



OPERATING INSTRUCTIONS

EN

Translation of the Original

HEPTA 400 P

Screw pump

PFEIFFER  **VACUUM**

Dear Customer,

Thank you for choosing a Pfeiffer Vacuum product. Your new screw pump is designed to support you with its performance, perfect operation and without impacting your individual application. The name Pfeiffer Vacuum stands for high-quality vacuum technology, a comprehensive and complete range of top-quality products and first-class service. With this expertise, we have acquired a multitude of skills contributing to an efficient and secure implementation of our product.

Knowing that our product must not interfere with your actual work, we are convinced that our product offers you the solution that supports you in the effective and trouble-free execution of your individual application.

Please read these operating instructions before putting your product into operation for the first time. If you have any questions or suggestions, please feel free to contact info@pfeiffer-vacuum.de.

Further operating instructions from Pfeiffer Vacuum can be found in the [Download Center](#) on our website.

Disclaimer of liability

These operating instructions describe all models and variants of your product. Note that your product may not be equipped with all features described in this document. Pfeiffer Vacuum constantly adapts its products to the latest state of the art without prior notice. Please take into account that online operating instructions can deviate from the printed operating instructions supplied with your product.

Furthermore, Pfeiffer Vacuum assumes no responsibility or liability for damage resulting from the use of the product that contradicts its proper use or is explicitly defined as foreseeable misuse.

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1 About this manual



IMPORTANT

Read carefully before use.
Keep the manual for future consultation.

1.1 Validity

This operating instructions is a customer document of Pfeiffer Vacuum. The operating instructions describe the functions of the named product and provide the most important information for the safe use of the device. The description is written in accordance with the valid directives. The information in this operating instructions refers to the product's current development status. The document shall remain valid provided that the customer does not make any changes to the product.

1.1.1 Applicable documents

Document	Number
Declaration of conformity	A component of these instructions

You can find this document in the [Pfeiffer Vacuum Download Center](#).

1.1.2 Variants

These instructions are applicable for HeptaDry vacuum pumps.

Pump type	Pump version
Hepta 400 P	Dry-compressing screw pump, water-cooled

1.2 Target group

This operating instructions is intended for persons who

- transport,
- installation,
- operate,
- decommissioning,
- servicing and cleaning,
- storage or disposal.

The work described in this document may only be carried out by persons who have appropriate professional qualifications (experts).

1.3 Conventions

1.3.1 Instructions in the text

Usage instructions in the document follow a general structure that is complete in itself. The required action is indicated by an individual step or multi-part action steps.

Individual action step

A horizontal, solid triangle indicates the only step in an action.

- This is an individual action step.

Sequence of multi-part action steps

The numerical list indicates an action with multiple necessary steps.

1. Step 1
2. Step 2
3. ...

1.3.2 Pictographs

The pictographs used in the document indicate useful information.



Note



Tip








true



false

1.3.3 Stickers on the product

This section describes all the stickers on the product along with their meaning.

 <p>PFEIFFER <i>VACUUM</i></p> <p>D-35614 Asslar</p> <p>Made in Germany</p> <table border="1"> <tr> <td>Vacuum Pump Hepta 400 P</td> <td>S/N = PPPYYWWNNNN</td> </tr> <tr> <td>$p_{abs} = 1 \text{ hPa (mbar)}$</td> <td>$V_{max} = 300 \text{ m}^3/\text{h}$</td> </tr> <tr> <td>$n_{max} = 3600 \text{ min}^{-1}$</td> <td>$m = 500 \text{ kg}$</td> </tr> <tr> <td>Oil = Pfeiffer D1</td> <td>Oil quantity = 1 L</td> </tr> <tr> <td colspan="2">PU V83 0004 000</td> </tr> </table>	Vacuum Pump Hepta 400 P	S/N = PPPYYWWNNNN	$p_{abs} = 1 \text{ hPa (mbar)}$	$V_{max} = 300 \text{ m}^3/\text{h}$	$n_{max} = 3600 \text{ min}^{-1}$	$m = 500 \text{ kg}$	Oil = Pfeiffer D1	Oil quantity = 1 L	PU V83 0004 000		<p>Rating plate (example) Rating plate for the screw pump</p>
Vacuum Pump Hepta 400 P	S/N = PPPYYWWNNNN										
$p_{abs} = 1 \text{ hPa (mbar)}$	$V_{max} = 300 \text{ m}^3/\text{h}$										
$n_{max} = 3600 \text{ min}^{-1}$	$m = 500 \text{ kg}$										
Oil = Pfeiffer D1	Oil quantity = 1 L										
PU V83 0004 000											
	<p>Motor rating plate Rating plate of the motor</p>										
	<p>Warning hot surface This sticker warns of injuries caused by high temperatures as a result of contact without safeguards during operation.</p>										
	<p>Operating instructions note This sticker indicates that this operating instructions must be read before performing any tasks.</p>										
	<p>Arrow indicating direction of rotation The direction of rotation arrow indicates the required motor rotation direction.</p>										

Tbl. 1: Stickers on the product

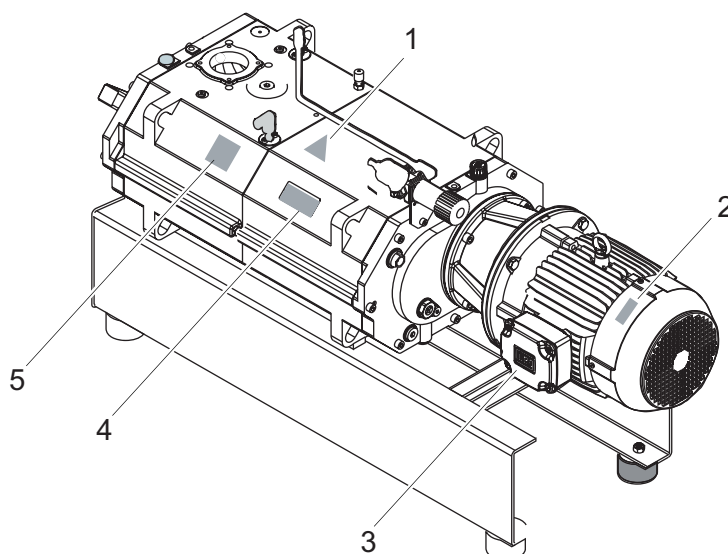


Fig. 1: Position of sticker on the product shown as an example

- | | |
|--|-----------------------------------|
| 1 Hot surface warning sign | 4 Rating plate for the screw pump |
| 2 Arrow indicating direction of rotation | 5 Operating instructions note |
| 3 Rating plate of the motor | |

1.3.4 Abbreviations

Abbreviation	Meaning in this document
OI	Operating instructions
FCR	Fluorocarbon rubber
N.N.	Mean sea level
PE	Protective earth (earthed conductor)
WAF	Width across flats
SLM	Standard liter per minute
T	Temperature switch
VCI	Volatile Corrosion Inhibitor

Tbl. 2: Abbreviations used in this document

1.4 Trademark proof

- Zitrec® M is a registered trademark of Arteco nv/sa.
- ROTEX® is a registered trademark of ROTEX Heating Systems GmbH.

2 Safety

2.1 General safety information

The following 4 risk levels and 1 information level are taken into account in this document.

DANGER

Immediately pending danger

Indicates an immediately pending danger that will result in death or serious injury if not observed.

- Instructions to avoid the danger situation

WARNING

Potential pending danger

Indicates a pending danger that could result in death or serious injury if not observed.

- Instructions to avoid the danger situation

CAUTION

Potential pending danger

Indicates a pending danger that could result in minor injuries if not observed.

- Instructions to avoid the danger situation

NOTICE

Danger of damage to property

Is used to highlight actions that are not associated with personal injury.

- Instructions to avoid damage to property



Notes, tips or examples indicate important information about the product or about this document.

2.2 Safety instructions

All safety instructions in this document are based on the results of the risk assessment carried out in accordance with Machinery Directive 2006/42/EC Annex I and DIN EN ISO 12100 Section 5. Where applicable, all life cycle phases of the product were taken into account.

Risks during transport

WARNING

Risk of serious injury from oscillating, toppling or falling objects

During transport, there is a risk of crushing and impact on oscillating, toppling or falling objects. There is a risk of injuries to limbs, up to and including bone fractures and head injuries.

- Secure the danger zone if necessary.
- Note the center of gravity of the load during transport.
- Do not lift the vacuum pump via the eye bolt on the motor.
- Ensure harmonious movements and moderate speeds.
- Observe safe handling of the transport devices.
- Avoid sloping attachment aids.
- Never stack products.
- Wear protective equipment, e.g. safety shoes.

Risks during installation

⚠ DANGER**Danger to life from electric shock**

Touching exposed and voltage-bearing elements causes an electric shock. Improper connection of the mains supply leads to the risk of touchable live housing parts. There is a risk to life.

- ▶ Before the installation, check that the connection leads are voltage-free.
- ▶ Make sure that electrical installations are only carried out by qualified electricians.
- ▶ Provide adequate grounding for the device.
- ▶ After connection work, carry out an earthed conductor check.

⚠ WARNING**Danger of injury due to exposed rotating parts**

Danger of crushing fingers and hands when the vacuum connection is open.

- ▶ Safely disconnect motor from the mains.
- ▶ Secure the motor against reactivation.
- ▶ Never insert hands or fingers into the vacuum connection.

⚠ CAUTION**Danger of injury from bursting as a result of high pressure in the exhaust line**

Faulty or inadequate exhaust pipes lead to dangerous situations, e.g., increased exhaust pressure. There is a danger of bursting. Injuries caused by flying fragments, the escaping of high pressure, and damage to the unit cannot be excluded.

- ▶ Open shut-off units immediately before or at the same time as starting the pump.
- ▶ Take care that atmospheric pressure is always present on the exhaust side. Overpressure or underpressure are not permissible.
- ▶ Check the function of the exhaust line on a regular basis.

Risks during operation

⚠ CAUTION**Health hazard from increased noise emission**

Remaining in the close proximity of the vacuum pump for a sustained period of time may cause hearing damage.

- ▶ Ensure adequate sound insulation.
- ▶ Wear hearing protection.

⚠ CAUTION**Danger of burns on hot surfaces**

Depending on the operating and ambient conditions, the surface temperature of the vacuum pump can increase to above 70 °C.

- ▶ Provide suitable touch protection.

Risks during maintenance, decommissioning and malfunctions

⚠ DANGER**Danger to life from electric shock**

Touching exposed and voltage-bearing elements causes an electric shock. Improper connection of the mains supply leads to the risk of touchable live housing parts. There is a risk to life.

- ▶ Before the installation, check that the connection leads are voltage-free.
- ▶ Make sure that electrical installations are only carried out by qualified electricians.
- ▶ Provide adequate grounding for the device.
- ▶ After connection work, carry out an earthed conductor check.

WARNING

Health hazard through poisoning from toxic contaminated components or devices

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ▶ Decontaminate affected parts before carrying out maintenance work.
- ▶ Wear protective equipment.

WARNING

Danger to life from electric shock in the event of a fault

In the event of a fault, devices connected to the mains may be live. There is a danger to life from electric shock when making contact with live components.

- ▶ Always keep the mains connection freely accessible so you can disconnect it at any time.

WARNING

Health hazard and environmental damage from toxic contaminated lubricant

Toxic process media can cause lubricant contamination. When changing the lubricant, there is a health hazard due to contact with poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Wear suitable personal protective equipment when handling these media.
- ▶ Dispose of the lubricant according to locally applicable regulations.

CAUTION

Danger of injury from moving parts

After a power failure or a standstill as a result of overheating, the motor restarts automatically. There is a risk of injury to fingers and hands if they enter the operating range of rotating parts.

- ▶ Safely disconnect motor from the mains.
- ▶ Secure the motor against reactivation.
- ▶ Dismantle the vacuum pump for inspection, away from the system if necessary.

CAUTION

Danger of burns on hot surfaces

In the event of a fault, the surface temperature of the vacuum pump can increase to above 105 °C.

- ▶ Allow the vacuum pump to cool down before carrying out any work.
- ▶ Wear personal protective equipment if necessary.

CAUTION

Scalding from hot lubricant

Danger of scalding when draining lubricant if it comes into contact with the skin.

- ▶ Wear protective equipment.
- ▶ Use a suitable collection receptacle.

Risks during disposal

⚠ WARNING**Health hazard through poisoning from toxic contaminated components or devices**

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ▶ Decontaminate affected parts before carrying out maintenance work.
- ▶ Wear protective equipment.

2.3 Safety precautions

**Duty to provide information on potential dangers**

The product holder or user is obliged to make all operating personnel aware of dangers posed by this product.

Every person who is involved in the installation, operation or maintenance of the product must read, understand and adhere to the safety-related parts of this document.

**Infringement of conformity due to modifications to the product**

The Declaration of Conformity from the manufacturer is no longer valid if the operator changes the original product or installs additional equipment.

- Following the installation into a system, the operator is required to check and re-evaluate the conformity of the overall system in the context of the relevant European Directives, before commissioning that system.

General safety precautions when handling the product

- ▶ Observe all applicable safety and accident prevention regulations.
- ▶ Check that all safety measures are observed at regular intervals.
- ▶ Do not expose body parts to the vacuum.
- ▶ Always ensure a secure connection to the earthed conductor (PE).
- ▶ Never disconnect plug connections during operation.
- ▶ Observe the above shutdown procedures.
- ▶ Keep lines and cables away from hot surfaces (> 70 °C).
- ▶ Never fill or operate the unit with cleaning agents or cleaning agent residues.
- ▶ Do not carry out your own conversions or modifications on the unit.
- ▶ Observe the unit protection class prior to installation or operation in other environments.
- ▶ Provide suitable touch protection, if the surface temperature exceeds 70 °C.

2.4 Limits of use of the product

Parameter	Hepta 400 P
Installation location	<ul style="list-style-type: none"> • Indoors, protected from dust deposits • Outdoors, protected from direct weather influences
Installation altitude	max. 1000 m above sea level
Orientation	Horizontal
permissible angle of inclination	± 1 °
Pumped medium intake temperature, max.	≤ 50 hPa: +200 °C > 50 hPa: +70 °C
Ambient temperature	5 – 50 °C

Parameter	Hepta 400 P
Relative humidity of air	max. 95 % at 30 °C
Exhaust pressure	Atmospheric pressure

Tbl. 3: Limits of use of the product

2.5 Proper use

- ▶ Use the vacuum pump for vacuum generation only.
- ▶ To protect the lubricant and the bearing, use sealing gas if high boiling, corrosive or particle-laden media (e.g. solvents) are pumped.
- ▶ Operate the vacuum pump within the application limits of the product and in compliance with the technical data.
- ▶ Adhere to the installation, commissioning, operating, and maintenance instructions.
- ▶ Use only accessory parts recommended by Pfeiffer Vacuum.

2.6 Foreseeable improper use

Improper use of the product invalidates all warranty and liability claims. Any use that is counter to the purpose of the product, whether intentional or unintentional, is regarded as improper use; in particular:

- Pumping of explosive media
- Pumping radioactive media
- Pumping of corrosive media
- Pumping media that introduce an ignition source to the suction chamber
- Pumping of gases that contain impurities such as particles, dust or condensate
- Pumping fluids that do not serve cleaning
- Use of the vacuum pump in potentially explosive atmospheres
- Use of the vacuum pump outside the specified area of application
- Use for pressure generation
- Use in strong electrical, magnetic, or electromagnetic fields
- Connection to vacuum pumps or equipment which are not suitable for this purpose according to their operating instructions
- Connection to devices with exposed live parts
- Use of accessories or spare parts not listed in these operating instructions
- Using the vacuum pump as a climbing aid

2.7 Personnel qualification

The work described in this document may only be carried out by persons who have appropriate professional qualifications and the necessary experience.

Training people

1. Train the technical personnel on the product.
2. Only let personnel to be trained work with and on the product when under the supervision of trained personnel.
3. Only allow trained technical personnel to work with the product.
4. Before starting work, make sure that the commissioned personnel have read and understood these operating instructions and all applicable documents, in particular the safety, maintenance and repair information.

2.7.1 Ensuring personnel qualification

Specialist for mechanical work

Only a trained specialist may carry out mechanical work. Within the meaning of this document, specialists are people responsible for construction, mechanical installation, troubleshooting, and maintenance of the product, and who have the following qualifications:

- Qualification in the mechanical field in accordance with nationally applicable regulations
- Knowledge of this documentation

Specialist for electrical engineering work

Only a trained electrician may carry out electrical engineering work. Within the meaning of this document, electricians are people responsible for electrical installation, commissioning, troubleshooting, and maintenance of the product, and who have the following qualifications:

- Qualification in the electrical engineering field in accordance with nationally applicable regulations
- Knowledge of this documentation

In addition, these individuals must be familiar with applicable safety regulations and laws, as well as the other standards, guidelines, and laws referred to in this documentation. The above individuals must have expressly granted operational authorization, to commission, program, configure, mark, and earth devices, systems, and circuits in accordance with safety technology standards.

Trained individuals

Only adequately trained individuals may carry out all works in other transport, storage, operation, and disposal fields. Such training must ensure that individuals are capable of carrying out the required activities and work steps safely and properly.

2.7.2 Personnel qualification for maintenance and repair

Adequately trained individuals are:

- **Maintenance level 1**
 - Customer with technical education
 - Pfeiffer Vacuum service technician
- **Maintenance level 3**
 - Pfeiffer Vacuum service technician

3 Product description

3.1 Function

The HeptaDry screw pumps function according to the double screw-pump principle. Two screw rotors rotate in the compression chamber. The medium to be pumped is trapped between the individual screw coils, compacted and transported to the gas outlet. During the compression process, the two screw rotors do not come into contact with each other or with the suction chamber.

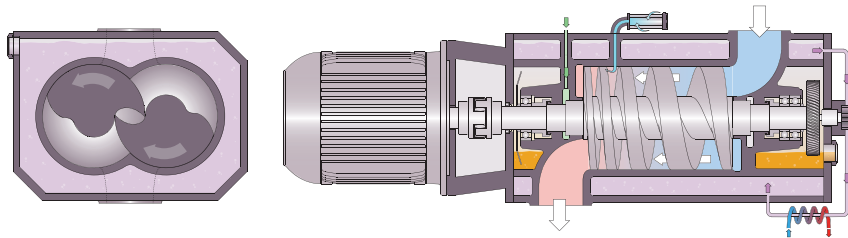


Fig. 2: Operating principle

Operation of this screw pump is instigated with each occurrence of intake pressure between atmosphere and final pressure. Despite contactless operation of the screw pump, no operating fluid, such as oil or water, is necessary within the working chamber. A gas ballast valve, sealing gas device and/or silencer can be installed at the gas exhaust, depending on the respective application.

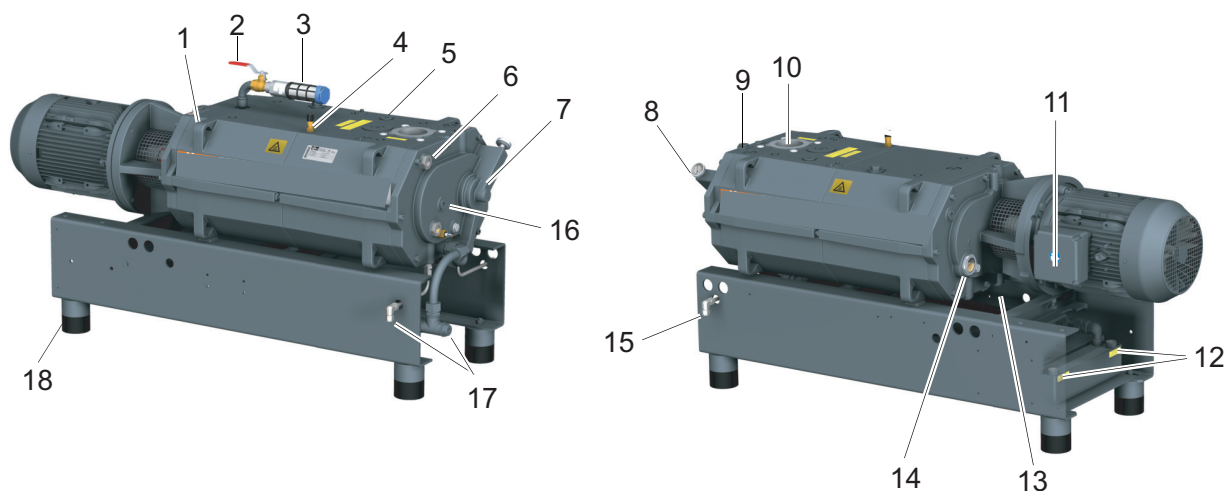


Fig. 3: Structure of the vacuum pump

- | | |
|-------------------------------|-----------------------------------|
| 1 Lifting eye (4x) | 10 Vacuum connection |
| 2 Gas ballast valve | 11 Motor terminal box |
| 3 Gas ballast filter | 12 Cooling water connection |
| 4 Safety valve | 13 Drain screw |
| 5 Cooling liquid filler screw | 14 Sight glass (2x) |
| 6 Cooling liquid sight glass | 15 Drain screw |
| 7 Cooling liquid pump | 16 Closing screw for screw rotors |
| 8 Thermometer | 17 Cooling liquid drain screw |
| 9 Filler screw (2x) | 18 Rubber-metal bumper (4x) |

3.1.1 Water cooling

An integrated water pump ensures an evenly distributed temperature within the pumping system. The temperature controller is fitted before the heat exchanger in the cooling circuit. If the cooling liquid temperature exceeds 55 °C, the temperature controller opens (mechanical opening) and allows the cooling liquid to flow into the heat exchanger.

3.1.2 Temperature monitoring

The switching temperatures are dependent upon the pump size and the type of cooling system. Temperature monitoring prevents overheating and potential blockages in the screw pump.

3.1.3 Thermometer

The thermometer shows the cooling water temperature in the cooling water chamber.

3.1.4 Shaft seal on motor side and vacuum side

The sealing systems prevent any penetration of process gases into the storage chambers. A sealing gas system may improve effectiveness of the sealing systems, depending on the respective application.

3.1.5 Gas ballast

An integrated gas ballast system serves the controlled supply of ambient air or inert gas into the suction chamber. Gas ballast supports the reduction of condensate accumulating in the pumping system.

3.1.6 Sealing gas system

Sealing gas is used to protect the screw pump in dusty processes, or wherever excessive gas throughputs are prevalent. Sealing gas prevents the ingress of damaging substances into the motor and bearing area. The supply is carried out either via a sealing gas valve or a sealing gas throttle without control.

3.1.7 Safety valve

The safety valve prevents overpressure in the secondary cooling loop and opens at a pressure of 6000 hPa.

3.1.8 Non-return valve

The non-return valve prevents backflow of exhausted gases.

3.2 Identifying the product

- ▶ To ensure clear identification of the product when communicating with Pfeiffer Vacuum, always keep all of the information on the rating plate to hand.
- ▶ Observe the motor-specific data on the motor rating plate attached separately.

3.3 Product features

Pump type	Characteristics
Hepta 400 P	<ul style="list-style-type: none"> • Nominal pumping speed at 50 Hz: 350 m³/h • Nominal pumping speed at 60 Hz: 420 m³/h • Water cooling • Temperature switch • Sealing systems

Tbl. 4: Characteristics of the screw pumps

3.4 Scope of delivery

- Screw pump
- Lubricant
- Locking caps for vacuum and exhaust connection
- Operating instructions

4 Transportation and Storage

4.1 Transport

WARNING

Risk of serious injury from oscillating, toppling or falling objects

During transport, there is a risk of crushing and impact on oscillating, toppling or falling objects. There is a risk of injuries to limbs, up to and including bone fractures and head injuries.

- ▶ Secure the danger zone if necessary.
- ▶ Note the center of gravity of the load during transport.
- ▶ Do not lift the vacuum pump via the eye bolt on the motor.
- ▶ Ensure harmonious movements and moderate speeds.
- ▶ Observe safe handling of the transport devices.
- ▶ Avoid sloping attachment aids.
- ▶ Never stack products.
- ▶ Wear protective equipment, e.g. safety shoes.

NOTICE

Property damage as a result of lubricant leaking into the pumping system.

Tilting of the screw pump will cause lubricant to overflow into the pumping system.

- ▶ Always transport the screw pump horizontally.
- ▶ Always transport the screw pump without lubricant.
- ▶ Only fill up lubricant at the final installation location.



Preparations for transport

Pfeiffer Vacuum recommends keeping the transport packaging and original protective cover.

General information regarding safe transport

1. Observe the weight specified on packaging.
2. Use personal protective equipment, e.g. safety shoes.
3. Use transport equipment (e.g. fork lift truck or lift truck).
4. Where possible, always transport or ship the product in the original packaging.
5. Be mindful of transport damage.
6. Always place the product on an adequately sized, level surface.

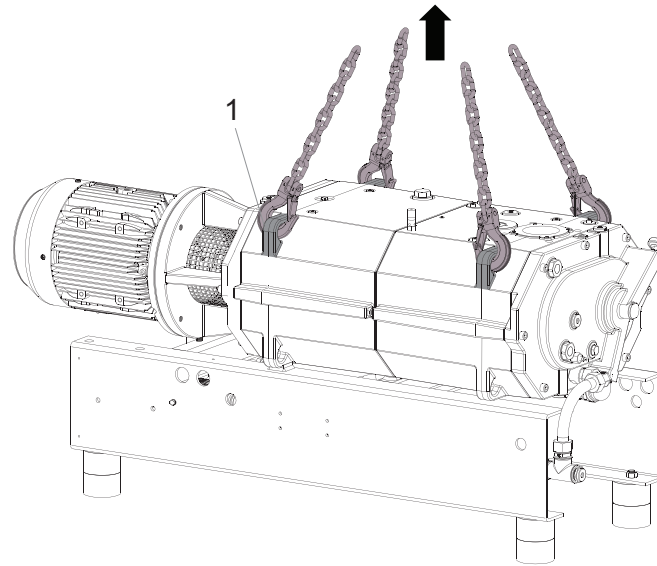


Fig. 4: Transporting the vacuum pump

- 1 Lifting eye (4x)

Transporting the vacuum pump without its packaging

1. Unpack the vacuum pump.
2. To protect the inside of the pump, leave the protective caps on the connections during transport.
3. For lifting, use the crane lug provided for this purpose, located on the top of the pump.
4. Lift the vacuum pump out of the transport packaging.
5. Always place the vacuum pump on an adequately sized, level surface.

4.2 Storage



Storage

Pfeiffer Vacuum recommends storing the products in their original transport packaging.

Storing the vacuum pump

1. Seal the vacuum and exhaust connection.
2. Make sure that the gas ballast valve is closed.
3. Store the vacuum pump only in dry, dust-free rooms, within the specified ambient conditions.
4. In rooms with humid or aggressive atmospheres: Hermetically seal the vacuum pump together with a drying agent in a plastic bag.
5. Replace the lubricant if storage is to exceed a period of more than 2 years.

Preserving the vacuum pump

Preserve the vacuum pump if the vacuum pump is exposed to unfavorable ambient conditions (e.g. aggressive environment, extreme fluctuations in temperature) or if the equipment is to be in storage for a period of more than 3 months.

1. Drain the lubricant and cooling water.
2. Close all openings so that they are airtight.
3. Secure any loose parts (e.g. sealing rings, flat seals) with adhesive tape.
4. Wrap the vacuum pump in VCI film.
5. Only store the vacuum pump in dry, dust-free and rooms which are not exposed to vibrations.
6. Where possible, store the vacuum pump in its original transport packaging.

5 Installation

5.1 Setting up the vacuum pump

Notes to ensure a reliable setup

1. Place the vacuum pump on a flat, horizontal surface which will ensure supply of the lubricant.
2. Observe the permissible angle of inclination of $\pm 1^\circ$.
3. If necessary, fasten the vacuum pump to the threaded holes of the anti-vibration buffer on a sturdy and horizontal base.
4. When installing the pump in a closed housing, ensure adequate air circulation.
5. Install the vacuum pump with adequate room to carry out maintenance work.
6. Ensure that the sight glass can be clearly seen and is easily accessible on the motor side and vacuum side.
7. Keep the voltage and frequency specifications on the motor rating plate visible and freely accessible.

5.2 Connecting the vacuum side

WARNING

Danger of injury due to exposed rotating parts

Danger of crushing fingers and hands when the vacuum connection is open.

- ▶ Safely disconnect motor from the mains.
- ▶ Secure the motor against reactivation.
- ▶ Never insert hands or fingers into the vacuum connection.

NOTICE

Property damage from contaminated gases

Pumping down gases that contain impurities (condensate, particles) damages the vacuum pump.

- ▶ Use suitable filters or separators from the Pfeiffer Vacuum range of accessories, to protect the vacuum pump.

NOTICE

Property damage from intake of solid particles

During commissioning, there is a risk of damage to the suction chamber from dirt from the system or the pipes.

- ▶ Use a suitable protective strainer ("start-up strainer") in the intake flange.
- ▶ Ensure that this strainer is only removed when the risk of solid particles entering the vacuum pump can be excluded.
 - Observe any pumping speed decrease.



Power input

- Select at least the same line cross section for the entire length of the power inputs as that exhibited by the screw pump connections.
- Keep the length of the line as short as possible.
- For line lengths > 5 m, select a line cross section which is greater than the connection nominal diameter.



Installation and operation of accessories

Pfeiffer Vacuum offers a wide range of specially tailored accessories for your screw pumps.

- Information and ordering options for approved [accessories](#) can be found online.
- Described accessories are not included in the shipment.

Connecting the vacuum side

1. Remove the protective cap from the vacuum connection.
2. Remove any scaling, loose fragments or similar from welded lines prior to installation.
3. Connect the vacuum pump to the vacuum chambers.
4. Install a shut-off unit into the intake line in order to block the influx of process gases.
5. Support or suspend the piping to the vacuum pump so that no piping system forces act on the vacuum pump.

5.3 Connecting the exhaust side**⚠ CAUTION****Danger of injury from bursting as a result of high pressure in the exhaust line**

Faulty or inadequate exhaust pipes lead to dangerous situations, e.g., increased exhaust pressure. There is a danger of bursting. Injuries caused by flying fragments, the escaping of high pressure, and damage to the unit cannot be excluded.

- ▶ Open shut-off units immediately before or at the same time as starting the pump.
- ▶ Take care that atmospheric pressure is always present on the exhaust side. Overpressure or underpressure are not permissible.
- ▶ Check the function of the exhaust line on a regular basis.

**Connecting the exhaust side**

- Do not close or throttle the exhaust line. The discharged gas must be permitted to stream out unhindered.
- Choose a minimum diameter equal to the nominal diameter of the exhaust connection.
- Do not use the exhaust line as a source of compressed air.
- Support or suspend the piping to the vacuum pump so that no piping system forces act on the vacuum pump.
- On vacuum pumps with silencer, fit the exhaust connection horizontally.

**Condensate separator**

Pfeiffer Vacuum recommends installing a condensate separator, with condensate drain at the lowest point of the exhaust line.

**Installation and operation of accessories**

Pfeiffer Vacuum offers a wide range of specially tailored accessories for your screw pumps.

- Information and ordering options for approved [accessories](#) can be found online.
- Described accessories are not included in the shipment.

Procedure

1. Remove the protective cap from the exhaust connection.
2. Connect the exhaust line with the exhaust connection.
3. Route the piping downwards from the vacuum pump, to prevent condensate return.

5.4 Connecting the cooling water supply**Prerequisites**

- Cooling water connection unpressurised
- Cooling system evacuated

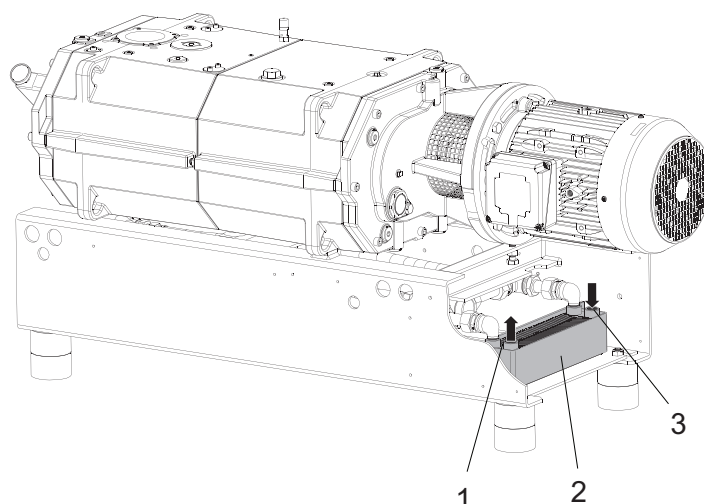


Fig. 5: Cooling water connection

- 1 Cooling water outlet 3 Cooling water inlet
2 Plate heat exchanger

Connecting the cooling water supply

1. Connect the cooling water inlet and the cooling water outlet with the water supply.
2. Open the water inflow.

Parameter	Cooling water
Feed capacity	4 – 10 l/min
Water pressure	1000 – 6000 hPa
Feed temperature	5 – 30 °C
Necessary differential pressure between flow and return flow	≥ 1000 hPa
Appearance	<ul style="list-style-type: none"> • filtered • mechanically clear • visually clear • no turbidity • no sediment • free from grease and oil
Hardness	< 90 mg/l (ppm)
pH value	7 – 8
Particle size	< 200 µm
Chloride content, max.	< 100 mg/l
Electrical conductivity, max.	≤ 100 µS/cm
Free chlorine	< 0.3 mg/l
Materials in contact with cooling water	Stainless steel

Tbl. 5: Requirements on the cooling water composition

5.5 Connecting the sealing gas system



Nitrogen monitoring tablet

Connect a sealing gas system as required, with or without nitrogen monitoring tablet.

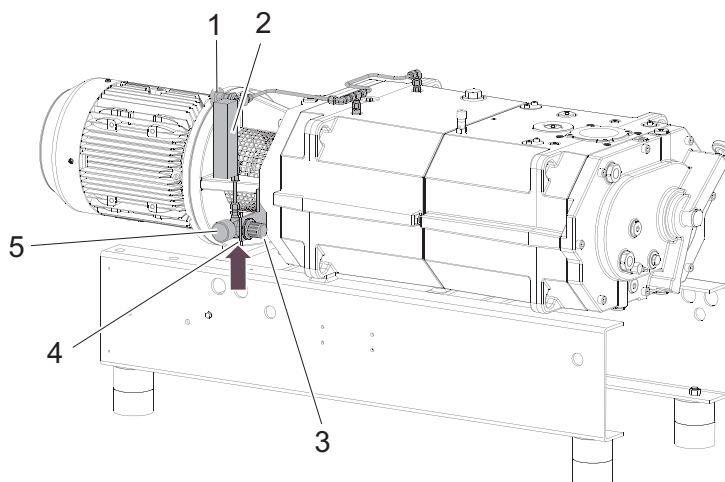


Fig. 6: Connecting the sealing gas system

- | | |
|-----------------------------|--------------------------|
| 1 Flow regulator | 4 Sealing gas connection |
| 2 Flow rate meter | 5 Pressure gauge |
| 3 Pressure regulating valve | |

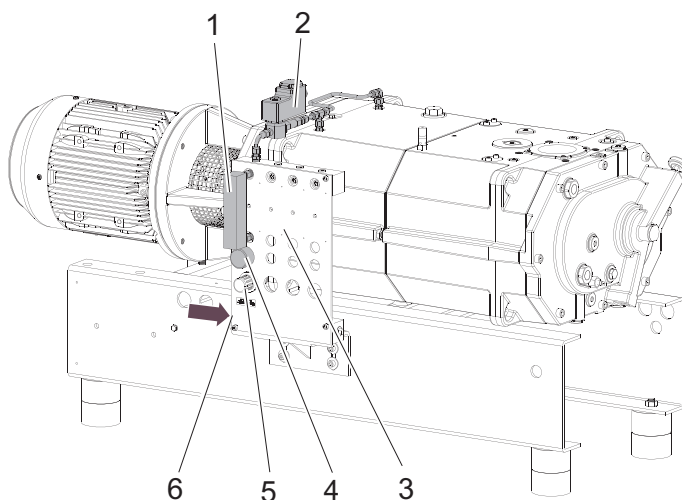


Fig. 7: Connecting the sealing gas system with nitrogen monitoring tablet

- | | |
|--------------------------------------|-----------------------------|
| 1 Flow rate meter, flow rate monitor | 4 Pressure gauge |
| 2 Solenoid valve | 5 Pressure regulating valve |
| 3 Nitrogen monitoring tablet | 6 Sealing gas connection |

Procedure

1. Connect the sealing gas connection to the gas supply.
– Connection size: 1/4" thread, ISO 228-1
2. Connect the electrics of the solenoid valve.
3. Connect the electrics of the flow rate monitor for the flow rate meter.

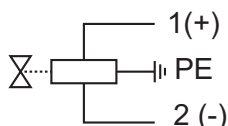


Fig. 8: Connection data for the solenoid valve

- $U = 24 \text{ V DC}$; $P_{\text{max}} = 8 \text{ W}$
- Contact: Normally closed

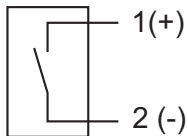


Fig. 9: Connection data for the flow rate monitor

- Pin 1 = Brown
- Pin 2 = White
- U = 5 to 25 V; I = 1 to 3 mA
- Switching element function: NAMUR, bistable
- Contact: Normally open (NO)
- Switching point: 2 SLM -> Minimum volume current

Gas type	Dry nitrogen or air
Gas temperature	0 – 60 °C
Max. gas pressure	13000 hPa
Recommended pressure setting at the pressure regulating valve	3000 hPa
Filtration	5 µm
Recommended flow rate	2 – 3 SLM
Air quality (for compressed air only)	According to ISO 8573-1, Class 5.4.4.

Tbl. 6: Requirements for the sealing gas

5.6 Connecting the gas ballast system

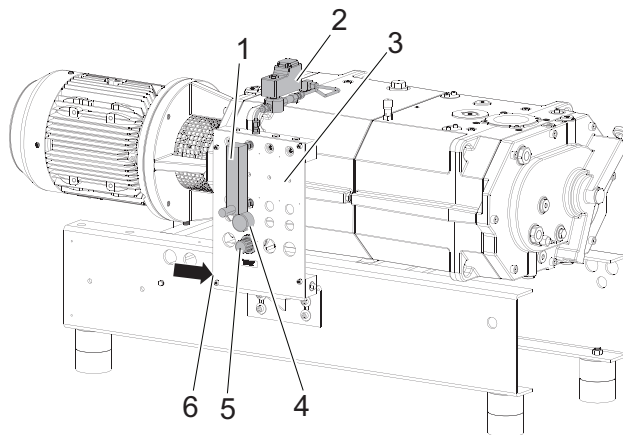


Fig. 10: Connecting the gas ballast system

- | | |
|-----------------------------------|-----------------------------|
| 1 Flow rate meter, flow regulator | 4 Pressure gauge |
| 2 Solenoid valve | 5 Pressure regulating valve |
| 3 Nitrogen monitoring tablet | 6 Gas ballast connection |

Procedure

1. Connect the gas ballast connection to the gas supply.
 - Connection size: 1/4" thread, ISO 228-1
2. Connect the electrics of the solenoid valve.

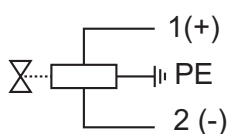


Fig. 11: Connection data for the solenoid valve

- $U = 24 \text{ V DC}$; $P_{\text{max}} = 8 \text{ W}$
- Contact: Normally closed

Gas type	Dry nitrogen
Gas temperature	0 – 60 °C
Max. gas pressure	13000 hPa
Recommended pressure setting at the pressure regulating valve	500 hPa
Filtration	5 µm
Recommended flow rate	20 SLM

Tbl. 7: Requirements for the ballast gas

5.7 Connecting the flushing gas system

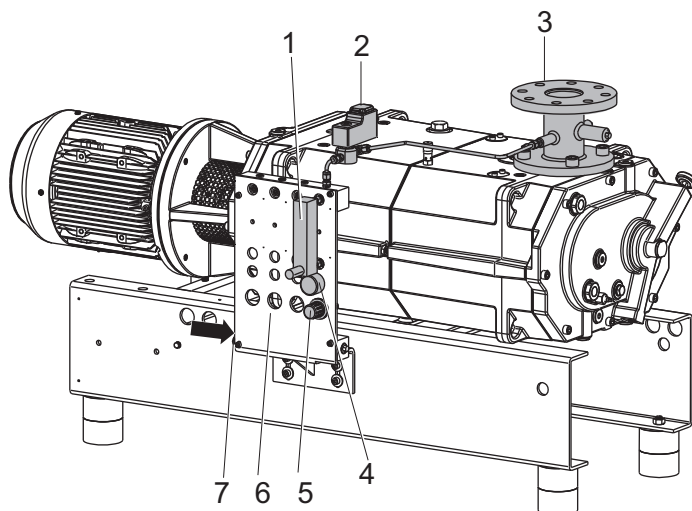


Fig. 12: Connecting the flushing gas system

- | | |
|-----------------------------------|------------------------------|
| 1 Flow rate meter, flow regulator | 5 Pressure regulating valve |
| 2 Solenoid valve | 6 Nitrogen monitoring tablet |
| 3 Vacuum flange | 7 Flushing gas connection |
| 4 Pressure gauge | |

Procedure

1. Connect the flushing gas connection to the gas supply.
 - Connection size: 1/4" thread, ISO 228-1
2. Connect the electrics of the solenoid valve.

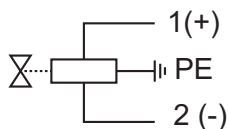


Fig. 13: Connection data for the solenoid valve

- $U = 24 \text{ V DC}$; $P_{\text{max}} = 8 \text{ W}$
- Contact: Normally closed

Gas type	Dry nitrogen
Gas temperature	0 – 60 °C
Max. gas pressure	13000 hPa
Recommended pressure setting at the pressure regulating valve	2500 hPa

Gas type	Dry nitrogen
Filtration	5 µm
Recommended flow rate	≥ 75 SLM

Tbl. 8: Requirements for the flushing gas

5.8 Installing the coupling

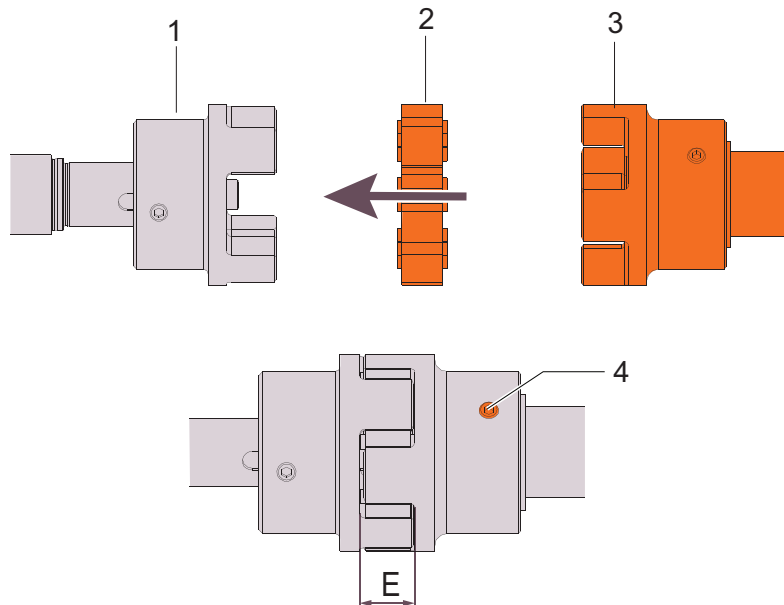


Fig. 14: Installing the coupling

- | | |
|----------------------------|-----------------------------|
| 1 Coupling hub (pump side) | 3 Coupling hub (motor side) |
| 2 Coupling gear ring | 4 Radial screw |

Installing the coupling

- Mount the motor side coupling hub on the motor shaft.
- Set the coupling connection to the value "E" in axial direction.
 - Coupling size ROTEX 38: Value "E" = 24 mm
 - Coupling size ROTEX 42: Value "E" = 26 mm
 - Coupling size ROTEX 48: Value "E" = 28 mm
- Tighten the radial screw.
 - Tightening torque: **10 Nm**
- Mount the motor onto the screw pump using the coupling gear ring.

5.9 Connecting the silencer



Installation and operation of accessories

Pfeiffer Vacuum offers a wide range of specially tailored accessories for your screw pumps.

- Information and ordering options for approved [accessories](#) can be found online.
- Described accessories are not included in the shipment.

Required tool

- Allen key, **WAF 14**

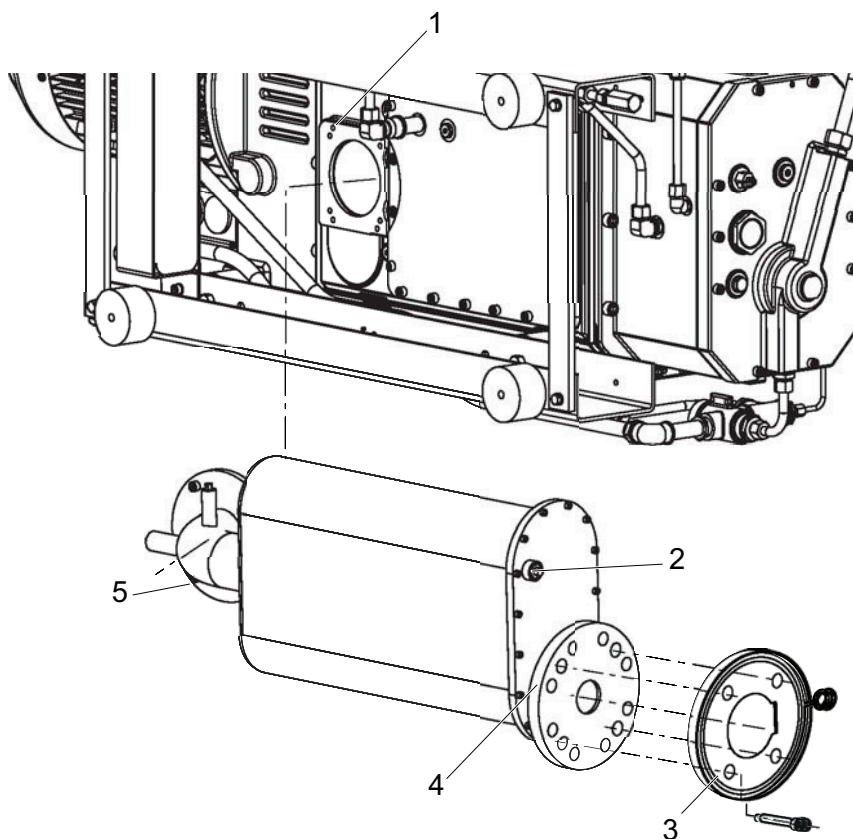


Fig. 15: Connecting the silencer

- | | |
|---------------------------------|-------------------------------|
| 1 Screw pump exhaust connection | 4 Silencer exhaust connection |
| 2 Condensate drain | 5 Silencer |
| 3 Non-return flap | |

5.10 Filling the cooling liquid

NOTICE

Property damage as a result of inadequate cooling

Inadequate cooling may cause damage to the vacuum pump.

- ▶ Only use the cooling liquid prescribed by Pfeiffer Vacuum (Zitrec M 25).
- ▶ Evacuate the cooling chambers following repairs and fill cooling liquid.

Required consumable material

- Cooling liquid

Required tool

- Allen key, **WAF 10**

Required aids

- Funnel (optional)

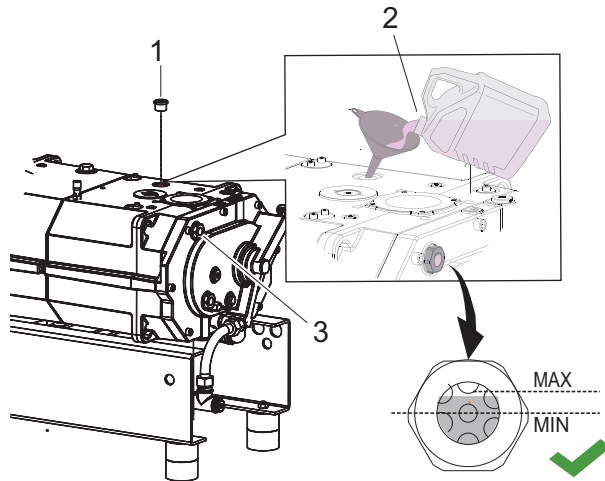


Fig. 16: Filling the cooling liquid

- | | |
|------------------|------------------------------|
| 1 Filler screw | 3 Cooling liquid sight glass |
| 2 Cooling liquid | |

Procedure

1. Unscrew the filler screw.
2. Fill the cooling liquid as indicated on the sight glass.
3. Screw in the filler screw.
4. Check the fill level during operation when running with final pressure.

5.11 Filling with lubricant

NOTICE

Property damage from using non-approved lubricant

Attainment of product-specific performance data is not ensured. If non-approved lubricants are used, all liability and warranty claims against Pfeiffer Vacuum are excluded.

- ▶ Use approved lubricant only.
- ▶ Use alternative, application-specific lubricants only following consultation with Pfeiffer Vacuum.



Checking the fill level

The correct fill level is between the MIN/MAX markings or within the ring mark on the sight glass.

The lubricant type is listed on the rating plate

- ▶ Please refer to rating plate of the vacuum pump for type and quantity of intended lubricant.
 - Only the lubricant used during initial installation is permissible.
- ▶ Contact Pfeiffer Vacuum if you want to use another type of lubricant.

Required consumable material

- Lubricant

Required tools

- Allen key, **WAF 10**

Required aids

- Funnel (optional)

5.11.1 Filling lubricant on the motor side

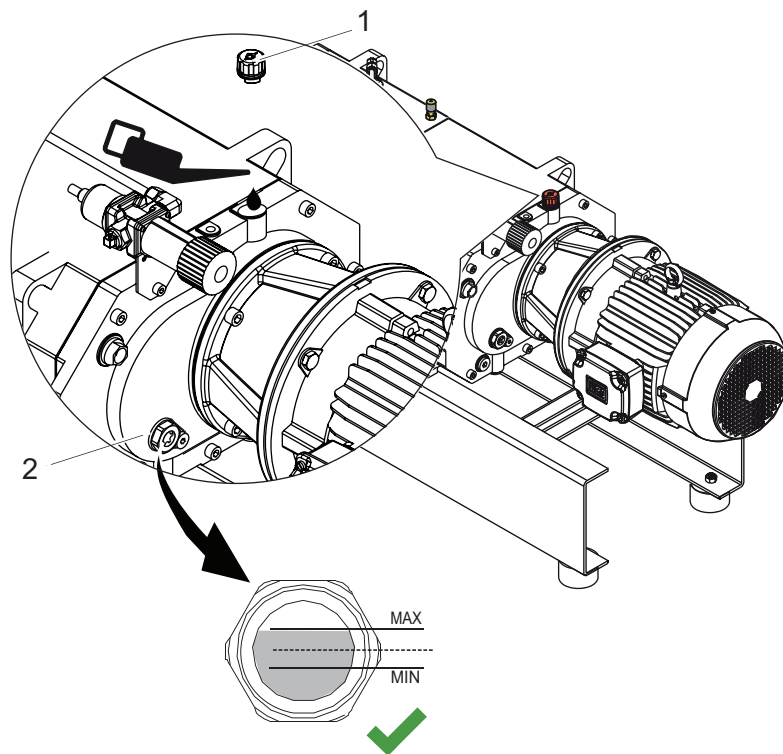


Fig. 17: Filling lubricant on the motor side

- 1 Filler screw 2 Sight glass

Procedure

1. Unscrew the filler screw.
2. Fill up with lubricant according to the marks on the sight glass.
3. Screw in the filler screw.
4. Check the fill level during operation when running with final pressure.

5.11.2 Filling lubricant on the vacuum side

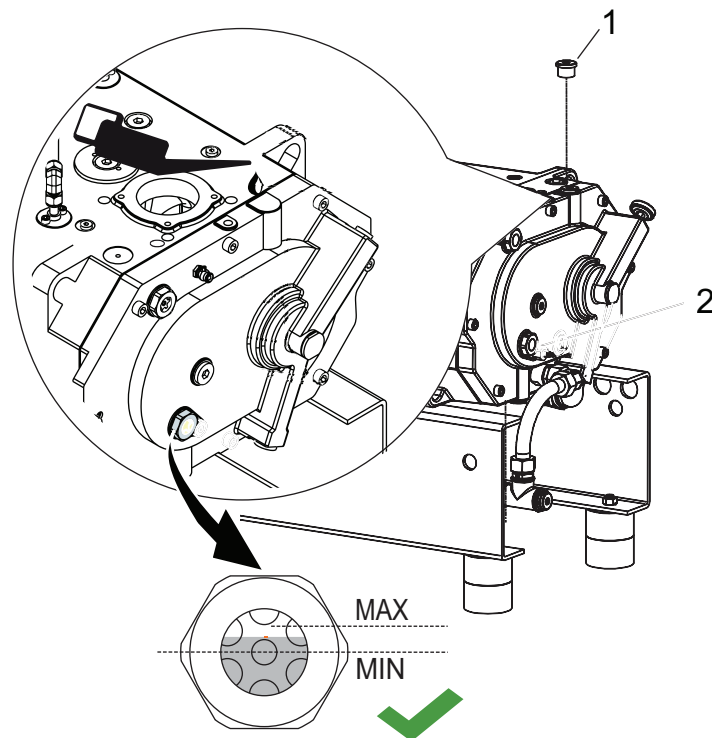


Fig. 18: Filling lubricant on the vacuum side

- 1 Filler screw 2 Sight glass

Procedure

1. Unscrew the filler screw.
2. Fill up the lubricant as indicated on the sight glass.
 - Filling levels with the first filling: approx. 3 mm above the sight glass middle.
3. Screw in the filler screw.
4. Check the fill level during operation when running with final pressure.

5.12 Connect to mains power supply

⚠ DANGER

Danger to life from electric shock

Touching exposed and voltage-bearing elements causes an electric shock. Improper connection of the mains supply leads to the risk of touchable live housing parts. There is a risk to life.

- ▶ Before the installation, check that the connection leads are voltage-free.
- ▶ Make sure that electrical installations are only carried out by qualified electricians.
- ▶ Provide adequate grounding for the device.
- ▶ After connection work, carry out an earthed conductor check.

⚠ WARNING

Risk of fatal injury due to electric shock on account of incorrect installation

The device's power supply uses life-threatening voltages. Unsafe or improper installation can lead to life-threatening situations from electric shocks obtained from working with or on the unit.

- ▶ Ensure safe integration into an emergency off safety circuit.
- ▶ Do not carry out your own conversions or modifications on the unit.

⚠ CAUTION**Danger of injury from moving parts**

After a power failure or a standstill as a result of overheating, the motor restarts automatically. There is a risk of injury to fingers and hands if they enter the operating range of rotating parts.

- ▶ Safely disconnect motor from the mains.
- ▶ Secure the motor against reactivation.
- ▶ Dismantle the vacuum pump for inspection, away from the system if necessary.

NOTICE**Risk of property damage from excess voltage**

Incorrect or excessive mains voltage will destroy the motor.

- ▶ Always observe the motor rating plate specifications.
- ▶ Route the mains connection in accordance with locally applicable provisions.
- ▶ Always provide a suitable mains fuse to protect the motor and supply cable in the event of a fault.

NOTICE**Motor damage from overheating**

Limited motor fan cooling capacity, caused by low speeds, causes the motor to overheat.

- ▶ During operation with frequency converter, observe the rotation speed range specified in the technical data.

Establish the mains supply

1. Always ensure a secure connection to the earthed conductor (PE).
2. Make sure that electrical or electromagnetic pulses from the power supply do not impair the screw pump motor.
3. Install an overload protection for the motor of the trip class 20 according to EN 60204-1.
4. Connect the motor to the power supply.

5.12.1 Connect three phase motor with 6-pin terminal board

There are 2 circuit arrangements:

- Delta connection for low voltage
- Star circuit for high voltage

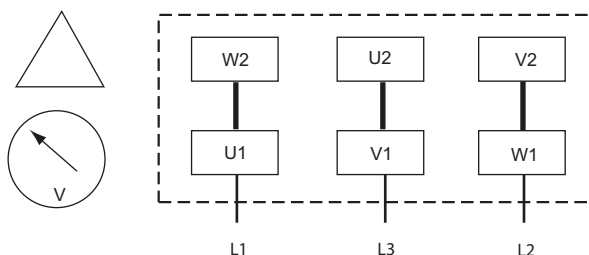


Fig. 19: Delta connection

Connect the three phase motor with delta connection

- ▶ Connect the three phase motor according to the connection diagram.

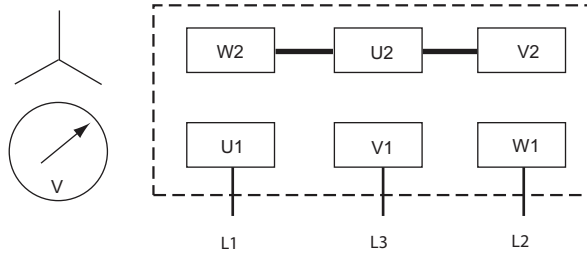


Fig. 20: Star circuit

Connect the three phase motor with star circuit

- Connect the three phase motor according to the connection diagram.

5.12.2 Connect three phase motor with 12-pin terminal board

There are 3 circuit arrangements:

- Double star circuit for low voltage
- Delta connection for medium voltage
- Star circuit for high voltage

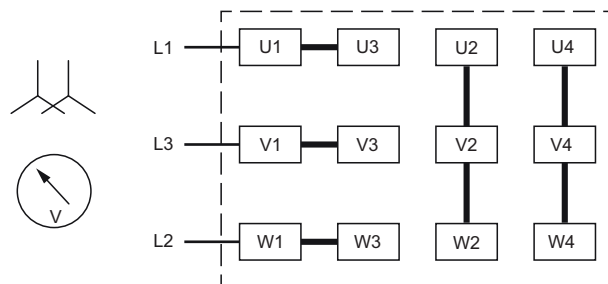


Fig. 21: Double star circuit

Connect the three phase motor with double star circuit

- Connect the three phase motor according to the connection diagram.

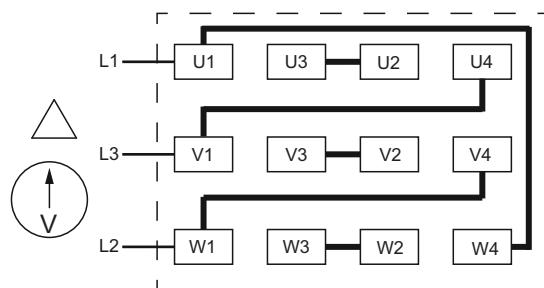


Fig. 22: Delta connection

Connect the three phase motor with delta connection

- Connect the three phase motor according to the connection diagram.

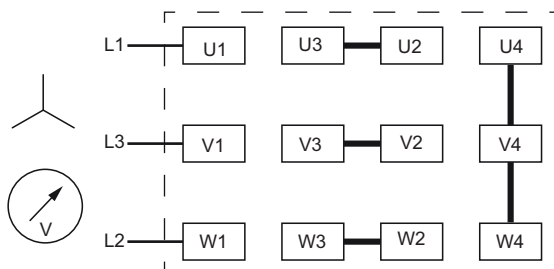


Fig. 23: Star circuit

Connect the three phase motor with star circuit

- ▶ Connect the three phase motor according to the connection diagram.

5.13 Checking the direction of rotation

NOTICE

Motor damage from overheating

Limited fan cooling capacity, caused by incorrect rotation direction, causes the motor to overheat.

- ▶ Check the direction of rotation using the rotation direction arrow on the fan of the motor.
- ▶ If the rotation direction is incorrect, switch 2 of the 3 phases.
- ▶ When doing so, make sure that the air flow is sucked through the ventilation grille, and directed over the motor to be cooled.

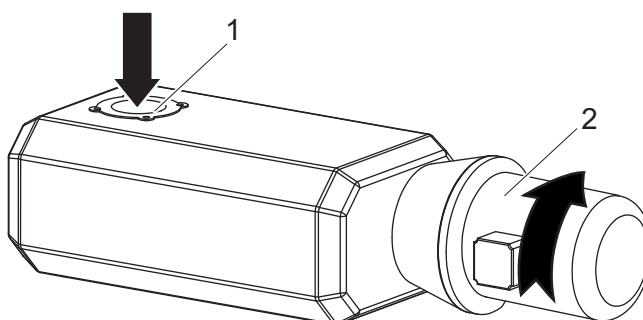


Fig. 24: Checking the direction of rotation

- 1 Vacuum connection 2 Motor fan

Procedure

1. Switch on the vacuum pump briefly (2 to 3 seconds).
2. Check the fan's rotation of direction on the motor. The motor fan and the coupling rotate in a clockwise direction.
3. If the direction of rotation is incorrect, exchange the 2 phases of the connecting cable in the motor terminal box.

5.14 Connecting the PTC thermistor tripping unit



Tripping units store the shut-down

Pfeiffer Vacuum recommends connecting motors with PTC in the stator winding to a PTC resistor tripping device for protection against overload.

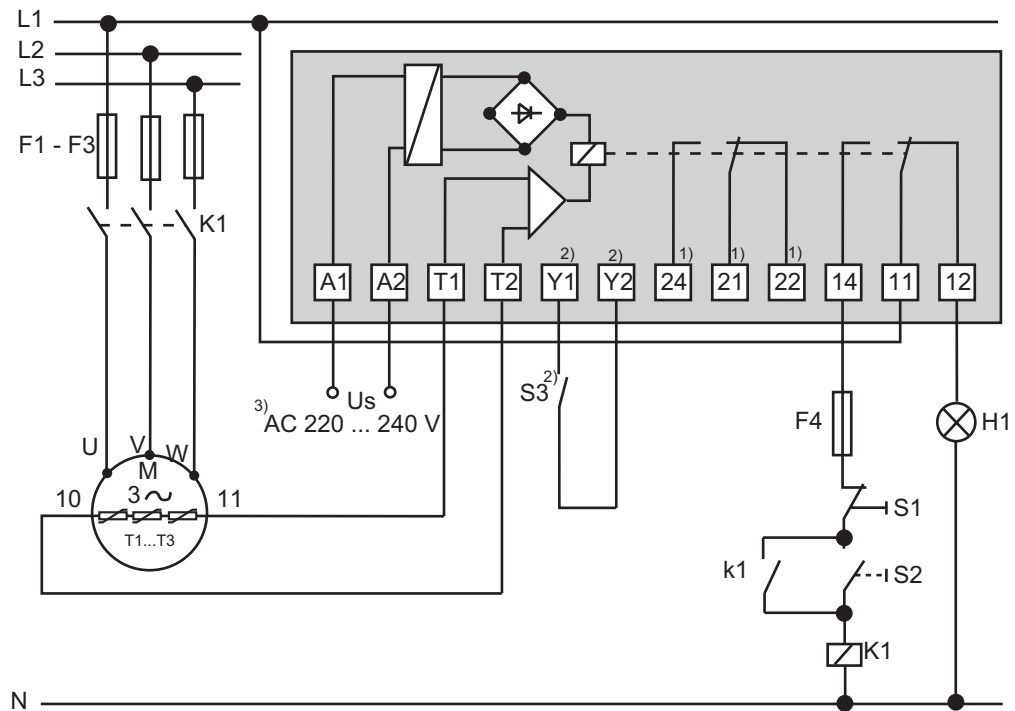


Fig. 25: Connection example with PTC thermistor tripping unit

U_s	Control voltage	T1 – T3	PTC resistor sensor
S_1	OFF button	H1	Tripping indicator
S_2	ON button	M	Motor, 3-phase
S_3	RESET button	¹⁾	For devices with two relay outputs only
K1	Contactor	²⁾	For MSR type (model) only
F1 – F4	Fuses	³⁾	Only for order no.: P 4768 052 FQ and P 4768 052 FE

Procedure

- After shut-down, switch the tripping unit back on manually via the installed RESET button or via the external RESET S3.
 - Switching on mains detected as automatic RESET.

6 Operation

6.1 Commissioning the vacuum pump

CAUTION

Danger of burns on hot surfaces

Depending on the operating and ambient conditions, the surface temperature of the vacuum pump can increase to above 70 °C.

- ▶ Provide suitable touch protection.

NOTICE

Property damage from using non-approved lubricant

Attainment of product-specific performance data is not ensured. If non-approved lubricants are used, all liability and warranty claims against Pfeiffer Vacuum are excluded.

- ▶ Use approved lubricant only.
- ▶ Use alternative, application-specific lubricants only following consultation with Pfeiffer Vacuum.

NOTICE

Lubrication of a dry-running screw pump

Lubricating the compression chamber can cause damage to the screw pump.

- ▶ Never lubricate the compression chamber with oil or grease.

NOTICE

Property damage from contaminated gases

Pumping down gases that contain impurities (condensate, particles) damages the vacuum pump.

- ▶ Use suitable filters or separators from the Pfeiffer Vacuum range of accessories, to protect the vacuum pump.

Before switching on

1. Inspect the screw pump for visible damage and ensure that the screw pump is only operated when in a sound condition.
2. Check the fill level of the lubricant on the motor side and vacuum side. Top up lubricant as required.
3. Check the cooling liquid filling level and top up cooling liquid as required.
4. Compare the voltage and frequency specifications on the motor rating plate with the available mains voltage and frequency.
5. Make sure that the suction chamber is free from all foreign matters.
6. Protect the screw pump from sucking in contamination using suitable measures (e.g. dust filter).
7. Make sure that the shut-off units on the pressure side open before starting the pump.
8. Open the cooling water flow and ensure the flow rate.
9. If necessary, vent the cooling chambers.
10. With a supply of sealing gas, open the sealing gas feed and set the sealing gas pressure.

6.2 Switching on the vacuum pump

CAUTION

Health hazard from increased noise emission

Remaining in the close proximity of the vacuum pump for a sustained period of time may cause hearing damage.

- ▶ Ensure adequate sound insulation.
- ▶ Wear hearing protection.

NOTICE**Damage to the vacuum pump due to intense temperature fluctuations**

If the housing cools down too quickly due to external influences, there is a risk of contact between the rotor at operating temperature and the colder pump housing. This will result in irreversible pump damage.

- ▶ Ensure that the screw pump is operated continuously within the applicable pressure range.
- ▶ Slowly adapt the throughput and temperature of the cooling liquid.
- ▶ Perform a max. of 6 starts every hour.

Procedure

1. Adjust the voltage supply using a suitable starting circuit (e.g. protective circuit).
2. Switch on the screw pump in each pressure range between atmospheric pressure and final pressure as required.
3. Open the cooling water feed and ensure an adequate flow.
4. With the sealing gas device installed, open the sealing gas supply and check the flow rate.
5. With the gas ballast supply installed, open the gas feed and check the flow rate.
6. Open the shut-off unit in the intake line and activate the screw pump in the process.
7. Allow the screw pump to warm up for approx. 30 minutes with the vacuum flange closed prior to starting the process.
8. Measure the motor current and make a note of the value as reference for future maintenance work and troubleshooting.

6.3 Conveying condensable vapors

Screw pumps which are equipped with either a gas ballast system or a gas ballast valve are suitable for conveying condensable vapors in the gas flow.

Prerequisite

- Silencer with condensate drain fitted
- Condensate drain in exhaust line

Required aids

- Collection receptacle

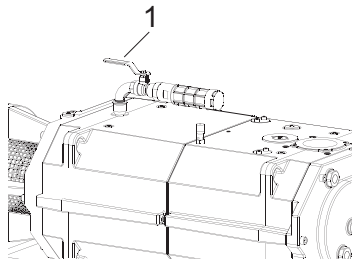


Fig. 26: Gas ballast valve

- 1 Gas ballast valve

Procedure

1. Design for a condensate drain in the exhaust line.
2. Place a collection receptacle below the condensate drain.
3. Open the gas ballast valve.
4. Allow the screw pump to run for 30 minutes in order to heat up.
5. Open the shut-off valve on the vacuum line.
6. Allow the condensate to discharge continuously for 30 minutes.
7. Close the shut-off valve on the vacuum line.
8. Close the gas ballast valve.

6.4 Flushing the screw pump with fluid

Flushing the screw pump with fluid is optional. Flush the inside of the screw pump with fluid after applications with process media that could adhesively bond inside the screw pump.

Prerequisites

- Shut-off valve in the vacuum line closed
- Screw pump disconnected from process

Required consumables

- Demineralized water (<5° dGH) water

Procedure

1. Reduce the pump rotation speed to $n < 10$ Hz.
2. Open the flushing fluid supply.
3. Operate the screw pump for 10 to 15 minutes at $n < 10$ Hz depending on the process.
 - Determine the ideal flushing duration as a function of the process in question.
4. Shut off the flushing fluid supply.
5. Operate the screw pump for a further 20 minutes with the vacuum line closed after flushing.
6. Switch the screw pump off.
7. Vent the screw pump.
8. Allow the screw pump to cool down.
9. Shut off the cooling water flow.

6.5 Flushing the screw pump with gas

Equipping the screw pump with a gas flushing device is optional. Perform flushing with flushing gas after fluid flushing or to protect the compression chamber against corrosion.

Prerequisites

- Shut-off valve in the vacuum line closed
- Screw pump disconnected from process

Required consumables

- Flushing gas

Procedure

1. Open the flushing gas supply.
2. Operate the screw pump for 3 to 5 minutes depending on the process while the screw pump takes in the flushing gas.
 - Determine the ideal flushing duration as a function of the process in question.
3. Shut off the flushing gas supply.
4. Switch the screw pump off.
5. Vent the screw pump.
6. Allow the screw pump to cool down.
7. Shut off the cooling water flow.

6.6 Switching off the vacuum pump

Procedure

1. Close the shut-off valve in the vacuum line and isolate the screw pump from the process.
2. Switch off the screw pump in each pressure range between atmospheric pressure and final pressure as required.
3. Shut off the cooling water flow.
4. Vent the screw pump to atmospheric pressure via the vacuum side.
5. Ensure that you do not vent the vacuum chamber through the screw pump.
6. Switch off the process- and pump-specific media supply (e.g. the sealing gas supply).

7 Maintenance

7.1 Maintenance information

WARNING

Health hazard through poisoning from toxic contaminated components or devices

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ▶ Decontaminate affected parts before carrying out maintenance work.
- ▶ Wear protective equipment.

WARNING

Health hazard and environmental damage from toxic contaminated lubricant

Toxic process media can cause lubricant contamination. When changing the lubricant, there is a health hazard due to contact with poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Wear suitable personal protective equipment when handling these media.
- ▶ Dispose of the lubricant according to locally applicable regulations.

CAUTION

Danger of burns on hot surfaces

Depending on the operating and ambient conditions, the surface temperature of the vacuum pump can increase to above 70 °C.

- ▶ Provide suitable touch protection.

NOTICE

Damage caused by unsuitable cleaning agents

Unsuitable cleaning agents damage the product.

- ▶ Do not use solvents as they attack the surface.
- ▶ Do not use any aggressive or abrasive cleaning agents.



Disassembly and cleaning

- When carrying out maintenance work, only dismantle the screw pump to the extent that is necessary.
- Clean the pump parts using industrial alcohol, isopropanol or similar agents.
- Avoid residues of cleaning agent inside the screw pump.

Preparatory measures

1. Shut down the screw pump and allow the screw pump to cool as required.
2. Disconnect the motor from the mains.
3. Secure the motor against unintentional reactivation.
4. Close the cooling water feed.
5. Switch off the process- and pump-specific media supply (e.g. the sealing gas supply).
6. Vent the screw pump to atmospheric pressure via the vacuum side.
7. Allow the cooling water to drain completely.
8. Disconnect all connections.
9. Dismantle the screw pump from the system as necessary.

7.2 Checklist for inspection and maintenance



Notes on maintenance intervals

The times for the maintenance intervals depend to a great extent on the process conditions; they apply for working with clean and inert gases. The use of corrosive process gases can substantially curtail the maintenance intervals.

- Agree shorter maintenance intervals for extreme loads or for specific processes with the [Pfeiffer Vacuum Service](#).



Maintenance intervals

You can carry out the **inspection** yourself.

We recommend Pfeiffer Vacuum Service for carrying out maintenance work of **Maintenance Level 1** and **Maintenance Level 3** (revision). If the required intervals listed below are exceeded, or if maintenance work is carried out improperly, no warranty or liability claims are accepted on the part of Pfeiffer Vacuum. This also applies wherever parts other than original spare parts are used.

Action	Inspection	Maintenance level 1	Maintenance level 3	Required material
described in document		OI		
Interval	Monthly	5000 h, or once a year at the latest	16000 h or every 4 years	
Inspection				
Visual and acoustic pump check	■			
<ul style="list-style-type: none"> • Check the lubricant level and color of the lubricant • Check vacuum pump for leaks 				
<ul style="list-style-type: none"> • Check the coolant level of the heat exchanger if installed 	■			
Maintenance level 1 – replacing lubricant and filter				
<ul style="list-style-type: none"> • Changing the lubricant 		■		Lubricant
<ul style="list-style-type: none"> • Changing the cooling liquid 		■		Cooling liquid
<ul style="list-style-type: none"> • Check electric connections and monitoring equipment 		■		
<ul style="list-style-type: none"> • Inspect the filter of the gas ballast valve if installed, and change as necessary 		■		Gas ballast filter (optional)
<ul style="list-style-type: none"> • Clean the outside of the pump housing • If installed, inspect silencer and clean as necessary • Clean magnetic sealing plug 		■		Suitable cleaning agent, compatible with the process
Maintenance level 3 – overhaul				
<ul style="list-style-type: none"> • Dismantle and clean the vacuum pump • Change wear parts • Changing the bearings 			■	Contact Pfeiffer Vacuum Service.

Tbl. 9: Maintenance intervals

7.3 Checking the lubricant level



Checking the fill level

The correct fill level is between the MIN/MAX markings or within the ring mark on the sight glass.

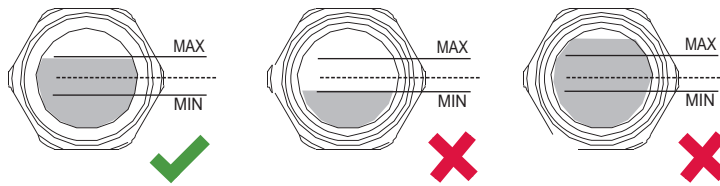


Fig. 27: Checking the lubricant level on the motor side

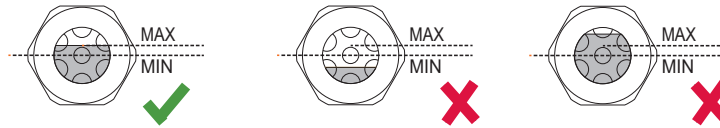


Fig. 28: Checking the lubricant level on the vacuum side

Checking the lubricant level

1. Shut down the vacuum pump.
2. Wait for 1 minute and check the lubricant level at the sight glass.
 - Check the lubricant level on the motor side and the vacuum side.
3. Make sure that the level is in the area at the middle of the inspection glass or up to 3 mm above it.
4. Top up lubricant as required.
5. Check the lubricant level daily during continuous operation, or prior to each activation.

7.4 Checking the cooling liquid level



Checking the fill level

The correct fill level is between the MIN/MAX markings or within the ring mark on the sight glass.



Fig. 29: Checking the cooling liquid level

Checking the cooling liquid level

1. Shut down the vacuum pump.
2. Check the cooling liquid level at the cooling liquid sight glass.
3. Top up cooling liquid as required.
4. Check the cooling liquid level daily during continuous operation, or always prior to switching on.

7.5 Changing the lubricant

⚠ WARNING

Health hazard and environmental damage from toxic contaminated lubricant

Toxic process media can cause lubricant contamination. When changing the lubricant, there is a health hazard due to contact with poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Wear suitable personal protective equipment when handling these media.
- ▶ Dispose of the lubricant according to locally applicable regulations.

⚠ CAUTION**Scalding from hot lubricant**

Danger of scalding when draining lubricant if it comes into contact with the skin.

- ▶ Wear protective equipment.
- ▶ Use a suitable collection receptacle.

NOTICE**Property damage from using non-approved lubricant**

Attainment of product-specific performance data is not ensured. If non-approved lubricants are used, all liability and warranty claims against Pfeiffer Vacuum are excluded.

- ▶ Use approved lubricant only.
- ▶ Use alternative, application-specific lubricants only following consultation with Pfeiffer Vacuum.

**Pfeiffer Vacuum recommends determining the precise service life of the lubricant in the first operating year.**

The usable life may deviate from the reference value specified depending on thermic and chemical loads, or due to penetrating process media in gear and bearing chambers.

**Checking the fill level**

The correct fill level is between the MIN/MAX markings or within the ring mark on the sight glass.

**Safety data sheets**

You can obtain the safety data sheets for lubricants from Pfeiffer Vacuum on request, or from the [Pfeiffer Vacuum Download Center](#).

The lubricant type is listed on the rating plate

1. Please refer to rating plate of the vacuum pump for type and quantity of intended lubricant.
2. Only use the lubricant which was applied during initial installation.
 - Contact Pfeiffer Vacuum if you want to use another type of lubricant.

Prerequisites

- Vacuum pump switched off and cooled
- Vacuum pump vented

Required consumable material

- Lubricant

Required tools

- Allen key, **WAF 10**
- Allen key, **WAF 19**

Required aids

- Cleaning cloth
- Collection receptacle
- Funnel (optional)

7.5.1 Draining lubricant on the motor side

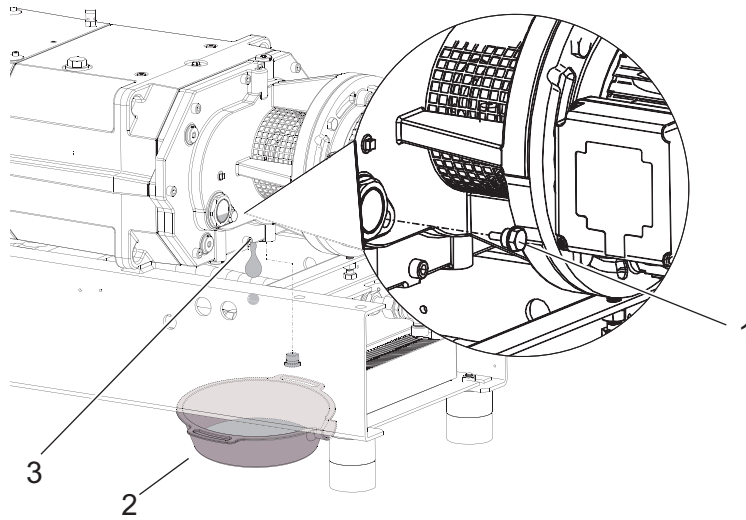


Fig. 30: Draining lubricant on the motor side

- | | |
|-------------------------|---------------|
| 1 Magnetic plug | 3 Drain screw |
| 2 Collection receptacle | |

Procedure

1. Place a collection receptacle beneath the drain hole on the motor side.
2. Unscrew the drain screw.
3. Unscrew the magnetic sealing plug.
4. Fully drain the lubricant.
5. Clean the magnetic sealing plug.
6. Screw in the magnetic sealing plug and drain screw.

7.5.2 Draining lubricant on the vacuum side

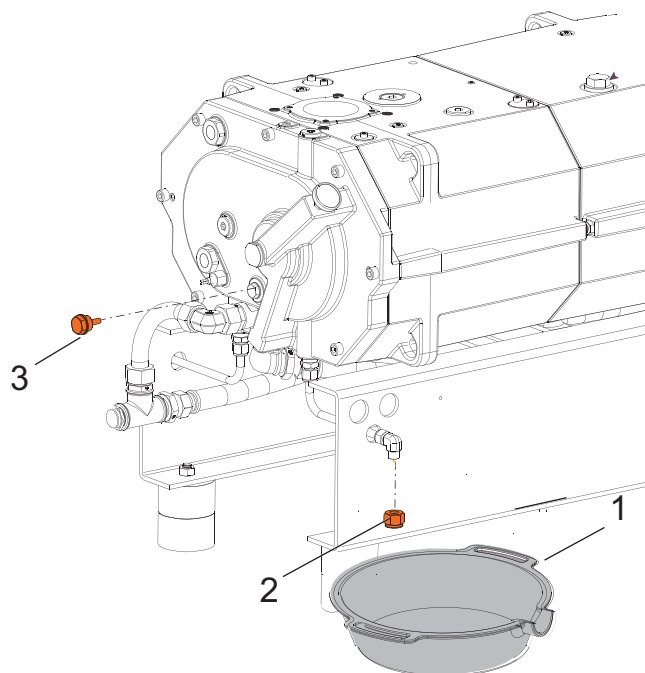


Fig. 31: Draining lubricant on the vacuum side

- | | |
|-------------------------|-----------------|
| 1 Collection receptacle | 3 Magnetic plug |
| 2 Drain screw | |

Procedure

1. Place a collection receptacle beneath the drain hole on the vacuum side.
2. Unscrew the drain screw.
3. Unscrew the magnetic sealing plug.
4. Fully drain the lubricant.
5. Clean the magnetic sealing plug.
6. Screw in the magnetic sealing plug and drain screw.

7.5.3 Filling lubricant on the motor side

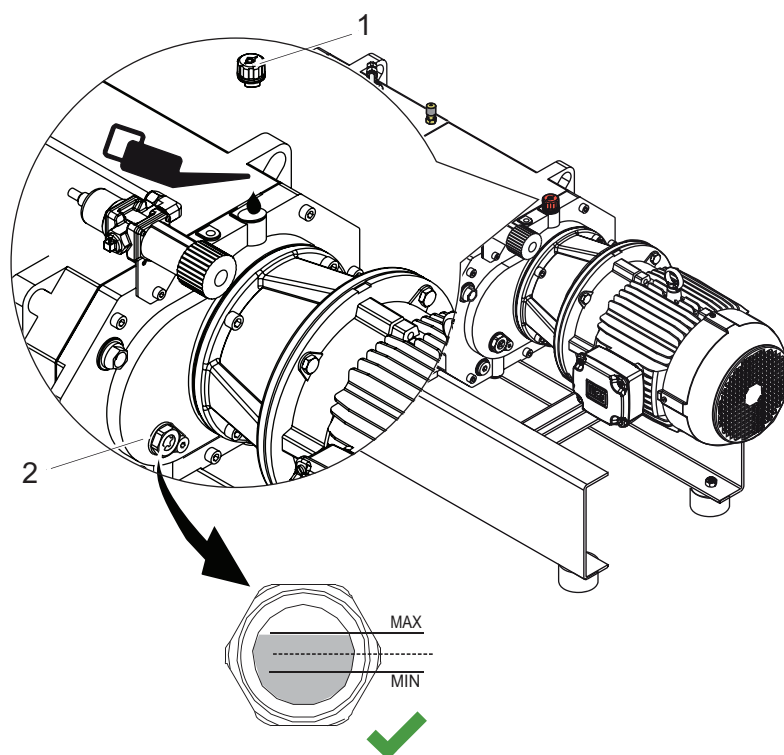


Fig. 32: Filling lubricant on the motor side

- 1 Filler screw 2 Sight glass

Procedure

1. Unscrew the filler screw.
2. Fill up with lubricant according to the marks on the sight glass.
3. Screw in the filler screw.
4. Check the fill level during operation when running with final pressure.

7.5.4 Filling lubricant on the vacuum side

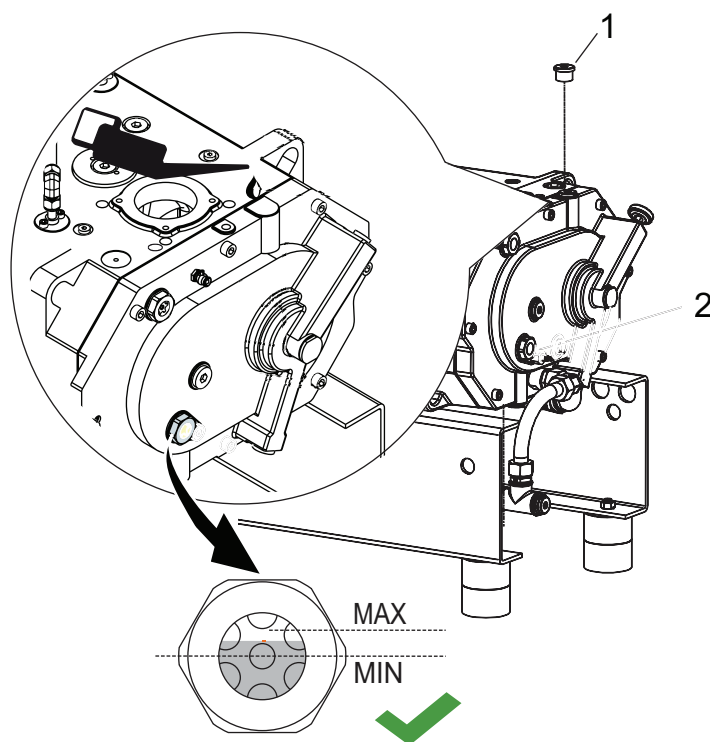


Fig. 33: Filling lubricant on the vacuum side

1 Filler screw

2 Sight glass

Procedure

1. Unscrew the filler screw.
2. Fill up the lubricant as indicated on the sight glass.
 - Filling levels with the first filling: approx. 3 mm above the sight glass middle.
3. Screw in the filler screw.
4. Check the fill level during operation when running with final pressure.

7.6 Changing the cooling liquid

NOTICE

Property damage as a result of inadequate cooling

Inadequate cooling may cause damage to the vacuum pump.

- ▶ Only use the cooling liquid prescribed by Pfeiffer Vacuum (Zitrec M 25).
- ▶ Evacuate the cooling chambers following repairs and fill cooling liquid.

7.6.1 Draining the cooling liquid

Prerequisites

- Vacuum pump switched off and cooled
- Vacuum pump vented

Required tool

- Allen key, **WAF 10**
- Allen key, **WAF 19**

Required aids

- Collection receptacle
- Cleaning cloth

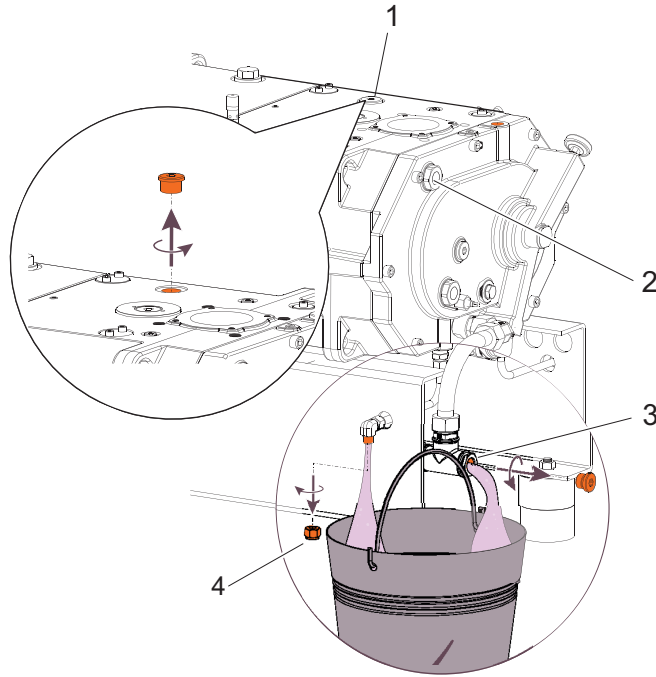


Fig. 34: Draining the cooling liquid

- | | |
|------------------------------|---------------|
| 1 Filler screw | 3 Drain screw |
| 2 Cooling liquid sight glass | 4 Drain screw |

Procedure

1. Unscrew the filler screw.
2. Place a collection receptacle below the two drain screws.
3. Unscrew both drain screws.
4. Fully drain the cooling liquid.
5. Screw in both drain screws.
6. Switch on the vacuum pump for a maximum of 5 seconds.
7. Repeat the drainage procedure in order to drain the remaining cooling liquid.
8. Screw in both drain screws.

7.6.2 Filling the cooling liquid

NOTICE

Property damage as a result of inadequate cooling

Inadequate cooling may cause damage to the vacuum pump.

- ▶ Only use the cooling liquid prescribed by Pfeiffer Vacuum (Zitrec M 25).
- ▶ Evacuate the cooling chambers following repairs and fill cooling liquid.

Required consumable material

- Cooling liquid

Required tool

- Allen key, **WAF 10**

Required aids

- Funnel (optional)

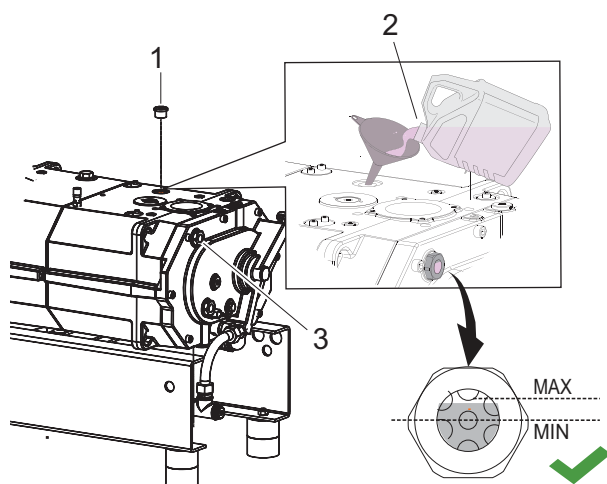


Fig. 35: Filling the cooling liquid

- | | |
|------------------|------------------------------|
| 1 Filler screw | 3 Cooling liquid sight glass |
| 2 Cooling liquid | |

Procedure

1. Unscrew the filler screw.
2. Fill the cooling liquid as indicated on the sight glass.
3. Screw in the filler screw.
4. Check the fill level during operation when running with final pressure.

7.7 Changing the gas ballast filter

The gas ballast filter is soiled if the vacuum pump takes in ambient air containing dust during gas ballast operation. As the soiling increases, the throughput of the gas ballast filter decreases. The risk of condensation and corrosion in the vacuum pump increases.

Required consumable material

- Compressed air
- Gas ballast filter

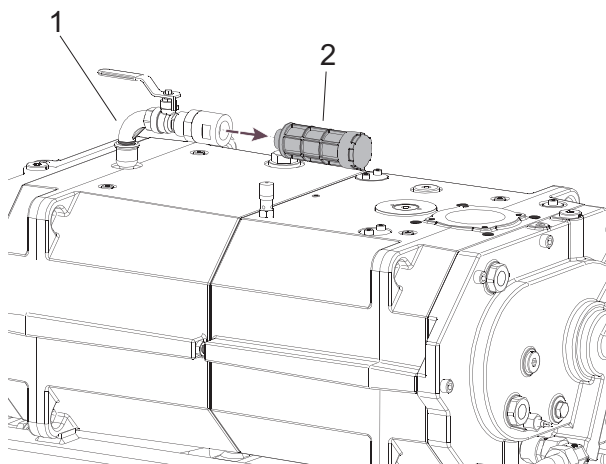


Fig. 36: Changing the gas ballast filter

- | | |
|--------------------|----------------------|
| 1 Gas ballast line | 2 Gas ballast filter |
|--------------------|----------------------|

Removing the gas ballast filter

1. Dismantle the gas ballast filter.
2. Check the gas ballast filter and replace the gas ballast filter in the event of severe contamination or damage.

Installing the gas ballast filter

- Screw the gas ballast filter into the gas ballast line.

7.8 Drain condensate in the silencer

WARNING

Health hazard through poisoning from toxic contaminated components or devices

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- Decontaminate affected parts before carrying out maintenance work.
- Wear protective equipment.

Clean silencer

Clean the silencer in accordance with the respective process, approx. every 5000 h with a suitable cleaning agent.

1. Remove the silencer from the vacuum pump.
2. Clean and dry the silencer thoroughly.
3. Mount the silencer onto the vacuum pump.

Clean non-return flap

Clean the non-return flap as a function of the process approx. every 1000 h with a suitable cleaning agent.

1. Check the functionality of the non-return flap.
2. If needed, restore the non-return flap's functionality.
3. Clean and dry the non-return flap thoroughly.

8 Decommissioning

8.1 Decommissioning the vacuum pump

Before shutting down the vacuum pump, observe the following instructions to adequately protect the interior of the vacuum pump (suction chamber) from corrosion:

Shutting down for longer periods

1. Close the shut-off valve in the vacuum line and disconnect the vacuum pump from the process.
2. Shut down the vacuum pump and allow it to cool if necessary.
3. Safely disconnect the drive motor from the mains.
4. Close the water supply.
5. Switch off the process- and pump-specific media supply (e.g. the sealing gas supply).
6. Vent the vacuum pump to atmospheric pressure via the vacuum side.
7. Drain the cooling water from both cooling water drain screws.
8. Disconnect all connections.
9. Drain the lubricant.
10. Dispose of used lubricant according to applicable regulations in each case.
11. Close the vacuum connection and fore-vacuum connection and any other openings with screw caps.
12. Store the vacuum pump in dry, dust-free rooms, within the specified ambient conditions.
13. In rooms with humid or aggressive atmospheres: Hermetically seal the vacuum pump together with a drying agent in a plastic bag.
14. Perform maintenance work, including replacement of the lubricant prior to recommissioning whenever the equipment has been in storage for a period of more than 2 years.
15. Do not store the vacuum pump in the vicinity of machines, traffic routes, etc., as strong vibrations may damage the bearing.
16. Preserve the vacuum pump if the vacuum pump is exposed to unfavorable ambient conditions (e.g. aggressive environment, extreme fluctuations in temperature) or if the equipment is to be in storage for a period of more than 3 months.

8.2 Recommissioning

NOTICE

Damage to the vacuum pump due to aging of the lubricant

The useful life of the lubricant is limited (max. 2 years). Prior to recommissioning, following a shut-down of **2 years or more**, carry out the following work.

- Change the lubricant.
- Replace the bearing and elastomer parts.
- Observe the maintenance instructions.
- Consult Pfeiffer Vacuum if necessary.

Procedure when recommissioning the vacuum pump

1. Put the vacuum pump into operation only if it is in a correct state.
2. Check the vacuum pump for visible damage.
3. Check the inside of the vacuum pump for contamination.
4. Remove any drying pearls from the suction chamber.
5. Do not operate the vacuum pump if any of the housing parts have signs of rust.
6. Notify [Pfeiffer Vacuum Service](#) whenever housing parts have signs of rust.
7. Perform a leak test prior to recommissioning the vacuum pump as required.

Loosen stuck screw rotors

After a standstill of several days or after sticky substances have been suctioned away, it may happen that the screw rotors stick to each other.

1. Unscrew the closing screw for manual rotation of the screw rotors.
2. Open up access to the screw rotors using an Allen key.
 - Turn the Allen key by hand in a clockwise direction.

3. Screw in the closing screw.
4. Switch the vacuum pump on.

9 Recycling and disposal

WARNING

Health hazard through poisoning from toxic contaminated components or devices

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ▶ Decontaminate affected parts before carrying out maintenance work.
- ▶ Wear protective equipment.



Environmental protection

You **must** dispose of the product and its components in accordance with all applicable regulations for protecting people, the environment and nature.

- Help to reduce the wastage of natural resources.
- Prevent contamination.



Environmental protection

The product and its components **must be disposed of in accordance with the applicable regulations relating to environmental protection and human health**, with a view to reducing natural resource wastage and preventing pollution.

9.1 General disposal information

Pfeiffer Vacuum products contain materials that you must recycle.

- ▶ Dispose of our products according to the following:
 - Iron
 - Aluminium
 - Copper
 - Synthetic
 - Electronic components
 - Oil and fat, solvent-free
- ▶ Observe the special precautionary measures when disposing of:
 - Fluoroelastomers (FKM)
 - Potentially contaminated components that come into contact with media

9.2 Disposing of the screw pump

Pfeiffer Vacuum screw pumps from the HeptaDry series contain materials which must be recycled.

1. Fully drain the lubricant.
2. Fully drain the cooling liquid.
3. Dismantle the motor.
4. Decontaminate the components that come into contact with process gases.
5. Separate the components into recyclable materials.
6. Recycle the non-contaminated components.
7. Dispose of the product or components in a safe manner according to locally applicable regulations.

10 Malfunctions

DANGER

Danger to life from electric shock

Touching exposed and voltage-bearing elements causes an electric shock. Improper connection of the mains supply leads to the risk of touchable live housing parts. There is a risk to life.

- ▶ Before the installation, check that the connection leads are voltage-free.
- ▶ Make sure that electrical installations are only carried out by qualified electricians.
- ▶ Provide adequate grounding for the device.
- ▶ After connection work, carry out an earthed conductor check.

CAUTION

Danger of burns on hot surfaces

In the event of a fault, the surface temperature of the vacuum pump can increase to above 105 °C.

- ▶ Allow the vacuum pump to cool down before carrying out any work.
- ▶ Wear personal protective equipment if necessary.

NOTICE

Danger of property damage from improper maintenance

Unprofessional work on the vacuum pump will lead to damage for which Pfeiffer Vacuum accepts no liability.

- ▶ We recommend taking advantage of our service training offering.
- ▶ When ordering spare parts, specify the information on the nameplate.

Problem	Possible causes	Remedy
Vacuum pump will not start	<ul style="list-style-type: none"> No mains voltage or operating voltage incorrect 	<ul style="list-style-type: none"> Check the mains voltage. Check the mains fuse. Check the motor switch.
	<ul style="list-style-type: none"> Thermal protection switch has tripped 	<ul style="list-style-type: none"> Determine the cause and eliminate the fault. Allow the vacuum pump to cool if needed.
	<ul style="list-style-type: none"> Pump system corroded from the inside or condensate present 	<ul style="list-style-type: none"> Check the process and pump medium Install a condensate collector. Contact Pfeiffer Vacuum Service.
	<ul style="list-style-type: none"> Motor seized 	<ul style="list-style-type: none"> Check the motor. Try to turn over the motor by hand with the power supply disconnected.
	<ul style="list-style-type: none"> Motor faulty 	<ul style="list-style-type: none"> Change the motor and check the new motor.
	<ul style="list-style-type: none"> Foreign particles in the suction chamber 	<ul style="list-style-type: none"> Remove the foreign particles. If the vacuum pump is seized, notify Pfeiffer Vacuum Service. Inspect the intake strainer.
	<ul style="list-style-type: none"> Rotors jammed or seized 	<ul style="list-style-type: none"> Rotate the screw rotors by hand using the rotor access screw Have the vacuum pump repaired. Contact Pfeiffer Vacuum Service.
Loud noises during operation	<ul style="list-style-type: none"> Gears, bearings or coupling elements are faulty 	<ul style="list-style-type: none"> Have the vacuum pump repaired. Contact Pfeiffer Vacuum Service.
	<ul style="list-style-type: none"> Incorrect or unsuitable lubricant 	<ul style="list-style-type: none"> Use a suitable lubricant.

Problem	Possible causes	Remedy
Excessive heat generated during operation	<ul style="list-style-type: none"> • Lubricant soiled 	<ul style="list-style-type: none"> • Change the lubricant
	<ul style="list-style-type: none"> • Lubricant level is too low 	<ul style="list-style-type: none"> • Top up lubricant.
	<ul style="list-style-type: none"> • Ambient temperature is too high 	<ul style="list-style-type: none"> • Ensure that the permissible ambient conditions are observed.
	<ul style="list-style-type: none"> • Cooling liquid filling level is too low 	<ul style="list-style-type: none"> • Top up cooling liquid. • Observe the requirements for the cooling water.
	<ul style="list-style-type: none"> • No cooling water feed, or cooling water pressure too low 	<ul style="list-style-type: none"> • Check the cooling water feed and flow rate. If necessary, increase the cooling water pressure.
	<ul style="list-style-type: none"> • Temperature of process gases at gas inlet is too high 	<ul style="list-style-type: none"> • Observe the temperature requirements for the gas inlet.
Vacuum pump not reaching final pressure	<ul style="list-style-type: none"> • Intake line plugged • Intake lines are too long or diameter is too short 	<ul style="list-style-type: none"> • Clean the intake line • Use a greater diameter or shorter lines.
	<ul style="list-style-type: none"> • Counter-pressure too high • Vacuum pump plugged with process residue • Cooling liquid or cooling water lacking • Contaminated or incorrect lubricant 	<ul style="list-style-type: none"> • Inspect and clean the exhaust line. • Dismantle and clean the vacuum pump. • Check the cooling liquid and the cooling water level. • Change the lubricant.
Lubricant level too low	<ul style="list-style-type: none"> • Loss of oil to the outside or inside 	<ul style="list-style-type: none"> • Inspect the oil chambers for leaks (covers, seals). • Check the shaft seals.
Lubricant is black	<ul style="list-style-type: none"> • Lubricant level is too low 	<ul style="list-style-type: none"> • Top up lubricant.
	<ul style="list-style-type: none"> • The intervals for changing the lubricant are too long 	<ul style="list-style-type: none"> • Change the lubricant.
	<ul style="list-style-type: none"> • High level of heat generation in the vacuum pump during operation 	<ul style="list-style-type: none"> • Rectify the cause of this heat generation.

Tbl. 10: Troubleshooting

11 Service solutions by Pfeiffer Vacuum

We offer first-class service

High vacuum component service life, in combination with low downtime, are clear expectations that you place on us. We meet your needs with efficient products and outstanding service.

We are always focused on perfecting our core competence – servicing of vacuum components. Once you have purchased a product from Pfeiffer Vacuum, our service is far from over. This is often exactly where service begins. Obviously, in proven Pfeiffer Vacuum quality.

Our professional sales and service employees are available to provide you with reliable assistance, worldwide. Pfeiffer Vacuum offers an entire range of services, from original replacement parts to service contracts.

Make use of Pfeiffer Vacuum service

Whether preventive, on-site service carried out by our field service, fast replacement with mint condition replacement products, or repair carried out in a Service Center near you – you have various options for maintaining your equipment availability. You can find more detailed information and addresses on our homepage, in the Pfeiffer Vacuum Service section.

You can obtain advice on the optimal solution for you, from your Pfeiffer Vacuum representative.

For fast and smooth service process handling, we recommend the following:



1. Download the up-to-date form templates.
 - Explanations of service requests
 - Service requests
 - Contamination declaration



- a) Remove and store all accessories (all external parts, such as valves, protective screens, etc.).
- b) If necessary, drain operating fluid/lubricant.
- c) If necessary, drain coolant.
2. Complete the service request and contamination declaration.



3. Send the forms by email, fax, or post to your local Service Center.

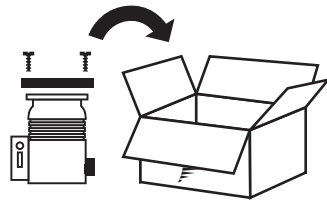


4. You will receive an acknowledgment from Pfeiffer Vacuum.

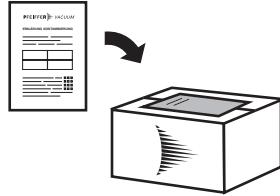
PFEIFFER VACUUM

Submission of contaminated products

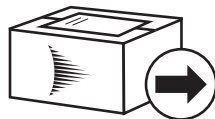
No microbiological, explosive, or radiologically contaminated products will be accepted. Where products are contaminated, or the contamination declaration is missing, Pfeiffer Vacuum will contact you before starting service work. Depending on the product and degree of pollution, **additional decontamination costs** may be incurred.



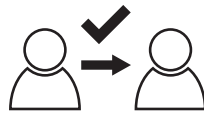
5. Prepare the product for transport in accordance with the provisions in the contamination declaration.
 - a) Neutralize the product with nitrogen or dry air.
 - b) Seal all openings with blind flanges, so that they are airtight.
 - c) Shrink-wrap the product in suitable protective foil.
 - d) Package the product in suitable, stable transport containers only.
 - e) Maintain applicable transport conditions.



6. Attach the contamination declaration to the **outside** of the packaging.



7. Now send your product to your local Service Center.



8. You will receive an acknowledgment/quotation, from Pfeiffer Vacuum.

PFEIFFER VACUUM

Our sales and delivery conditions and repair and maintenance conditions for vacuum devices and components apply to all service orders.

12 Accessories



View the [range of accessories for screw pumps](#) on our website.

12.1 Accessory information

PTC resistor tripping unit for motor protection

Monitors the motor winding temperature

Dust separators

Protects the pump from particles out of processes

Silencer

The silencer reduces the noise level during operation without exhaust line.

Non-return flap

To protect the vacuum pump against condensate and particles returning from the exhaust

12.2 Ordering accessories

Description	Order number
PTC-resistor tripping device for motor protection 220 – 240 V AC	P 4768 052 FQ
Exhaust Silencer DN 80, PN 16	PU Z00 102
Check flap Hepta 400 P/630 P	PU Z00 202
SAS 63, DN 63 ISO-K, polyester filter	PK Z60 511

Tbl. 11: Accessories

12.3 Consumables

When selecting the type and amount of lubricant, always refer to the specifications on the rating plate.

Description	Order number
D1, synthetic diester based oil, 1 l	PK 005 875 -T
D1, synthetic diester based oil, 5 l	PK 005 876 -T

Tbl. 12: Consumables

13 Technical data and dimensions

13.1 General

	mbar	bar	Pa	hPa	kPa	Torr mm Hg
mbar	1	$1 \cdot 10^{-3}$	100	1	0.1	0.75
bar	1000	1	$1 \cdot 10^5$	1000	100	750
Pa	0.01	$1 \cdot 10^{-5}$	1	0.01	$1 \cdot 10^{-3}$	$7.5 \cdot 10^{-3}$
hPa	1	$1 \cdot 10^{-3}$	100	1	0.1	0.75
kPa	10	0.01	1000	10	1	7.5
Torr mm Hg	1.33	$1.33 \cdot 10^{-3}$	133.32	1.33	0.133	1

$$1 \text{ Pa} = 1 \text{ N/m}^2$$

Tbl. 13: Conversion table: Pressure units

	mbar l/s	Pa m³/s	sccm	Torr l/s	atm cm³/s
mbar l/s	1	0.1	59.2	0.75	0.987
Pa m³/s	10	1	592	7.5	9.87
sccm	$1.69 \cdot 10^{-2}$	$1.69 \cdot 10^{-3}$	1	$1.27 \cdot 10^{-2}$	$1.67 \cdot 10^{-2}$
Torr l/s	1.33	0.133	78.9	1	1.32
atm cm³/s	1.01	0.101	59.8	0.76	1

Tbl. 14: Conversion table: Units for gas throughput

13.2 Technical data

Classification	Hepta 400 P
Nominal pumping speed at 50 Hz	350 m³/h
Nominal pumping speed at 60 Hz	420 m³/h
Final pressure with gas ballast	$1 \cdot 10^{-1}$ hPa
Final pressure without gas ballast	$5 \cdot 10^{-2}$ hPa
Rated power 50 Hz	7.5 kW
Rated power 60 Hz	9.5 kW
Emission sound pressure level without gas ballast at 50 Hz	66 dB(A)
Emission sound pressure level without gas ballast at 60 Hz	69 dB(A)
Operating fluid amount	1 l
Cooling water flow	240 – 360 l/h
Cooling water temperature	5 – 30 °C
Ambient temperature	5 – 50 °C
Shipping and storage temperature	5 – 55 °C
Weight	500 kg

Tbl. 15: Technical data for Hepta 400 P

13.3 Substances in contact with the media

Check whether the following materials are chemically resistant to the process media being conveyed.

Pump parts	Substances in contact with the media
Pump housing	Cast iron (nodular graphite cast iron)
Rotor	Cast iron (nodular graphite cast iron)

Pump parts	Substances in contact with the media
Inlet/exhaust flange	Aluminium
Seals	FCR
Screws	Galvanized steel, stainless steel

Tbl. 16: Materials that make contact with the process media

13.4 Dimensions

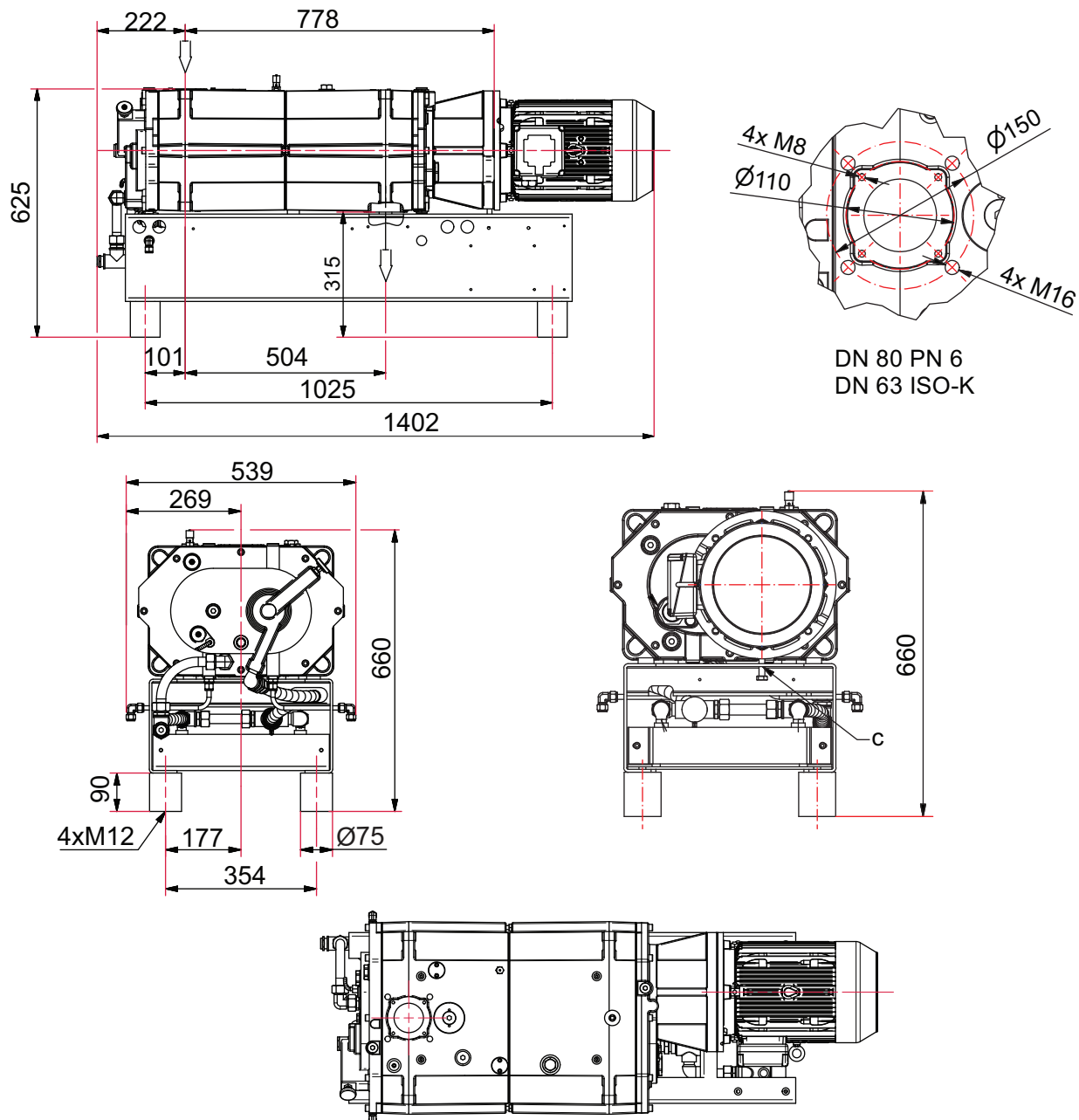


Fig. 37: Dimensions of Hepta 400 P
Dimensions in mm

Declaration of conformity

Declaration for product(s) of the type:

Screw pump

Hepta 400 P

We hereby declare that the listed product satisfies all relevant provisions of the following **European Directives**.

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

Electromagnetic compatibility 2014/30/EU

Restriction of the use of certain hazardous substances 2011/65/EU

Restriction of the use of certain hazardous substances, delegated directive 2015/863/EU

Harmonized standards and applied national standards and specifications:

DIN EN ISO 12100: 2011-03

DIN EN 60204-1: 2019-06

DIN EN ISO 13857: 2008-06

DIN EN 61000-6-2: 2006-03

DIN EN 1012-2 : 2011-12

DIN EN 61000-6-4: 2011-09

DIN EN ISO 2151 : 2009-01

DIN EN 13849-1: 2016-06

The authorized representative for the compilation of technical documents is Mr. Wolfgang Bremer, Pfeiffer Vacuum GmbH, Berliner Straße 43, 35614 Asslar, Germany.

Signature:



(Daniel Sälzer)
Managing Director

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Asslar, 2020-06-22



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