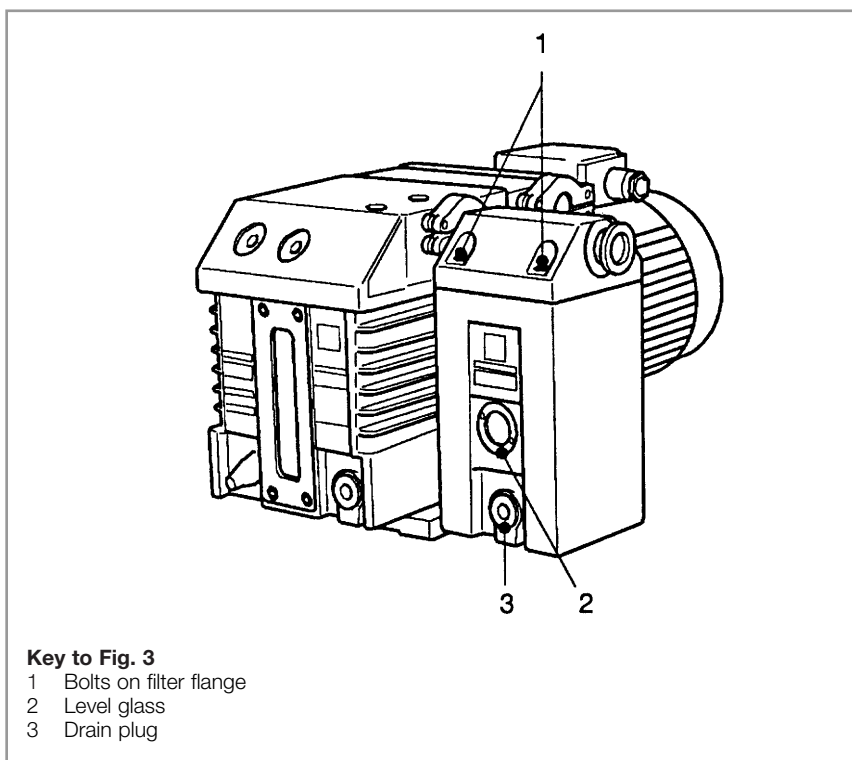


Fig. 3 TRIVAC rotary vane vacuum pump with exhaust filter fitted on

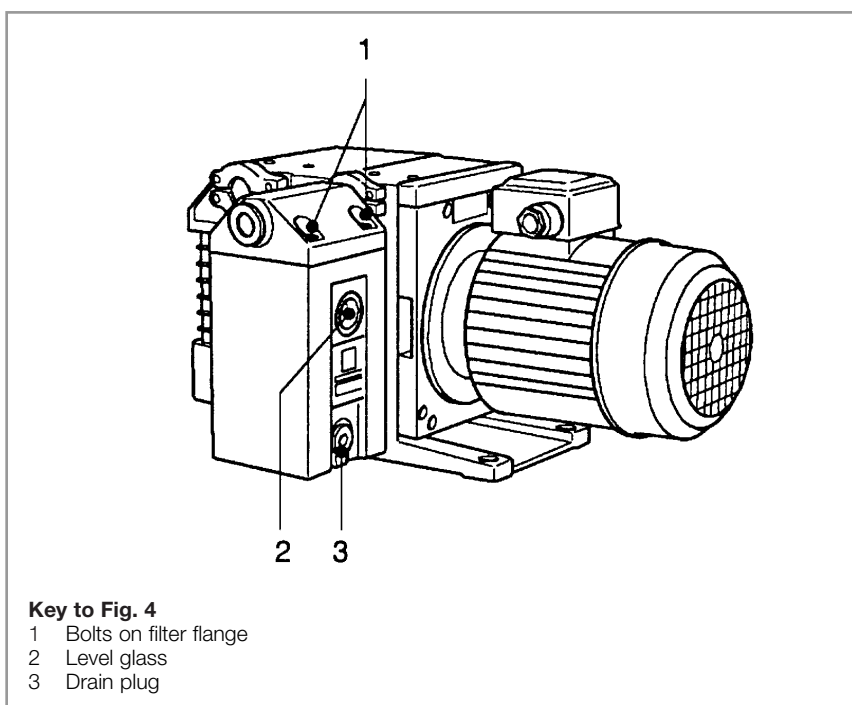


Fig. 4 TRIVAC rotary vane vacuum pump with condensate trap fitted on

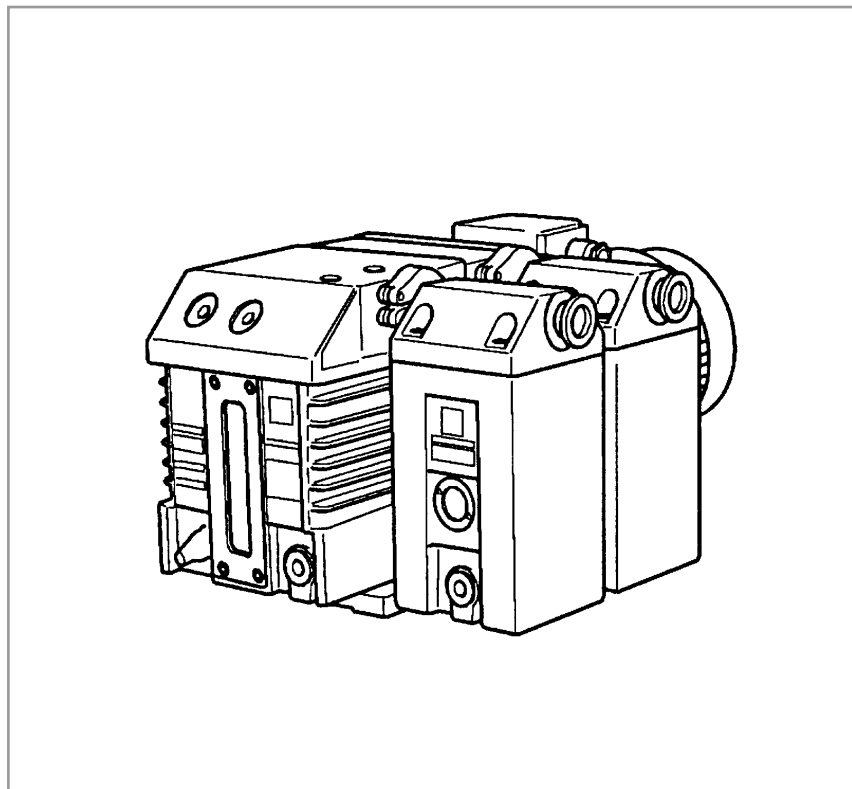


Fig. 5 TRIVAC rotary vane vacuum pump with exhaust filter and condensate trap fitted on

## 3 Maintenance



### Caution

Hazardous substances may escape from the filter, condensate or the oil.

Take suitable precautions (e. g. gloves, goggles or gas mask). Observe all safety regulations.

### 3.1 Exhaust Filters/Draining the Oil

The filtered-out quantity of oil must be drained from the filter at regular intervals depending on the operating conditions of the pump. For this purpose unscrew oil drain plug (3/3).

The oil must not rise above the centre of the oil level glass (3/2). At higher oil level the filter elements may be flooded causing oil drops to be entrained by the gas stream.

Apart from this reduction of the effective filter area will increase the differential pressure which might cause the pressure relief valve to open.



### **Replacement of filter elements**

The filter elements must be replaced from time to time. The time interval depends on the application and the operating conditions of the vacuum pump. The higher the degree of contamination during operation and the hotter the pump, the shorter the time interval for replacing the filter elements.

They should be replaced in any case if the pressure relief valve opens while the oil has been duly drained from the filter.

For replacing the filter elements shut down the pump.

Drain the oil (3/3) and reinsert the oil drain plug.

Support the filter housing by placing, say, wooden strips underneath.

Remove 4 screws (3/1) and put down the filter housing.

Loosen the small-flange connections to the pump's exhaust port and exhaust line and remove the lid.

Replace the used filter elements with new ones. Make sure that the vulcanised on seal of the filter elements is seated in the centering groove in the housing cover.

When disposing of used oil and spent filter elements, please observe the relevant environmental protection regulations.

**Caution**

Mount the housing lid between the pump's exhaust port and line.

Rescrew the filter lid with a gasket that is in perfect condition.

The starting torque of the screws is 5 Nm.

## **3.2 Condensate Traps**

The accumulating condensate must be drained at regular intervals (depending on the application of the TRIVAC pumps).

Unscrew the drain plug (4/3) and drain the condensate.

If the condensate level in the trap is too high - liquid level visible in the inspection window (4/2) - it may flow back into the pump affecting its operation severely.

### 3.3 Leybold Service

If equipment is returned to Leybold, indicate whether the equipment 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 these Operating Instructions: "Declaration of Contamination of Vacuum Instruments and Components".

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

This declaration of contamination is required to meet German Law and to protect our personnel.

Leybold must return any equipment without a "Declaration of Contamination" to the sender's address.

#### Warning



The equipment must be packed in such a way, that it will not be damaged during shipping and so that any contaminants are not released from the package.

## Declaration of Contamination of Compressors, Vacuum Pumps and Components

The repair and / or servicing of compressors, vacuum pumps and components will be carried out only if a correctly completed declaration has been submitted. **Non-completion will result in delay.** The manufacturer can refuse to accept any equipment without a declaration.

**A separate declaration has to be completed for every single component.**

This declaration may be completed and signed only by authorised and qualified staff.

Customer/Dep./Institute: _____  Address _____  Person to contact: _____ Phone: _____ Fax: _____ Order number of customer: _____	<b>Reason for returning</b> <input checked="" type="checkbox"/> applicable please mark <input type="checkbox"/> repair <input type="checkbox"/> chargeable <input type="checkbox"/> warranty <input type="checkbox"/> replacement <input type="checkbox"/> chargeable <input type="checkbox"/> warranty <input type="checkbox"/> DKD-calibration <input type="checkbox"/> Factory calibration <b>Returning of goods because of following reason:</b> <input type="checkbox"/> rent/loan <input type="checkbox"/> for credit <input type="checkbox"/> against exchange <input type="checkbox"/> exchange already received/arranged
---	---

<b>A. Description of the equipment (machine or component)</b> Type: _____ Part number: _____ Serial number: _____ Type of oil used: _____	Ancillary equipment _____ _____ _____
---	--

B. Condition of the equipment		No	Yes	No	Contamination:	No	Yes
1. Has the equipment been used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	toxic	<input type="checkbox"/>	<input type="checkbox"/>
2. Drained (Product/service fluid)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	corrosive	<input type="checkbox"/>	<input type="checkbox"/>
3. All openings sealed airtight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	microbiological	<input type="checkbox"/>	<input type="checkbox"/>
4. Purged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	explosive	<input type="checkbox"/>	<input type="checkbox"/>
If yes which cleaning agent:					radioactive	<input type="checkbox"/>	<input type="checkbox"/>
and which method of cleaning:					other harmful substances	<input type="checkbox"/>	<input type="checkbox"/>

C. Description of processed substances (Please fill in absolutely)			
1. What substances have come into contact with the equipment:			
Trade name and / or chemical term of service fluids and substances processed, properties of the substances; According to safety data sheet (e.g. toxic, inflammable, corrosive, radioactive)			
Trade name:	Chemical name:	Residues:	
a) _____	_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	
b) _____	_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	
c) _____	_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	
d) _____	_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2. Are these substances harmful?		Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
3. Dangerous decomposition products when thermally loaded		Yes	No
Which:		<input type="checkbox"/>	<input type="checkbox"/>

**Components contaminated by microbiological, explosive or radioactive products will not be accepted without written evidence of decontamination.**

D. Legally binding declaration	
<b>I / we hereby declare that the information supplied on this form is accurate and sufficient to judge any contamination level.</b>	

Name of authorised person (block letters): _____	
Date _____ Signature of authorised person _____	Company stamp

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