

## Rotary Vane Pump



**UNO/DUO 2.5, DUO 2.5 C  
UNO 5**

## Inhalt

<b>1</b>	<b>Preliminary remarks</b>	<b>3</b>
1.1	Validity	3
1.2	Conventions	3
<b>2</b>	<b>Safety</b>	<b>5</b>
2.1	Safety precautions	5
2.2	Proper use	5
2.3	Improper use	5
<b>3</b>	<b>Transport and storage</b>	<b>6</b>
3.1	Transport	6
3.2	Storage	6
<b>4</b>	<b>Product description</b>	<b>7</b>
4.1	Product identification	7
4.2	Design and function	8
<b>5</b>	<b>Installation</b>	<b>8</b>
5.1	Setting up the pump	8
5.2	Filling up the operating fluid	9
5.3	Connecting the vacuum side	10
5.4	Connecting the exhaust side	10
5.5	Connecting to the mains power supply	11
<b>6</b>	<b>Operation</b>	<b>13</b>
6.1	Before switching on the pump	13
6.2	Switching on the pump	13
6.3	Pumping condensable vapours	13
6.4	Switching off the pump	15
<b>7</b>	<b>Maintenance</b>	<b>16</b>
7.1	Precautions	16
7.2	Changing the operating fluid	16
<b>8</b>	<b>Shutdown</b>	<b>18</b>
8.1	Shutting down for longer periods	18
<b>9</b>	<b>Malfunctions</b>	<b>18</b>
9.1	Troubleshooting	19
<b>10</b>	<b>Service</b>	<b>20</b>
<b>11</b>	<b>Spare parts package</b>	<b>21</b>
<b>12</b>	<b>Accessories</b>	<b>24</b>
<b>13</b>	<b>Technical data</b>	<b>25</b>
13.1	Dimensions	26

# 1 Preliminary remarks

## 1.1 Validity

This operating manual is for customers of Pfeiffer Vacuum. It describes the functioning of the designated product and provides the most important information for safe use of the unit. The description follows applicable EU guidelines. All information provided in this operating manual refer to the current state of the product's development. The documentation remains valid as long as the customer does not make any changes to the product.

Up-to-date operating instructions can also be downloaded from [www.pfeiffer-vacuum.net](http://www.pfeiffer-vacuum.net).

## 1.2 Conventions

### Safety instructions

The safety instruction in Pfeiffer Vacuum operating manuals are the result of risk evaluations and hazard analyses and are oriented on international certification standards as specified by UL, CSA, ANSI Z-535, Semi-S1, ISO 3864 and DIN 4844. In this document, the following hazard levels and information are considered:

<b>DANGER</b>
<b>Immediate danger</b> Death or very severe injuries occur
<b>WARNING</b>
<b>Possible danger</b> Death or injuries may occur
<b>CAUTION</b>
<b>Possible danger</b> Medium to slight injuries may occur
<b>NOTE</b>
<b>Command or note</b> Command to perform an action or information about properties, the disregarding of which may result in damage to the product.

## Pictograph definitions



Prohibition of an action or activity in connection with a source of danger, the disregarding of which may result in serious accidents.



Warning of a displayed source of danger in connection with operation of the unit or equipment.



Command to perform an action or task associated with a source of danger, the disregarding of which may result in serious accidents.



Important information about a product, handling or applicable part of the documentation to which special attention should be paid.

## Instructions in the text

→ Work instruction: here you have to do something.

## Abbreviations used

**C version:** Corrosive gas version

**HV valve:** Vacuum safety valve

## Symbols used

The following symbols are used consistently throughout the diagrams.

Ⓟ Vacuum flange

Ⓛ Exhaust flange

Ⓞ Gas ballast valve

⚡ Power connection

## 2 Safety

### 2.1 Safety precautions



#### NOTE

##### Duty to inform

Each person involved in the installation, operation or maintenance of the vacuum pump must read and observe the safety-related parts of these operating instructions.

→ The operator is obligated make operating personnel aware of dangers originating from the vacuum pump, the pumped medium or the entire system.

- Do not expose any body parts to the vacuum.
- Observe the safety and accident prevention regulations.
- Check regularly that all safety precautions are being complied with.
- Do not carry out any unauthorised modifications or conversions to the pump.
- Depending on the operating and ambient conditions, the surface temperature of the pump may rise above 70°C. Use suitable finger guards if necessary.
- When returning the pump to us please note the instructions in the Service section.

### 2.2 Proper use

- The vacuum pump may only be used to generate a vacuum.
- Installation, operating and maintenance regulations must be complied with.
- Using accessories not mentioned in this manual is not permitted without authorisation from Pfeiffer Vacuum.



#### NOTE

##### CE conformity

The manufacturer's declaration of conformity becomes invalid if the operator modifies the original product or installs additional components.

→ Following installation into a plant and before commissioning, the operator must check the entire system for compliance with the valid EU directives and reassess it accordingly.

### 2.3 Improper use

Improper use is deemed to be:

Use for purposes deviating from those mentioned above, especially:

- Pumping of corrosive gases (the C version is an exception to this).
- Pumping of explosive media.
- Operation of the pump in potentially explosive areas.
- Pumping of gases containing impurities such as particles, dusts and condensate; note the vapour compatibility levels of the pump.
- Pumping of substances that tend to sublime.
- Use of the rotary vane pump to generate pressure.
- Pumping of liquids.
- Connection to pumps or units which are not suitable for this purpose according to their operating instructions.

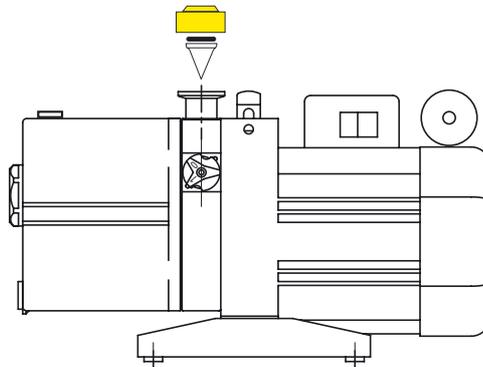
- Connection to units which have touchable and voltage carrying parts.
- Improper use will cause all claims for liability and guarantees to be forfeited.

## 3 Transport and storage

### 3.1 Transport

#### Transport instructions

- Remove the locking cap from the vacuum and exhaust flange immediately before connecting!
  - Check the protective stainer, paying attention to the o-ring.
- Use only the handle on the top side of the pump to lift the pump.



**Fig. 1: Transporting the pump**

### 3.2 Storage

- Check that all the openings on the pump are securely closed.
- Store the pump in a cool, dry place; preferably at room temperatures (approx. 20°C).
  - For a longer period of storage, seal the pump in a PE bag with drying agents enclosed.
  - For a period of storage longer than one year, it is recommended to carry out maintenance and change the operating fluid.

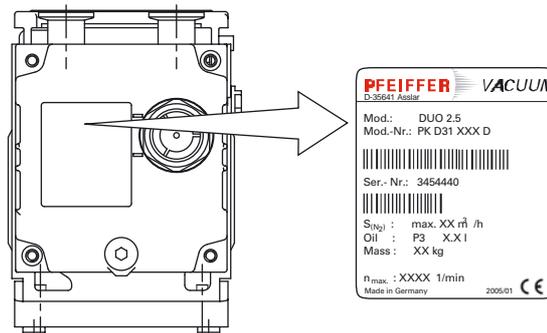
## 4 Product description

### 4.1 Product identification

To correctly identify the product when communicating with Pfeiffer Vacuum, always have the information from the rating plate available and use it:

- Pump model and model number
- Type and amount of operating fluid
- Date of manufacture

Please find the voltage range and motor-related data on the separately attached motor rating plate.



**Fig. 2: Product identification on the rating plate**

#### Scope of delivery

- Pump with motor and power cord
- Operating fluid P3 (for standard pump)
- Centering ring with O-ring
- Locking cap for vacuum and exhaust flange
- Operating instructions

#### Differences between the pump types

Pump type	Pump versions
UNO 5, UNO/DUO 2.5	Standard version of pump
DUO 2.5 C	C version of pump; differences from the standard version: <ul style="list-style-type: none"> <li>• Operating fluid F4</li> <li>• Gas ballast valve with dosable flushing gas connection</li> <li>• Vane material changed</li> </ul>

## 4.2 Design and function

Vacuum pumps of the UNO/DUO series are oil-sealed, single-/two-stage rotary vane vacuum pumps. The vacuum pumps are equipped with a high vacuum safety valve that vacuum seals the vacuum chamber and vents the pump at the same time when the pump is at standstill.

The pumps are suitable for use in laboratories to generate coarse and medium vacuums and can also be used as backing pumps on diffusion or turbomolecular pumps.

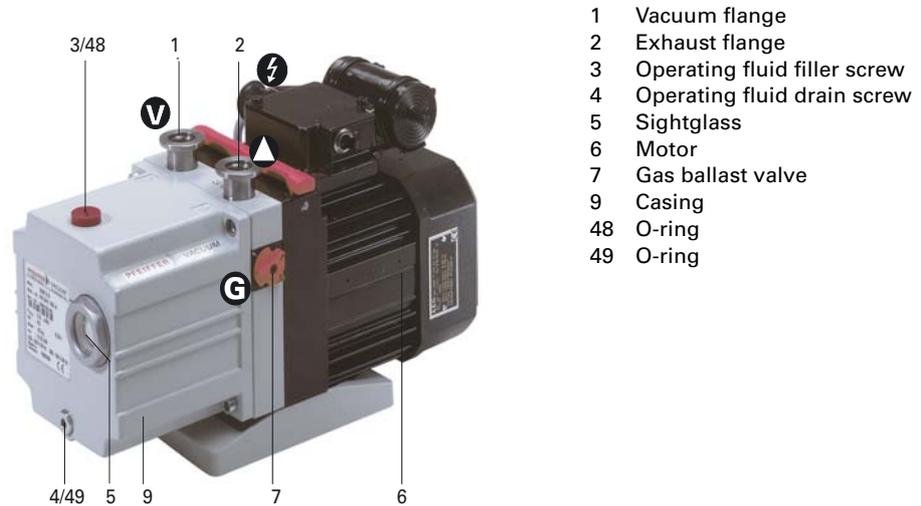


Fig. 3: UNO/DUO 2.5 Rotary vane vacuum pump

## 5 Installation

### 5.1 Setting up the pump

#### Installation location

Observe the following requirements when setting up the pump:

- Maximum angle of inclination 10° to each side
- Maximum erection height 2000 m N.N.
- Permissible ambient temperature: +12 ... +40°C
- Maximum relative humidity 85%

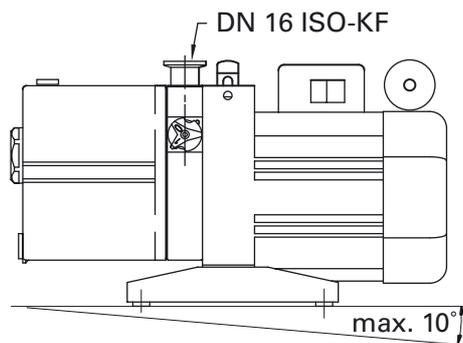


Fig. 4: Setting up

- Fill up with operating fluid before operating the first time (see p. 9, chap. 5.2).
  - Amount and type according to rating plate
- Always place the pump on a firm, even surface.
- Where stationary installation is involved, anchor the pump on site; if necessary, exchange the base for one with mounting holes (on request).
- When installing the pump in a closed housing, ensure there is sufficient air circulation.
  - Sightglass 5 and gas ballast valve 7 must be visible and readily accessible.
  - Voltage and frequency information given on the motor rating plate must be visible.

## 5.2 Filling up the operating fluid

The type and amount of operating fluid should be visible on the pump's rating plate for every rotary vane vacuum pump.

The delivery consignment for the **standard pump** contains sufficient operating fluid for one filling. Pumps for special applications (e.g. for pumping corrosive gases) can be operated with other operating fluids. These operating fluids must be ordered separately, and using them requires prior authorisation from Pfeiffer Vacuum.

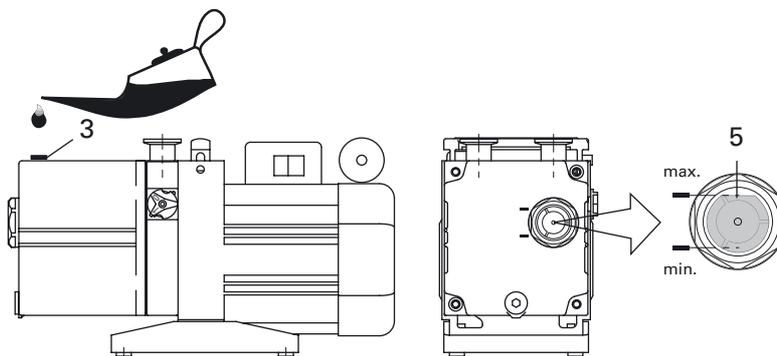
### Permissible operating fluids

- P3 (Standard operating fluid)
- F4 (Operating fluid for corrosive gas versions)
- D1 for special applications (on request)
  - Final pressure of measurement, depending on the type of gas:  $< 5 \cdot 10^{-2}$  mbar

Guarantees relating to attainment of final pressures and trouble free functioning of the pump apply only providing one of these operating fluids is used.

### Filling up the operating fluid

- Unscrew operating fluid filler screw.
- Fill up operating fluid.
  - Correct filling level: Middle of sightglass
  - Minimum filling level: lower sightglass marking at the casing



**Fig. 5: Filling up the operating fluid**

- Screw in operating fluid filler screw 3.
- Check operating fluid level only when the pump is warm and running; close
  - vacuum flange and gas ballast valve to do so.
  - Check operating fluid daily in non-stop operation, otherwise whenever the pump is switched on. Refilling is possible when the pump is in final vacuum operation.



<b>WARNING</b>
<p><b>Toxic vapours!</b></p> <p>Danger of poisoning when igniting and heating synthetic operating fluids (e.g. F4/F5) above 300°C.</p> <ul style="list-style-type: none"> <li>→ Observe the application instructions of the operating fluid manufacturer.</li> <li>→ Do not allow operating fluid to make contact with tobacco products; observe safety precautions when handling chemicals.</li> </ul>

### 5.3 Connecting the vacuum side

- The connection between the pump and the vacuum chamber should be kept as short as possible.
  - Use metallic hoses or PVC hoses with flange connections.
  - Clear welded lines of any tinder, loose parts, etc. before installation.
  - In order to protect the pump, the separators, filters etc. can be connected ahead (see Accessories). However, please observe the loss of pumping speed due to the conductance values of the accessories.

### 5.4 Connecting the exhaust side



<b>CAUTION</b>
<p><b>High pressure in the exhaust line!</b></p> <p>Danger of damage to the seals and danger of the pump bursting.</p> <ul style="list-style-type: none"> <li>→ Install the line without shut-off valves on the exhaust side.</li> <li>→ If there is danger of a build-up of excess pressure (&gt; 1500 mbar abs.) in the lines, observe all official accident prevention safety regulations.</li> <li>→ If the exhaust gases are being extracted, the exhaust pressure must be at least 250 mbar greater than the pressure at the intake side.</li> </ul>

- Choose the cross-section of the exhaust line to be at least the size of the nominal connection diameter of the vacuum pump's intake flange.
- Piping to the pump must be suspended or supported.
  - Forces from the piping system must not be allowed to act on vacuum pumps which are anchored.
- Lay piping from the pump sloping downward so that no condensate can flow back into the pump; otherwise fit a condensate separator.



<b>WARNING</b>
<p><b>Emission of toxic substances from the exhaust!</b></p> <p>Danger of poisoning from emitted gases or vapours, which can be detrimental to health and/or can pollute the environment, depending on the particular application.</p> <ul style="list-style-type: none"> <li>→ Comply with the applicable regulations when working with toxic substances.</li> <li>→ Only officially approved filter systems may be used to separate out these substances.</li> </ul>

## 5.5 Connecting to the mains power supply



### CAUTION

#### Excess voltage!

Danger of destroying the motor.

- Power connections must comply with local regulations. Voltage and frequency information given on the motor rating plate must correspond to the mains voltage and frequency values.
- To protect the motor in case of malfunction, mains fuse protection must be implemented.

### Single phase motors

The vacuum pumps are fitted with a built-in thermal protection switch. Depending on the type of pump, different motor versions with a power cord are possible:

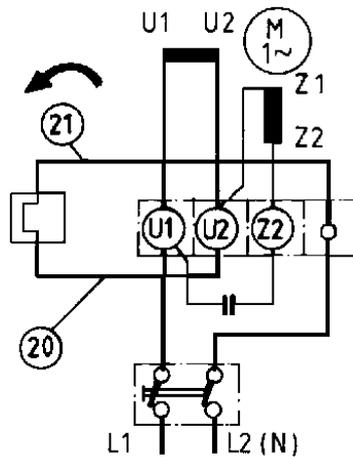


Fig. 6: Motor circuit diagram with switch

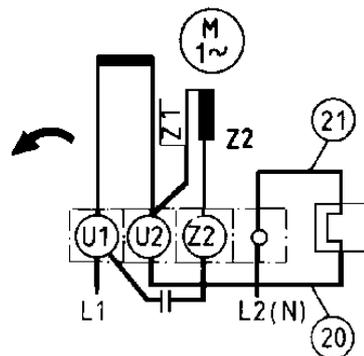


Fig. 7: Motor circuit diagram without switch

**Deliverable motor versions**

Motor voltage [V]	Frequency [Hz]	Nominal current [A]	Recommended fuse, slow [A]	Cable/plug version
95 ... 105 100 ... 115	50 60	3.2 3.8	6 6	with 2 m cable, Japanese plug und UL certificate (only for winding insulation)
100 ... 105 110 ... 130	50 60	3.2 3.6	6 6	mit 2 m cable, USA plug and UL certificate (for motor)
190 ... 210 200 ... 220	50 60	1.6 2	4 4	mit 2 m cable, without plug and UL certificate (for motor)
220 ... 240 220 ... 240	50 60	1.4 1.8	4 4	with 2 m cable and three-pin plug
115/230 115/230	50 60	2.8/1.4 3.6/1.8/	6/4 6/4	with 2 m cable, without plug with UL certificate for motor (motor switchable)



**WARNING**

**Danger of injury from moving parts!**

After power failure or motor shutdown due to overheating, the motor may restart automatically.

- Secure the motor so that it cannot be switched on while any work is being performed on the pump.
- If necessary, dismantle the pump from the installation for inspection.

**Motor protection**

- To protect the motor in case of malfunction, carry out fuse protection in accordance with the regional regulations.
  - Select a fuse with slow characteristics.

## 6 Operation

### 6.1 Before switching on the pump

- Check the operating fluid level in the sightglass.
- Compare the voltage information on the rating plate with the mains voltage.
- Check that the exhaust connection allows free flow (max. permissible pressure 1.5 bar absolute).
  - Activate the shut-off valves in such a way that they open before or at the same time as the pump is started.
- Protect the pump sufficiently from taking in contaminants by means of suitable precautions (e.g. dust filters); if necessary, check regularly or replace at shorter intervals.

### 6.2 Switching on the pump

The pump can be switched on in any pressure range.

No special precautions are necessary when pumping dry gases, provided that the correct pump version is used with the operating fluid specified for it.



#### CAUTION

##### Hot surface!

Danger of burns if hot parts are touched. Depending on the operating and ambient conditions, the surface temperature of the pump may rise above 70°C.

- In this case, use suitable finger guards.

### 6.3 Pumping condensable vapours

Should the process gases contain condensable gases present at high percentages, the pump must be operated with a gas ballast (i.e. with an open gas ballast valve).



#### CAUTION

##### Bad final vacuum and damage to the pump!

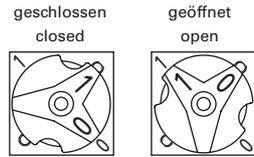
Danger of condensation and corrosion due to exceeding the water vapour compatibility (see Technical data) during operation without a gas ballast or in case of insufficient supply of flushing gas.

- Only pump vapours when the pump is warm and the gas ballast valve is open.
- When the process has been completed, allow the pump to continue running for about 30 minutes with the vacuum flange closed and the gas ballast open for operating fluid regeneration purposes.

#### Gas ballast valve, standard version

To avoid condensation in the pump when pumping condensable vapours, air is periodically fed into the working chamber at the beginning of the compression phase via the gas ballast valve 7.

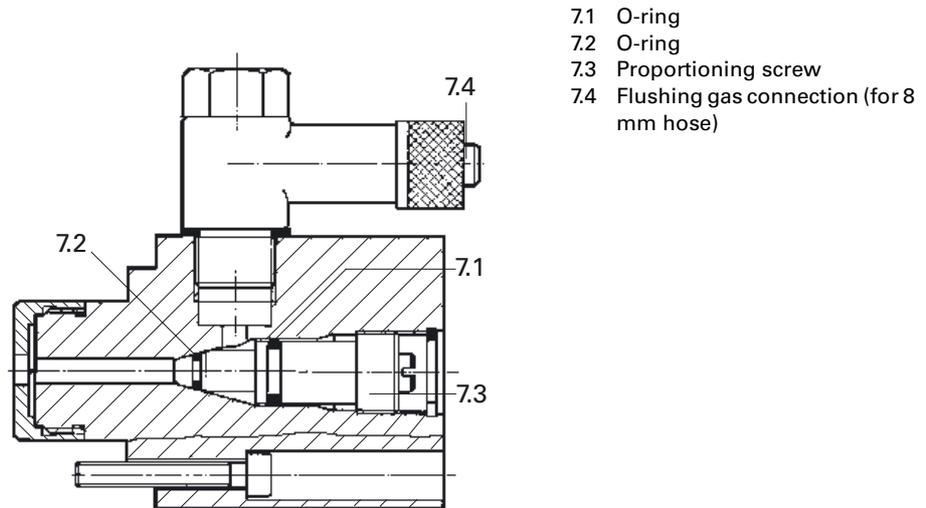
The gas ballast valve is closed when turning to the right to position 0 and open when turning to the left to position 1. Intermediate settings are not possible.



**Fig. 8: Standard version of gas ballast valve**

**Gas ballast valve, corrosive gas version**

If the pumping process requires the connection of flushing gas, the C version of the gas ballast with the flushing gas connection must be used.



**Fig. 9: Corrosive gas version of gas ballast valve**

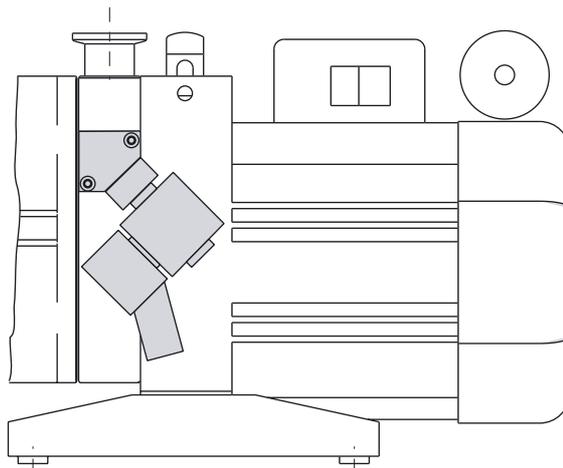
- Connect flushing gas at the flushing gas connection 7.4.
- Set flushing gas pressure; maximum pressure 1.2 bar (absolute).
  - Select the type and amount of flushing gas depending on the process; consult Pfeiffer Vacuum if necessary.
- Use the proportioning screw 7.3 to set the desired amount of gas.
  - Closed when fully turned to the right; open when fully turned to the left.

**Gas ballast valve with solenoid valve**

To control the flow of the flushing gas externally, an electromagnetic valve can also be used as an alternative to the versions described above. The valve makes it easier to operate the gas ballast and allows clean air or other gas to be let in in a process-controlled manner.



<b>CAUTION</b>	
<b>Flushing gas pressure higher than allowed endangers the operational reliability of the pump.</b>	
The power input of the pump, the temperature and the ejection of operating fluid will increase.	
→ Observe the maximum permissible flushing gas pressure.	
→ Set the amount of flushing gas on site; dosing is not possible on the solenoid valve!	



**Fig. 10: Solenoid valve for controlling the gas ballast inlet**

Performance data of the solenoid valve	
2/2 way valve	closed when disconnected
Supply voltage	24 VDC, +/- 10 %
Power input	4 W
Socket	Type 2506
Threaded connection of flushing gas	1/8" inside
Flushing gas pressure	max. 1.2 bar (absolute)
Amount of flushing gas	max. 250 l/h

## 6.4 Switching off the pump

The pump can be switched off in any pressure range.

Starting at a differential pressure of > 250 mbar between the intake and exhaust side, the integrated HV valve will automatically close when the pump is switched off. The intake line to the vacuum equipment (vacuum chamber) is blocked at the same time and the pump is vented.



### NOTE

**The pressure in the pump may rise due to inadvertent venting or leakage!**

Danger of backflow of operating fluid into the intake line.

- A differential pressure of > 250 mbar is necessary for proper functioning of the vacuum safety valve.
- Provide an additional shut-off valve in the intake line.

## 7 Maintenance

### 7.1 Precautions



#### WARNING

##### **Danger of injury from moving parts!**

After power failure or motor shutdown due to overheating, the motor may restart automatically.

- Secure the motor so that it cannot be switched on while any work is being performed on the pump.
- If necessary, dismantle the pump from the installation for inspection.



#### WARNING

##### **Pump parts may be contaminated from pumped media!**

Danger of poisoning due to contact with harmful substances.

- Decontaminate the pump before carrying out any maintenance work.
- In the event of contamination, take suitable safety precautions to prevent your health from being harmed by any dangerous substances.
- Allow the pump to cool to a safe temperature.
- Only dismantle the pump as far as necessary in order to repair defects.
- Dispose of used operating fluid in compliance with local regulations.
- When using synthetic operating fluids or working with toxic substances or substances contaminated with corrosive gases, the relevant instructions governing their use must be observed.
- Use only alcohol or similar agents for cleaning pump parts. Do not use soluble cleaning agents.

### 7.2 Changing the operating fluid

The changing interval for the operating fluid depends on the pump applications.

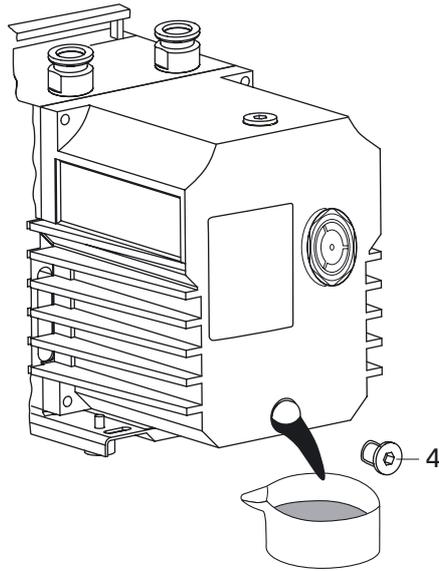


#### NOTE

##### **Depending on the applications, Pfeiffer Vacuum recommends determining the exact service life of the operating fluid during the first year of operation.**

The replacement interval may vary from the guide value specified by Pfeiffer Vacuum depending on the thermal and chemical loads, and the accumulation of suspended particles and condensation in the operating fluid.

- Change the operating fluid at least once every year.
- The level of deterioration of organic operating fluids (P3, for example) can be read off the colour scale in accordance with DIN 51578; request the supplementary sheet PK 0219 BN or download it from the Internet.
- Fill the specimen in a test tube or some similar vessel and test by holding against the light.
- Where discolouration is dark yellow to red brown (equivalent to 4 ... 5 on the scale) change operating fluid.
- Switch off pump.
- Unscrew operating fluid drain screw 4 and drain operating fluid.



**Fig. 11: Draining the operating fluid**



<b>WARNING</b>	
<b>Hot operating fluid!</b>	<p>Danger of burns when draining due to contact with skin.</p> <p>→ Wear suitable protective clothing.</p>



<b>WARNING</b>	
<b>Operating fluid may contain toxic substances from the pumped media!</b>	<p>Danger of poisoning from the emission of harmful substances (radioactive, toxic, etc.) from the operating fluid.</p> <p>→ Wear suitable protective clothing and respirators.</p> <p>→ Dispose of operating fluid according to the regulations</p>

- Screw in operating fluid drain screw 4; pay attention to o-ring.
- Allow pump to run for a maximum of 5 seconds with the vacuum flange open.
- Drain off remaining operating fluid.
  - In case of serious contamination, the operating fluid will have to be changed several times (flushing):

## Flushing

- Fill up the sightglass with operating fluid to the middle.
- Operate the pump with the gas ballast open until the pump has warmed up.
- Drain the operating fluid again and check for contamination, flush again if necessary.
- Screw the operating fluid drain screw back in.
- Fill up with operating fluid and check the filling level (see p. 9, chap. 5.2) .



<b>NOTE</b>	
<b>Request safety data sheets for operating fluids and lubricants</b>	<p>from Pfeiffer Vacuum or download them from the Internet.</p> <p>→ Dispose of operating fluid according to the local regulations.</p>

## 8 Shutdown

### 8.1 Shutting down for longer periods

Follow the following procedure before shutting down the pump for a longer period of time:

- Switch off pump.
- Change operating fluid (*see p. 16, chap. 7.2*).
- Allow the pump to warm up.
- Fill up the pump with new operating fluid to the top edge of the sightglass to protect all parts of the pump from corrosion.
- Close vacuum flange and exhaust flange with locking caps.



#### CAUTION

##### Emission of operating fluid!

Danger of the operating fluid being emitted at the exhaust flange if overfilled.

- Drain the operating fluid to the normal level before restarting the pump.

## 9 Malfunctions

Please note the following instructions should the pump malfunction:



#### CAUTION

##### Hot surface!

Danger of burns if hot parts are touched. The surface temperature of the pump may rise above 105°C in case of malfunction.

- Carry out work on the pump only after it has cooled to a safe temperature.



#### NOTE

##### Motor overload!

Depending on the malfunction (e.g. blocking during cold start), the motor may not be sufficiently protected by the built-in thermal protection switch from damage through overheating.

- Implement an additional network safety device.

## 9.1 Troubleshooting

Problem	Possible causes	Remedy
Pump will not start up	No mains voltage or voltage does not correspond to the motor data	Check mains voltage and mains fuse protection; check motor switch
	Pump temperature too low	Warm up pump to > 12°C
	Thermal protection switch has responded	Detect and fix cause of overheating; allow pump to cool off if necessary.
	Pump system dirty	Clean pump; contact Pfeiffer Vacuum Service if necessary.
	Pump system damaged	Clean and overhaul pump; contact Pfeiffer Vacuum Service if necessary.
	Motor defective	Replace motor
Pump switches off after a while after being started	Thermal protection switch of the motor has responded	Detect and fix cause of overheating; allow motor to cool off if necessary.
	Mains fuse protection triggered due to overload (e.g. cold start)	Warm up pump
	Exhaust pressure too high	Check opening of exhaust line and exhaust accessories
Pump does not attain final pressure	Measurement reading is false	Check gauge, check final pressure without installation connected.
	Pump or connected accessories are dirty	Clean pump and check components for contamination.
	Operating fluid dirty	Operate pump for a longer period with gas ballast valve open or change operating fluid
	Leak in system	Repair leak
	Operating fluid filling level too low	Top off operating fluid
	Pump damaged	Contact Pfeiffer Vacuum Service.
Pumping speed of pump too low	Intake line not well-dimensioned	Keep connections as short as possible and see that cross-sections are sufficiently dimensioned
	Exhaust pressure too high	Check opening of exhaust line and exhaust accessories
Loss of operating fluid	Swivel gasket leaky	Check tightness; replace gasket if necessary
	Radial shaft seal ring leaky	Replace seal ring and check bushing
	Operational loss of operating fluid	If necessary, install oil mist filter and oil return unit
Unusual operating noises	Silencer dirty	Clean or replace the silencer; .
	Damage to the pump system	Clean and overhaul pump; contact Pfeiffer Vacuum Service if necessary.
	Motor bearing defective	Replace motor; contact Pfeiffer Vacuum Service if necessary



### NOTE

**Service work may only be carried out by qualified personal!**

Pfeiffer Vacuum is not liable for any damage to the pump resulting from work carried out improperly.

- ➔ Take advantage of our service training programs from technical training; additional information at [www.pfeiffer-vacuum.net](http://www.pfeiffer-vacuum.net).
- ➔ Please state all the information on the pump rating plate when ordering spare parts.

## 10 Service

### **Pfeiffer Vacuum offers first-class service!**

- Maintenance/repairs on the spot by Pfeiffer Vacuum field service
- Maintenance/repairs in the nearby service center or service point
- Fast replacement with replacement products in mint condition
- Advice on the most cost-efficient and quickest solution

Detailed information and addresses at: **[www.pfeiffer-vacuum.net](http://www.pfeiffer-vacuum.net) (Service).**

### **Maintenance and repairs in the Pfeiffer Vacuum ServiceCenter**

The following steps are necessary to ensure a fast, smooth servicing process:

- RMA<sup>1)</sup> form and contamination declaration.
- Fill in the RMA form and send it by fax or e-mail to your service address.
- Enclose the RMA confirmation of receipt from Pfeiffer Vacuum in the shipment.
- Fill in the contamination declaration and enclose it in the shipment (required!).
- Dismantle all accessories.
- Drain operating fluid/lubricant.
- Send the pump in its original packaging if at all possible.

### **Returning contaminated vacuum pumps**

Units which are microbiologically, explosively or radioactively contaminated will not be accepted by Pfeiffer Vacuum as a matter of principle. Hazardous substances are substances and compounds in accordance with the hazardous goods directive (current version). Should pumps be contaminated or the contamination declaration be missing, Pfeiffer Vacuum will decontaminate the pumps at your cost.

### **Returning contaminated pumps or units**

- Neutralise the pump by flushing it with nitrogen or dry air.
- Close off all openings so that they are air-tight.
- Seal the pump or unit in suitable protective film.
- Only return the pump/unit in a suitable and sturdy transport container.

All service orders are carried out exclusively according to our repair conditions for vacuum units and components.

<sup>1)</sup> RMA: Download the return material authorisation

# 11 Spare parts package

## Set of seals

The set of seals contains all seals including all o-rings of the assembly groups and the subassemblies.

## Maintenance kit

The pack contains the o-rings of the operating fluid filler and drain screw for changing the operating fluid. Also the radial shaft seal ring and the o-ring for the casing after cleaning the operating fluid sump is included.

## Set of vanes

The pack contains the vanes of the pump stages and the vane springs.

## Overhaul kit

The pack contains all wearing parts of the pump to replace the following parts after dismantling the whole pump:

- Set of seals
- Wearing parts of the pumping system
- Wearing parts of the vacuum safety valve
- Wearing parts of the gas ballast valve.

## Set of vacuum safety valve

The pack contains the wearing parts of the vacuum safety valve. Also the o-rings between the valve housing and the pumping system and the o-ring of the casing are included.

## Set of discharge valves

The pack contains the wearing parts of the discharge valves. Also the wearing parts of the exhaust valve and the o-ring of the casing are included.

## Coupling kit

The pack contains the coupling halves, the can and the radial shaft seal ring.

Standard pump type	Pump type	Set of seals	Set of vanes	Maintenance kit	Overhaul kit	Set of vacuum safety valves	Discharge valves	Coupling kit
PK D31 707 ... PK D31 712	UNO 2.5	PK E00 002 -T	PK E08 003 -T	PK E01 004 -T	PK E02 005 -T	PK E04 001 -T	PK E05 001 -T	PK E06 001 -T
PK D41 707 ... PK D41 712	DUO 2.5	PK E00 002 -T	PK E08 014 -T	PK E01 004 -T	PK E02 008 -T	PK E04 001 -T	PK E05 001 -T	PK E06 001 -T
PK D31 807 ... PK D31 812	UNO 5	PK E00 002 -T	PK E08 004 -T	PK E01 004 -T	PK E02 026 -T	PK E04 007 -T	PK E05 010 -T	PK E06 001 -T

<b>Spare parts package</b>	<b>No.</b>	<b>Parts according to the exploded view on the following pages, is still incorrect</b>
Set of seals	PK E00 002 -T	13.1, 14 , 100, 101, 102, 103, 104, 105, 106, 107, 108, 109*, 110.
Set of vanes	PK E08 003 -T	12.4, 12.10, 12.15
	PK E08 004 -T	
	PK E08 014 -T	
Maintenance kit	PK E01 004 -T	14, 101, 102, 107, 110.
Overhaul kit	PK E02 005 -T	PK E00 002 -T, 3, 4, 7.7, 13, 16, 17, 19, 22, 24, 12.4, 12.10, 12.15
	PK E02 008 -T	PK E00 002 -T, 3, 4, 7.7, 13, 16, 17, 19, 22, 24, 12.4, 12.10, 12.15
	PK E02 026-T	PK E00 002 -T, 3, 4, 13, 7.1, 7.2, 7.7, 12.4, 12.10, 12.15, 13.3, 16, 17, 19, 22, 24, 28, 31.
Set of vacuum safety valves	PK E04 001 -T	4, 14, 16, 17, 22, 102, 104, 106.
	PK E04 007 -T	4, 14, 16, 17, 22, 104, 106, 109.
Discharge valves	PK E05 001 -T	14, 24, 25, 102, 104, 106.
	PK E05 010 -T	14, 24, 25, 104, 106, 109.
Coupling kit	PK E06 001 -T	3, 19, 110.

\* **only for UNO 5**



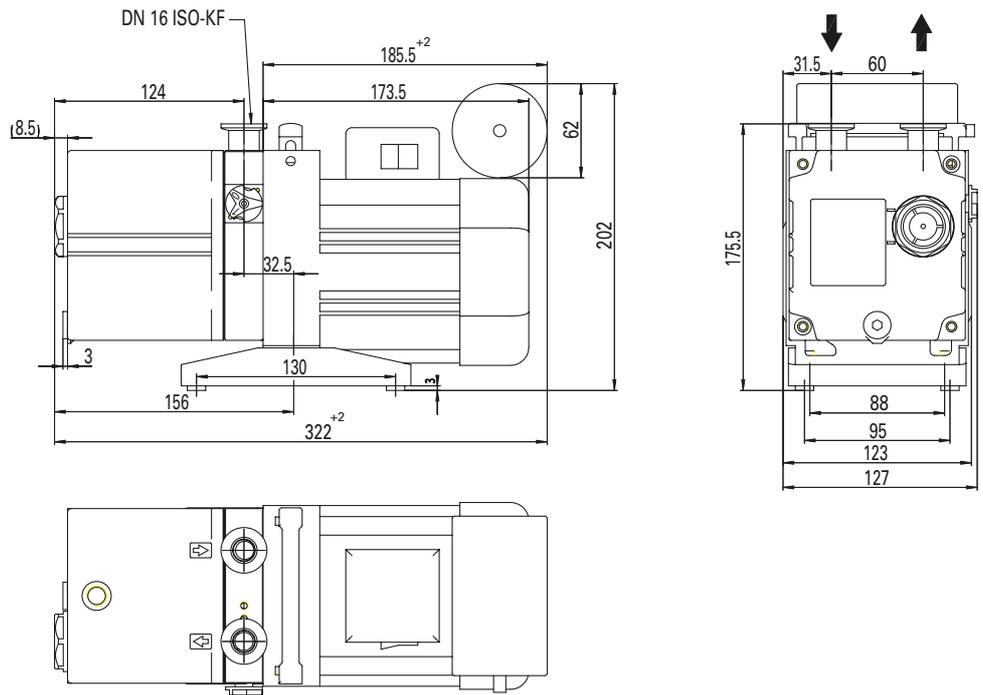
## 12 Accessories

Description	Size	Number	Comments/ (relevant manual)
Oil mist filter ONF 016	DN 16 ISO-KF	PK Z40 003	PK 0213 BN
Oil return unit of ONF 016 via special gas ballast valve		PK 194 315 -T	PK 0207 BN
Condensate separator KAS 16	DN 16 ISO-KF	PK Z10 003	PK 0220 BN
Dust separator STP 016	DN 16 ISO-KF	PK Z60 203	PK 0120 BN
Zeolite trap ZFO 016	DN 16 ISO -KF	PK Z70 003	PD 0005 BN
Operating fluid P3	0.5 litres	PK 001 136 -T	
Operating fluid P3	1 litre	PK 001 106 -T	
Operating fluid P3	5 litres	PK001 107 -T	
Operating fluid F4	0.5 litres	PK 005 886 -T	
Operating fluid F4	1 litre	PK 005 887 -T	

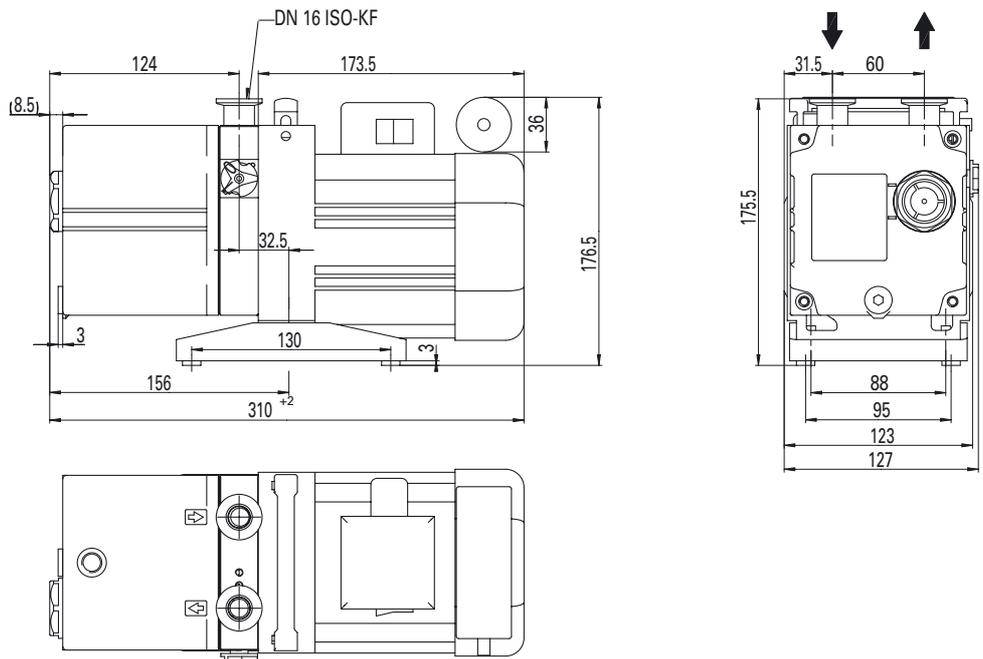
## 13 Technical data

Size	Unit	UNO 5	UNO 2.5	DUO 2.5 DUO 2.5 C
Connection nominal diameter Input Output		DN 16 ISO-KF DN 16 ISO-KF	DN 16 ISO-KF DN 16 ISO-KF	DN 16 ISO-KF DN 16 ISO-KF
Volume flow rate at 50 Hz 60 Hz	m <sup>3</sup> /h	4.6 5.1	2.5 3.9	2.5 3.9
Final pressure: Total with gas ballast Final pressure: Total without gas ballast	mbar	< 1 < 5 · 10 <sup>-2</sup>	< 1 < 5 · 10 <sup>-2</sup>	< 6 · 10 <sup>-3</sup> < 6 · 10 <sup>-3</sup>
Exhaust pressure, min. Exhaust pressure, max.	mbar	> 250 < 1500	> 250 < 1500	> 250 < 1500
Water vapour compatibility 50 Hz 60 Hz	mbar	20 20	15 15	15 15
Water vapour capacity 50 Hz 60 Hz	g/h	65 75	26 30	30 34
Noise level without gas ballast	dB(A)	55	53	53
Amount of operating fluid	l	0.40	0.45	0.4
Min. run-up temperature acc. to DIN 28 426	°C	+ 12	+ 12	+ 12
Max. permissible operating temperature (at 25°C ambient temperature and operating fluid P3, with gas ballast)	°C	80	80	80
Rotation speed at 50 Hz 60 Hz	1/min	2880 3420	2880 3420	2880 3420
Rated power, motor 50 Hz 60 Hz	kW	0.15 0.18	0.15 0.18	0.15 0.18
Weight	kg	10.5	10.2	10.5

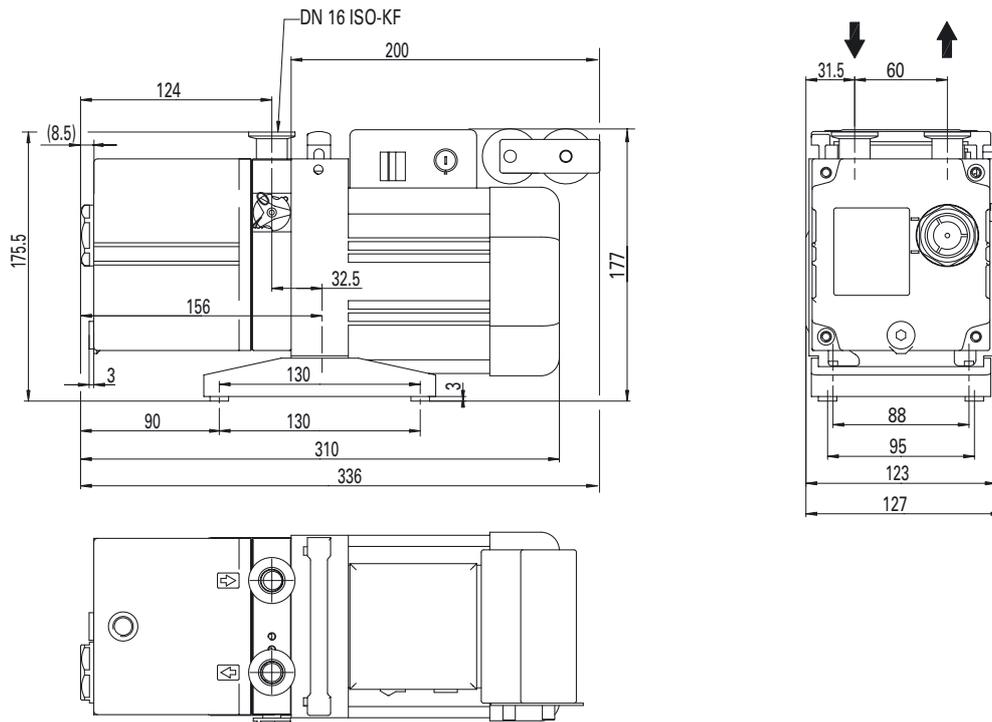
### 13.1 Dimensions



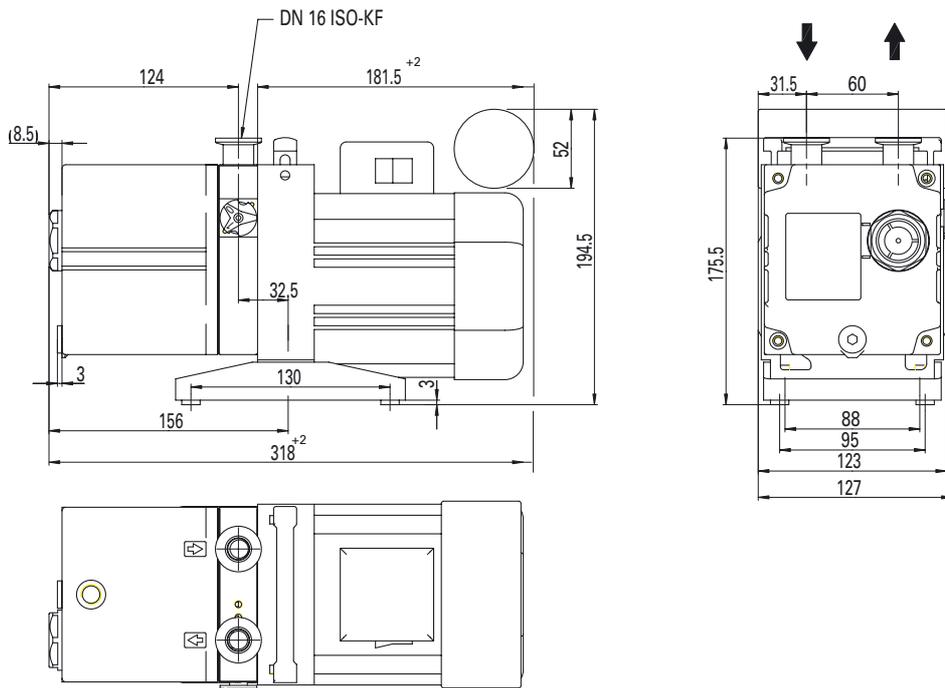
**Fig. 12: Dimensions for motor versions: 95 ... 105 V; 50 Hz / 100 ... 115V, 60 Hz**



**Fig. 13: Dimensions for motor versions: 190 ... 210 V, 50 Hz / 200 ... 220V, 60 Hz / 220 ... 240 V, 50/60 Hz**



**Fig. 14: Dimensions for motor versions: 115/230, 50/60 Hz**



**Fig. 15: Dimensions for motor versions: 100 ... 105 V; 50 Hz / 110 ... 130V, 60 Hz**



**Konformitätserklärung**  
**Declaration of Conformity**



im Sinne folgender EU-Richtlinien:

*pursuant to the following EU directives:*

- Maschinen/*Machinery* **98/37/EG** Anhang/*Annex IIA*)
- Elektromagnetische Verträglichkeit/ *Electromagnetic Compatibility* **89/336/EWG**
- Niederspannung/*Low Voltage* **73/23/EWG**

Hiermit erklären wir, dass das unten aufgeführte Produkt den Bestimmungen der EU-Maschinenrichtlinie 98/37/EG, der EU-Richtlinie über Elektromagnetische Verträglichkeit 89/336/EWG und der EU-Niederspannungsrichtlinie 73/23/EWG entspricht.

*We hereby certify, that the product specified below is in accordance with the provision of EU Machinery Directive 98/37/EEC, EU Electromagnetic Compatibility Directive 89/336/EEC and EU Low Voltage Directive 73/23/EEC.*

**Produkt/Product:**

**UNO/DUO 2.5**

**DUO 2.5 C**

**UNO 5**

Angewendete Richtlinien, harmonisierte Normen und angewendete, nationale Normen in Sprachen und Spezifikationen:

*Guidelines, harmonised standards, national standards in languages and specifications which have been applied:*

- DIN EN ISO 12100-1; DIN EN ISO 12100-2
- EN 294
- EN 60335-1, 41
- EN 61010
- EN 60204
- EN 50081-1, -2
- EN 1012-2

**Unterschrift/Signature:**

Pfeiffer-Vacuum GmbH  
Berliner Strasse 43  
35614 Asslar  
Germany

(W. Dondorf)  
Geschäftsführer  
*Managing Director*

Konf. II/2000

**Vacuum is nothing, but everything to us!**



**Turbopumps**



**Rotary vane pumps**



**Roots pumps**



**Dry compressing pumps**



**Leak detectors**



**Valves**



**Components and feedthroughs**



**Vacuum measurement**



**Gas analysis**



**System engineering**



**Service**

**PFEIFFER**  **VACUUM**

Pfeiffer Vacuum Technology AG · Headquarters/Germany

Tel. +49-(0) 64 41-8 02-0 · Fax +49-(0) 64 41-8 02-2 02 · [info@pfeiffer-vacuum.de](mailto:info@pfeiffer-vacuum.de) · [www.pfeiffer-vacuum.net](http://www.pfeiffer-vacuum.net)