Translation of the Original Operating Instructions

UnoLine™
DuoLine™

Rotary Vane Pumps

UNO/DUO 35/65
UNO/DUO 35/65 M
DUO 35/65 C/MC
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1  About this manual

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.

Applicable documents

<table>
<thead>
<tr>
<th>UNO/DUO 35/65</th>
<th>Operating instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety information for vacuum pumps “Safety Guide”</td>
<td>PT 0300 BN*</td>
</tr>
<tr>
<td>Declaration of Conformity</td>
<td>Part of this document</td>
</tr>
<tr>
<td>Operating instructions for accessories (order-specifically)</td>
<td>see section “accessories”*</td>
</tr>
</tbody>
</table>

*also available via www.pfeiffer-vacuum.net

1.2  Conventions

Safety instructions

The safety instructions 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:

**DANGER**

Immediate danger

Death or very severe injuries occur.

**WARNING**

Possible danger

Death or injuries may occur.

**CAUTION**

Possible danger

Medium to slight injuries may occur.

**NOTE**

Command or note

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.

Instructions in the text

Work instruction: here you have to do something.

Abbreviations used

C version: Corrosive gas version
M version: Version with magnetic coupling
MC version: C-Version with magnetic coupling

Symbols used

The following symbols are used consistently throughout in all illustrations:

- Vacuum flange
- Exhaust flange
- Gas ballast valve
- Power connection
2 Safety

2.1 Safety precautions

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duty to inform</td>
</tr>
</tbody>
</table>
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.  
⇒ Absolute observe the safety information for vacuum pumps (PT 0300 BN)!  
⇒ The operator is obligated to make operating personnel aware of dangers originating from the vacuum pump, the pumped medium and 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 pumps.
- Depending on the operating and ambient conditions, the surface temperature of the pumps 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.

The following safety instructions are only valid for the disassembly of the drive system for a vacuum pump with a magnetic coupling:

- When disassembling the drive system from the pump housing, the strong magnetic field may influence the function and operational reliability of electrical and electronic devices.
- Persons with cardiac pacemakers must keep away from the magnetic coupling. Danger to life!
- Disassembled magnetic couplings must be kept away from computers, data storage media and other electronic components.
- Keep the disassembled components of the magnetic coupling separate at all times. Danger of crushing!
- Do not allow any magnetised parts into the vicinity of the magnetic coupling. Danger of injury!

2.2 Proper use

<table>
<thead>
<tr>
<th>NOTE</th>
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<tbody>
<tr>
<td>CE conformity</td>
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</table>
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.

- 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.
2.3 Improper use

Improper use will cause all claims for liability and guarantees to be forfeited. Improper use is deemed to be all use for purposes deviating from those mentioned above, especially:

- Pumping of corrosive gases (with exception of corrosive gas versions).
- 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 vacuum pump to generate pressure.
- Pumping of liquids.
- The use of operating fluids not specified by Pfeiffer Vacuum.
- 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.

3 Transport and storage

3.1 Transport

Transport instructions

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

![Fig. 1: Transporting the pump](image)

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 temperature (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 ensure reliable identification of the product, always keep all of the information on the rating plate to hand, and use it when communicating with Pfeiffer Vacuum:

- Pump model and model number
- Serial number
- Type and quantity of the operating fluid
- Date of manufacture

For motor-specific data, please see the separately installed motor rating plate.

Fig. 2: Product identification on the rating plate

Scope of delivery

- Pump with motor (power cord/power switch --> dependent on the motor type)
- Operating fluid P3 (for standard pump)
- Cone strainer and centering ring with O-ring
- Locking cap for vacuum and exhaust flange
- Operating instructions

Differences between the pump type

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Pump versions</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNO/DUO 35/65</td>
<td>Standard version of pump</td>
</tr>
<tr>
<td>DUO 35/65 C</td>
<td>C version of pump; differences from the standard version:</td>
</tr>
<tr>
<td></td>
<td>• Operating fluid F5</td>
</tr>
<tr>
<td></td>
<td>• Vane material changed</td>
</tr>
<tr>
<td></td>
<td>• Gas ballast valve with dosable flushing gas connection</td>
</tr>
<tr>
<td></td>
<td>• Leak rate ≤ 1*10⁻⁵ mbar * l/s</td>
</tr>
<tr>
<td>UNO/DUO 35/65 M</td>
<td>M version of pump; differences from the standard version:</td>
</tr>
<tr>
<td></td>
<td>• Magnetic coupling at the pump system</td>
</tr>
<tr>
<td></td>
<td>• Leak rate ≤ 1*10⁻⁵ mbar * l/s</td>
</tr>
<tr>
<td>DUO 35/65 MC</td>
<td>MC version of pump; differences from the standard version:</td>
</tr>
<tr>
<td></td>
<td>• Operating fluid F5</td>
</tr>
<tr>
<td></td>
<td>• Vane material changed</td>
</tr>
<tr>
<td></td>
<td>• Gas ballast valve with dosable flushing gas connection</td>
</tr>
<tr>
<td></td>
<td>• Magnetic coupling at the pump system</td>
</tr>
<tr>
<td></td>
<td>• Oiler for the shaft feed through</td>
</tr>
<tr>
<td></td>
<td>• Leakrate ≤ 1*10⁻⁵ mbar * l/s</td>
</tr>
</tbody>
</table>
4.2 Construction and function

The UnoLine™/DuoLine™ pumps are oil sealed, single-/two-stage rotary vane pumps with air cooling and pressure oil lubrication and suitable for many coarse and fine vacuum applications. The pumps are equipped with a vacuum safety valve that vacuum seals the vacuum chamber and vents the pump at the same time when the pump is at a standstill. The pump version with magnetic coupling is not subject to any mechanical wear, and is thus maintenance-free.

**Fig. 3: Rotary vane pump UNO/DUO 35/65**

1. Vacuum flange
2. Exhaust flange
4. Support stand
6. Casing
74. Gas ballast valve
80. Sight glass
104. Base plate
140. Operating fluid filler screw
142. Operating fluid filler screw
234. O-ring
236. O-ring
250. Motor

**Fig. 4: Rotary vane pump DUO 35/65 C**

74. Gas ballast valve with flushing gas connection
110. Oiler
104. Base plate
142. Operating fluid drain screw
236. O-ring
5 Installation

5.1 Setting up the pump

Installation location

Observe the following requirements when setting up the pump:

- Note the load-bearing capacity of the mounting surface.
- Maximum installation altitude 2000 m (above mean sea level)
- Permissible ambient temperature: +12...+40°C
- Maximum relative humidity 85%

Fig. 5: Setting up

- Fill up with operating fluid before operating the first time (see p. 13, chap. 5.5).

  - 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.

- When installing the pump in a closed housing, ensure there is sufficient air circulation.
  - Sightglass and gas ballast valve must be visible and readily accessible.
  - Voltage and frequency information given on the motor rating plate must be visible.

5.2 Connecting the vacuum side

- Before attaching the piping at the vacuum flange remove locking cap and insert protective strainer with the respective O-ring.

- The connection between the pump and the recipient should be kept as short as possible.
  - Depending on the pump type, use metallic hoses or PVC hoses with flange connections.
  - Separators, filters etc. may be installed upstream to protect the pump (see accessories). However, please observe the loss of pumping capacity due to the conductivity of the accessories.

If a protective strainer is inserted into the intake port, the suction capacity loss is negligible.
5.3 Connecting the exhaust side

**CAUTION**

High pressure in the exhaust line!
Danger of damage to the seals and danger of the pump bursting.

- Install the line without shut-off valves on the exhaust side.
- If there is danger of a build-up of excess pressure (> 1500 mbar abs.) in the lines, observe all official accident prevention safety regulations.
- If the exhaust gases are being extracted, the exhaust pressure must be at least 250 mbar greater than the pressure at the intake side.

- Choose the cross-section of the exhaust line to be at least the size of the nominal connection diameter of the vacuum pump’s exhaust connection.
- Piping to the pump must be suspended or supported.
  - Forces from the piping system must not be allowed to act on vacuum pumps.
- Lay piping from the pump, sloping downward so that no condensate can flow back into the pump; otherwise fit a condensate separator.
  - If an air trap is created in the system then a device for draining condensation water must be provided at the lowest point.

**WARNING**

Emission of toxic substances from the exhaust!
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.

- Comply with the applicable regulations when working with toxic substances.
- Only officially approved filter systems may be used to separate out these substances.

5.4 Connecting to the mains power supply

Depending on the pump type, different motor versions are possible:

- Three phase motor without switch and mains cable (with 3 PTC).
- Three phase motor with switch and mains cable (without 3 PTC).

**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 and supply cable in case of malfunction, mains fuse protection must be implemented.

**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.
Three phase motor

Inspection of the direction of rotation

With pumps with three-phase motors is it necessary to check the direction of rotation!

### CAUTION

**Operating fluids may leak out!**

If the direction of rotation is incorrect, there is a danger that operating fluids may leak at the vacuum flange.

→ Always check the direction of rotation before filling in operating fluid.

→ Remove the locking cap from the exhaust flange (if existing).
→ Switch the pump on briefly (from 2 to 3 sec.).
   - The motor and motor fan must turn in a clockwise direction (see the arrow on the support stand).
→ If the direction of rotation is incorrect: Swap two phase contacts at the connecting cable.
→ Fill up the operating fluid.

Motor protection

Pump motors equipped with PTC temperature sensors (3PTC) in the stator windings can be connected to a PTC resistor tripping device for protection against overload.

Tripping devices store the shutdown event and need to be manually switched back on again via the integrated RESET button or via the external RESET S3. Mains-ON is detected as an automatic RESET. Other approved motor temperature monitoring can be used also by the operator.

→ Set up the connections so that the directional rotation indicated on the pump is maintained, regardless of the representations in the current flow diagram.

**NOTE**

The transmission power of the pump’s magnetic coupling is so great that there is no overload protection for the motor.
Installation

On site fuse protection with current circuit-breaker

valid for motor version without switch/with 3PTC
Depending on the process conditions and the intake pressure, the motor can become overloaded, i.e. the power input can exceed $I_N$. In cyclical operation, it is permissible for the current to temporarily exceed the rated current $I_N$ by 15%, provided that the motor temperature is monitored by means of a thermistor.

Fuse protection with preset circuit-breaker in terminal box

valid for motor version with switch/without 3PTC
Operating conditions that exceed the rated current $I_N$ for longer periods can trigger the current circuit-breaker. In this case monitoring with a PTC temperature sensor (3PTC) is not possible.

The Three Phase Current Motor Circuit

Delta Connection
The three coils are connected in series with the connection point connected to the mains. The voltage of each coil is the same as the mains voltage whereas the mains current is the cube root of the coil current. Delta connections are denoted by the symbol $\Delta$. The voltage between the mains supply lines is called mains voltage. The mains current is the current which flows in the supply lines.

![Fig. 7: Motor coil and connecting plate of Delta Connection](image)

Star Connection
The ends of the three coils are connected at the star center. The terminal voltage is the cube root of the coil voltage; the mains and the coil current are the same. Star connections are denoted by the symbol $\text{Y}$. A star connection three phase motor for 400 V mains voltage has a coil voltage of 230 V.

![Fig. 8: Motor coil and connecting plate of Star Connection](image)
5.5 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 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 must be defined in accordance with Pfeiffer Vacuum specifications before initial assembly and ordered separately.

**Permissible operating fluids**
- P3 (Standard operating fluid)
- F5 (Operating fluid for corrosive gas versions)
- D1 (for special applications and higher operating temperature)
  - Final pressure of measurement, depending on the type of gas: \(< 5 \times 10^{-2}\) mbar

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
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<tbody>
<tr>
<td>Guarantees relating to attainment of final pressures and trouble free functioning of the pump apply only providing one of the permissible operating fluids is used.</td>
</tr>
</tbody>
</table>

**Filling up the operating fluid**

- Unscrew operating fluid filler screw.
- Fill up operating fluid.
  - Correct filling level during operations: Within the markings at the sightglass frame.

**Fig. 9: Filling up the operating fluid**

- Screw in operating fluid filler screw 140.
- 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.

<table>
<thead>
<tr>
<th>WARNING</th>
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<tbody>
<tr>
<td><strong>Toxic vapours!</strong></td>
</tr>
<tr>
<td>Danger of poisoning when igniting and heating synthetic operating fluids (e.g. F4/F5) above 300°C.</td>
</tr>
</tbody>
</table>
- Observe the application instructions of the operating fluid manufacturer.
- Do not allow operating fluid to make contact with tobacco products; observe safety precautions when handling chemicals. |
5.6 Operations monitoring (option)

A pressure switch can be installed on the side of the support to monitor the oil pressure of the rotary vane pump during operations. By pressure drop and when the pump is at rest, the contact of the pressure switch opens. The signal can be used to control external valves:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching voltage</td>
<td>5 ... 250 Volt (potential free)</td>
</tr>
<tr>
<td>Maximum current</td>
<td>2 Amp.</td>
</tr>
<tr>
<td>Protection type</td>
<td>IP 55</td>
</tr>
</tbody>
</table>

1 + 2 NO switches = open without pressure

Fig. 10: Circuit diagram, pressure switch for operating fluid monitoring
6 Operation

6.1 Before switching on the pump

- Check the operating fluid level in the sightglass.
- Check the voltage and frequency information on the rating plate with the mains voltage and frequency values.
- 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 operating fluid 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. In order to attain the lowest possible final pressures, the gas ballast valve should be closed.

**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 rotary vane 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.

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

**Gas ballast valve, standard version**

To avoid condensation in the pump when pumping condensable vapours, ambient air or alternatively inertgas is periodically fed into the working chamber at the beginning of the compression phase via the gas ballast valve 74.

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.
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.

- Connect flushing gas at the hose nozzle of the gas ballast valve.
- Set flushing gas pressure; maximum pressure 1.5 bar (absolute).
  - Select the type and amount of flushing gas depending on the process; consult Pfeiffer Vacuum if necessary.

**CAUTION**

Flushing gas pressure higher than allowed endangers the operational reliability of the pump.

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 maximum permissible flushing gas pressure via the spindle in the gas ballast valve or on site!
6.4 Switching off the pump

The pump can be switched off in any pressure range.

Rotary vane pumps have an integrated safety valve on the intake side. If the differential pressure between the exhaust side and the intake side is \( \geq 250 \) mbar, then the valve closes automatically and vents the pump when the pump is switched off.

\[ \text{Switch the pump off at the mains switch or disconnect from the mains in a secure manner.} \]

Venting the vacuum chamber

**CAUTION**

Danger of backflow of operating fluid into the intake line!

Contamination of the connected vacuum system!

\[ \text{Vent the vacuum chamber within 30 s, regardless of the chamber size.} \]

\[ \text{For a longer venting process, use an additional shut-off valve and shut off the intake line after switching off the pump.} \]

Maintaining the vacuum in the chamber

**CAUTION**

Danger of backflow of operating fluid into the intake line!

Contamination of the connected vacuum system!

\[ \text{Because the safety valve of the pump is not suitable for longer-term sealing, install an additional shut-off valve in the intake line.} \]

\[ \text{Shut off the intake line immediately after switching off the pump.} \]
7 Maintenance

7.1 Precautions

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
</table>
| **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. |

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
</table>
| **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.
Certain repair and overhaul work should only be performed by Pfeiffer Vacuum Service (PV). Pfeiffer Vacuum will be released from all warranty and liability claims if the required intervals for inspection, maintenance, or overhaul are exceeded or inspection, maintenance, repair or overhaul procedures are not performed properly. This also applies if replacement parts other than Pfeiffer Vacuum OEM replacement parts are used.

### 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 operating fluid P3 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 142 and drain operating fluid.
Fig. 13: Draining the operating fluid

**WARNING**

Hot operating fluid!
Danger of burns when draining due to contact with skin.
⇒ Wear suitable protective clothing.

**WARNING**

Operating fluid may contain toxic substances from the pumped media!
Danger of poisoning from the emission of harmful substances (radioactive, toxic, etc.) from the operating fluid.
⇒ Wear suitable protective clothing and respirators.
⇒ Dispose of operating fluid according to the local regulations

⇒ Screw in operating fluid drain screw 142; 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 with operating fluid to the middle of the sight glass.
⇒ 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. 13, chap. 5.5).

**NOTE**

Request safety data sheets for operating fluids and lubricants from Pfeiffer Vacuum or download them from the Internet.
⇒ Dispose of operating fluid according to the local regulations.
## 7.3 Cleaning the gas ballast valve

Gas ballast valve only becomes dirty if dusty ambient air is sucked in.

- Unscrew screw 74.4 (standard version).
- Remove gas ballast head 74.5. Be careful with O-rings 74.14 and 74.18 (standard version).
- Unscrew two screws 74.22 (74.23 C version).
- Remove gas ballast flange 74.2 (74.7 C version); take care with O-rings 74.18 and 74.20.
- Unscrew screw 74.26, remove washer 74.32 and plate spring 74.6.
- DC-Version: remove circlip 74.34.
- Unscrew spindle 74.8 with O-rings 74.10 and 74.12.
- Unscrew hose nozzle 74.9 with O-ring 74.16.
- Clean nozzle opening in gas ballast flange 74.2 (74.7 C version).
- Check plate spring 74.6 and replace if necessary.
- Unscrew silencer screw 74.3; be careful with O-ring 74.12.
- Unscrew 2 screws 184 from gas ballast valve housing 74.1, take care with O-rings 232 and 238.
- Clean all parts and, if necessary, replace defective parts or gas ballast valve complete.
- Assembly in reverse order.

---

**Fig. 14: Gas ballast valve standard version 74, PK 223 664-U**

- 74.1 Gas ballast valve housing
- 74.2 Gas ballast flange
- 74.3 Silencer screw
- 74.4 Special screw
- 74.5 Gas ballast knob
- 74.6 Plate spring
- 74.12 O-ring
- 74.14 O-ring
- 74.18 O-ring
- 74.20 O-ring
- 74.22 Screw
- 74.26 Screw
- 74.30 Guide pin
- 74.32 Washer
- 184 Screw
- 232 O-ring
- 238 O-ring
Fig. 15: Gas ballast valve C version 74, (set of retrofit: PK 223 713-U)

- 74.1 Gas ballast valve housing
- 74.3 Silencer screw
- 74.7 Special gas ballast flange
- 74.8 Spindle
- 74.9 Hose connecting piece
- 74.10O-ring
- 74.12O-ring
- 74.16O-ring
- 74.18O-ring
- 74.20O-ring
- 74.24Screw
- 74.34Circlip
- 184 Screw
- 232 O-ring
- 238 O-ring
7.4 Cleaning and setting the silencer

The silencer is a nozzle set inside the gas ballast flange which silences the knocking sound of the oil. When dirty it should be cleaned or replaced.

Cleaning the silencer

- Unscrew silencer screw 74.3; be careful with O-ring 74.12.
- Clean the boring.
- Re-fit silencer 74.3 with O-ring 74.12.

Adjusting the silencer

- First screw silencer screw 74.3 tight.
- Turn gas ballast knob 74.5 clockwise, in position "0".
  - C version: Close spindle 9 by turning to the right.
- A knocking sound soon will be audible when the pump is running.
- Slowly loosen silencer screw 74.3 until the knocking sound disappears.

Adjusting the gas ballast level

C version The gas ballast level can be adjusted by turning the spindle 74.8:

- Turning to the left: Open.
- Turning to the right: Closed.

7.5 Checking the oil level in the oiler (only for C version pumps)

Pumps in the corrosive gas version come equipped with an additional oiler. In these versions the cavity between the radial shaft seal rings on the rotor shaft are supplied with operating fluid by an oiler.

- Check oil level during continuous operation on a daily basis, otherwise each time the pump is switched on.
- When filling, oiler 110 should only be filled up to the "max." mark on sightglass 114;
  - use the same operating fluid as in the pump.
8 Decommissioning

8.1 Shutting down for longer periods
Before shutting down the pump, observe the following procedure and adequately protect the pump system against corrosion:

- Switch off pump.
- Change operating fluid (see p. 19, chap. 7.2).
- Start the pump and allow the pump to warm up.
- Fill up the pump with new operating fluid to the top edge of the sightglass.
- Close vacuum flange and exhaust flange with locking caps.

8.2 Restarting the pump
Visually inspect the inner of the pump before taking it into operation. If there is evidence of rust on the parts of the pump which form the housing then do not take it into operation and contact Pfeiffer Vacuum Service.
Depending on how long the pump is taken out of operation, it may be necessary to replace the radial shaft sealing rings. With reference to DIN 7716 and the manufacturer’s specifications we recommend replacing the installed elastomer parts after 2 years.

- If drying pearls were inserted then they should be removed now. Improper handling can cause failure of the pump.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
</table>

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.

8.3 Disposal
Products or parts thereof (mechanical and electrical components, operating fluids, etc.) may cause environmental burden.

- Safely dispose of the materials according to the locally applicable regulations.
### 9 Malfunctions

Please note the following instructions should the pump malfunction:

<table>
<thead>
<tr>
<th>DANGER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strong magnetic field in the vicinity of the drive system!</strong></td>
</tr>
<tr>
<td>Danger to life for persons with cardiac pacemakers when the drive system is disassembled.</td>
</tr>
<tr>
<td>➤ Persons with cardiac pacemakers must not enter the area of the magnetic field.</td>
</tr>
<tr>
<td>➤ Disassembled magnetic couplings must be kept away from computers, data storage media and other electronic components.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hot surface!</strong></td>
</tr>
<tr>
<td>Danger of burns if hot parts are touched. The surface temperature of the pump may rise above 105 °C in case of malfunction.</td>
</tr>
<tr>
<td>➤ Carry out work on the pump only after it has cooled to a safe temperature.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor overload!</strong></td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>➤ Implement an additional network safety device.</td>
</tr>
</tbody>
</table>
## 9.1 Troubleshooting

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

### NOTE

Service work should 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.
- 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 exchange products in mint condition
- Advice on the most cost-efficient and quickest solution

Detailed information and addresses at: www.pfeiffer-vacuum.net (Service).

Maintenance and repairs in the Pfeiffer Vacuum Service Center
The following steps are necessary to ensure a fast, smooth servicing process:

- Download the RMA\(^1\) 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.
- Drain cooling medium, if used.
- Send the pump or unit 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/unit by flushing it with nitrogen or dry air.
- Close off all openings so that they are air-tight.
- Seal the pump/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.

\(^1\) RMA: Return Material Authorization
11 Spare parts

Please also specify model number of the the rating plate when ordering accessories or spare parts.

**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(s), the o-ring for the casing after cleaning the operating fluid sump and the coupling star are included.

**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.

**Pumping system**
The pack contains an assembled pumping system, tested with operating fluid P3 or F5 (only for C-Version).

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

**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, coupling set and the fan.

**Coupling kit (valid for M/MC version)**
The pack contains the coupling halves the can and the respective o-ring.
### 11.1 Spare parts packages

The spare parts packages listed here are only applicable for standard models. Please state all information on the rating plate when ordering spare parts. Other spare parts than those described in this manual must not be used without the agreement of Pfeiffer vacuum.

<table>
<thead>
<tr>
<th>Pump type with revision index “A”</th>
<th>Set of seals</th>
<th>Maintenance kit</th>
<th>Overhaul kit</th>
<th>Pumping system</th>
<th>Set of vanes</th>
<th>Vacuum safety valve</th>
<th>Discharge valves</th>
<th>Coupling kit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C version</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DUO 35 C</td>
<td>PK E20 003 -T</td>
<td>PK E21 007 -T</td>
<td>PK E22 007 -T</td>
<td>PK E23 004 -T</td>
<td>PK E28 004 -T</td>
<td>PK E24 001 -T</td>
<td>PK E25 003 -T</td>
<td>PK E26 001 -T</td>
</tr>
<tr>
<td>DUO 65 C</td>
<td>PK E20 003 -T</td>
<td>PK E21 003 -T</td>
<td>PK E22 014 -T</td>
<td>PK E23 007 -T</td>
<td>PK E28 006 -T</td>
<td>PK E24 001 -T</td>
<td>PK E25 005 -T</td>
<td>PK E26 001 -T</td>
</tr>
<tr>
<td><strong>M version</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DUO 35 M</td>
<td>PK E20 001 -T</td>
<td>PK E21 002 -T</td>
<td>PK E22 010 -T</td>
<td>PK E23 005 -T</td>
<td>PK E28 003 -T</td>
<td>PK E24 001 -T</td>
<td>PK E25 001 -T</td>
<td>PK E26 002 -T</td>
</tr>
<tr>
<td>DUO 65 M</td>
<td>PK E20 001 -T</td>
<td>PK E21 002 -T</td>
<td>PK E22 012 -T</td>
<td>PK E23 012 -T</td>
<td>PK E28 005 -T</td>
<td>PK E24 001 -T</td>
<td>PK E25 004 -T</td>
<td>PK E26 002 -T</td>
</tr>
<tr>
<td><strong>MC version</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 12 Accessories

Further detailed accessories are contained in the Pfeiffer Vacuum printed Catalogue or the Online Catalogue.

<table>
<thead>
<tr>
<th>Description</th>
<th>Size</th>
<th>Number</th>
<th>Comments/ (relevant manual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas ballast valve, retrovit kit</td>
<td></td>
<td>PK 223 713 -U</td>
<td>C version for flushing gas connection</td>
</tr>
<tr>
<td>Gas ballast valve with solenoid valve, retrovit kit</td>
<td></td>
<td>PK 223 717 -U</td>
<td>C version (24 V/DC)</td>
</tr>
<tr>
<td>Dust separator STZ 040</td>
<td>DN40 ISO-KF</td>
<td>PK Z60 008</td>
<td>PK 0120 BN</td>
</tr>
<tr>
<td>Dust separator STR 040</td>
<td>DN40 ISO-KF</td>
<td>PK Z60 108</td>
<td>PK 0120 BN</td>
</tr>
<tr>
<td>Oil mist filter ONF 35/65</td>
<td>DN40 ISO-KF</td>
<td>PK Z40 150</td>
<td>PK 0183 BN</td>
</tr>
<tr>
<td>Oil mist filter ONF 35/65 C</td>
<td>DN40 ISO-KF</td>
<td>PK Z40 152</td>
<td>PK 0183 BN, C-Version</td>
</tr>
<tr>
<td>Oil mist filter ONFR 35/65 C</td>
<td>DN40 ISO-KF</td>
<td>PK Z40 153</td>
<td>PK 0183 BN, C-Version</td>
</tr>
<tr>
<td>Oil return retrofit kit</td>
<td></td>
<td>PK 005 710 -T</td>
<td></td>
</tr>
<tr>
<td>Chemical oil filter OFC 35/66</td>
<td></td>
<td>PK Z90 320</td>
<td>PK 0182 BN</td>
</tr>
<tr>
<td>Mechanical oil filter OFM 35/66</td>
<td></td>
<td>PK Z90 321</td>
<td>PK 0184 BN</td>
</tr>
<tr>
<td>Condensate separator KAS 040</td>
<td>DN40 ISO-KF</td>
<td>PK Z10 008 A</td>
<td>PK 0116 BN</td>
</tr>
<tr>
<td>Cooling trap KLF 040</td>
<td>DN40 ISO-KF</td>
<td>auf Anfrage</td>
<td>PD 0015 BN</td>
</tr>
<tr>
<td>Adsorption filter FAK 040</td>
<td>DN40 ISO-KF</td>
<td>auf Anfrage</td>
<td>PD 0017 BN</td>
</tr>
<tr>
<td>Adsorption filter FBL 040</td>
<td>DN40 ISO-KF</td>
<td>auf Anfrage</td>
<td>PD 0017 BN</td>
</tr>
<tr>
<td>Zeolite trap ZFO 040</td>
<td>DN40 ISO-KF</td>
<td>auf Anfrage</td>
<td>PD 0018 BN</td>
</tr>
<tr>
<td>Operation control unit with oil pressure switch</td>
<td></td>
<td>PK 223 720 -U</td>
<td>PK 0191 BN</td>
</tr>
<tr>
<td>Operation control unit with oil pressure switch when using OFC/OFM</td>
<td></td>
<td>PK 223 741 -U</td>
<td>PK 0191 BN</td>
</tr>
<tr>
<td>Sight glass adapter without sensors</td>
<td></td>
<td>PK 223 721 -U</td>
<td>PK 0190 BN</td>
</tr>
<tr>
<td>Sight glass adapter complete with sensors</td>
<td></td>
<td>PK 223 739 -U</td>
<td>PK 0190 BN</td>
</tr>
<tr>
<td>Sight glass adapter with operating fluid level control</td>
<td></td>
<td>PK 223 718 -U</td>
<td>PK 0190 BN</td>
</tr>
<tr>
<td>Operating fluid P3 1 litre</td>
<td></td>
<td>PK 001 106 -T</td>
<td></td>
</tr>
<tr>
<td>Operating fluid P3 5 litre</td>
<td></td>
<td>PK 001 107 -T</td>
<td></td>
</tr>
<tr>
<td>Operating fluid P3 20 litre</td>
<td></td>
<td>PK 001 108 -T</td>
<td></td>
</tr>
<tr>
<td>Operating fluid D1 1 litre</td>
<td></td>
<td>PK 005 875 -T</td>
<td></td>
</tr>
<tr>
<td>Operating fluid D1 5 litre</td>
<td></td>
<td>PK 005 876 -T</td>
<td></td>
</tr>
<tr>
<td>Operating fluid D1 20 litre</td>
<td></td>
<td>PK 005 877 -T</td>
<td></td>
</tr>
<tr>
<td>Operating fluid F5 1 litre</td>
<td></td>
<td>PK 001 852 -T</td>
<td>C version</td>
</tr>
<tr>
<td>Operating fluid F5 5 litre</td>
<td></td>
<td>PK 001 853 -T</td>
<td>C version</td>
</tr>
<tr>
<td>Operating fluid F5 0,25 litre</td>
<td></td>
<td>PK 001 854 -T</td>
<td>C version</td>
</tr>
<tr>
<td>PTC resistor tripping unit</td>
<td></td>
<td>P 4768 051 FQ</td>
<td></td>
</tr>
</tbody>
</table>

1 filled with zeolite
## 13 Technical Data

### UNO/DUO 35

<table>
<thead>
<tr>
<th>Feature</th>
<th>UNO 35</th>
<th>DUO 35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flange (in)</td>
<td>DN 40 ISO-KF</td>
<td>DN 40 ISO-KF</td>
</tr>
<tr>
<td>Flange (out)</td>
<td>DN 40 ISO-KF</td>
<td>DN 40 ISO-KF</td>
</tr>
<tr>
<td>Pumping speed at 50 Hz</td>
<td>32 m³/h</td>
<td>32 m³/h</td>
</tr>
<tr>
<td>Pumping speed at 60 Hz</td>
<td>36 m³/h</td>
<td>36 m³/h</td>
</tr>
<tr>
<td>Ultimate pressure with gas ballast</td>
<td>≤ 5·10⁻² mbar</td>
<td>≤ 5·10⁻³ mbar</td>
</tr>
<tr>
<td>Ultimate pressure without gas ballast</td>
<td>≤ 1 mbar</td>
<td>≤ 3·10⁻³ mbar</td>
</tr>
<tr>
<td>Leakage rate safety valve</td>
<td>≤ 1 · 10⁻⁴ mbar · l/s</td>
<td>≤ 1 · 10⁻⁴ mbar · l/s</td>
</tr>
<tr>
<td>Water vapor tolerance at 50 Hz</td>
<td>30 mbar</td>
<td>20 mbar</td>
</tr>
<tr>
<td>Water vapor tolerance at 60 Hz</td>
<td>30 mbar</td>
<td>20 mbar</td>
</tr>
<tr>
<td>Water vapor capacity 50 Hz</td>
<td>700 g/h</td>
<td>600 g/h</td>
</tr>
<tr>
<td>Water vapor capacity 60 Hz</td>
<td>780 g/h</td>
<td>660 g/h</td>
</tr>
<tr>
<td>Emission sound pressure level without gas ballast</td>
<td>≤ 61 dB (A)</td>
<td>≤ 61 dB (A)</td>
</tr>
<tr>
<td>Pump fluid filling</td>
<td>4,5 l</td>
<td>3,2 l</td>
</tr>
<tr>
<td>Rated power 50 Hz</td>
<td>1.1 kW</td>
<td>1.1 kW</td>
</tr>
<tr>
<td>Rated power 60 Hz</td>
<td>1.25 kW</td>
<td>1.25 kW</td>
</tr>
<tr>
<td>Nominal rotation speed at 50 Hz</td>
<td>1400 rpm</td>
<td>1400 rpm</td>
</tr>
<tr>
<td>Nominal rotation speed at 60 Hz</td>
<td>1690 rpm</td>
<td>1690 rpm</td>
</tr>
<tr>
<td>Weight</td>
<td>50 kg</td>
<td>56 kg</td>
</tr>
</tbody>
</table>

### UNO/DUO 65

<table>
<thead>
<tr>
<th>Feature</th>
<th>UNO 65</th>
<th>DUO 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flange (in)</td>
<td>DN 40 ISO-KF</td>
<td>DN 40 ISO-KF</td>
</tr>
<tr>
<td>Flange (out)</td>
<td>DN 40 ISO-KF</td>
<td>DN 40 ISO-KF</td>
</tr>
<tr>
<td>Pumping speed at 50 Hz</td>
<td>62 m³/h</td>
<td>62 m³/h</td>
</tr>
<tr>
<td>Pumping speed at 60 Hz</td>
<td>70 m³/h</td>
<td>70 m³/h</td>
</tr>
<tr>
<td>Ultimate pressure with gas ballast</td>
<td>≤ 5·10⁻² mbar</td>
<td>≤ 5·10⁻³ mbar</td>
</tr>
<tr>
<td>Ultimate pressure without gas ballast</td>
<td>≤ 1 mbar</td>
<td>≤ 3·10⁻³ mbar</td>
</tr>
<tr>
<td>Leakage rate safety valve</td>
<td>≤ 1 · 10⁻⁴ mbar · l/s</td>
<td>≤ 1 · 10⁻⁴ mbar · l/s</td>
</tr>
<tr>
<td>Water vapor tolerance at 50 Hz</td>
<td>30 mbar</td>
<td>20 mbar</td>
</tr>
<tr>
<td>Water vapor tolerance at 60 Hz</td>
<td>30 mbar</td>
<td>20 mbar</td>
</tr>
<tr>
<td>Water vapor capacity 50 Hz</td>
<td>1400 g/h</td>
<td>1000 g/h</td>
</tr>
<tr>
<td>Water vapor capacity 60 Hz</td>
<td>1580 g/h</td>
<td>1120 g/h</td>
</tr>
<tr>
<td>Emission sound pressure level without gas ballast</td>
<td>≤ 61 dB (A)</td>
<td>≤ 61 dB (A)</td>
</tr>
<tr>
<td>Pump fluid filling</td>
<td>5,4 l</td>
<td>4,2 l</td>
</tr>
<tr>
<td>Rated power 50 Hz</td>
<td>1.5 kW</td>
<td>1.5 kW</td>
</tr>
<tr>
<td>Rated power 60 Hz</td>
<td>1.7 kW</td>
<td>1.7 kW</td>
</tr>
<tr>
<td>Nominal rotation speed at 50 Hz</td>
<td>1400 rpm</td>
<td>1400 rpm</td>
</tr>
<tr>
<td>Nominal rotation speed at 60 Hz</td>
<td>1690 rpm</td>
<td>1690 rpm</td>
</tr>
<tr>
<td>Weight</td>
<td>60 kg</td>
<td>65 kg</td>
</tr>
</tbody>
</table>
13.1 Dimension diagram

Fig. 16: UNO/DUO 35/65

Fig. 17: DUO 35/65 M

Fig. 18: DUO 35/65 MC
Declaration of conformity

according to the EC directive:

• Machinery 2006/42/EC (Annex II, no. 1 A)

We hereby declare that the product cited below satisfies all relevant provisions of
EC directive "Machinery" 2006/42/EC.
In addition, the product cited below satisfies all relevant provisions of EC directive
"Electromagnetic Compatibility" 2004/108/EC.
The agent responsible for compiling the technical documentation is Mr. Sebastian
Oberbeck, Pfeiffer Vacuum GmbH, Berliner Straße 43, 35614 Aßlar.

DuoLine®/DuoLine™
UNO/DUO 35/65
DUO 35/65 C/MC
UNO/DUO 35/65 M

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

DIN EN ISO 12100-1 : 2004
DIN EN ISO 12100-2 : 2004
DIN EN 1012-2 : 1996
DIN EN ISO 14121-1 : 2007

DIN EN ISO 13857 : 2008
DIN EN 61000-6-1 : 2007
DIN EN 61000-6-2 : 2006
DIN EN 61000-6-3 : 2007
DIN EN 61000-6-4 : 2007

Signatures:

(M.Bender)
Managing Director

(Dr. M. Wiemer)
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CE/2010
Vacuum is nothing, but everything to us!

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- Rotary vane pumps
- Roots pumps
- Dry compressing pumps
- Leak detectors
- Valves
- Components and feedthroughs
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