

Roots Pump with Standard and Canned Motor (AS)



WKP 250 A, WKP 250 AS
WKP 500 A, WKP 500 AS
WKP 500 AD

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Please note:

Current operating instructions are also available via www.pfeiffer-vacuum.net.

1. Safety Precautions

- ☞ Read and follow all the instructions in this manual.
- ☞ Inform yourself regarding:
 - Hazards which can be caused by the pump;
 - Hazards which can arise in your system;
 - Hazards which can be caused by the medium being pumped.
- ☞ Avoid exposing any part of your body to vacuum.
- ☞ Observe all safety and accident prevention regulations.
- ☞ Check regularly that all safety requirements are being complied with.
- ☞ Do not use the pump for the purpose of generating pressure.
- ☞ Do not carry out any unauthorised conversions or modifications on the pump.
- ☞ When returning the pump to us please note the shipping instructions in Section 7.

1.1. For Your Orientation

Instructions in the text

- ➔ Operating instruction: Here, you have to do something.

Symbols used

The following symbols are used in the illustrations and in the text throughout this operating manual:

- V** Vacuum flange
- △** Fore-vacuum flange
- ⚡** Electrical connection
- M** Measuring connection for pressure or gas temperature measurements
- SG** Sealing gas connection

Position numbers

Identical pump and accessory parts have the same position numbers in all illustrations in this operating manual.

1.2. Pictogram Definitions



Danger of injury from rotating parts.



Danger of burns from touching hot parts.



Danger of an electric shock.



Danger of personal injury.



Danger of damage to the pump or system.

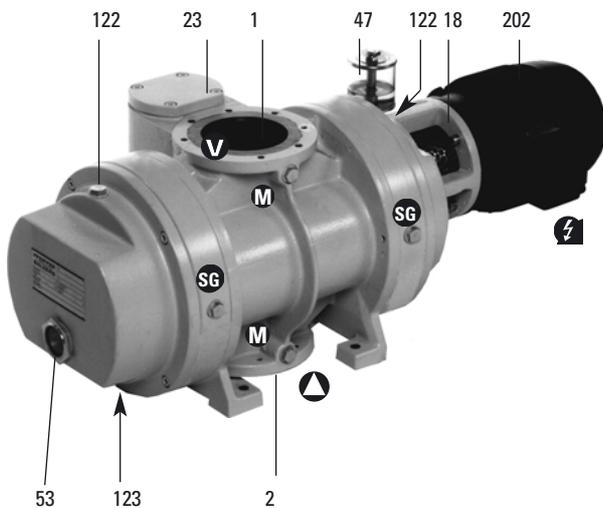
Modifications reserved.

2. Understanding The Pump

2.1. Main Features

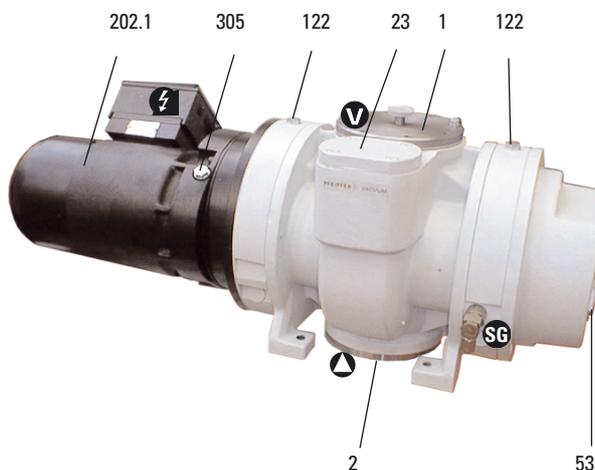
Roots Pump WKP 250 A and WKP 500 A/AD

- 1 Vacuum flange, 
- 2 Exhaust flange (fore-vacuum side), 
- 18 Lantern
- 23 Overflow valve cover
- 47 Oiler
- 53 Sight glass
- 122 Lubricant filler screw
- 123 Lubricant drain screw
- 202 Motor



Roots Pump WKP 500 AS

- 1 Vacuum flange, 
- 2 Exhaust flange (fore-vacuum side), 
- 23 Overflow valve cover
- 53 Sight glass
- 122 Lubricant filler screw
- 202.1 Canned motor
- 305 Locking screw for the bearing chamber evacuation (please see Section 3.6.)



The Roots Pumps WKP 250 A and WKP 500 A/AD works on the Roots principle in which two synchronous arranged lobes turn without contact in a housing. Owing to the counter rotating action of the two lobes in the suction chamber no friction is involved and therefore no lubrication is necessary. Only the two, separated gear chambers require lubrication. Permeation of the lubricant into the suction chamber is prevented by a labyrinth sealing system and lubricant return flow channels.

The pump shaft feedthrough is fitted with radial shaft seal rings overlaid with sealing oil. The sealing oil is also the lubricant for the pump.

Because the Roots Pumps cannot compress against atmosphere, it can only be operated in conjunction with a backing pump. An overflow valve, integrated in the housing, enables the pump to be switched on at any pressure range from atmospheric pressure, together with the backing pump.

Proper Use

- The Roots Pumps WKP 250 A and WKP 500 A/AD may only be used to generate vacuum.
- Do not pump explosive gases (special operation conditions should be checked with Pfeiffer Vacuum).
- Do not operate the pump in locations where there is an explosion hazard (a special version for this application is available on request).
- The Roots Pumps may not be used for the purpose of generating pressure.
- Installation, start-up, operating and maintenance instructions must be observed.
- Accessories other than those named in this manual may not be used without the agreement of Pfeiffer Vacuum.

Improper Use

The following are regarded as improper:

- Uses not covered above, and, in particular:
 - Connection to pumps and units which is not permitted according to their operating instructions.
 - Connection to units which contain touchable and voltage carrying parts.

Improper use will cause any rights regarding liability and guarantees to be forfeited.

2.2. Differences Between The Pump Types

Standard version

- The pump is manufactured with flanges as per ISO.
- Overflow valve to protect against thermal overloading.
- Connections for sealing gas inlet, shaft extraction and gear extraction.
- Standard motor.

Pressure surge protected version (WKP 500 AD)

This version of the pump has been specially designed for operations in the chemical processing industry. The pump is subjected to special testing with a test pressure of 16 bar. Those parts exposed to pressure are manufactured in spheroidal graphite cast iron (GGG 40.3) and the connection flanges of this pump are manufactured to DIN requirements (PN 16).

Helium-tight model with:

- Canned motor.
- On request delivered with test certificate.

Corrosive gas version with:

- Canned motor.
- Fluorine-resistant materials.
- On request delivered with test certificate.

3. Installation

3.1. Transporting The Pump

When lifting the pump for transportation and assembly, the lifting gear should only be attached to the eye bolts (threaded holes in the vacuum flange ) .

3.2. Pump Set-Up And Location

- ➔ The Roots Pump must be erected in a horizontal position. The vacuum flange  serves as a reference surface.
- ➔ Sight glasses 53 on the front side must be visible.
- ➔ A boring in each foot is provided for the purpose of fixing the pump to the standing surface. In this respect do not subject the pump to stress.
- ➔ The pump must be protected from draughts and the direct effect of the weather.

3.3. Connecting The Vacuum Side

- ➔ Keep the connection between the vacuum chamber and pump as short as possible in the nominal diameter of the pump flange. If the connection is in excess of 5 m, a greater nominal diameter should be used.
- ➔ Remove all scaling and loose particles from welded lines prior to assembly.
- No stress from the suction line should be allowed to act on the pump.
- To compensate for stresses, fit a bellows in the pipeline.
- Use a protective grill in the intake connection if there is a danger that particles may be sucked in (see Section 9., Accessories).

3.4. Connecting The Fore-Vacuum Side

- No stress from the fore-vacuum line should be allowed to act on the Roots Pump or the backing pump.
- Always lay lines sloping slightly downwards to the condensators or components.

Where pumping combinations with intermediate condensators are involved, lay the line sloping downwards to the condensator.

If a siphon trap arises in the line, a unit to drain the condensate must be fitted at the deepest point.

3.5. Connecting To The Mains Power Supply



Electrical connections must be carried out in accordance with local regulations. The voltage and frequency information on the rating plate must concur with the mains voltage. The Roots Pump must be interlocked with the backing pump. It may only be switched on at the same time as or when the backing pump is already running.

Standard motors

Checking the direction of rotation:

- ➔ Switch on the pump for a short time (max. 5 seconds).
- ➔ Motor and motor fan must turn in the direction of the arrow (see arrow on the casing).
- ➔ If direction of rotation incorrect, interchange two phases.

Canned motors

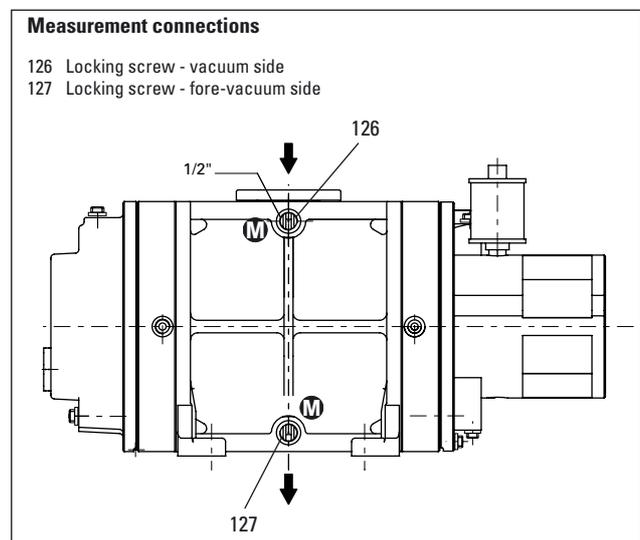
Connect the motor as per the wiring diagram and check the direction of rotation: The motor fan is driven by alternating current (220/230 V or 115 V 50/60 Hz) and has therefore no influence on the direction of rotation of the motor.

Checking the direction of rotation with a rotating field measuring instrument

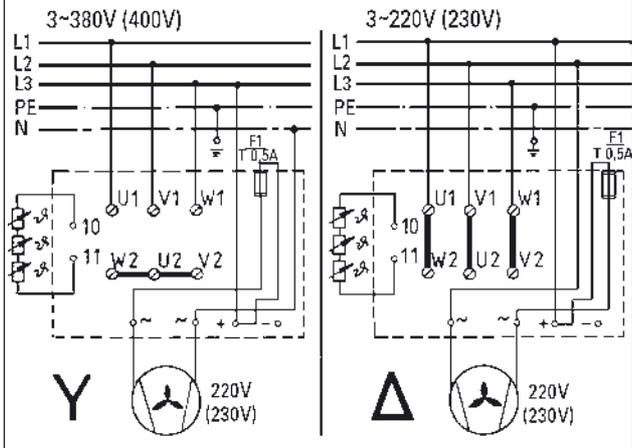
- ➔ Connecting to U1 - L1, V1 - L2 and W1 - L3 must cause clockwise running when viewing the drive shaft of the Roots Pump.

Visual check of the direction of rotation

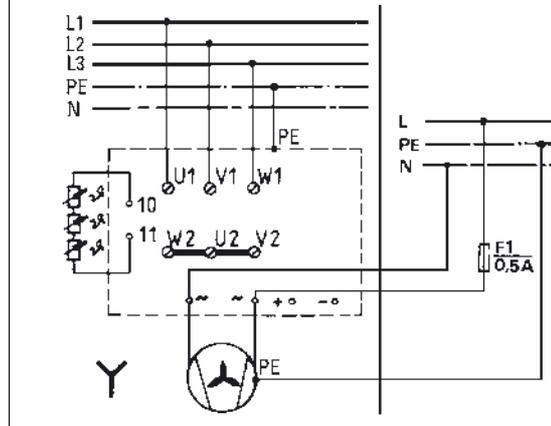
- ➔ Remove the locking screws of measurement connections 126 and 127.
- ➔ Switch on the pump for a short time (max. 5 seconds).
- ➔ The pumping direction of the Roots Pump is from up to down. When the direction of rotation is correct, air will be sucked in at the upper measurement connection and expelled at the lower (check by using a strip of paper).
- ➔ If the pumping direction is incorrect, interchange two phases.
- ➔ Close measurement connections 126 and 127.



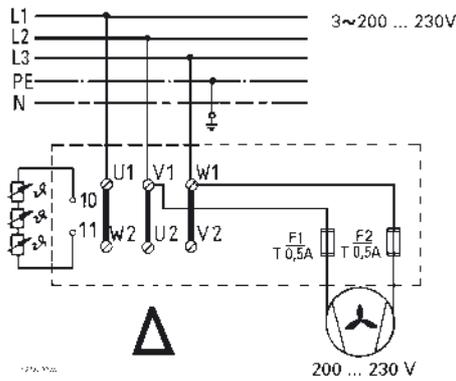
Connection example for canned motors



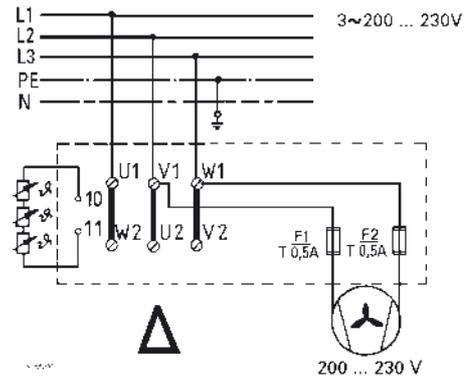
Connection example for canned motors with separate voltage supply for the fan



Connection example for canned motors with fan supplied from the terminal board (delta connected)

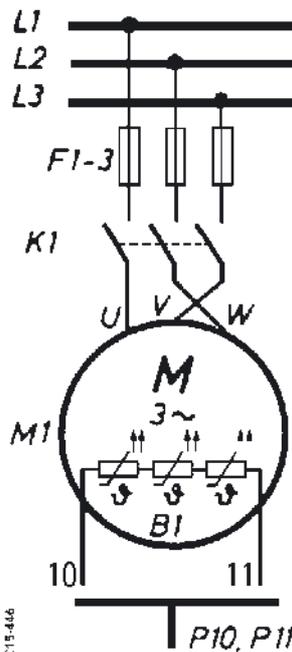


Connection example for canned motors with fan supplied from the terminal board (star connected)



Power pack with motor to be protected

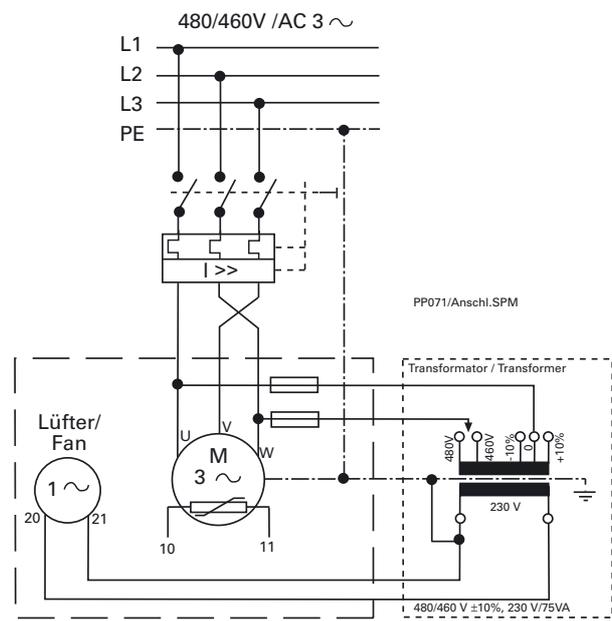
Frequency and Voltage see rating plate



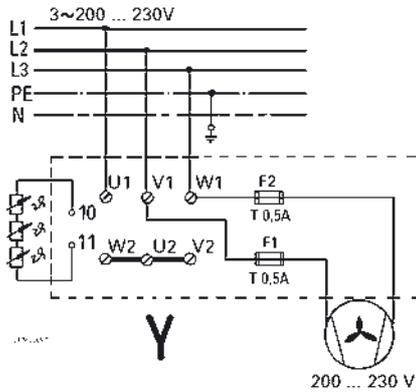
When connecting the pump the direction of rotation shown on the pumps must be observed irrespective of what is shown on the circuit diagram.

C15-446

Connection example for canned motors with special voltage supply with transformer for the power supply of the fan



Connection example for canned motors with fan supplied from the terminal board (star connected)



Three phase motors with PTC

Pumps fitted with these motors are used primarily in systems or in closed rooms. The motors of these pumps are fitted with three PTCs which are built into the stator windings. The connection of a tripping unit will protect the pump against overloading (see connection example).

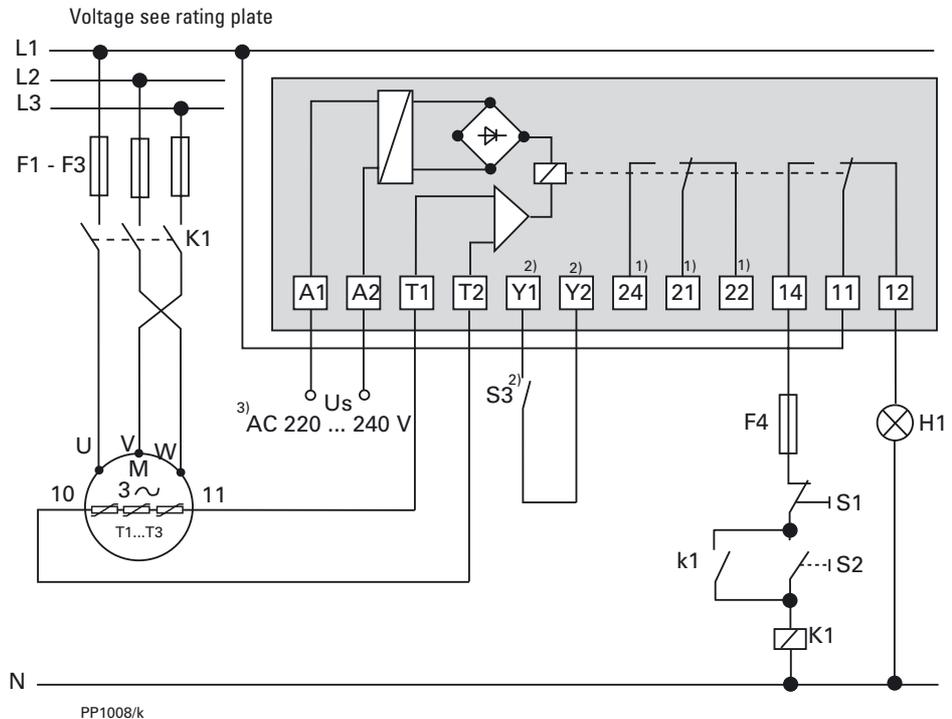
Tripping unit:

PTC tripping unit with two switchover contacts at the output manufactured by Ziehl, type MSR 220 F (see Section 9, „Accessories“), AEG type TMA 4R or Siemens type 3 UN8 004.

Connection example for water cooled canned motors with Tripping unit (typ MSR 220 F, order no.: P 4768 051 FQ)

- U_S Control Voltage
- S1 Pressure key „OFF“
- S2 Pressure key „ON“
- S3 Control switch (reset key)
- K1 Motor contactor
- F1 ... F4 Fuses
- T1... T3 Temperature sensors
- H1 Signal lamp
- M Motor, 3-phase

- ¹⁾ Only for units with two relays outputs
- ²⁾ Only for type MSR
- ³⁾ Only for order no. P 4768 051 FQ



Tripping Units Type MSR save the switch-off occurring on thermal overload and it is necessary to manually reset via the integrated key or via the externally connected key S3 to switch back on. Switching on via the mains is automatically recognised as a reset.



Canned motor version:
Actuation of the tripping unit can also cause in a molten fuse in the fan circuit.

3.6. Connecting The Special Accessories

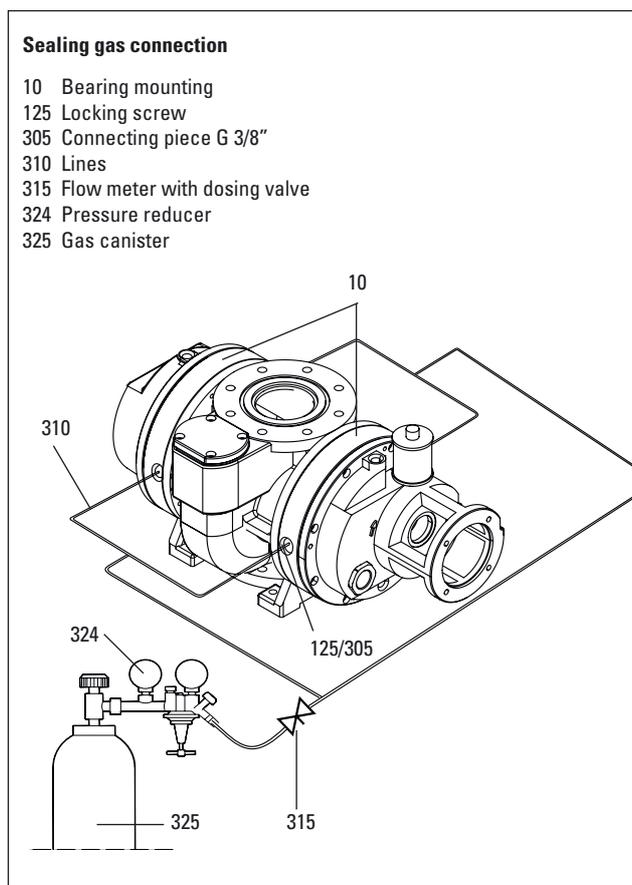
The accessory connections are not included in the delivery consignment and have therefore to be ordered as a component set (see Accessories).

Sealing gas connection

Pumping high boiling point media (e.g. solvents) can be damaging for the lubricating fluid. Damage can be prevented by admitting sealing gas (dependent on the process) into the shaft feedthrough between the working chamber and the gear chamber.

The sealing gas line can be made with Festo Pneumatic, Ermeto or small flange components and must be connected to all 4 sealing gas inlets of the pump.

- ➔ Unscrew the four locking screws 125 from the bearing mountings 10; take care with the O-ring.
- ➔ In place of the locking screws, screw in respective screw fittings G 3/8" 305 with O-rings.
- ➔ Make flange connection and fit lines 310.
- ➔ Connect gas canister 325 with pressure reducer 324 to flow meter 315 and adjust the level of sealing gas (Section 4.3).



Flushing unit

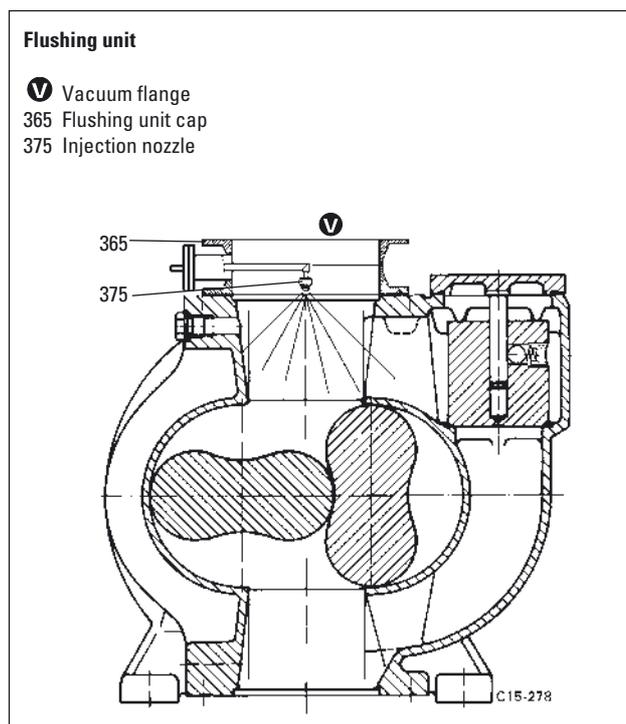
During operations, the WKP 250 A and WKP 500 A/AD can be continuously, or as required, flushed up to 0.25 l/min if the medium being pumped is causing serious contamination or deposits in the suction chamber.

Injection nozzle 375 has been designed to operate at a pressure of 3 bar at the maximum flushing fluid level of the pump. The fluid injected into the pump must be completely discharged, e.g. with the use of condensators or a collection vessel.

- ➔ Fit flushing unit cap 365 onto the vacuum flange V.
- ➔ Fit a shut-off valve and a flow meter with dosing valve in the feeder line for shutting off and to control the flow.
- ➔ Adjust the level of flushing fluid (see Section 4.4.).

Protective grill

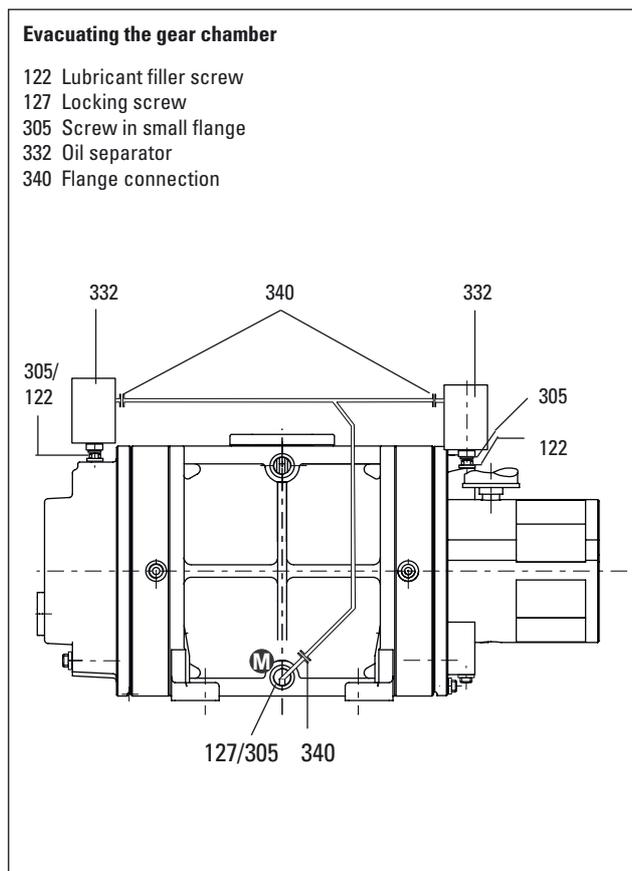
If, when pumping, there is a danger that particles may be sucked in, a protective grill should be fitted to the suction port to protect the Roots Pump (see Accessories). The reduction in pumping speed is minimal.



Evacuating the gear chamber

For rapid evacuation of the vacuum chamber (<1 min), the gear chambers should be evacuated via oil separators in the connecting line to the fore-vacuum side.

- ➔ Unscrew lubricant filler screw 122 and locking screw 127; take care with the O-rings.
- ➔ Screw in small screw in flanges 305 (DN 10 KF G 3/8") with O-ring into 122 and 127.
- ➔ Flange on both oil separators 332 and fit lines.



4. Operations

4.1. Filling Up And Checking The Lubricant



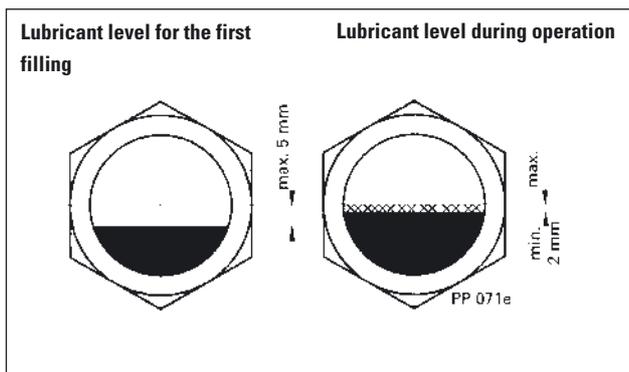
Before first time operating, the gear chambers of the pump must be filled with lubricant. The delivery consignment includes sufficient lubricant for one complete filling. The sealing oil chamber of the drive shaft is already filled with P3.

Standard version pumps are tested with lubricant P3. Guarantees relating to attainment of final pressures and trouble free functioning apply only providing this lubricant is used.

Pumps for special applications (e.g. for pumping corrosive gases) can be operated with special operating fluids such as F5 and other Pfeiffer Vacuum operating fluids. The use of such operating fluids requires prior authorisation from Pfeiffer Vacuum.

P3 must be disposed of in accordance with local waste disposal regulations.

- ➔ Remove lubricant filler screw 122.
- ➔ Fill up with lubricant included in the consignment; refer to rating plate for correct quantity. The filling level is approx. 5mm below the middle of the sight glass.
- ➔ Replace lubricant filler screw 122; be careful with the O-rings.
- ➔ The level during operations should be approx. between the min./max. position at the sight glass.
- ➔ Check lubricant level daily during non-stop operations, otherwise each time the pump is switched on.
- ➔ To top up with lubricant, the pump must be switched off and vented to atmospheric pressure.



Sealing oil chamber

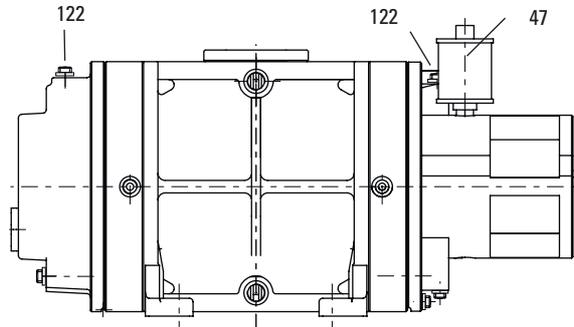
The sealing oil chamber of the drive shaft is filled with lubricant. Oiler 47 should always be filled to the half way mark, maximum, (when the pump is cold); top up as necessary. When the pump becomes warm, the lubricant expands and can spill over if the oiler is too full.

Please note:

Pumps with canned motors do not have a sealing oil chamber.

Filling Up And Checking The Lubricant At The Standard Pump

- 47 Oiler
- 122 Lubricant filler screw

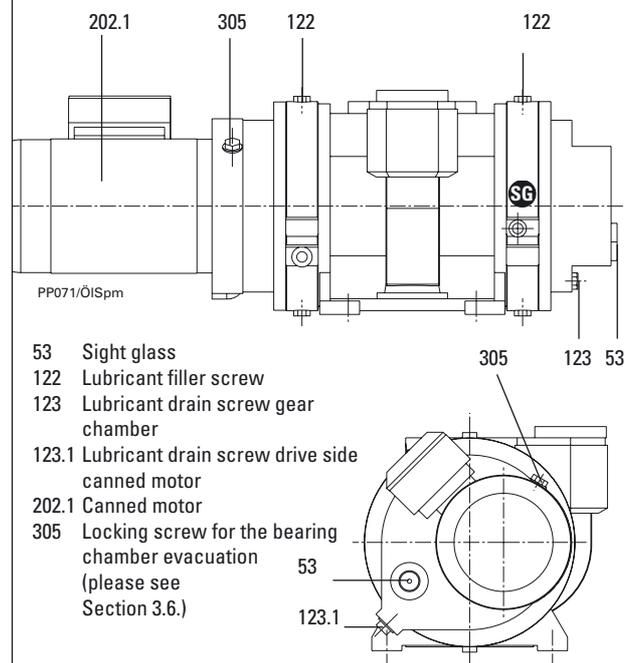


Filling up lubricant chamber on the canned motor

The lubricant chamber on the canned motor is connected, via the lubricant drain hole on standard pumps, with the bearing chamber and has the same level of operating fluid.

- ➔ Check the filling level during operations on sight glass 53 as per the illustration in the standard operating instructions.

Filling Up And Checking The Lubricant at canned motor version



4.2. Switching The Pump ON And OFF

- ➔ The Roots Pump is switched on with or after the backing pump.
- In the high pressure range the overflow valve is open. It protects the Roots Pump against thermal overloading.
- The overflow valve closes when the pressure differential between the intake and the pressure side is under 75 mbar.
- The Roots Pump can be switched off at any time.
- Do not ventilate the vacuum chamber via the Roots Pump.
- Vent via the intake side.

4.3. Adjusting The Level Of Sealing Gas

- ➔ Open gas canister 325.
- ➔ Set a pressure of max. 2.5 bar at pressure reducer 324.

The effective pumping speed and the attainable final pressure is influenced by the level at which the sealing gas level has been set.

- ➔ Set the required level of sealing gas on the flow meter with dosing valve 315.

The following criteria dictate how much sealing gas should be used:

- The level which may be delivered to the pumped medium.
- The level which is required to adequately protect the lubricant.

Experience shows that the level of sealing gas to be delivered is, dependent on the working pressure, between 1% (at high working pressures) and 8% (low working pressures).

Calculation of the sealing gas flow rate

Q_S = Sealing gas flow rate at standard conditions [Nm^3/h]

p = Intake pressure [mbar]

p_0 = Ambient pressure at standard conditions [mbar]

Δp = Pressure differential at the overflow valve [mbar]

p_V = Fore-vacuum pressure [mbar]

A_S = Sealing gas quantity of the total gas flow
($0,01 \leq A_S \leq 0,08$)

S_{th} = Volume flow rate of the WKP [m^3/h]

$$Q_S = \frac{S_{th} \cdot p \cdot A_S}{p_0}$$

Example for WKP 500 A/AD with 50 mbar intake pressure and 8% sealing gas quantity:

$$Q_S = \frac{490 \cdot 50 \cdot 0,08}{1013} = 1,93 \text{ Nm}^3/\text{h}$$

This applies to exhaust pressures > 100 mbar:

$$Q_S = \frac{S_{th} \cdot (p_V - \Delta p) \cdot A_S}{p_0}$$



At a pressure of 2.5 bar the delivery of sealing gas must be stopped immediately when switching off the pump. If, after switching off, the pump is to be vented with Nitrogen (N_2) via the sealing gas line, a maximum pressure of 1.2 bar may not be exceeded.

4.4. Adjusting The Level Of Flushing Fluid

The level of flushing liquid can be adjusted by a flow meter (not included in the delivery consignment). The injection level for the WKP 250 A and WKP 500 A/AD is maximum 0.5 l/min at a pressure of 3 bar. The flushing fluid level can be set with the use of a flow meter (not included in the delivery consignment).



This pressure and throughput must not be exceeded in the given time otherwise the pump could be damaged. Where pumping stations, intermediate condensators or collection vessels are involved, the fluid level should be set according to the smallest pump in the pumping station.

It is possible that the fluid must be drained off before compressing against atmosphere. It is essential to take account of the water vapour compatibility of the next pump in the series.

Table of flushing fluid levels

WKP 18000/25000:	Maximum 3 l/min
WKP 8000/12000, WGK 8000:	Maximum 2 l/min
WKP 6000 A/AD:	Maximum 1.75 l/min
WKP 4000 A/AD, WGK 4000:	Maximum 1.5 l/min
WKP 2000/2000 A, WGK 1500:	Maximum 1.0 l/min
WKP 1000 A/AD:	Maximum 0.5 l/min
WKP 250 A, WKP 500 A/AD:	Maximum 0.25 l/min

5. What To Do In The Case Of Breakdown ?

Problem	Possible Cause	Remedy
Pump doesn't attain final pressure, pump has to low volume flow rate, extension of pumping-down time.	<ul style="list-style-type: none"> • Pump dirty • Lubricant dirty • Leak in system • Backing pump faulty • Overflow valve faulty • Oiler lose lubricant 	<ul style="list-style-type: none"> • Clean suction chamber, see Section 6.3. • Change lubricant, see Section 6.2. • Repair leak. • Check backing pump. • Clean overflow valve and check for wear, see section 6.4. • Request repair by Pfeiffer Vacuum Service.
Unusual operating noises	<ul style="list-style-type: none"> • Pump dirty • Damage to bearing or gear cogs • Dirty overflow valve • Damage to motor shaft bearing 	<ul style="list-style-type: none"> • Clean suction chamber, see Section 6.3. • Request repair by Pfeiffer Vacuum Service. • Clean overflow valve, see section 6.4. • Request repair by Pfeiffer Vacuum Service.
Pump doesn't start	<ul style="list-style-type: none"> • Pump dirty • Damage to gear cogs • Damage to bearing • Mains power failure 	<ul style="list-style-type: none"> • Clean suction chamber, see Section 6.3. • Request repair by Pfeiffer Vacuum Service. • Request repair by Pfeiffer Vacuum Service. • Check electrical connections.

6. Maintenance

6.1. Maintenance Precautions



Always ensure the pump cannot be switched on when carrying out any work on the pump. If necessary, remove the pump from the system to carry out inspection work.

Dispose of used lubricant in compliance with local regulations.

- When working with synthetic operating media, toxic substances and substances contaminated with corrosive gases, the relevant instructions governing their use must be observed.
- Only use benzene or similar agents for cleaning pump parts. Do not use soluble washing agents.

6.2. Changing The Lubricant

The intervals for lubricant replacement of gear chamber and loose bearings are governed by the operating conditions. Influential factors are operating temperature, operations with or without sealing gas and the type of process medium.

Please note:

Please request safety instruction data sheets for operating fluids from Pfeiffer Vacuum or download from the INTRANET/INTERNET.



Gear chamber lubricant replacement

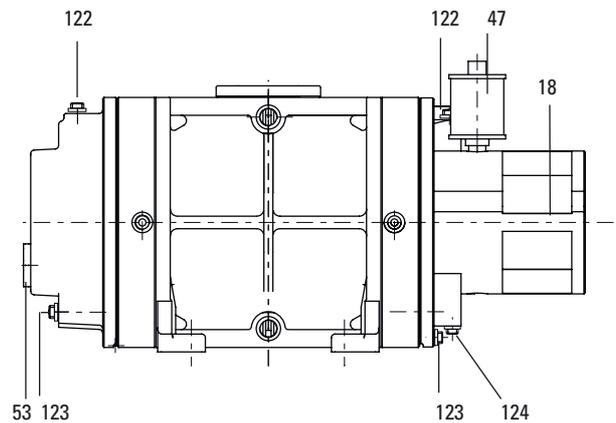
Normal intervals for lubricant replacements for organic lubricants (for example P3) as well as for synthetic lubricants (for example F5):

At least once a time a year.

- ➔ The level of deterioration of organic lubricant (for example P3) can be read off from the colour scale in accordance with DIN 51578 on the supplementary sheet PK 800 219 BN/B; on request.
 - The colour scale enables precise colour determination.
- ➔ Fill a specimen in a test tube or some similar vessel and test by holding against the light.
- ➔ Where the discolouration is dark yellow to red brown (equivalent to 4 ... 5 on the scale) change lubricant.
 - At a colour level of 7 - 8 it is possible that the pump has already been damaged.
- ➔ Switch off pump and vent to atmosphere.
- ➔ Unscrew lubricant filler and drain screws 122/123 (each two pieces), for canned motor version unscrew drain screw 123.1, and drain lubricant; take care with the o-ring.

Filling up and checking the lubricant

- 47 Oiler
- 53 Sight glass
- 18 Lantern
- 122 Lubricant filler screw
- 123 Lubricant drain screw
- 124 Lubricant drain screw (sealing oil chamber)



The lubricant temperature can be as high as 80 °C. During maintenance and repair work, process related toxic gases and vapours can escape from the lubricant which may become contaminated with harmful substances (radioactive, chemical etc.).

Please note:

Disposal of used lubricant is subject to the relevant local regulations.

- ➔ Screw in lubricant drain screw 123/123.1; take care with the position of the O-ring.
- ➔ Fill in fresh lubricant and check level as per section 4.1.

Sealing oil chamber

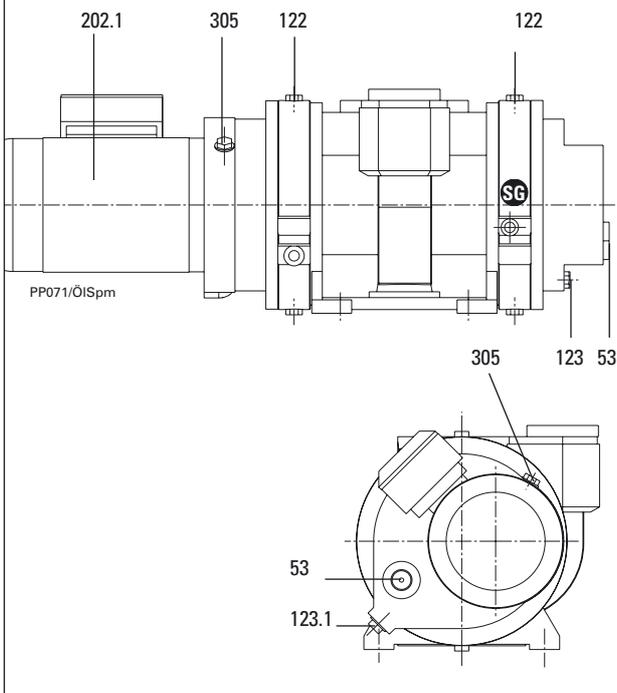


The recommendation for sealing oil replacements is once a time a year.

- ➔ Unscrew lubricant drain screw 124 for the sealing oil chamber on lantern 18; take care with the o-rings.
- ➔ Drain lubricant.
- ➔ Screw in lubricant drain screw 124 with the o-ring.
- ➔ Top up oiler 47 to the half way mark with new lubricant (sealing oil).

Filling Up And Checking The Lubricant at canned motor version

- 53 Sight glass
- 122 Lubricant filler screw
- 123 Lubricant drain screw gear chamber
- 123.1 Lubricant drain screw drive side canned motor
- 202.1 Canned motor
- 305 Locking screw for the bearing chamber evacuation (please see Section 3.6.)



6.3. Cleaning The Suction Chamber

- ➔ Disconnect the drive motor from the mains power supply and ensure it cannot be switched on.
- ➔ Dismantle vacuum line, fore-vacuum line and blank flange 54 of the pump.



When cleaning, the position of the rotor may only be changed with the help of tools, or e.g. a block of wood (danger of an accident).

- ➔ Clean the suction chamber through the three connections using a suitable cleaning agent.
- ➔ After cleaning, re-fit the blank flange and pipe lines.
- ➔ Remove security device to prevent the motor being switched on.
- ➔ Each time the suction chamber is cleaned the lubricant should be changed (as per Section 6.2.).

6.4. Cleaning The Overflow Valve

The pump must first be vented to atmospheric pressure before dismantling the overflow valve.

- ➔ Unscrew screws 111 and remove valve cover 23; take care with the O-ring 86.
- ➔ Remove valve plate 33 from the overflow channel and dismantle.
- ➔ Clean the guide bolts on the valve cover 23, dry and then rub lightly with emery paper (120 grain); if necessary replace complete if there is grooving.

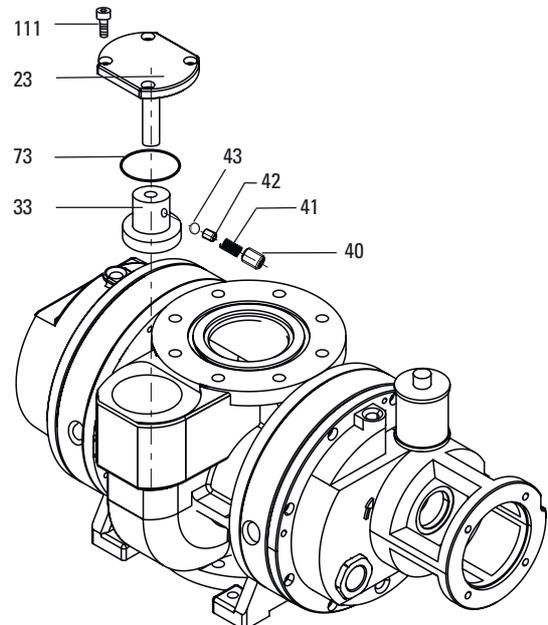


On no account should the guide bolts be oiled because this would adversely affect the evaporation.

- ➔ Clean all other parts, check for wear and tear and replace if necessary.

Overflow valve

- 23 Valve cover
- 33 Valve plate
- 40 Pressure screw
- 41 Compression spring
- 42 Pressure piece
- 43 Ball
- 73 O-ring
- 111 Screw



6.5. Shutting Down The Pump For Longer Periods

If the pump is to be shut down for a longer period, the whole of the internal chamber must be protected against corrosion. The suction chamber should be checked for cleanliness in accordance with the instructions in Sections 6.3. and 6.4. and cleaned as necessary. In addition, the lubricant should be changed in accordance with the instructions in Section 6.2.

- ➔ Close intake and pressure ports.
- ➔ Evacuate the suction chamber via the upper measuring connection at room temperature $p < 1\text{mbar}$ and vent with Nitrogen.
- ➔ Insert drying beads after pumping clean (provides additional safety).

7. Service

Do Make Use Of Our Service Facilities

In the event that repairs are necessary to your pumping station, a number of options are available to you to ensure any system down time is kept to a minimum:

- Have the pump repaired on the spot by our Pfeiffer Vacuum Service Engineers;
- Return the individual components to the manufacturer for repairs;
- Replace individual components with a new value exchange units.

Local Pfeiffer Vacuum representatives can provide full details.

Before Returning:

- ➔ When returning the pump please use original factory packing.
- ➔ Dismantle all accessories.
- ➔ Drain lubricant.
- ➔ If the pump free of harmful substances, please attach a clearly visible notice: "Free of contamination" (to the unit being returned, the delivery note and accompanying paperwork).

Harmful substances" are substances and preparations as defined in current legislation. Pfeiffer Vacuum will carry out the decontamination and invoice this work to you if you have not attached this note. This also applies where the operator does not have the facilities to carry out the decontamination work. Units which are contaminated microbiologically, explosively or radioactively cannot be accepted as a matter of principle.

Fill Out The Contamination Declaration

- ➔ In every case the "Contamination Declaration" must be completed diligently and truthfully.
- ➔ A copy of the completed declaration must accompany the unit; any additional copies must be sent to your local Pfeiffer Vacuum Service Center.

Start-Up

Depending on how long the pump has been shut down it may be necessary to exchange the elastomer parts. With reference to German Industrial Standards DIN 7716 and the manufacturer's instructions, replacement of the integrated elastomer parts is recommended after two years. The same time period is applicable to the rotor bearings. If drying beads had been inserted they should be removed. Improper handling can cause the pump to break down.

Please get in touch with your local Pfeiffer Vacuum representatives if there are any questions regarding contamination.



Decontaminate units before returning or possible disposal. Do not return any units which are microbiologically, explosively or radioactively contaminated.

Returning Contaminated Units

If contaminated units have to be returned for maintenance/repair, the following instructions concerning shipping must be followed without fail:

- ➔ Neutralise the pump by flushing with nitrogen or dry air.
- ➔ Seal all openings to the air.
- ➔ Seal pump or unit in suitable protective foil.
- ➔ Ship units only in appropriate transport containers.



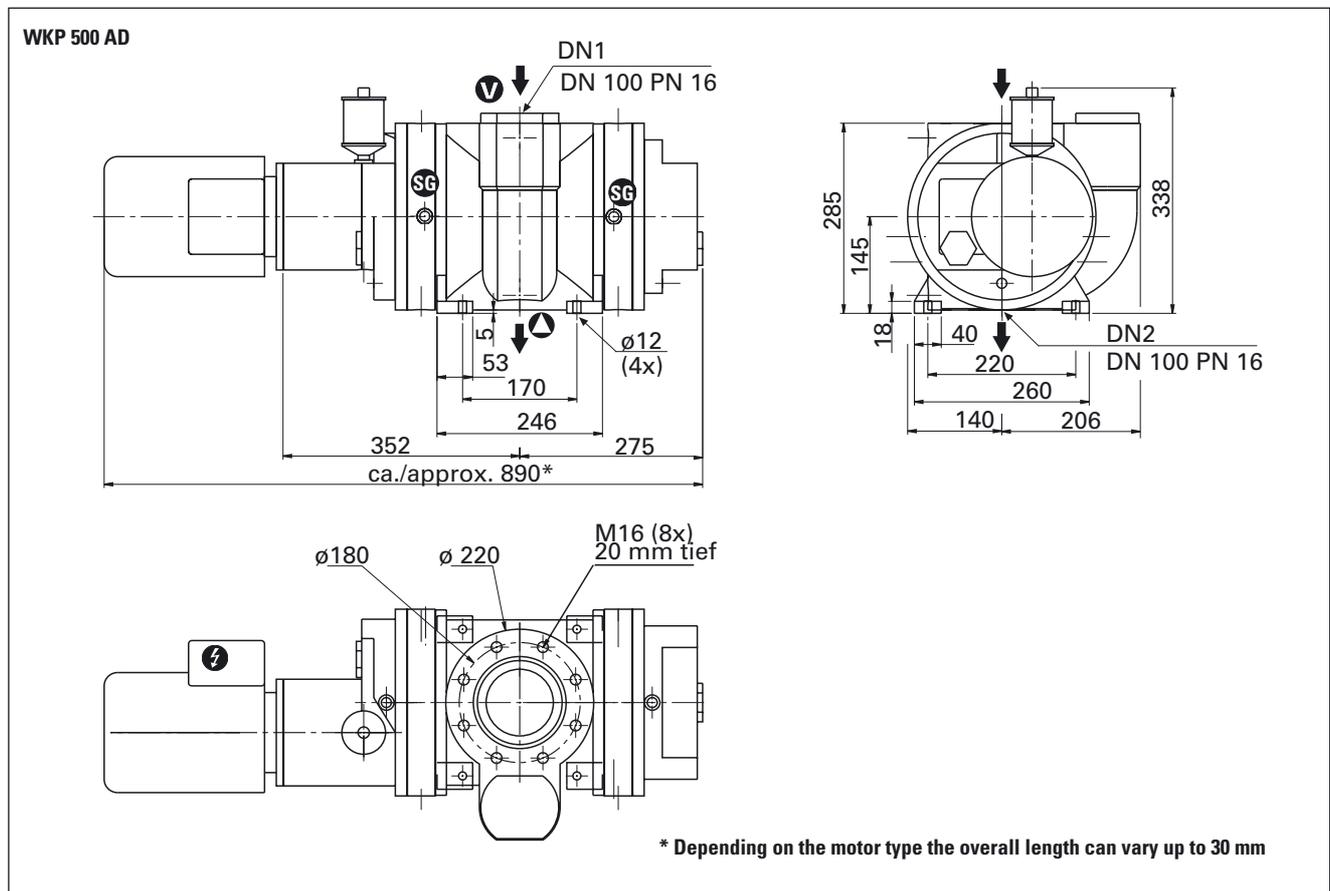
Repair orders are carried out according to our general conditions of sale and supply.

- ➔ If repairs are necessary, please send the unit together with a short damage description to your nearest Pfeiffer Vacuum Service Center.

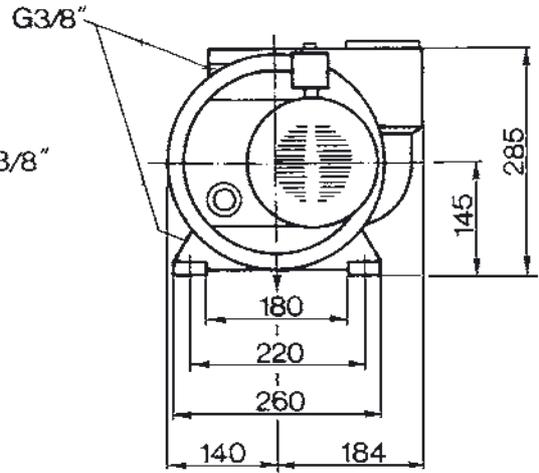
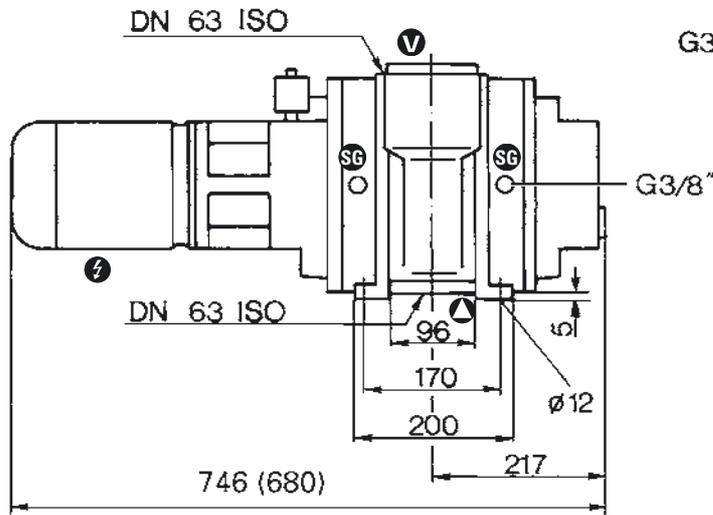
8. Technical Data

Description	Unit	WKP 250 A	WKP 250 AS	WKP 500 A	WKP 500 AD	WKP 500 AS
Connection nominal diameter Input (DN1) Output (DN2)		DN 63 ISO-F DN 63 ISO-F	DN 63 ISO-F DN 63 ISO-F	DN 100 ISO-F DN 100 ISO-F	DN 100 PN 16 DN 100 PN 16	DN 100 ISO-F DN 100 ISO-F
Nominal pumping speed at 50 Hz 60 Hz	m ³ /h m ³ /h	270 324	270 324	490 588	490 588	490 588
Switch on pressure Differential pressure at the overflow valve	mbar mbar	1000 75	1000 75	1000 75	1000 75	1000 75
Tightness of the pump with Radial shaft seal ring Pump with canned motor	mbar l/s mbar l/s	$< 1 \cdot 10^{-2}$	$< 1 \cdot 10^{-5}$	$< 1 \cdot 10^{-2}$	$< 1 \cdot 10^{-2}$	$< 1 \cdot 10^{-5}$
Noise level as per DIN 45 635	dB (A)	72 ... 75	70 ... 75	72 ... 75	72 ... 75	70 ... 75
Nominal rotation speed 50 Hz 60 Hz	1/min 1/min	3000 3600	3000 3600	3000 3600	3000 3600	3000 3600
Motor power at 50 Hz 60 Hz Canned motor 50 Hz 60 Hz	kW kW kW kW	0,75 1,5	1,5 1,7	1,5 1,5	1,5 1,5	1,5 1,7
Lubricant	l	1,5	1,3	1,5	1,5	1,3
Weight with motor, approx.	kg	93	104	115	115	126

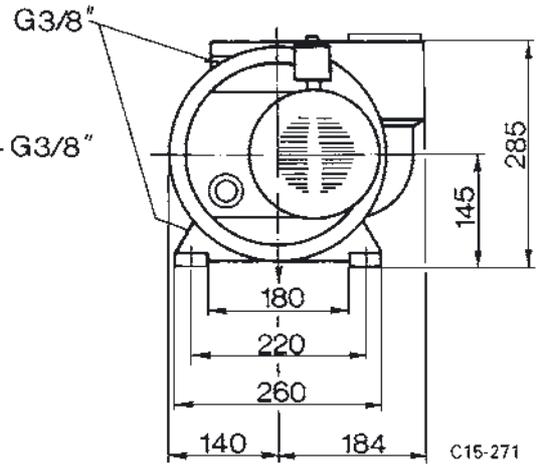
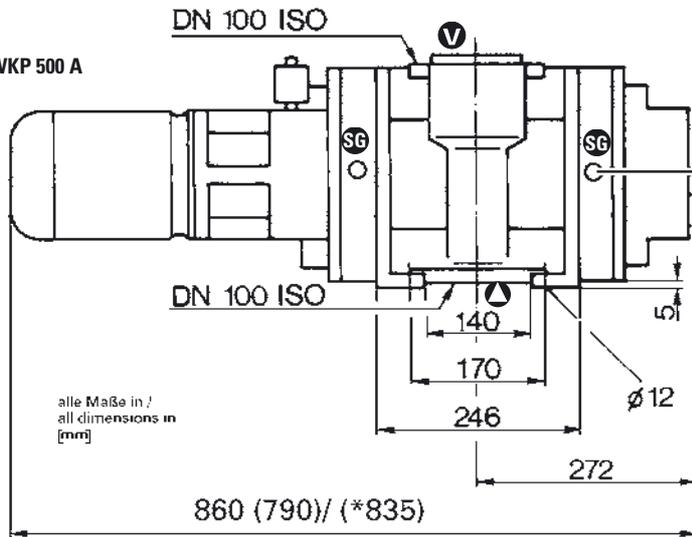
8.1. Dimensions



WKP 250 A



WKP 500 A



Dimensions for pumps with
Canned motor /
*Canned motor special: 2/2,2 KW

9. Accessories

Description	Size	Number	Comments	Order Quantity
Sealing gas connection	WKP 250 A	PP 027 401 -T	(for 4 inlet)	
Sealing gas connection	WKP 500 A/AD	PP 027 401 -T	(for 4 inlet)	
Flushing unit	WKP 250 A	on request		
Flushing unit	WKP 500 A/AD	on request		
Protective grill WKP 250 A	DN 63 ISO	PK 300 010-X		
Protective grill WKP 500 A	DN 100 ISO	PP 030 149-XA		
PTC tripping unit	220 V AC	P 4768 051 FQ		
Gear chamber evacuation unit	WKP 250 A	PP 030 420-T		
Gear chamber evacuation unit	WKP 500 A/AD	PP 030 421-T		
Oil separator		PP 030 401-U		
Zeolite trap		PP 030 408-U		

10. Spare Parts

Set of seals

The set of seals contains all sealing components like O-rings, radial shaft seal rings, flat seals, square washers, profiled sealing rings and the supporting rings for the radial shaft seal rings. Not included are centering rings for connecting the pump for the intake and pressure side.

Maintenance kit

The maintenance set contains the radial shaft seal rings and all neighboring sealing components. Additionally the sealing rings for the operating fluid filler and the drain screw, the coupling set as well as both o-rings for the gear cover are included.

Overhaul kit

The maintenance set contains the set of seals, ball bearings, roller bearings, circlips, all guiding parts of the overflow valve, sight glasses, protective sleeve, oiler, grooved nuts and the coupling set.

Gear wheels

Included are only the main and the auxiliary wheel.

Art. No.	Standard Pump type	Set of seals	Maintenance kit	Overhaul kit	Gear Wheels
PP W21 000 ... 019	WKP 250 A	PP E00 002 AT	PP E01 002 AT	PP E02 002 AT	PP E03 001 -T
PP W21 000 A ... 019 A	WKP 250 A	PP E00 002 AT	PP E01 002 AT	PP E02 002 AT	PP E03 001 -T
PP W31 000 ... 019	WKP 500 A	PP E00 013 AT	PP E01 002 AT	PP E02 002 AT	PP E03 001 -T
PP W31 000 A ... 019 A	WKP 500 A	PP E00 013 AT	PP E01 002 AT	PP E02 002 AT	PP E03 001 -T
PP W31 700 ... 719	WKP 500 AD	PP E00 022 AT	PP E01 002 AT	PP E02 032 AT	PP E03 001 -T
PP W31 700 A ... 719 A	WKP 500 AD	PP E00 022 AT	PP E01 002 AT	PP E02 032 AT	PP E03 001 -T



The use of other spare parts than mentioned in this instruction requires prior authorisation from Pfeiffer Vacuum.

Only authorized, experienced and trained personnel are permitted to make changes or perform maintenance or repairs. Unapproved changes by the customer void all warranty and liability claims against Pfeiffer Vacuum.

The spare parts packages listed above are only valid for the pumps in **standard versions**. When ordering please be sure to state the full information given on the rating plate.

Please use our Service Training offers (information is also available via www.pfeiffer-vacuum.net).

Declaration of Contamination of Vacuum Equipment and Components

The repair and/or service of vacuum components will only be carried out if a correctly completed declaration has been submitted. Non-completion will result in delay.

The manufacturer could refuse to accept any equipment without a declaration.

This declaration can only be completed and signed by authorised and qualified staff:

1. Description of component:

- Equipment type/model: _____
- Code No.: _____
- Serial No.: _____
- Invoice No.: _____
- Delivery Date: _____

2. Reason for return:

3. Equipment condition

- Has the equipment been used?
yes no
- What type of pump oil was used?

- Is the equipment free from potentially harmful substances?
yes (go to section 5)
no (go to section 4)

4. Process related contamination of equipment

- toxic yes no
- corrosive yes no
- microbiological hazard*) yes no
- explosive*) yes no
- radioactive*) yes no
- other harmful substances yes no

*) We will not accept delivery of any equipment that has been radioactively or microbiologically contaminated without written evidence of decontamination!

Please list all substances, gases and by-products which may have come into contact with the equipment:

Tradename Product name Manufacturer	Chemical name (or Symbol)	Danger class	Precautions associated with substance	Action if spillage or human contact
1.				
2.				
3.				
4.				
5.				

5. Legally Binding Declaration

I hereby declare that the information supplied on this form is complete and accurate. The despatch of equipment will be in accordance with the appropriate regulations covering Packaging, Transportation and Labelling of Dangerous Substances.

Name of Organisation: _____

Address: _____ Post code: _____

Tel.: _____

Fax: _____ Telex: _____

Name: _____

Job title: _____

Date: _____ Company stamp: _____

Legally binding signature: _____

Herstellereklärung Manufacturer's Declaration

im Sinne folgender EU-Richtlinien:
pursuant to the following EU directives:

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

Hiermit erklären wir, daß das unten aufgeführte Produkt zum Einbau in eine Maschine bestimmt ist und daß deren Inbetriebnahme so lange untersagt ist, bis festgestellt wurde, daß das Endprodukt den Bestimmungen der EU-Richtlinie 98/37/EWG entspricht.

Das unten aufgeführte Produkt entspricht den Anforderungen der EU-Richtlinien **Maschinen 98/37EWG, Elektromagnetische Verträglichkeit 89/336/EWG** und **Niederspannung 73/23/EWG**.

We hereby certify that the product specified below is intended for installation in a machine which is forbidden to be put into operation until such time as it has been determined that the end product is in accordance with the provision of EU Directive 98/37/EEC.

*The product specified below is in correspondence to the EU directives **Machinery 98/37/EEC, Electromagnetic Compatibility 89/336/EEC** and **EU Low Voltage 73/23/EEC**.*

Produkt/Product:

**WKP 250 A, WKP 250 AS
WKP 500 A/AD, WKP 500 AS**

Angewendete Richtlinien, harmonisierte Normen und angewendete nationale Normen:

Guidelines, harmonised standards, national standards in which have been applied:

**DIN EN ISO 12100-1; DIN EN ISO 12100-2
EN 294 EN 50081-1
EN 50082-1 EN 60204-1 EN 1012-2**

Unterschrift/Signature:



Pfeiffer Vacuum GmbH
Berliner Str. 43
35614 Asslar
Germany

(W. Dondorf)
Geschäftsführer
Managing Director

Herst.l./2003

Vacuum is nothing, but everything to us!



Turbopumps



Rotary vane pumps



Roots pumps



Dry compressing pumps



Leak detectors



Valves



Components and feedthroughs



Vacuum measurement



Gas analysis



System engineering



Service

PFEIFFER  **VACUUM**

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