

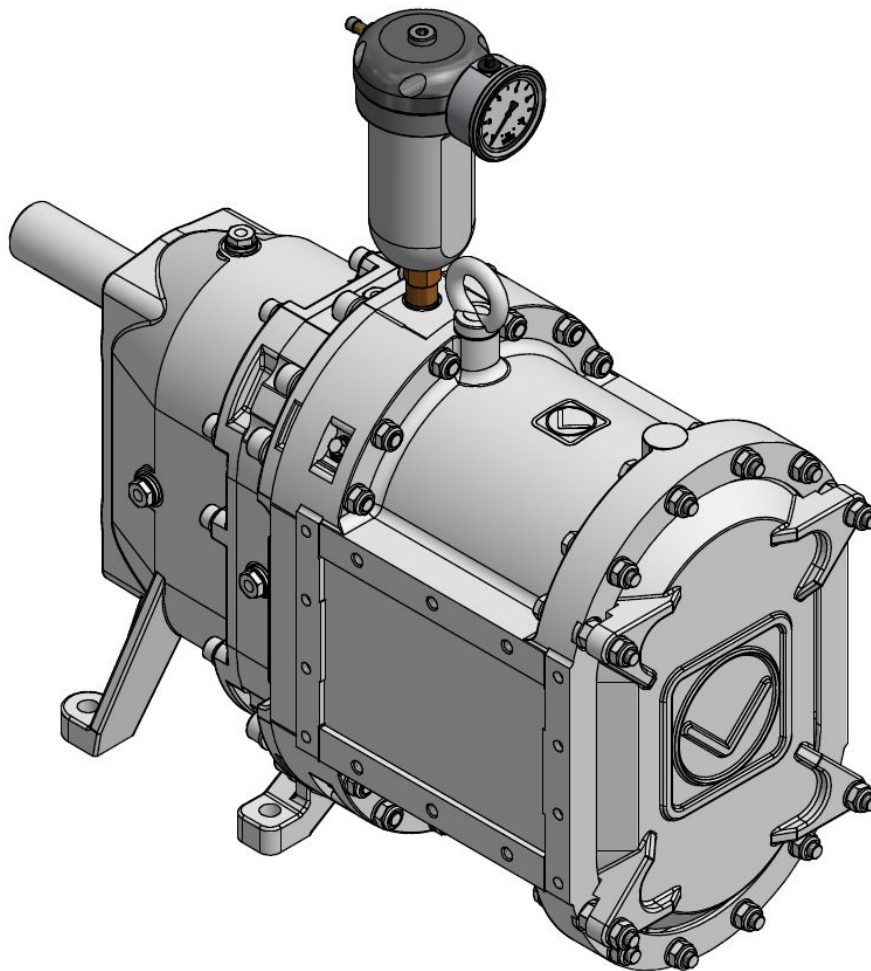


Operating Instructions

Rotary Lobe Pump

VX136Q

ENGINEERED TO WORK



Original operating instructions

Issuer

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Dear customer,

in every one of our products, you will see the entirety of our competence and our power of innovation at work. Each product is developed and built so that you can work more successfully.

We call it quite simply: ENGINEERED TO WORK

If you want to know more about our company or put forward requests or suggestions, a wealth of information can be found at www.vogelsang.info

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1 User information

1.1 Using the operating instructions

These instructions contain all necessary information concerning the operating elements, handling, start-up and maintenance and repair work, as well as the relevant technical data. The operating instructions are a component of the machine.

IMPORTANT READ CAREFULLY BEFORE USE

Read the operating instructions thoroughly. All of the points presented in these instructions must be understood and observed by those persons responsible for the installation, operation, maintenance and repair of the machine.

Vogelsang does not accept any liability for damage resulting from failure to comply with these operating instructions.

KEEP FOR FUTURE REFERENCE

Please keep the manual ready to hand to ensure easy access to the necessary information at all times.

Additional copies of the manual are available on request ☎✉ or to download from our website.

1.2 Relevant documents



- Dimension sheet / drawing
- Characteristic line
- EC declaration of conformity

Optional:

Technical information for drive system

Please read and adhere to the information and instructions in the relevant documents.

1.3 Presentation convention

Presentation	Meaning
•	Listing
–	Sublisting
1. 2.	Carry out these actions in the described sequence
→ Fig. "Caption"	Reference to a figure for additional information
→ Chapter "Chapter heading"	Reference to a chapter for additional information
→ Table "Table caption"	Reference to a table for additional information
 "Relevant document"	Reference to a document for additional information
 Technical support	Contact our technical support

1.4 Explanation of symbols

The following symbols and signal words are used in this manual:

- 1 If personal protective equipment is needed to work with and on the machine, that is indicated by the following symbols:**



Indicates that protective gloves must be worn for subsequent tasks.



Indicates that protective goggles must be worn for subsequent tasks.



Indicates that safety shoes must be worn for subsequent tasks.

2 This symbol draws attention to the use of tools:



Tools, mounting devices and resources required for the following work tasks.

3 General notices and information about environmental protection are marked by these symbols:



NOTE

Refers to further information and useful notes.



ENVIRONMENTAL PROTECTION

Refers to measures to be observed to prevent damage to the environment.

4 Safety notes are introduced by these symbols and words:



CAUTION

Refers to a dangerous situation in which failure to comply with the safety note could result in light injuries.



WARNING

Refers to a dangerous situation in which failure to comply with the safety note could result in death or serious injuries.



DANGER

Refers to an (extremely) dangerous situation in which failure to comply with the safety note will result in death or serious injuries.



RISK OF ELECTRIC SHOCK

Touching live parts leads to dangerous electrocution.
This can result in electric shock, burns or death.



ATTENTION

Refers to possible damage to machinery or property as a result of failure to comply with this note.

1.5 Machine versions described here

In → **Chapter** "Installation", the following optional machine versions are described:

Machine version	Chapter reference
• With or without pump connectors	→ Chapter "Pump connector"
• On a base or without a base	→ Chapter "Base, support surface for machine"
• With the following drive options: <ul style="list-style-type: none">– Electric drive– Hydraulic drive– PTO drive– Combustion engine drive	→ Chapter "Drive"
• With or without system control	→ Chapter "System control"

The machines listed in these operating instructions correspond to the Machinery Directive (2006/42/EC), see sample printout in →**Chapter** "EC declaration".

2 EC declaration

EC Declaration of conformity

According to Machinery Directive 2006/42/EC; annex II A

Manufacturer: Hugo Vogelsang
Maschinenbau GmbH
Holthöge 10-14
D-49632 Essen/Oldb.

We hereby declare that the machine described below meets the basic health and safety requirements of the Machinery Directive 2006/42/EC in its design and construction and in the version marketed by us. If a change is made to the machine without our agreement, this declaration loses its validity.

Product: Rotary lobe pump

Applied harmonised standards:

DIN EN ISO 12100:2011-03
DIN EN 1037:2008-11
DIN EN 349:2008-09
DIN EN ISO 13857:2008-06

Applied national standards and technical specifications:

DIN EN 82079-1:2013-06
DIN 4844-1:2012-06
DIN 4844-2:2012-12
DIN ISO 3864-1:2012-06
DIN EN 809:2012-10
DIN EN 12162:2010-05

The person authorized to compile the technical documentation is:
Hugo Vogelsang Maschinenbau GmbH; Holthöge 10-14; 49632 Essen (Oldb.), Germany

49632 Essen, 2013-06-01





Harald Vogelsang (Managing Director)

3 Specifications

VX136Q series	Max. speed: 800 min⁻¹		Max. differential pressure**	Theoretical operating torque***
	Theoretical capacity*			
Size	[l]	[m ³ /h]	[bar]	[Nm]
70	1.27	60	10	240
105	1.90	90	10	355
140	2.53	120	8	390
210	3.80	180	5	395

* All values refer to theoretical capacity. The actual capacity is lower; it depends on the various operating conditions.

** Valid only for short operation times. For continuous operation, please contact our service department  .

The service time of the rotary lobes is reduced by high temperatures, especially in combination with high pressure.

*** Theoretical operating torque with max. differential pressure and water, designed for NBR elastomers.




Maximum free passage: Ø 40 mm



ATTENTION

When using the pump for a **highly viscous medium**, the pump speed must be reduced according to the material's viscosity, to prevent the intake flow from breaking off on the suction side (cavitation protection).

Weights and dimensions

For the machine's weight and dimension specifications, see  "Dimension sheet"

3.1 Material description for rotary lobes

Marking on the rotary lobe	Material	Elastomer-based	Resistant up to	Pump medium	Characteristics
NBR	NBR	Nitrile butadiene rubber	80 °C *	Sewage sludge, petrol, oil, grease, diesel oil, spindle oil	Oil-resistant
NBR	NBR, white	Nitrile butadiene rubber	80 °C *	Oil, butter, linseed and olive oil, lard	Food grade
SBR	SBR	Styrene butadiene rubber	60 °C	Liquid manure	Wear-resistant
SL	EPDM-SL (EPDM-Sewage-Line)	Ethylene propylene diene M-class rubber	80 °C *	Water, liquid manure, sewage sludge, biogas substrate	Not oil and grease resistant, water resistant, steam resistant
AL	EPDM-AL (EPDM-Aqua-Line)	Ethylene propylene diene M-class rubber	80 °C *	Drinking water	Drinking water approved **, not oil or grease-resistant, water-resistant, steam-resistant
EPDM	EPDM, white	Ethylene propylene diene M-class rubber	80 °C *	Water, mash, slightly acidic products	Food grade
PU	PU (Werobust)	Polyurethane vulcanised	50 °C	Abrasive medium	Wear-resistant
PUR	PUR	Polyurethane cast	80 °C	Abrasive medium	Highly wear-resistant
CSM	CSM (Hypalon)	Chloro-sulfonyl polyethylene rubber	80 °C *	Petrol, oil, acids, alkali solutions	Wear-resistant, acid-resistant and alkali-resistant
FPM	FPM	Fluorocarbon gum	80 °C *	Solvents, salt water, oil, petrol, acids	Acid-resistant and alkali-resistant
	Steel lobes (pure material)	1.4571	150 °C 200 °C*	Pure medium Chemistry	High temperatures, high chemical resistance
	Steel rotary lobes (pure material)	C45 nitrided	150 °C 200 °C*	Pure medium petrochemical	High temperatures, chemical resistance

Table: Material description

* consult Vogelsang in the event of the combination of "high differential pressure and high temperatures" ☎️✉️

** drinking water approvals: KTW, DVGW-Arbeitsblatt, W 270, WRAS, BELAQUA



Please consult us ☎️✉️

- If you require combinations with high differential pressure and high temperatures – (see * in → Table "Material description").
- With solid material lobes with media containing foreign matter
- If you should discover discrepancies or if precise specifications have not been provided for the medium



ATTENTION

Risk of premature wear on rotary lobes made of FPM in the event of excess pump pressure!

The material 'FPM' for rotary lobes is usable only up to max. 6 bar differential pressure.

Please see → Chapter "Specifications".

3.2 InjectionSystem

InjectionSystem refers to a special type of pump housing segment for filling optimisation.

The InjectionSystem injects foreign matter directly into the delivery spaces in the pump chamber as they open, conveying them on to the pump outlet (for improved foreign matter protection).

In addition, an InjectionSystem also improves the internal sealing of the pump.

Injection S (Symmetrical InjectionSystem)

The filling optimisation structure is located at the pump inlet and at the pump outlet. This allows flow in either direction.

Injection S provides improved pump sealing (with more seal lines), thus allowing higher volumetric efficiency.

Injection A (Asymmetrical InjectionSystem)

The filling optimisation structure is located at the pump inlet only. Therefore, the direction of flow is set in advance. A brief reverse operation is possible.

Injection A provides improved foreign matter protection with low-viscosity fluids and a high proportion of foreign matter.

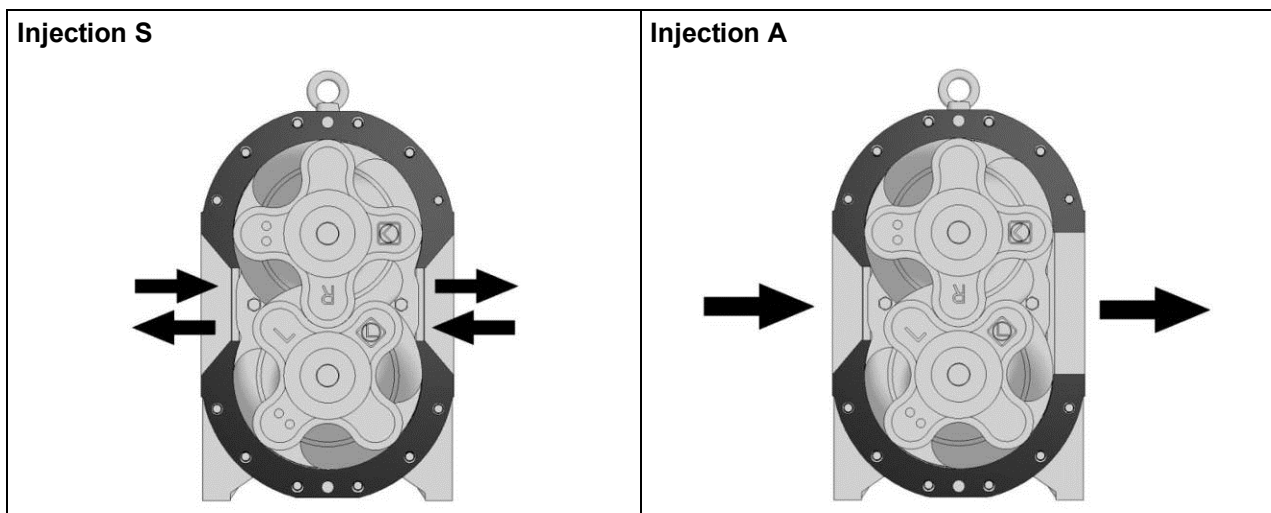


Fig. 1: Flow direction with InjectionSystem

3.3 Brief overview of tightening torques and working fluid volumes



Working fluid volumes

- Gear oil: 2 litres
- Buffer or quenching fluid
 - VX136: 1.5 litres (guideline, depending on the buffer chamber assembly)
 - VX136VVA: 1.2 litres (guideline, depending on the buffer chamber assembly)
- Lubricating grease: 5 shots per grease nipple



Tightening torques

- Pump connector
 - Hexagon head bolt (steel): 50 Nm
 - Hexagon head bolt (stainless steel): 40 Nm
- Buffer chamber and gearbox
 - Screw plug: 60 Nm
- Rotary lobe (spring washer and pressure disc)
 - Strain bolt (steel): tighten with 200 Nm, then loosen before tightening again with 140 Nm.
 - Strain bolt (stainless steel): tighten with 160 Nm, then loosen before tightening again with 140 Nm.
- Wear plate
 - Hexagon head bolt: 40 Nm

3.4 Name plate

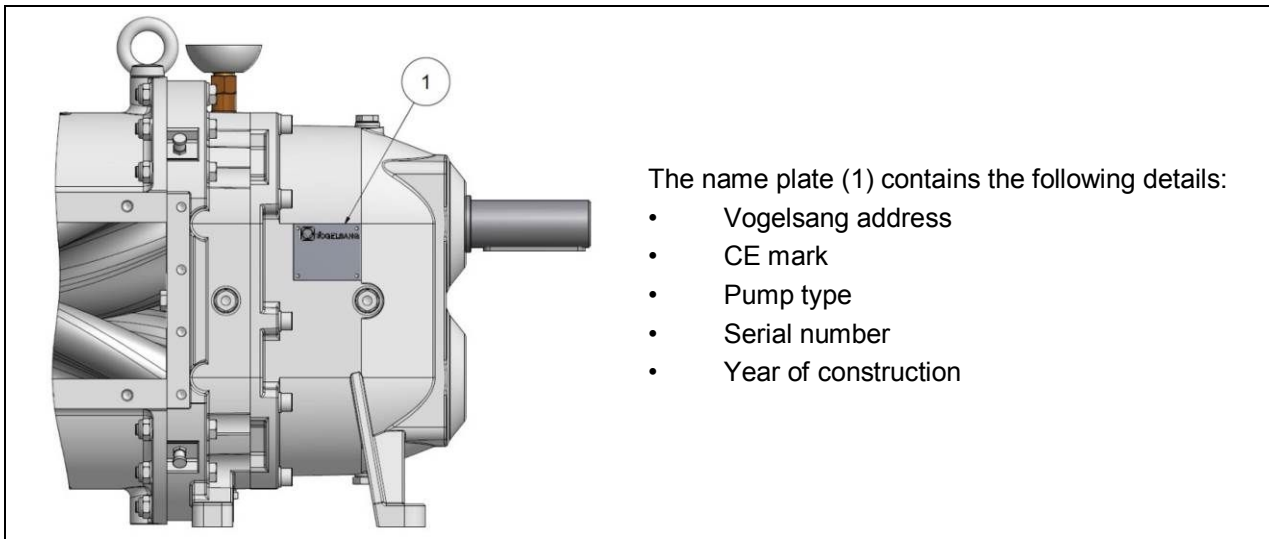


Fig. 2: Name plate

4 Safety

4.1 Intended use

The Vogelsang rotary lobe pump (hereinafter "pump" or "machine") is a self-priming positive displacement pump for pumping fluids ranging from water-like to highly viscous (hereinafter "medium").

The medium can be chemically neutral, acidic or alkaline. It can be loaded with solid particles and/or gas. The maximum free passage specified in → **Chapter** "Specifications" must not be exceeded.

The pump is designed to pump the medium specified by the customer.

For a different medium, or if the pump was not designed for a specific application, the materials of the wetted pump components must be checked for suitability. In some cases the pump must be reconfigured.

The pumps described in these operating instructions are not intended for use in potentially explosive atmospheres.

Any other use is contrary to the intended use. Vogelsang is not liable for any damage resulting from such incorrect use.

4.2 General safety notes

Before assembly, start-up, maintenance and repair of the machine, read the operating instructions in full and carefully observe the warning and safety notes.



WARNING

Risk of injury (catching, crushing, collision) due to rotating rotary lobes if the machine starts up unexpectedly!

Before starting maintenance and repair work (opening covers, disassembling connectors) and before troubleshooting, switch the machine off and secure it against being switched on again.



WARNING

Risk of injury from medium escaping under high pressure!

If the maximum differential pressure is exceeded, machine parts may burst and medium may spray out.

- The maximum differential pressure must not be exceeded → **Chapter** "Specifications".
- Observe and implement the recommendations in → **Chapter** "Installation in pipes".
- Protect the machine or system against overpressure. For example, the following **safety devices** can be used:
 - A current limiter on the motor
 - A pressure relief valve
 - Cut-off with a pressure control switch
 - An overload coupling



WARNING

Skin and eye irritation caused by contact with hazardous working materials or media!

All work on the machine can lead to contact with working materials or media.



- Personnel must wear suitable protective clothing.
- The operator must inform his or her staff about any potentially hazardous substances in working materials or media.



CAUTION

Risk of burning due to exposed host surfaces!

If the medium temperature is greater than 60 °C or the pump experiences dry running, the pump housing, the connectors or the pipes can become very hot.

At high speeds or high differential pressure, the gearbox housing can also become very hot.

- Avoid (accidental) contact with hot surfaces.
- Avoid dry running of the pump, e.g. by means of dry running protection via
 - Temperature monitor
 - Level measurement
 - Flow measurement



ATTENTION

Risk of frost!

To protect the pump against damage caused by frozen medium, drain it when there is a risk of frost.

- Drain the pump by running the pump in either direction (forward or reverse), until all liquid is drained out of the pump. You can use drain cocks in the connectors to do this.
- For complete emptying of the pump chamber, remove the Q cover, → **Chapter** "Opening the Q cover".
- Before start-up, refill with fluid.

4.3 Training of persons

Only trained and instructed persons may work with and on the pumps. The operator must clearly define the responsibilities of the persons for operating, servicing and maintaining equipment.

A person to be trained may only work with and on the pump under the supervision of an experienced person.

Activity	Person specially trained for the activity ¹⁾	Instructed person ²⁾	Person with specialised training ³⁾
Transport	X	--	X
Installation	--	--	X
Start-up	--	--	X
Operation	X	X	X
Checking safety devices	--	--	X
Electrical work	--	--	X
Maintenance	X	X	X
Repair	--	--	X
Decommissioning	--	--	X

Key: X..allowed --..not allowed

- 1) A person who can take on a specific task and who is authorised to carry it out for a company that is suitably qualified.
- 2) A person who has been instructed, and if necessary trained, in the tasks assigned to them and in the possible risks associated with incorrect behaviour and who has been instructed in the required protective equipment and protective measures.
- 3) A person whose technical training and knowledge of relevant regulations enables them to assess the tasks assigned to them and recognise possible risks (a qualified specialist).

Note:

A qualification equivalent to technical training may also be attained by many years of activity in the relevant field of work.

4.4 Warning and safety stickers on the machine

Warning and safety stickers on the machine provide important information for safe operation. Heeding the stickers promotes the safety of persons who work with and on the machine.

The warning and safety stickers must not be removed and must be replaced immediately if damaged or lost.

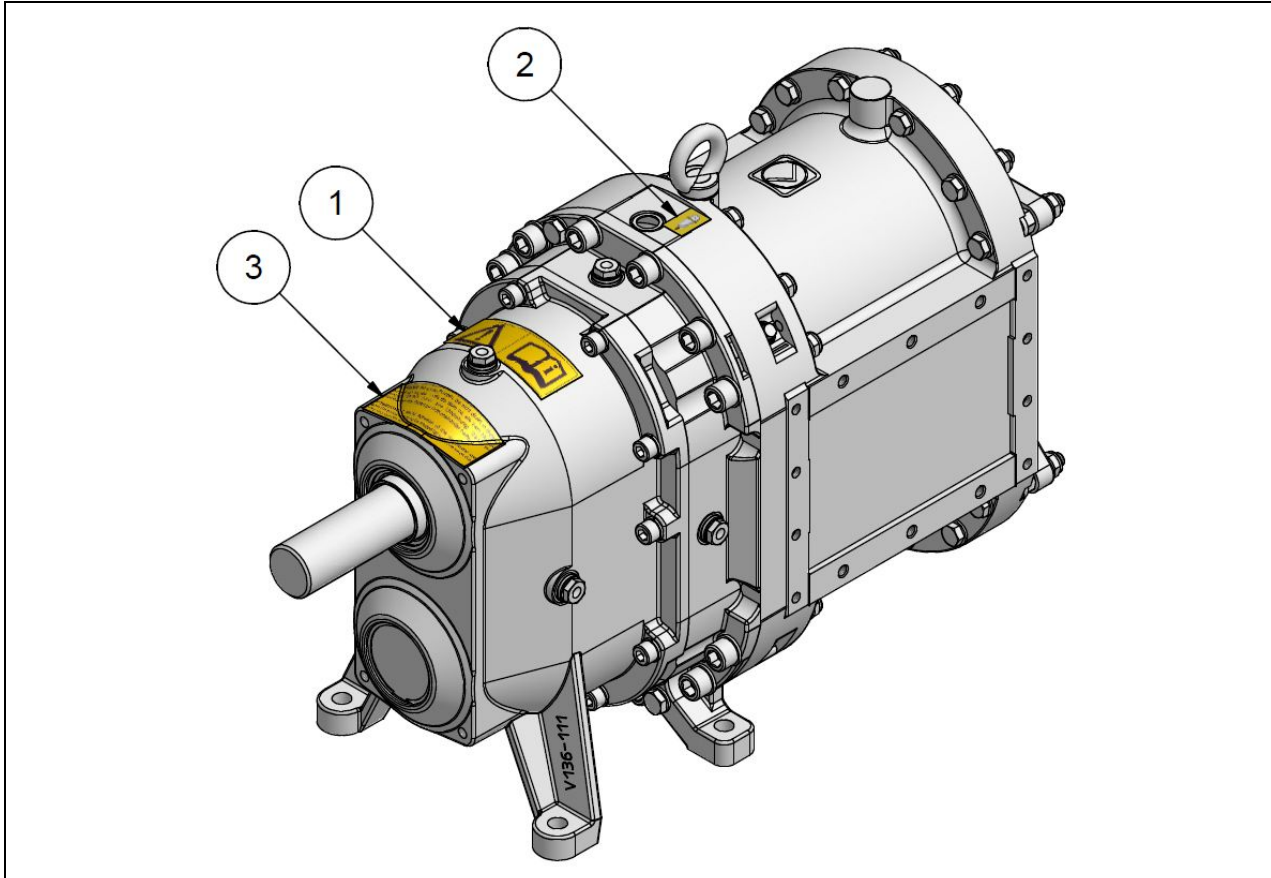


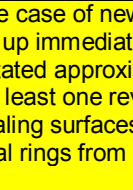


Fig. 3: Positioning of the warning and safety stickers

(example only, the position of the stickers can vary depending on the size of the pump)

Pos.	Sticker	Part no.	Meaning
1		VAU.133	Before start-up of the machine, read the operating instructions!
2		VAU.138	Buffer fluid tank or quenching fluid tank
3		VAU.115	See sticker (Only used for pumps with a mechanical seal consisting of the mating materials SiC-SiC)

5 Transport, storage

5.1 Transport

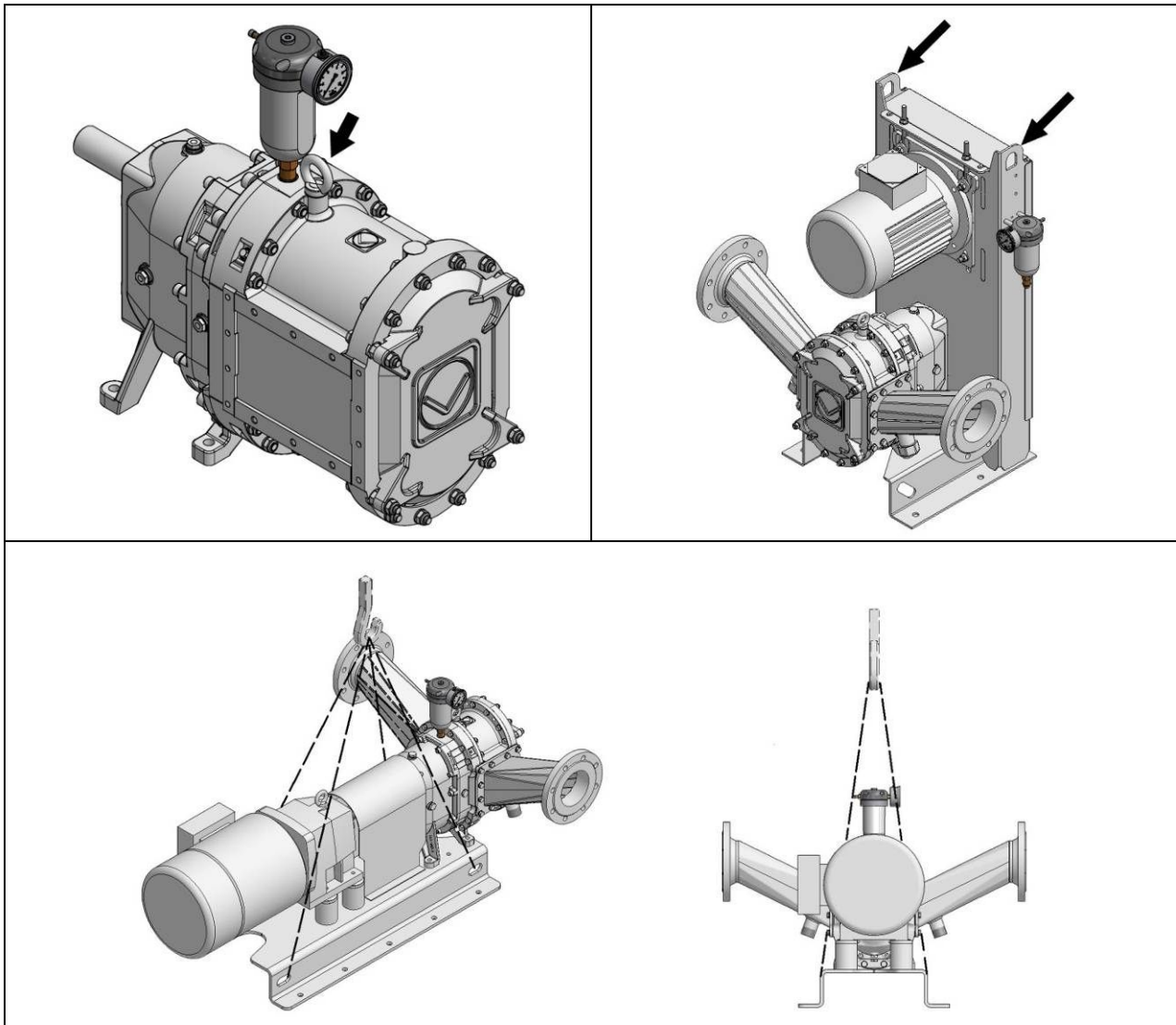


Fig. 4: Transport aids



WARNING

Risk of crushing or concussion due to falling machine!

The machine may start to sway or topple when it is transported, loaded or set down. To ensure safe transport, take note of the following:

- The loading and transporting may only be carried out by specially trained persons.
- Standing under raised loads is prohibited. Direct persons out of the danger area.
- Permissible transport options for the machine: suspended, or bolted to a Euro pallet.
- In the case of suspended transport of the machine:
 - Dismount the buffer fluid tank or quenching fluid tank before transporting.
 - Use the fitted lifting eye bolts and/or lifting lugs for hoisting gear and securely fasten the lifting tackle.
 - Use the lifting eye bolts **on the pumps** only for lifting and transporting the pump **without** mounted parts or any system components (e.g. motor, connectors or base).

5.2 Storage

Complete pumps, cartridge mechanical seals, individual O-rings and seal components

If not stored and handled properly, the physical characteristics of products made of rubber may change. Possible consequences include excessive hardening, softening, lasting deformation, peeling, cracking or other surface damage.

Long-term storage is possible under the following conditions (longer than 6 months to a maximum of 5 years):

- The storage area should be dry (relative humidity under 65%) and the temperature should be between 5 °C and 30 °C.
- The pump chamber can be sealed with a preservative that is compatible with the material of the lobes and gaskets.
- The products should be protected against light, especially direct sunlight and strong artificial light with a high ultraviolet component.

After a storage period of five years or more and before start-up we recommend:

- Checking and renewing (if necessary) all wetted gaskets and lobes
- Changing the gear oil and the buffer or quenching fluid

For pumps with a mechanical seal that has the mating materials SiC-SiC, the shaft must be turned (at least one revolution) every two months so that the sealing surfaces of the mechanical seal rings do not stick together.

6 Assembly

6.1 Installation in pipe systems

- The pump may be installed in an upright, horizontal, vertical or suspended position → Fig. "Installation variants".
With a horizontal installation, the inlet must be on the bottom and the outlet on the top.
If the pump is to be suspended or installed vertically, please contact us. ☎️ ✉️
- When installing the pump, ensure that there is easy access for maintenance work. If the screw plugs for draining the gear oil and buffer or quenching fluid are not easy to reach, discharge lines may be used (part nos. PBT.013 and/or PBT.014).
- Ensure that the pump is tension-free upon installation and also during operating.

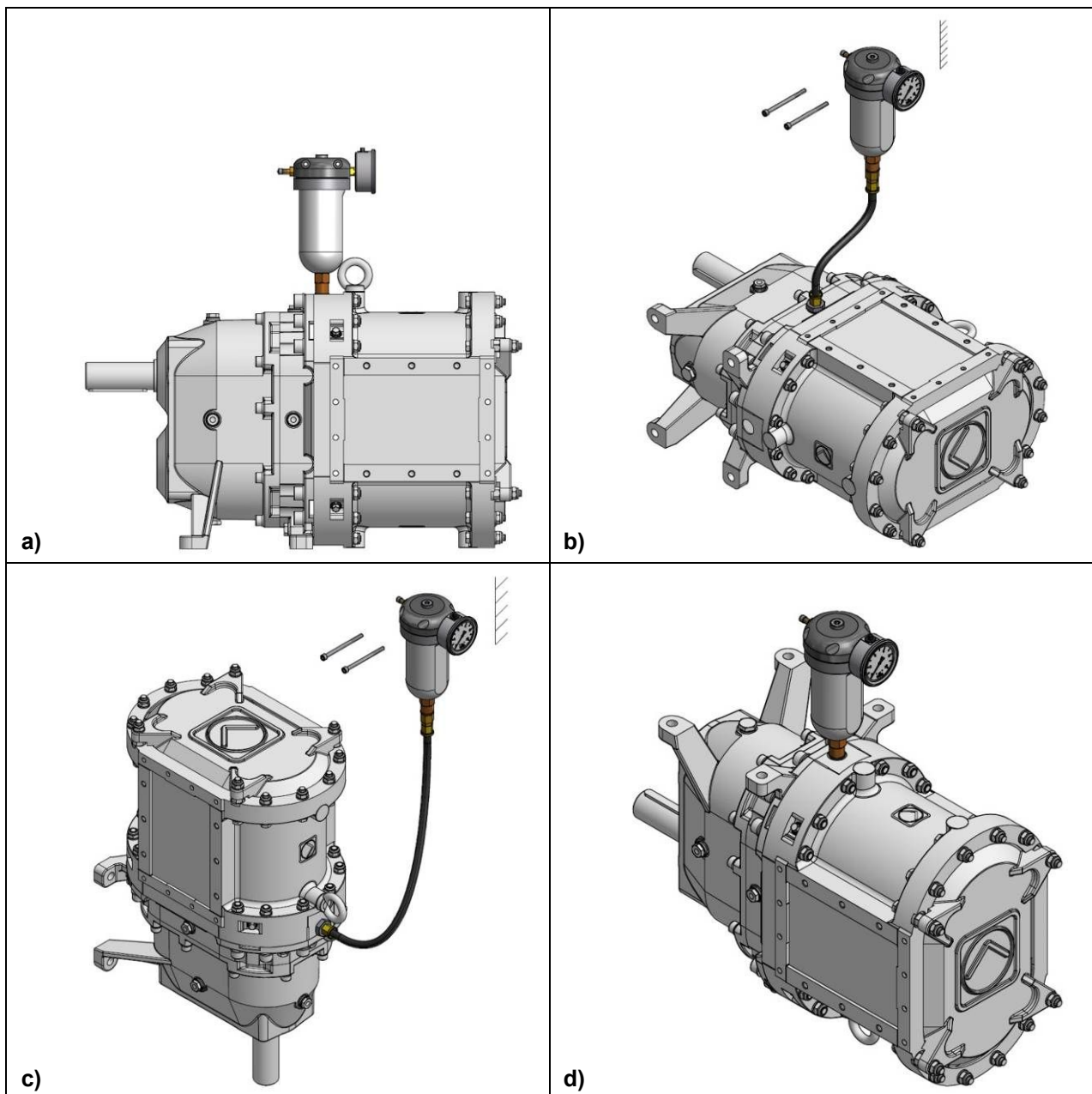


Fig. 5: Installation variants

- | | |
|--|---------------|
| a) upright | b) horizontal |
| c) vertical (fix the buffer fluid tank in place pointing upwards and above the buffer chamber) | d) suspended |

6.2 Pipes

- Only use the pipe diameters, wall thicknesses and materials recommended by us or by our representatives. The sealing material must be compatible with the medium.
- Position the pressure and suction connections pointing upwards. This will ensure that the fluid remains in the pump after it is switched off.
- Keep the pipe as free as possible from foreign matter (stones, wood residues, etc.) in order to prevent increased wear on rotary lobes and housing.



ATTENTION

Hazard due to closed pipes!

Pumping must not take place against a closed pipe. The pump shaft seals or even the pump housing or the pipe may be damaged or destroyed by the resulting high pressure. A pressure monitoring system is optionally available from us (setting at 10% over the nominal pressure of the pipe) ☎️✉️.



WARNING

Risk of injury from medium escaping under high pressure!

If the maximum pressure is exceeded, parts may burst and the pumped medium may spray out.

- Follow recommendations for pipes. Only use high-pressure pipes on the discharge side:
 - **Up to** nominal diameter DN 150 - PN 16 (bar) pipes
 - **From** nominal diameter 200 - PN 10 (bar) pipes, except when the outlet pressure of the pump unit is ≥ 10 bar

If you are uncertain about anything, please contact us. ☎️✉️

- During periods of inactivity and periods of hot weather, fermentation may occur in closed pipes. The resulting gas can result in a large pressure increase that can damage the pump or pump unit and cause the injuries mentioned above. Therefore, ensure that no medium is left in the pump.
- Attention – if a connector **with a sight glass** is installed on the suction side:
The pressure must not exceed **max. 2 bar** during reverse pumping → Fig. "Flow direction with pump units".



ATTENTION

To protect from high pressure losses and cavitation, heed the advice for laying the suction lines:

- The maximum suction height is 8 m. This is the maximum distance between the lowest and highest points of the suction pipe. Observe NPSH.
- Suction lines whose diameter is too small may restrict the suction capability of the pump. Caution, risk of cavitation!
If the diameter of the suction pipe is too small, the maximum suction height will be reduced by the loss of pressure due to pipe friction. Contact us for a calculation ☎️✉️.
- Suction lines over 30 m must be laid with a slope of at least $2 \times \text{pipe diameter}$ in the direction of flow, ensuring that the pipeline can never run dry → Fig. "Long suction lines".

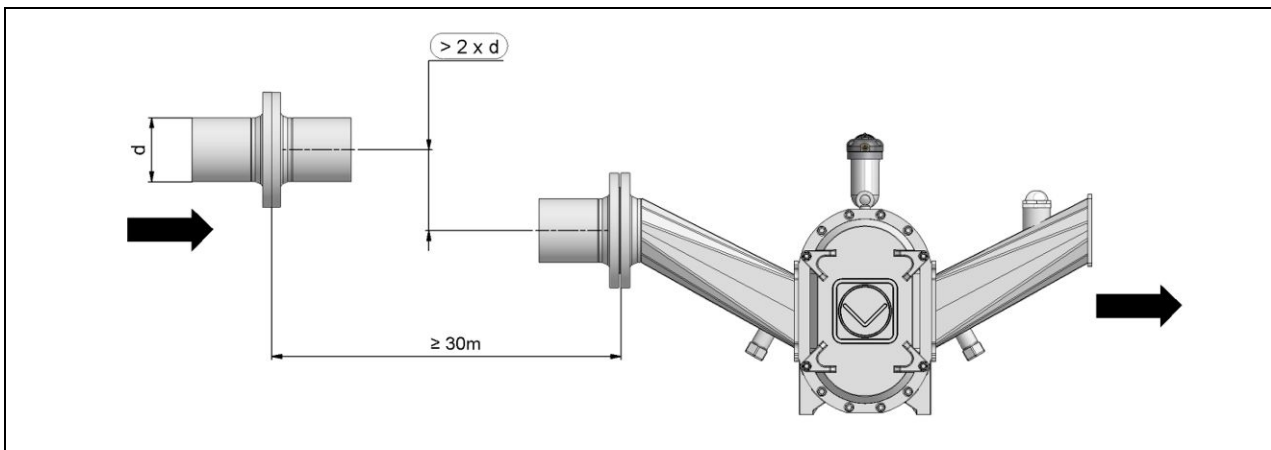


Fig. 6: Long suction lines

6.3 Direction of flow

The pump is suited for both flow directions.

Please observe the following machine and safety exceptions in which the flow direction is predefined:

- Installation in pipes with automatic check valves → **Chapter "Pump units"**
- Injection A → **Chapter "InjectionSystem"**

6.3.1 Pump with motor drive

If you are using motor-driven pumps with one drive shaft, the flow direction is selected by determining the direction of rotation of the drive motor, such as an electric motor or hydraulic motor.

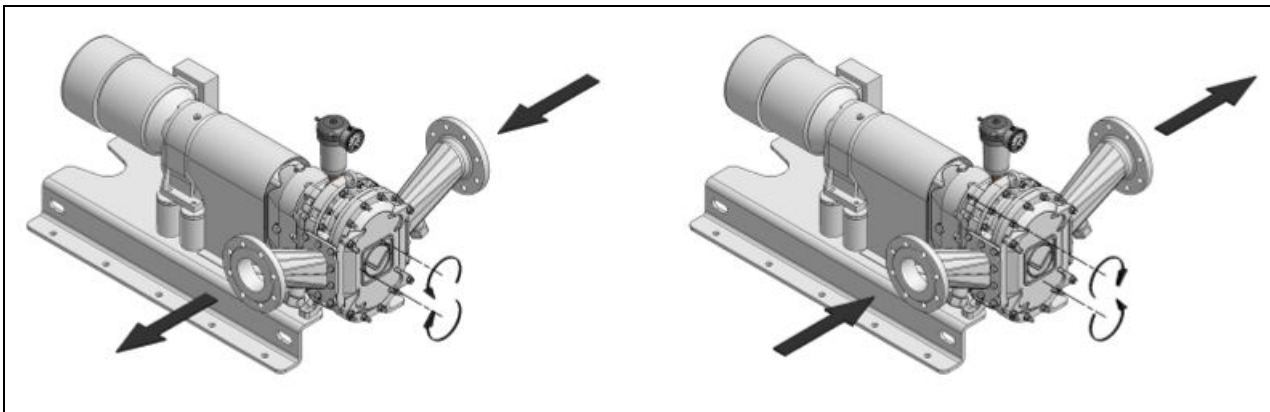


Fig. 7: Flow direction with motor drive

6.3.2 Pump with PTO drive

If you are using tractor driven pumps with two drive shafts, connect either the upper or lower cardan shafts thus determining the flow direction.

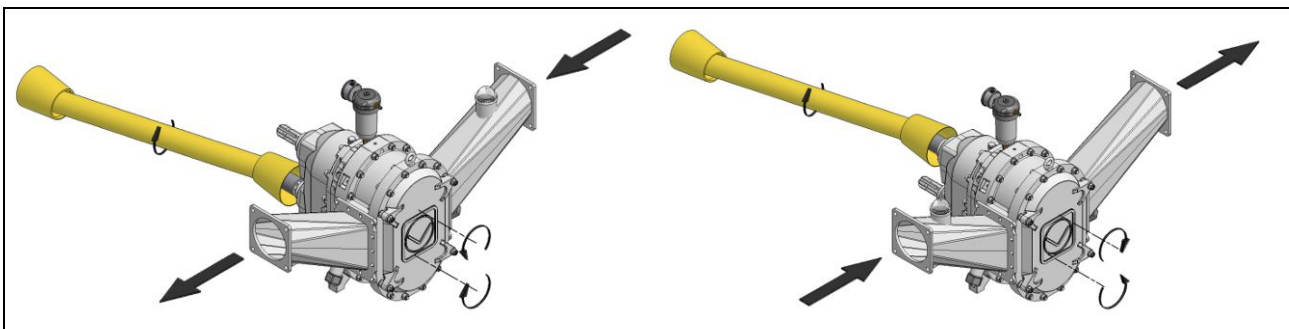


Fig. 8: Flow direction with PTO drive

6.3.3 Pump systems

The pressure and suction sides are rigidly defined by the rotation of the pumps. When there are suction difficulties, it is possible to draw in through the discharge side. A reversal of the flow direction is not possible if the pipelines are protected by automatic check valves.



WARNING

Risk of injury from medium escaping under high pressure!

If a connector has a **sight glass**, the sight glass may burst if the pressure is too high.

A connector with a sight glass must be installed **on the suction side**. The pressure may not exceed **max. 2 bar** during reverse pumping.

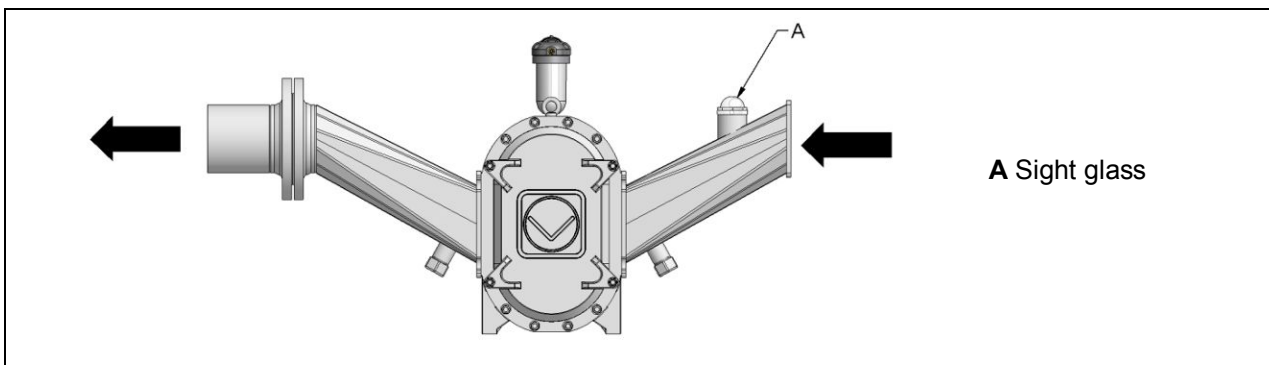


Fig. 9: Flow direction with pump units

6.3.4 Pumps with InjectionSystem

→ Chapter "Specifications" – "InjectionSystem"

Injection S (Symmetrical InjectionSystem)

With the symmetrical InjectionSystem, the flow can be in either direction.

Injection A (Asymmetrical InjectionSystem)

With the asymmetrical InjectionSystem, the flow direction is set in advance. A brief reverse operation is possible.

6.4 Pump connection



ATTENTION

Risk of breakage due to connectors under tension!

Flange connections can exert excessive forces on the machine.

The connectors must be mounted stressless. In other words, the connectors have to be precisely one in front of the other, even when they are not screwed into place.

Note the **tightening sequence** when mounting the connectors:

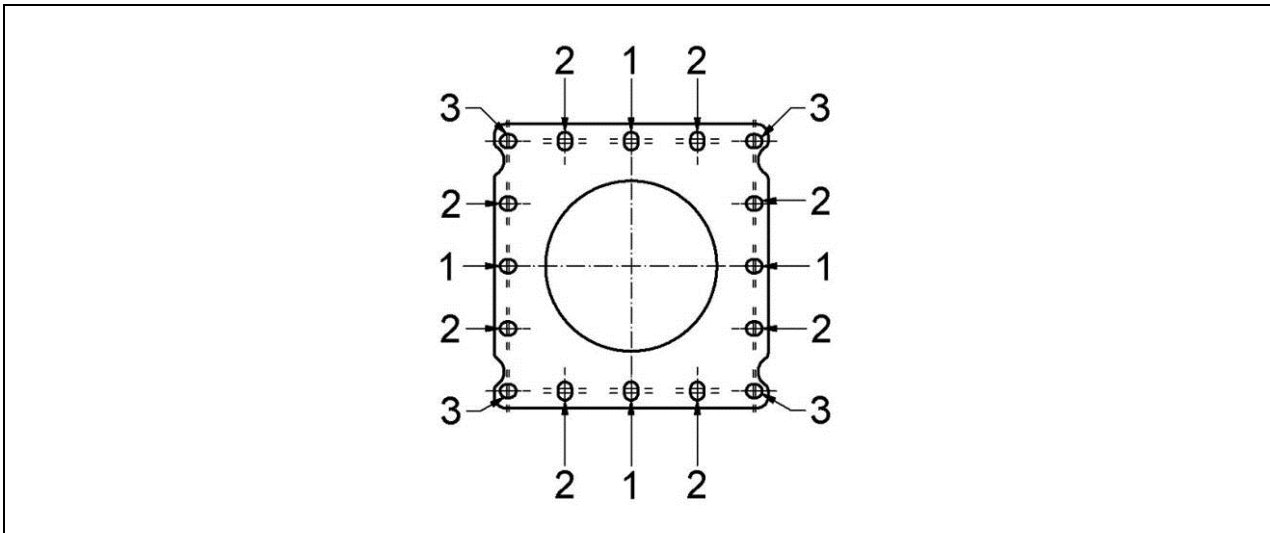


Fig. 10: Tightening sequence



Tightening torques

M 10 hexagon head bolt (8.8, steel): 50 Nm

M 10 hexagon head bolt (A2, stainless steel): 40 Nm



ATTENTION

Before installing stainless steel bolts and stainless steel nuts:

Clean threads and contact surfaces. Apply anti-seize paste (part no. BKL.014/BAS.001) evenly and in sufficient quantity to the screw head face and bearing face and to the thread using a brush or filling knife etc. to avoid seizing of stainless steel.

6.5 Base, support surface for machine

6.5.1 Machine without base



WARNING

Risk of crushing or concussion due to falling machine caused by insufficient stability!

The machine must be securely fastened to the supporting surface. The machine must never be held in position by the connected pipe because this could result in the screw connections breaking or failing. Retighten all motor fastening screws and nuts on the base after 20 operating hours.

6.5.2 Machine and motor on base



CAUTION

Impairment of communication and discomfort due to machine vibration!

A distorted base or insufficient fastening of the machine and motor to the base can lead to machine vibration and discomfort.

- Install the base stressless on the support surface.
- Retighten all motor and machine mounting screws and nuts on the base after 20 operating hours.



WARNING

Injuries caused by friction, catching, grazing from the exposed rotating drive shaft/coupling!

If the machine starts up unexpectedly during assembly or repair work, this can result in accidental contact with the exposed rotating drive shaft/coupling.

- The coupling area must be protected by a screwed cover.
- The machine may only be started up again after maintenance, repairs or trouble-shooting once all the protective equipment has been re-installed.
- Before starting assembly and repair work on the coupling, switch the machine off and secure it against being switched on again.

6.5.2.1 Base C (coupling)

In addition, also read and note the following:  "Coupling manufacturer's operating instructions"



ATTENTION

Vibration and wear due to incorrectly oriented coupling!

To protect the machine against damage caused by vibration, you must **check the orientation of the coupling before start-up and correct it, as necessary**, →Fig. "Orientation procedure".

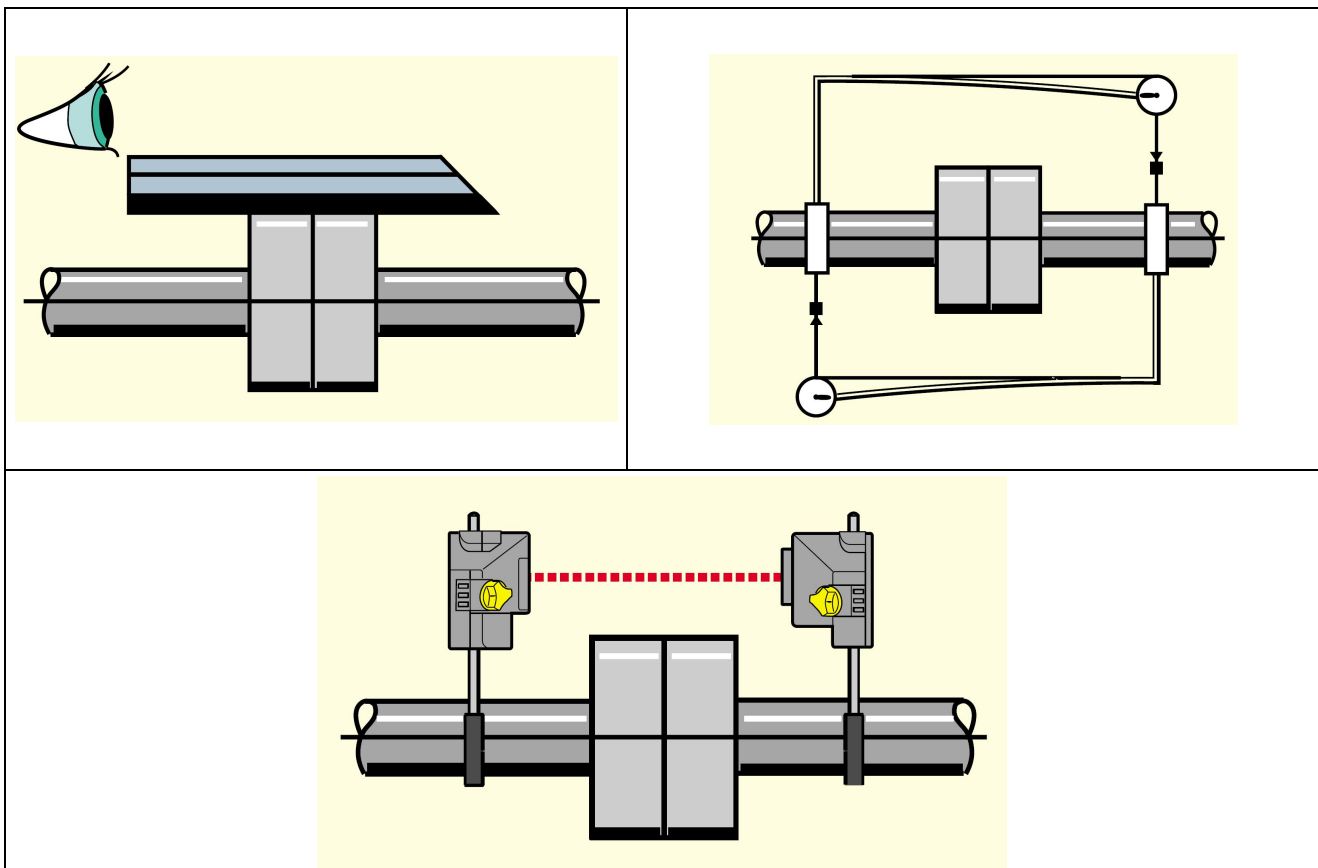



Fig. 11: Orientation procedure

6.5.2.2 Base B (belt drive)

For this type of construction, please request the document  "Technical information TINF.PU.020.xx, accompanying sheet for belt drives".

For machines with belt drive check the belt tension acc. to the accompanying sheet → **Chapter "Maintenance plan"**:

- At start-up
- Before and after longer shutdowns
- After the first 10 operating hours
- Every 2000 operating hours, once per year minimum

6.5.3 Machine on hand cart



WARNING

Risk of crushing or concussion due to falling machine caused by insufficient stability!

Secure the hand cart against toppling or rolling during standstill and when the pump is in operation.

6.5.4 Machine on three-point base



WARNING

Risk of crushing or concussion due to falling machine caused by insufficient stability!

Before operating the pump, ensure that the three-point base is properly attached and secured to the tractor.

6.6 Drive

The technical specifications for the drive system to be installed are determined by the machine's specifications → **Chapter "Specifications"**.

In addition, also read and note the following:  "Technical information for the drive system to be installed".



WARNING

Injuries caused by friction, catching, grazing from the exposed rotating drive shaft/coupling!

If the machine starts up unexpectedly during assembly or repair work, this can result in accidental contact with the exposed rotating drive shaft/coupling.

- The coupling area must be protected by a screwed cover.
- The machine may only be started up again after maintenance, repairs or trouble-shooting once all the protective equipment has been re-installed.
- Before starting assembly and repair work on the coupling, switch the machine off and secure it against being switched on again.

6.6.1 Electric drive

Connection to the energy supply may only be established by qualified technical personnel **following** installation in the pipe.



RISK OF ELECTRIC SHOCK

Touching live parts leads to dangerous electrocution.
This can result in electric shock, burns or death.



In addition, also read and note the following: "Technical information for geared motor"

Before connecting the geared motor (electric motor with or without gearbox)

- Check that the power supply is correct for the motor.
- Check that the power feed and fuse protection are adequately dimensioned to allow for multiple rotation direction changes and peak loads within a short period of time.
- Be sure to follow the cable layout diagram on the inside of the motor terminal box cover.
- Note that the PTC resistor of the geared motor must be connected to the terminals provided on the pump control, to a PTC control unit or to a variable frequency drive with a PTC input (each available as an option).
- Install a maintenance switch in close proximity to the machine (recommendation).

Before start-up or long-term storage

The seal on the vent screw (if present) must be removed in order to prevent overpressure build-up in the gearbox and thus leakage.

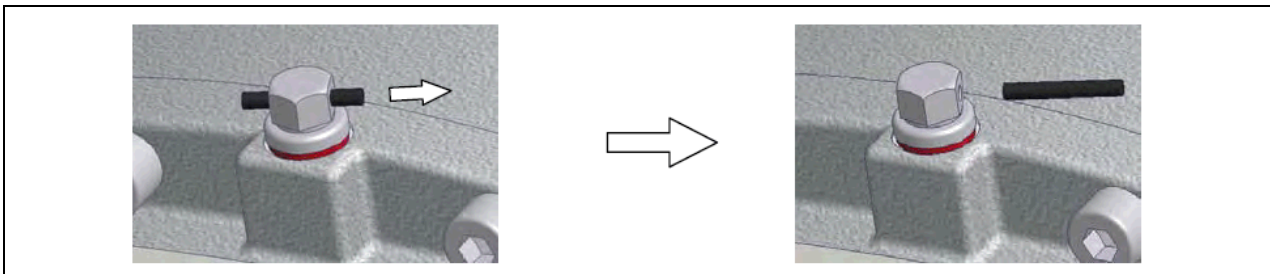


Fig. 12: Vent screw on the gearbox (removing the seal)

6.6.2 Hydraulic drive

Connection to the energy supply may only be established by qualified technical personnel **following** installation in the pipe.



WARNING

Risk of infection from hydraulic oil!

Leakages can occur due to seal faults.



- Personnel must wear suitable protective clothing.
- The connection to the power supply must be established by qualified technical personnel.

In the event of injuries with hydraulic oil, consult a doctor immediately!

In addition, also read and note the following:  "Technical information for hydraulic motor"

Hydraulic hose lines

- Before connecting hydraulic hoses, read and follow the manufacturer's specifications for hydraulic motors.
- Observe the permissible hydraulic pressure and the permissible delivery rate.
- Replace hydraulic hose lines that show signs of damage or ageing. Only use genuine Vogelsang hydraulic hose lines.
- The date of manufacture of the hydraulic hose line is displayed on the pressing component of the connector. The period of usage for the hydraulic hose line should not exceed 6 years (although 5 years is recommended), including a possible storage period of no more than 2 years.

Installing two hydraulic motors

When two hydraulic motors are installed, they are operated in parallel and the torques of both motors are added.

Control unit

In the event of high hydraulic motor speeds, never suddenly set the control unit to "lock position" in order to avoid pressure peaks. Whenever possible, switch from "operation" to "floating position".

6.6.3 Combustion engine drive

In addition, also read and note the following:  "Technical information for combustion engine"

Before start-up

- Fill the tank with fuel. The fuel must meet the specifications in the operating instructions.
- Fill up with sufficient operating oils. The oil grade must meet the specifications in the operating instructions.



DANGER

In enclosed or poorly ventilated spaces, poisonous engine exhaust gases can lead to a loss of consciousness and death!

- Never operate the engine in enclosed or poorly ventilated spaces.
- Do not breathe in exhaust gases.



DANGER

Fire hazard due to fuel!

Leaking or spilled fuel can ignite on hot motor parts and cause serious burns.

- Only refuel when the engine is switched off.
- Never refuel in the vicinity of open flames or ignitable sparks.
- Do not smoke.
- Do not spill fuel.



WARNING

Risk of burning due to exposed hot surfaces!

Parts of the exhaust system and the surface of the engine become hot during operation and must not be touched until they cool down again once the engine has been switched off.

6.6.4 PTO drive

In addition, also read and note the following:  "Technical information from cardan shaft manufacturer"



CAUTION

Impairment of communication and discomfort due to oscillating cardan shafts!

If cardan shafts are connected or aligned incorrectly, this can result in noise generation and vibration hazards.

- Always follow the instructions of the cardan shaft manufacturer.
- Observe permissible flex angle and minimum profile overlapping of the cardan shafts.



WARNING

Risk of crushing when assembling/disassembling stiff cardan shaft couplings!

Cardan shaft couplings may become stiff due to installation errors.





- Wear protective gloves.
- Before installation, check that the PTO shaft is in perfect condition and make sure that the components to be installed are clean.



WARNING

Risk of catching hands or work clothing in the rotating shaft end (without cardan shaft)!

There is a risk of injury due to accidental contact with the exposed rotating shaft end.

Before start-up/operation, make sure that a suitable PTO shaft guard is installed. If no suitable PTO shaft guard is present, please request one from us.  

Operating torque limitation for PTO drive

In order to prevent overloading the pump drive shaft, the operating torque must be limited.

With cardan shafts with a profile	Operating torque limited to
1 3/8", 6-part	1600 Nm
1 3/4", 6-part	3200 Nm
1 3/4", 20-part	3200 Nm

This operating torque limitation is **not** an overpressure safety control device for the pump (see 'Theoretical operating torque' in → **Chapter "Specifications"**.)

6.7 System control



Controls

We recommend our control system, which is specially designed for use with the pump in order to provide optimum service life for the pump. All connections necessary for connecting the pump to a control system are available.

If a new control is made by a switching system manufacturer, the new manufacturer must make the network connections in AC4.

Please contact us with regards to the correct programming of the control system ☎✉.



Automatic mode requires safety equipment

Machines that are operated in automatic mode must be equipped with a temperature and pressure monitoring system (safety devices). These safety devices can be obtained from us as options.

Variable frequency drive operation

In general, rotary lobe pumps can be designed for variable frequency drive operation.

Advantages:

- Adaptation to operating conditions (viscosity, delivery rate, NPSH_a)
- Wear compensation
- Speed-proportional delivery rate (see characteristic line)
- Increasing acceleration and deceleration times
 - Reduces pressure peaks
 - Reduces the danger that pipeline vibrations occur

A variable frequency drive with a linear torque characteristic line is to be used.
The starting torque/nominal torque ratio must be > 1.3.

7 Start-up



Personnel for start-up and operation

We recommend starting up the machine in the presence of persons who are responsible for further operation of the machine.



WARNING

Risk of injury, catching by rotating rotary lobes!

The pump may only start-up if the inlet and outlet pipes are connected so that access to the rotating rotary lobes in the pumping chamber is not possible.

Checklist before start-up


Pump connection

- Are the inlet and outlet lines connected?
- Are the drain cocks closed, and is the pump filled with fluid?

Base, coupling

- Is the coupling, if present, correctly aligned (see documents provided by the coupling manufacturer)?

Drive

- If a PTO drive is present, are the cardan shafts correctly aligned?
- Is the belt tension, if applicable, OK?
See  "Technical Information TINF.PU.020.xx, accompanying sheet for belt drives".
- Is the motor connected correctly to the power supply, if applicable, (→ documents provided by the motor manufacturer)?
 - Star or delta connection, voltage, frequency (see name plate and inside of terminal box)?
 - Motor protection ensured, e.g. by a circuit breaker?
 - A short switching time should be set for star-delta starting (if present).
 - A short start ramp should be set for the soft starter, if present.
 - Is the variable frequency drive/soft starter, if present, designed and configured correctly?
 - Units should be suitable for heavy starting
- Is the motor connected correctly to the hydraulic lines, if applicable, (→ documents provided by the motor manufacturer)?

Buffer chamber, pump gearbox

- Are the optional buffer chamber assemblies correctly installed? Are they correctly adjusted?
Is the buffer chamber pressure OK (if applicable)? → **Chapter "Maintenance" – "Buffer chamber"**
 - Is the type of buffer or quenching fluid OK?*
 - Is the fluid level in the buffer chamber OK?*
 - Are the oil grade and oil level in the gearbox of the pump OK?*
 - If equipped with a grease nipple, has the sealing prechamber been greased?*
- *Requirements met by the pump when delivered*

Flow direction, pipe system

- Is the flow direction OK? Check the pump's direction of rotation.
- Is the pipe system sealed and free of leakage?
- Is unobstructed flow guaranteed in the pipe system?
Positive displacement pumps must never be operated in a sealed pipe.

Sensors, safety

- Have all safety devices been installed and is their proper functioning ensured?
- Are safety devices or maintenance switches easy to reach?

Put the pump into operation and check inlet and outlet pressure, speed and capacity.

8 Maintenance



WARNING

Risk of injury (catching, crushing, collision) due to rotating rotary lobes if the machine starts up unexpectedly!

Before starting maintenance and repair work (opening covers, disassembling connectors) and before troubleshooting, switch the machine off and secure it against being switched on again.



WARNING

Risk of injury from working materials escaping under high pressure!

When the drain plugs on the gearbox and buffer chamber are loosened or the buffer fluid tank cover is opened, working materials can spray out under high pressure.



- Personnel must wear suitable protective clothing.

Before carrying out maintenance and repair work, release the buffer chamber pressure.

- To protect against fluids spraying out, carefully and slowly open the buffer chamber and the gearbox. Cover the valves or screws to be removed with a cloth or similar item where appropriate.

8.1 Buffer chamber

In the following chapters, we describe the following possible **buffer chamber assemblies**:

- 1 → Chapter "Pressurisable buffer fluid tank"
- 2 → Chapter "Depressurised quenching fluid tank"
- 3 → Chapter "Pressure valve"
- 4 → Chapter "Plugs"

Buffer chamber assemblies act to improve control of the pump shaft seal. The fluid level and the set pressure can be monitored, depending on the design.

Electronic buffer chamber monitoring is also possible. Ask us for more information. ☎️✉️

If your pump is equipped with a dry buffer chamber or a circulation system, please read the corresponding → **Chapter** ""Dry buffer chamber" sealing system" or "Circulation system on the cartridge mechanical seal".

8.1.1 Pressurisable buffer fluid tank

The pressurisable buffer fluid tank (hereinafter "tank") with manual air pump ensures a constant and defined buffer chamber pressure (buffer chamber pressure = tank pressure). The tank is for safely monitoring the buffer chamber.

Installing the tank (before pump start-up)

1. First remove the plug from the buffer chamber.
2. Open the tank: undo the upper coupling of the upper housing (hold the union nut tight so that the lower coupling does not come loose).
3. Screw the tank directly into the cast body of the buffer chamber. Fill the tank about one quarter full (when delivered, the buffer chamber is already filled).
4. Close the tank and use a manual air pump or a compressed-air supply outlet to set the required tank pressure.

Topping up buffer fluid (maintenance and inspection)

1. Relieve the pressure from the buffer chamber via the valve on the tank.
2. Open the tank: undo the upper coupling of the upper housing (hold the union nut tight so that the lower coupling does not come loose).
3. Top up the buffer fluid in the tank. The tank must be one quarter full.
4. Close the tank and use a manual air pump or a compressed-air supply outlet to set the required tank pressure.

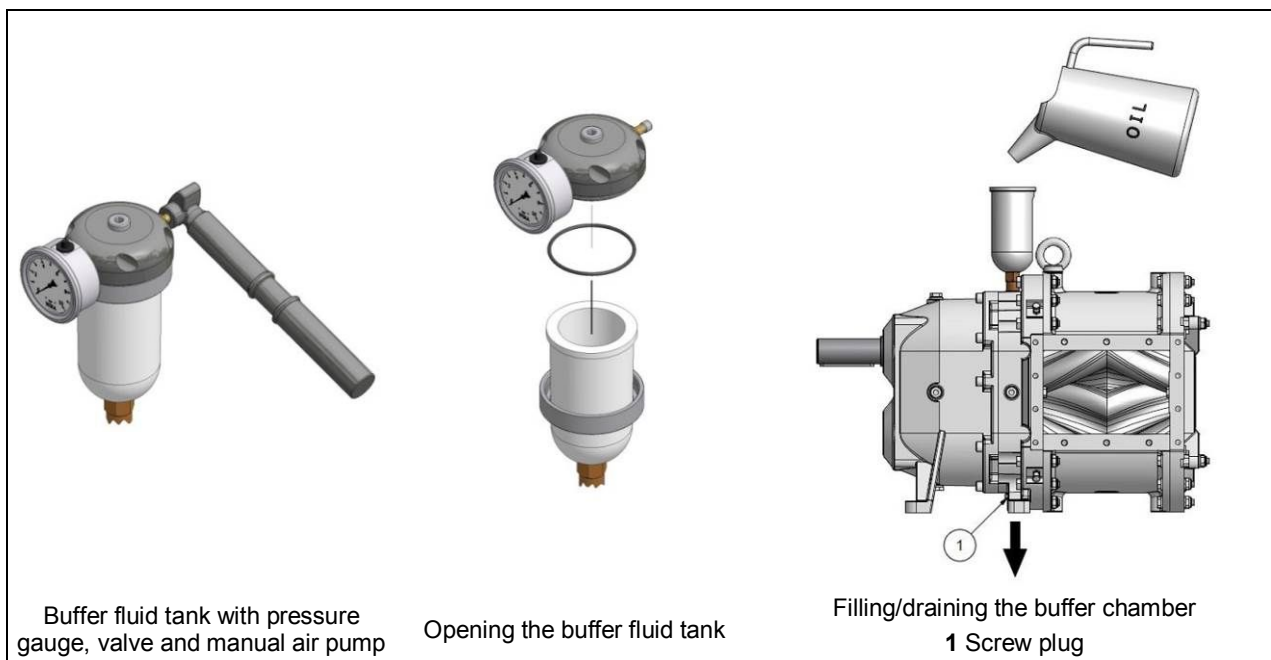


Fig. 13: Pump with buffer fluid tank

Tank pressure

The tank pressure should be about 0.5 bar higher than the average pressure in the pump.

Tank pressure = 0.5 bar + (pressure on the suction side + pressure on the discharge side) / 2

Example

A pump primes with 0.4 bar suction and discharges with 2.0 bar overpressure.

Pressure on the suction side: -0.4 bar, pressure on the discharge side: 2.0 bar.

$$\text{Tank pressure} = 0.5 \text{ bar} + \frac{(-0,4\text{bar} + 2\text{bar})}{2} = 1.3 \text{ bar}$$

In this example, the tank pressure is 1.3 bar.

Independently of this, the tank pressure should be no more than 5 bar with a single mechanical seal and no more than 10 bar with a double mechanical seal.



Lobe change and cartridge mechanical seal change

Before a lobe and cartridge mechanical seal change, depressurise the **tank pressure** and prime it again after changing.

Trouble indication

Possible indications of trouble in the sealing system after the running-in period:

- Severe contamination of the buffer fluid in the tank
- Buffer fluid escaping (tank is empty)
- Increase in buffer fluid (tank is full)



Buffer fluid properties

- The hydrodynamic lubrication film of a mechanical seal can cause:
 - Slight contamination of the buffer fluid
 - Slight increase or decrease in the buffer fluid level
- A slight increase in the buffer fluid level is also possible due to thermal expansion during pump operation.

8.1.2 Depressurised quenching fluid tank

The quenching fluid is used for non-pressurised lubrication and cooling of the pump shaft seal. Any leakage of fluids (pump medium or gear oil) is absorbed by the quenching fluid.

The installation of the quenching fluid tank and the topping up of quenching fluid is as described in → **Chapter** "Pressurisable buffer fluid tank".

The instructions for pressurising the tank do not apply in the case of buffer chamber assembly "depressurised quenching fluid tank".

Please also observe the "Trouble indication" and "Buffer fluid properties" in → **Chapter** "Pressurisable buffer fluid tank".

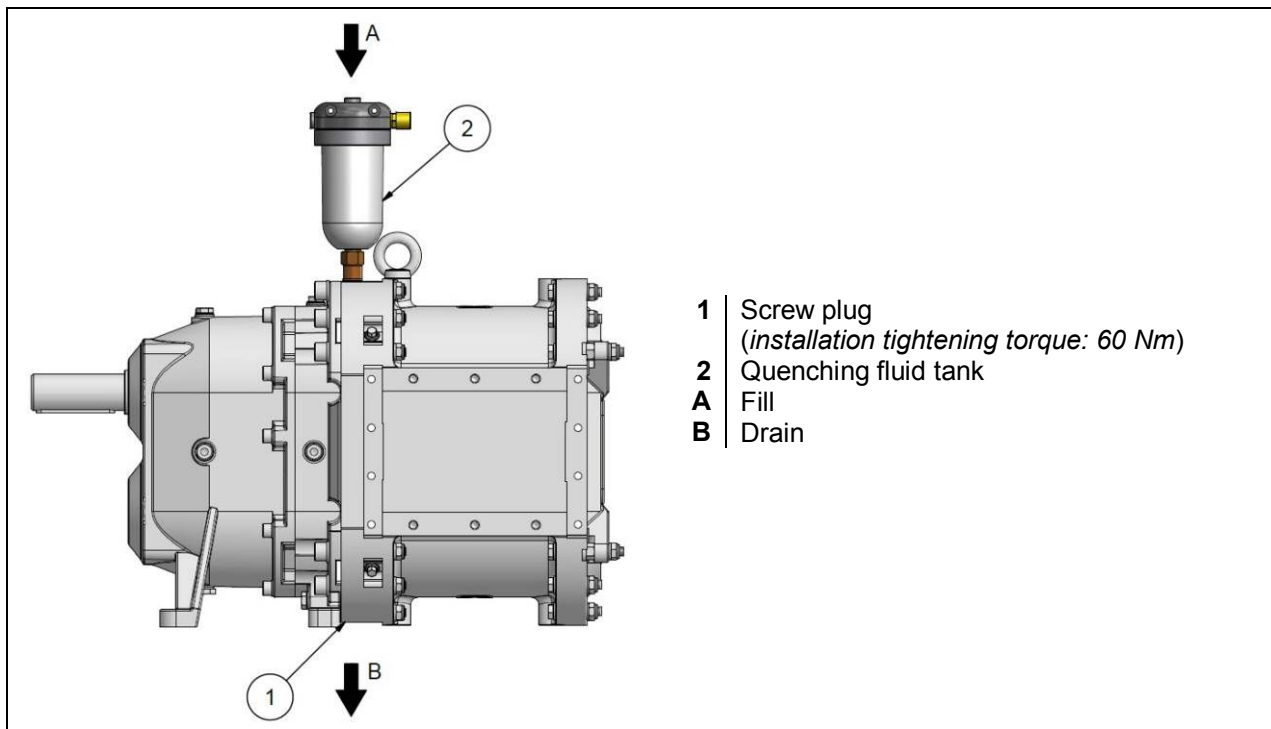


Fig. 14: Pump with quenching fluid tank

8.1.5 Buffer or quenching fluid - type

For optimum functioning of the mechanical seal, we recommend the oil grades listed in → Chapter "Oils and lubricants".

Please check your order confirmation to see whether the buffer chamber of your machine is filled with an oil differing from this chapter. In that case use only the oil specified on your order confirmation.



ATTENTION

To prevent premature wear of the seal, only silicone oil may be used with EPDM O-rings.

To prevent contamination of the pump medium, **no fluid** must be filled into the buffer chamber of pumps with the "dry buffer chamber" sealing system.

8.1.6 Buffer or quenching fluid - quantity

Series	VX136	VX136VVA*
Buffer or quenching fluid quantity	1.5** litres	1.2** litres

* VVA = All steel and cast parts of the machine that come in contact with the medium are made of stainless steel.

** Guideline, depending on the buffer chamber assembly → Chapter "Buffer chamber assemblies".

8.1.7 Buffer or quenching fluid - inspection and change

Buffer fluid or quenching fluid

- Check:
 - After the first 20 operating hours
 - Every 200 operating hoursElectronic buffer chamber monitoring is possible. Ask us ☎️✉️.
- replace:
 - Every 2000 operating hours
 - When there is severe contamination

When there is intense leakage, replace the cartridge mechanical seal → Chap. "Changing cartridge mechanical seal"

→ Chap. "Maintenance plan"



Buffer or quenching fluid properties

- The hydrodynamic lubrication film of a mechanical seal can cause:
 - Slight contamination of the buffer or quenching fluid
 - Slight increase or decrease in the buffer or quenching fluid level
- A slight increase in the buffer or quenching fluid level is also possible due to thermal expansion during pump operation.



Environmentally friendly disposal

Treat buffer fluid or quenching fluid, for example, oils and hydraulic fluids, like hazardous waste and dispose of them properly.

8.2 Draining and cleaning the buffer chamber



Emptying and cleaning the buffer chamber

- If the cartridge mechanical seal is defective, drain and clean the buffer chamber.
- Before changing a cartridge mechanical seal, drain the buffer chamber and clean it if it is contaminated severely.

Procedure

→ Chapter "Buffer chamber"

1. In case of buffer chamber assemblies with a pressurisable buffer fluid tank or pressure valve, depressurise the buffer chamber before draining or cleaning.
2. Remove the buffer chamber assemblies.
3. Undo the lower screw plug (1) → **Fig.** "Pump with buffer fluid tank" or → **Fig.** "Pump with quenching fluid tank" and drain the buffer or quenching fluid from the buffer chamber.
4. If there is heavy contamination, clean the buffer chamber.
5. Screw the lower screw plug back in (tightening torque: 60 Nm) and install the various buffer chamber assemblies in reverse sequence.
If the lower screw plug is not accessible due to the installation position, a drain pipe can be installed on the side on request. ☎️✉️

8.3 "Dry buffer chamber" sealing system

This sealing system is only used if it is essential to prevent buffer chamber fluid from getting into the pump medium. It is used for pumps that pump pure, non-abrasive media, e.g. water.

To prevent contamination of the pump medium, **no fluid** must be filled into the buffer chamber of pumps with the "dry buffer chamber" sealing system.

Medical white oil, part no. BSS.010, can be used as the gear oil.



Notice

White oil, part no. BSS.010: approved only for continuous operation up to 50% of the max. approved differential pressure of the pump → **Chapter "Specifications"**.

Please contact us. ☎️✉️



ATTENTION

To protect against seal damage, dry running of the pump must be avoided on pumps with a dry buffer chamber. Before start-up, remove the plug from the vent screw (5) → **Fig. "Installation example - dry buffer chamber"** and completely fill the pump chamber with fluid.

Combination of mechanical seal rings in this sealing system

Type of construction: block ring

Mating materials: AISI 304/AISI 316 Ti tungsten carbide coated/carbon

Installation

→ **Fig. "Installation example - dry buffer chamber"**

Connect tank (3) with connecting pipe (4) at the bottom of the buffer chamber. The tank must be installed below the buffer chamber in order to collect medium leakage. The fluid level in the tank should come up no further than the bottom edge of the buffer chamber.

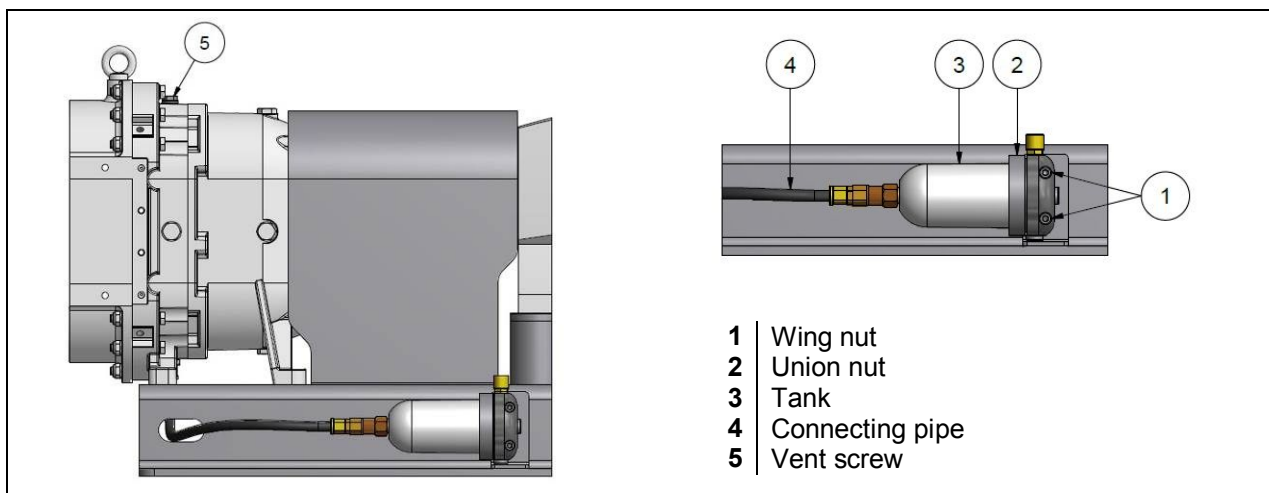


Fig. 16: Installation example - dry buffer chamber

Monitoring the buffer chamber

If the tank (3) is filled with leaked fluid (e.g. pump medium, gear oil or condensed water), undo the wing nuts (1), unscrew the tank cover (union nut (2)) and drain the tank. If the tank is filled by more than half within a month, please contact our service department. ☎️✉️

8.4 Circulation system on the cartridge mechanical seal

The cartridge mechanical seal is flushed by a circulation system. The flushing liquid, e.g. oil, water or glycerine, must be compatible with the pump medium.

Technical prerequisites for the circulation system

- Flushing connectors (1) on the pump → Fig. "Flushing operation".
- Cartridge mechanical seal with the "double mechanical seal" arrangement. The selection of materials for the cartridge mechanical seal depends on the flushing medium.

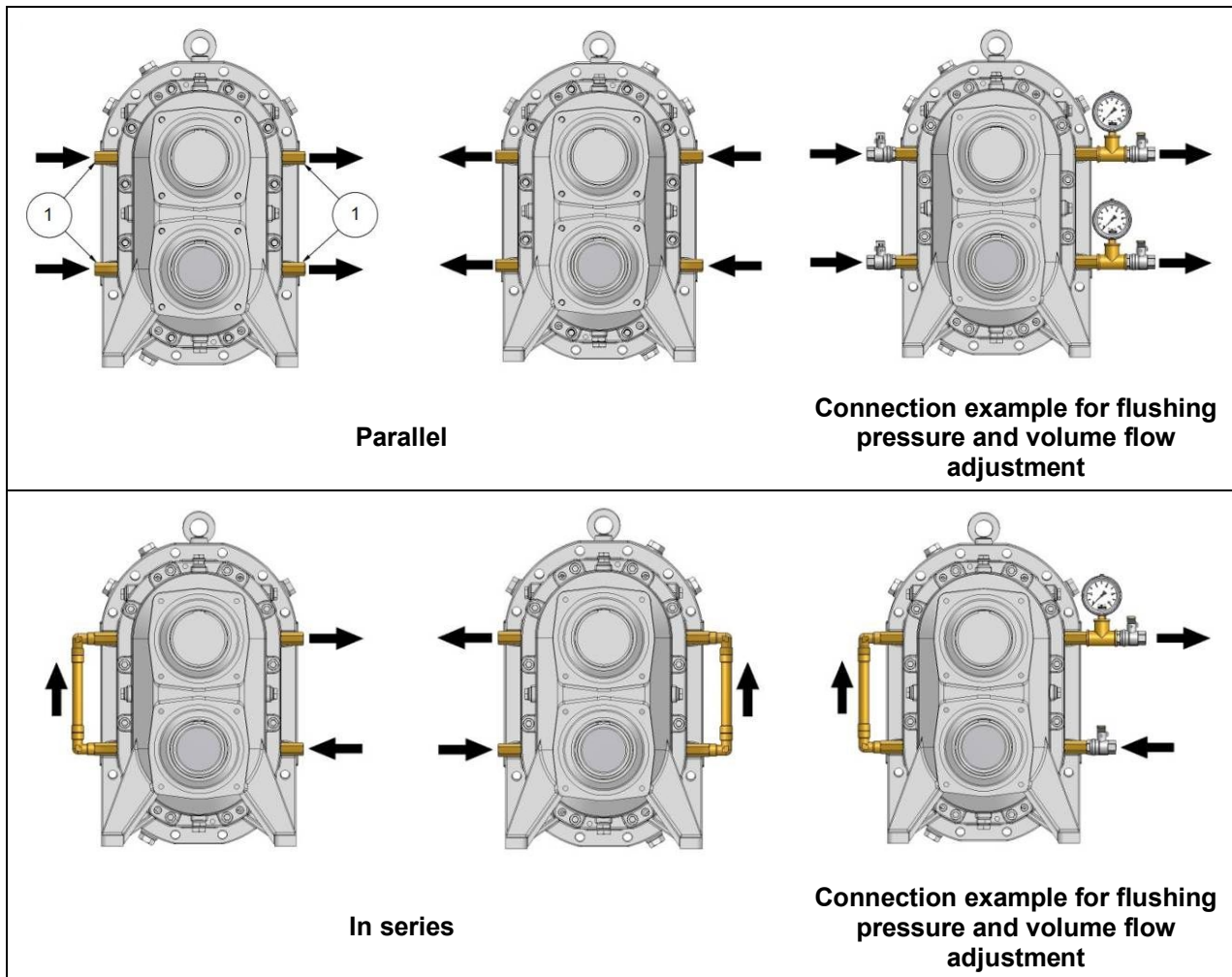


Fig. 17: Flushing operation

Adjustment of flushing pressure and volume flow

→ Fig. "Flushing operation - connection example for flushing pressure and volume flow adjustment".

Adjusting the flushing pressure

The flushing pressure can be adjusted and monitored with a pressure gauge.

The flushing pressure should be about 0.5 bar higher than the average pressure in the pump.

Flushing pressure = 0.5 bar + (pressure on the suction side + pressure on the discharge side) / 2

Example:

A pump primes with 0.4 bar suction and discharges with 2.0 bar overpressure.

Pressure on the suction side: -0.4 bar, pressure on the discharge side: 2.0 bar

$$\text{Flushing pressure} = 0.5 \text{ bar} + \frac{(-0,4\text{bar} + 2\text{bar})}{2} = 1.3 \text{ bar}$$

In this example, the flushing pressure is 1.3 bar.

If there is an increased risk that medium will get between the sliding surfaces, the pressure should be increased by 1 bar (in the example: 1.3 bar + 1 bar).

Independently of this, the flushing pressure should be no more than 10 bar with a double mechanical seal.

Adjusting the volume flow

The volume flow of the flushing fluid depends on the application and the degree of contamination. The higher the volume flow, the better the flushing effect.

The volume flow should be at least 0.1 l/min and no more than 10 l/min.

We recommend the flushing operation as specified in → **Fig.** "Flushing operation - parallel":

- Every cartridge mechanical seal is flushed with clean flushing fluid.
- A possible defect of the single cartridge mechanical seal is detected.

Alternatively, the flushing operation can be done as indicated in → **Fig.** "Flushing operation - in series":

- Flushing fluid is supplied only via the lower flushing inlet and reaches the upper flushing outlet via the two cartridge mechanical seals.

Note with this alternative flushing operation:

- A possible defect cannot be assigned to the single cartridge mechanical seal.
- Possible impurities of the cartridge mechanical seal rinsed for the first time can get into the subsequent mechanical seal.

8.5 Gearbox

8.5.1 Gear oil - grade

We recommend the oils listed in → **Chapter** "Oils and lubricants".

8.5.2 Gear oil - quantity

2 litres

8.5.3 Gear oil – inspection and change

→ **Fig.** "Gear oil change"

Inspect the gear oil and top up small quantities up to the seal indicator pipe (C) (only top up when the gearbox is at a standstill):

every 500 operating hours, however at least every 3 months

Change gear oil:

- After the first 20 operating hours
- Every 2000 operating hours

The buffer or quenching fluid should be changed at the same time as the gear oil change → **Chapter** "Buffer chamber assembly".



Environmentally friendly disposal

Treat gearbox oils like hazardous wastes and dispose of properly.

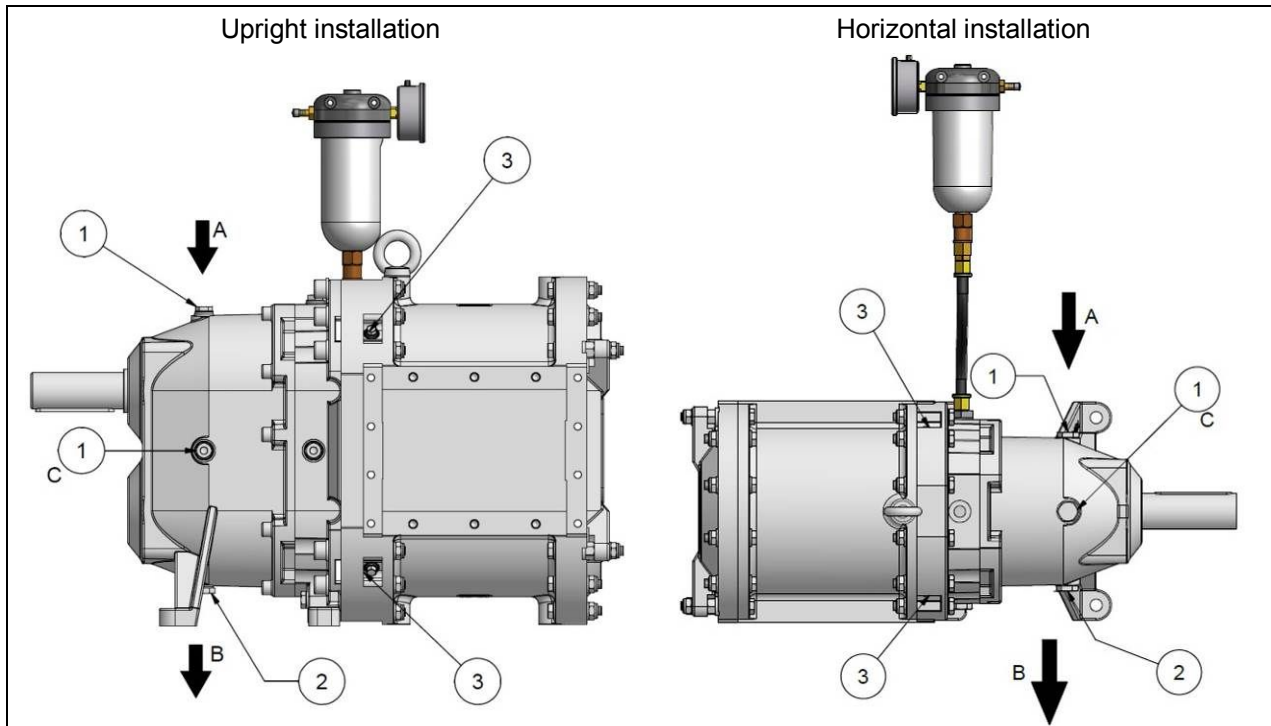


Fig. 18: Gear oil change

- | | | | |
|---|---------------------|---|----------|
| 1 | Screw plug | A | Filling |
| 2 | Magnetic screw plug | B | Draining |
| 3 | Grease nipple | C | Checking |

The screw plug 1 must be at the top, the magnetic screw plug 2 must be at the bottom.



Tightening torque

Tightening torque for mounting the screw plugs → 60 Nm

8.6 Greasing of sealing prechamber

Grease nipples are primarily used for long-fibred media. They can be retrofitted upon request. ☎️✉️

The sealing prechamber can be greased through the grease nipples. Lubrication prevents the fibrous matter from hardening and adversely affecting the function of the mechanical seal.



ATTENTION

- A regular → **lubrication interval** prevents the lubrication channel from clogging.
- To ensure effective distribution of the lubricant, always lubricate while the machine is running and not when it is stationary.

Lubricating grease - type

We recommend the lubricating grease listed in → **Chapter "Oils and lubricants"**.

Lubricating grease - quantity

5 shots per grease nipple (4 x) with a lube gun

Lubrication interval

- At start-up
- Before and after long shutdowns (2-3 weeks)

→ **Chapter "Maintenance plan"**

8.7 Oils and lubricants

1 Standard Vogelsang oil for pump gearboxes and buffer chamber

Part number	BSS.006	
Description	EP (Extreme Pressure) gear oil	
Trade name (Fuchs)	Titan Gear MP 90	
Characteristics		Test acc. to
SAE class	90 (85W-90)	DIN 51512 or SAE J306c
Kinematic viscosity		DIN 51562
at 40°C	198 mm ² /s	
at 100°C	17.3 mm ² /s	
Flash point	215°C	DIN ISO 2592
Pour point	-18°C	DIN ISO 3016
Water hazard class	Slightly hazardous to waters	

2 Alternative oils for pump gearboxes and buffer chamber

Part number	BSS0021*	
Description	Fully synthetic industrial gear oil based on poly-alpha-olefins	
Trade name (Fuchs)	Renolin Unisyn CLP	
Characteristics		Test acc. to
ISO VG	220	DIN 51519
Kinematic viscosity		DIN EN ISO 3104
at 40°C	220 mm ² /s	
at 100°C	26.7 mm ² /s	
Flash point	260°C	DIN ISO 2592
Pour point	-42°C	DIN ISO 3016
Water hazard class	Slightly hazardous to waters	

* when using BSS0021 oil for the pump gearbox, the maintenance interval for inspection and gear oil change may be doubled → **Chapter "Maintenance plan"**.

Part number	BSS.010**	
Description	Medical white oil: water-white, non-fluorescent, tasteless and odourless mixture of hydrocarbons	
Trade name (Fuchs)	White oil W 530 (PH.EUR.)	
Characteristics		Test acc. to
Kinematic viscosity		DIN 51562
at 20 °C	238 mm ² /s	
at 40 °C	68 mm ² /s	
at 100 °C	8.4 mm ² /s	
Flash point	230 °C	DIN ISO 2592
Pour point	-24 °C	DIN ISO 3016
Ambient temperature	-20°C to +40°C	
Water hazard class	Slightly hazardous to waters	

** approved only for continuous operation up to 50% of the max. approved differential pressure of the pump → **Chapter "Specifications"**. Please contact us. ☎✉



Sealing system with mechanical seal ring made of Duronit

If a mechanical seal ring made of Duronit is used in the sealing system, the damage loading step for the buffer chamber oil must be ≥ 12 .

3 Alternative oils for the buffer chamber

Part number	BSS.014	
Description	Mineral oil based hydraulic and lubricating oil	
Trade name (Fuchs)	Renolin B 15	
Characteristics		Test acc. to
ISO VG	46	DIN 51519
Viscosity index	105	DIN ISO 2909
Kinematic viscosity		DIN EN ISO 3104
at 40°C	46 mm ² /s	
at 100°C	6.9 mm ² /s	
Flash point	210°C	DIN ISO 2592
Pour point	-24°C	DIN ISO 3016
Water hazard class	Slightly hazardous to waters	

Part number	BSS.016	
Description	Biodegradable, environmentally friendly, multigrade hydraulic oil based on rape seed oil (as per ISO 15308, type HETG)	
Trade name (Fuchs)	Hydraulic oil 40 N	
Characteristics		Test acc. to
ISO VG	46	DIN 51519
Viscosity index	220	DIN ISO 2909
Kinematic viscosity		DIN 51562-1
at 40°C	42 mm ² /s	
at 100°C	9.6 mm ² /s	
Flash point	300°C	DIN ISO 2592
Pour point	-36°C	DIN ISO 3016
Water hazard class	Slightly hazardous to waters	

4 Oils for the buffer chamber with electronic buffer chamber monitoring

Part number	BSS.021	
Description	Fully synthetic EP industrial gear oil on the basis of selected polyglycols (PAG)	
Trade name (Fuchs)	Renolin PG 100	
Characteristics		Test acc. to
ISO VG	100	DIN 51519
Kinematic viscosity		DIN EN ISO 3104
at 40°C	100 mm ² /s	
at 100°C	19.6 mm ² /s	
Flash point	260°C	DIN ISO 2592
Pour point	-48°C	DIN ISO 3016

Part number	BSS.017	
Description	Fully synthetic EP industrial gear oil on the basis of selected polyglycols (PAG)	
Trade name (Fuchs)	Renolin PG 46	
Characteristics		Test acc. to
ISO VG	46	DIN 51519
Viscosity index	203	DIN ISO 2909
Kinematic viscosity		DIN 51562
at 40°C	46 mm ² /s	
Flash point	240°C	DIN ISO 2592
Water hazard class	Slightly hazardous to waters	

5 Lubricant for pump grease nipples

Part number	BSS.002	
Description	Lithium soap grease with a mineral oil base	
Trade name (Fuchs)	Renolit GP 2	
Characteristics		Test acc. to
Identification	K2K-30	DIN 51502
	ISO-L-X-CCEA 2	ISO 6743-9
Intrinsic viscosity		DIN 51562-1
at 40 °C	110 mm ² /s	
at 100 °C	9.5 mm ² /s	
Dropping point	> 180 °C	IP 396
Service temperature	-30 to +120 °C	DIN 51825
Water hazard class	Slightly hazardous to waters	

9 Repair



WARNING

Risk of injury (catching, crushing, collision) due to rotating rotary lobes if the machine starts up unexpectedly!

Before starting maintenance and repair work (opening covers, disassembling connectors) and before troubleshooting, switch the machine off and secure it against being switched on again.



WARNING

Skin and eye irritation caused by contact with hazardous working materials or media!

All work on the machine can lead to contact with working materials or media.



- Personnel must wear suitable protective clothing.
- The operator must inform his or her staff about any potentially hazardous substances in working materials or media.



ATTENTION

Before installing stainless steel bolts and stainless steel nuts:

Clean threads and contact surfaces. Apply anti-seize paste (part no. BKL.014/BAS.001) evenly and in sufficient quantity to the screw head face and bearing face and to the thread using a brush or filling knife etc. to avoid seizing of stainless steel.



VVA

VVA = All steel and cast parts of the machine coming in contact with the medium are made of stainless steel.

9.1 Conversion and spare parts

Modifications or changes to the machine are only permissible after consultation with Vogelsang. Only accessory parts approved by Vogelsang or genuine spare parts may be used. The use of other parts invalidates the guarantee for any resulting damage.

9.2 Opening the Q cover

1. Depressurise the entire pump unit.
2. Shut off the connected pipes if possible.
3. Drain the pump as much as possible. Attention! Any remaining fluid will flow out of the machine when the Q cover is dismounted.
4. Depressurise the buffer chamber if necessary → **Chapter "Buffer chamber"**.
5. Undo hexagon nuts (1) on the Q cover (2).
6. Remove Q cover and remove the O-ring (3).

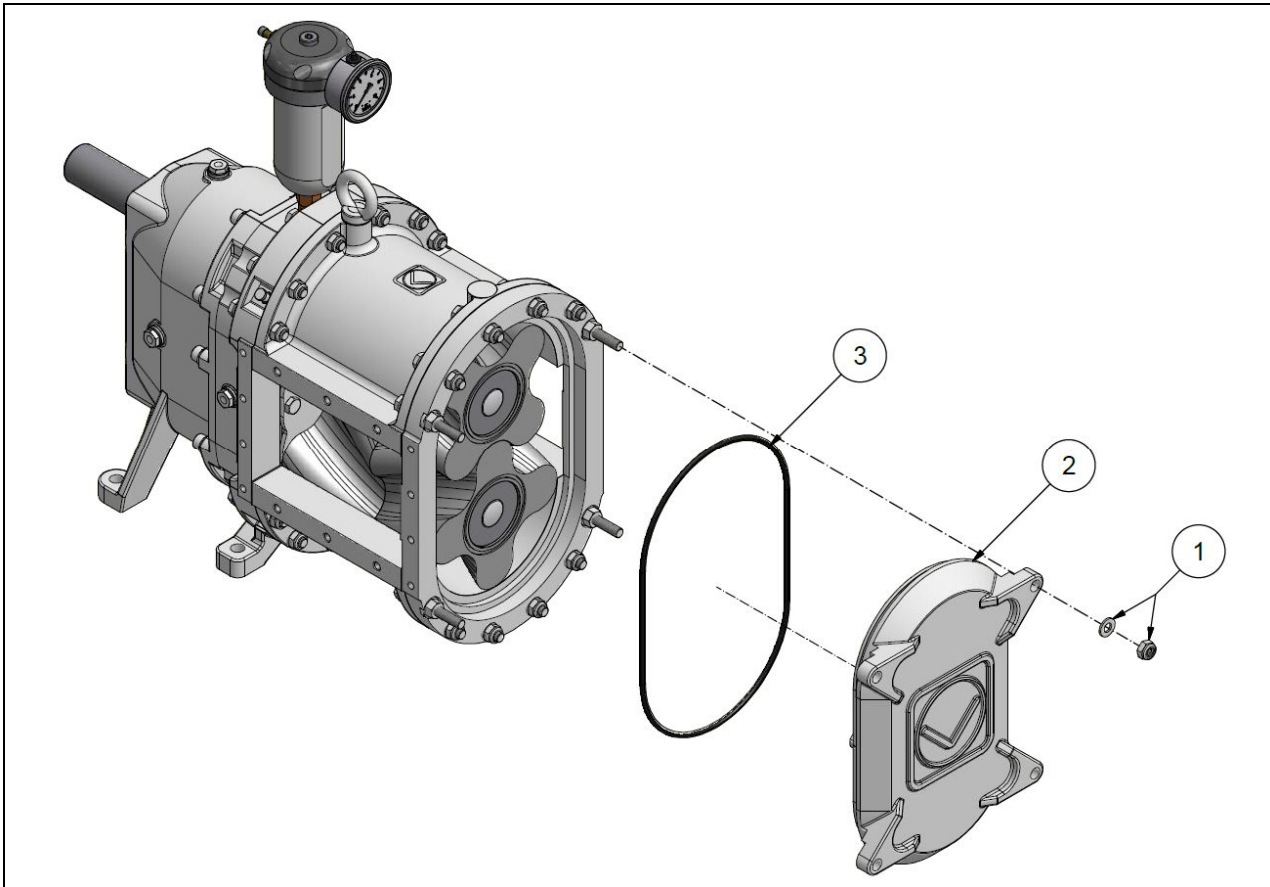


Fig. 19: Opening/closing the Q cover

- | | |
|---|---------------------------------|
| 1 | Hexagon nut / Hexagon head bolt |
| 2 | Q cover |
| 3 | O-ring |

9.3 Rotary lobe change



Lobe puller for pump sizes	70, 105:	Part no. PBA.B001.TK
	140, 210:	Part no. PBA.B001.TL

Alternatively:

Combination tool for lobe change **and** cartridge mechanical seal change for all VX136Q pump sizes: Part no. PBA.B033.T1



ATTENTION

Risk of premature wear on rotary lobes made of FPM in the event of excess pump pressure!

The material 'FPM' for rotary lobes is usable only up to max. 6 bar differential pressure. Please see → **Chapter "Specifications"**.

→ Fig. "Lobe change"

When assembling, replace the O-rings, strain bolts and strain bolt cover.

1. Open the Q cover (2) → **Chapter "Opening the Q cover"**.
2. Remove cover (4) from the strain bolts and undo strain bolts (5). Pull off the pressure discs (7) using a suitable bolt (strain bolt) or with the threaded rod of the lobe puller. Remove O-rings (6.8).



Notice: VVA series

With the VVA series with rubberised lobes (not with solid material lobes), the lobe core is protected by an additional sealing ring in which the pressure disc and spring washer are located. Dismount this sealing ring and reinstall it after the lobe change.

3. Pull the lobes from the shafts using a lobe puller. (Pull HiFlo and HiFloplus lobes off the upper and lower shaft in pairs).
4. Before installing the new lobes, thoroughly clean the contact surfaces of lobes and seal components!
5. Follow the same sequence in reverse to install the new rotary lobes → **Fig. "HiFlo and HiFloplus arrangement"**.



Notice: solid material lobes

When assembling solid material lobes, fit an O-ring (12) on the gearbox side of each lobe. When installing two lobe pairs, also fit O-rings (11) between the lobe pairs. The O-rings shown in the figure (12, 11) are not present with rubberised lobes (not solid material lobes).

6. When installing the pressure discs and spring washers, make sure that the spring washers (9) are positioned correctly in the pressure discs → **Fig. "Position of pressure disc and spring washer"**. Carefully press the pressure discs and spring washers into the lobe groove. Spring washers must not fall into the extracting groove. Tighten the spring washers and pressure discs with the strain bolt. Install the strain bolt cover (4).



Tightening torque for strain bolts

- Tighten the M16 strain bolt (10.9, steel) with **200 Nm**, then loosen it and tighten again with **140 Nm**.
 - Tighten the M16 strain bolt (A4, stainless steel) with **160 Nm**, then loosen it and tighten again with **140 Nm**.
7. Close the Q cover → **Chapter "Closing the Q cover"**.
 8. Adjust the pressure in the buffer chamber if necessary → **Chapter "Buffer chamber"**.

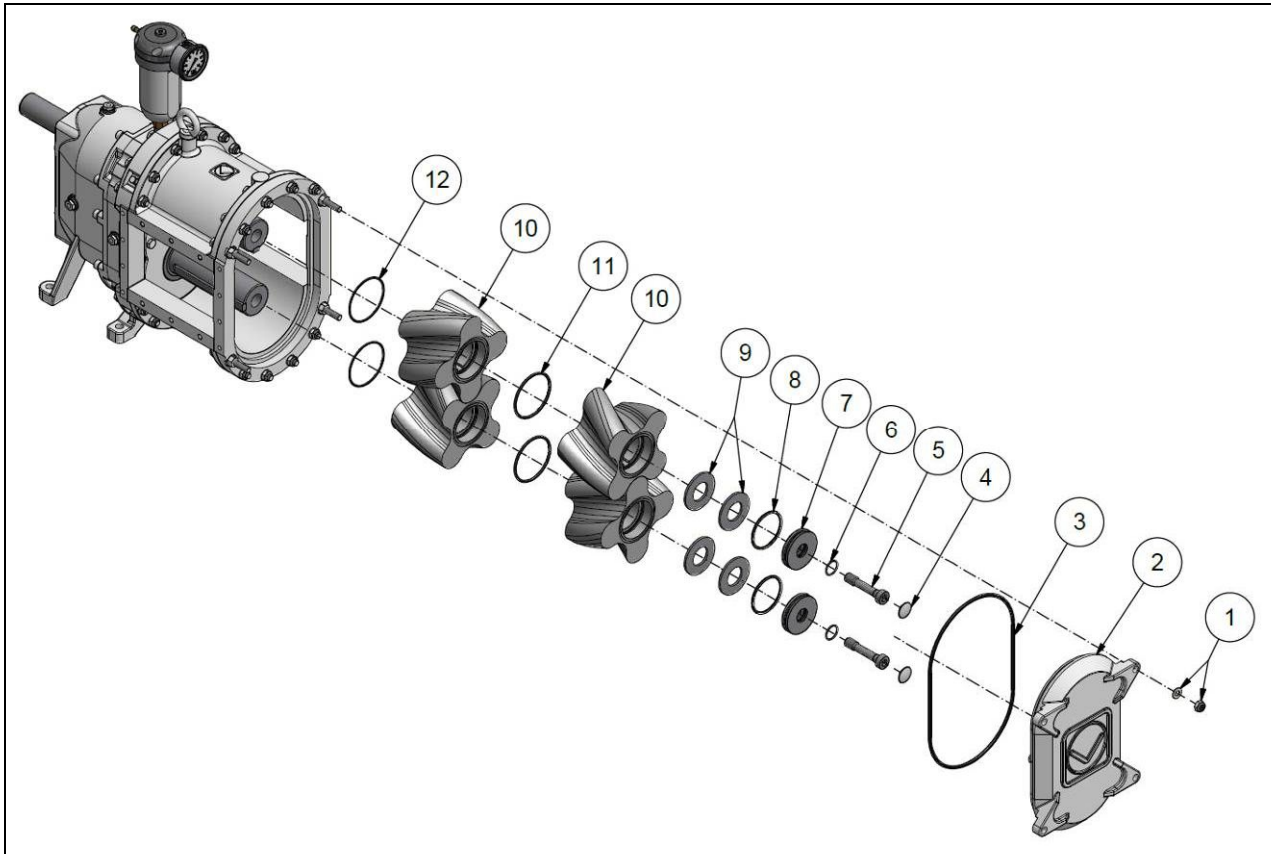


Fig. 20: Rotary lobe change



HiFloplus

HiFloplus-rotary lobes, in contrast to HiFlo rotary lobes, have a second groove. The groove, which in the "arrangement HiFloplus" is **not** to be used, is marked in red.

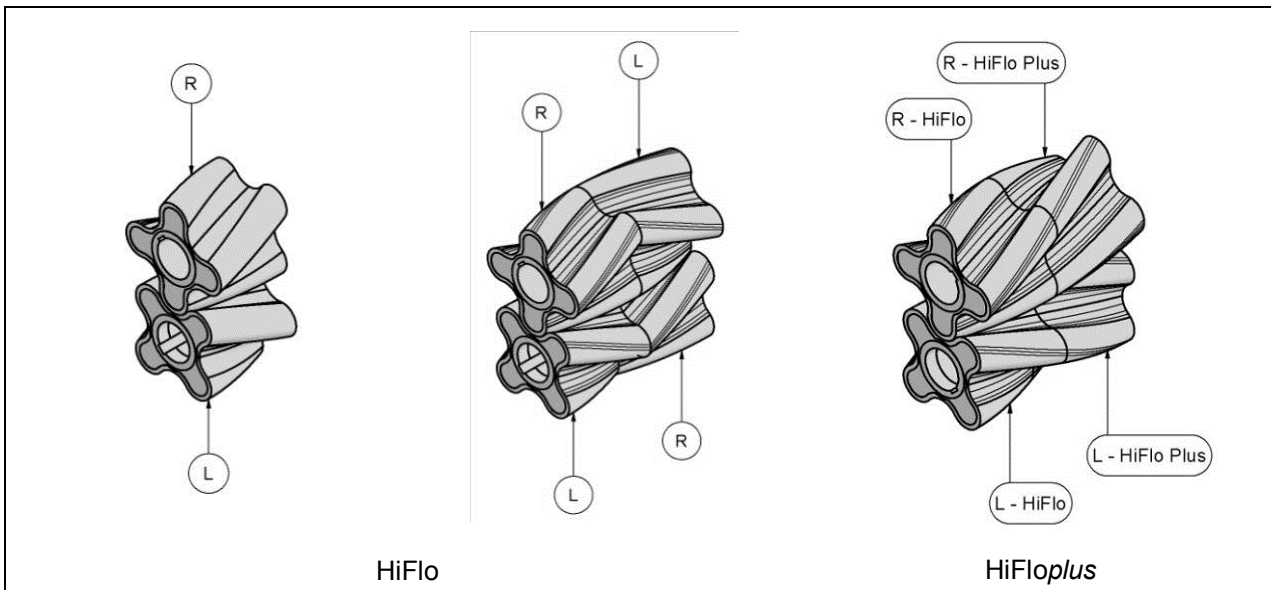


Fig. 21: HiFlo and HiFloplus arrangement
(L = left lobe, R = right lobe)

Position of pressure disc and spring washer

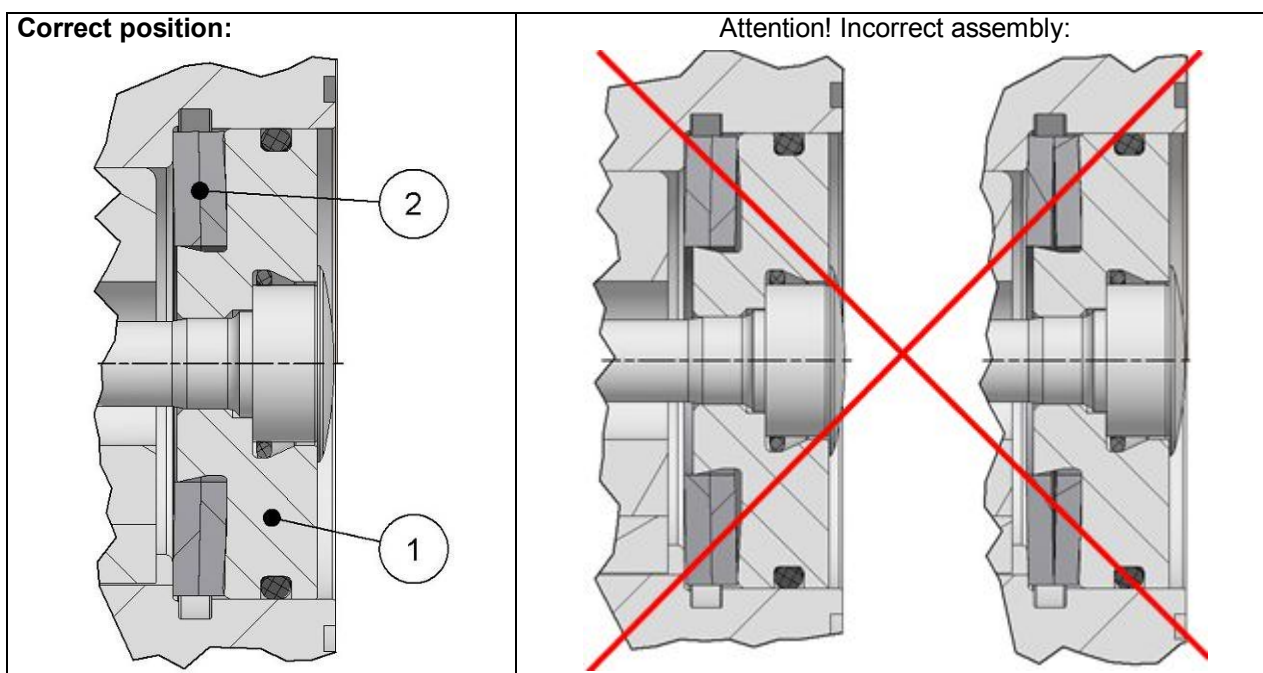


Fig. 22: Position of pressure disc and spring washer

- 1 | Pressure disc
- 2 | Spring washers (two per shaft)

9.4 Change of wear plates

! ATTENTION

The wear plates have a defined curvature. To prevent premature wear by the rotary lobes, the correct installation position of the wear plate must be observed during installation → Fig. "Installation position of the curved wear plates".

i Tightening torque

Wear plate screws: 40 Nm

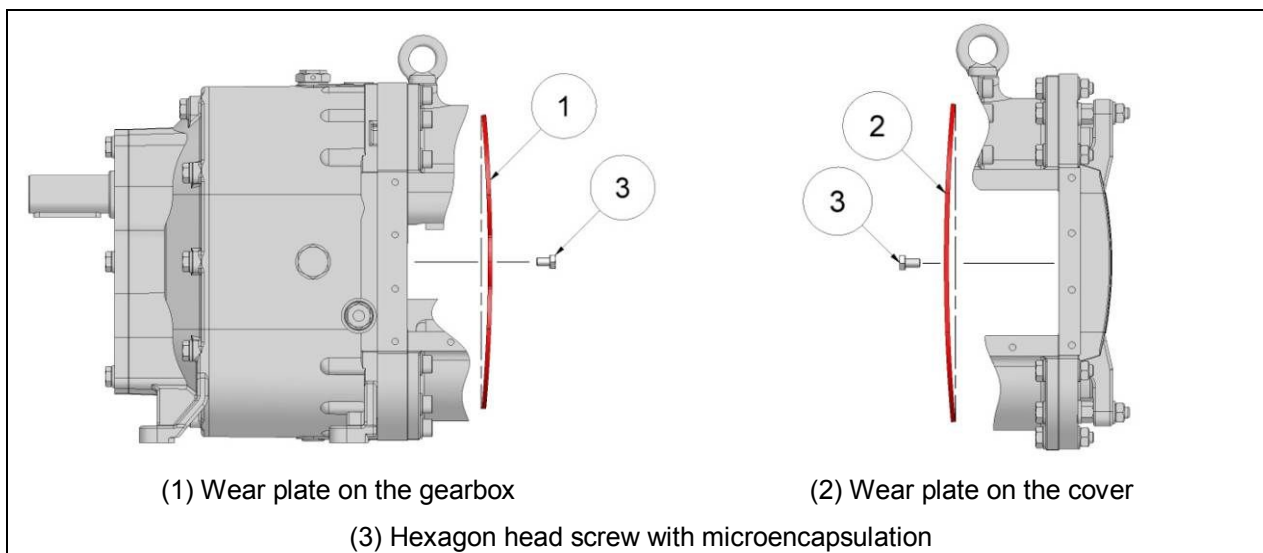


Fig. 23: Installation position of the curved wear plates

9.5 Change of cartridge mechanical seal



Cartridge mechanical seal – installation/disassembly tool: Part no. WKZ0456

Alternatively:

Combination tool for lobe change **and** cartridge mechanical seal change for all VX136Q pump sizes: Part no. PBA.B033.T1

→ Fig. "Cartridge mechanical seal on the gearbox"

1. Depressurise the buffer chamber.
2. Drain and clean the buffer chamber.
3. If flushing connectors or a circulation system are fitted, dismount them → **Chapter** "Circulation system on the cartridge mechanical seal" and → **Fig.** "Flushing operation".
4. Drain gear oil.
5. Follow the steps specified in → **Chapters** "Lobe change" and "Wear plate change".
6. Remove the set screws (1) of the cartridge mechanical seal (Fig. a)).
7. Put on installation tool (A) and screw the cylinder head bolts (2) into the extracting boreholes of the cartridge mechanical seal (Fig. b)).
8. Smoothly pull out the cartridge mechanical seal using the hexagon head bolts (3) of the installation tool (Fig. b)).
9. Change O-ring (4) in the bearing seal housing (Fig. c)).
10. Before installing the new cartridge mechanical seal, carefully remove the burrs on the keyways and clean the cartridge mechanical seal seat in the housing.
11. Push new cartridge mechanical seal onto the shaft. Carefully oil the outer O-rings on the seal carrier (position 5 in Fig. b)) before installation. Attention! Do not use oil for EPDM O-rings!
12. If a circulation system is present, the flushing connector boreholes in the cartridge mechanical seal must be aligned with the flushing connector boreholes in the bearing seal housing.
13. To install the new cartridge mechanical seal, place the installation tool on the cartridge mechanical seal without bolts.
14. Push lobe (without fitting key) onto the shaft.
15. Insert the pressure disc and the strain bolt.
16. Tighten the lobe until the cartridge mechanical seal is flush with the pump housing.
17. Reinstall any removed flushing connectors.
18. Remove the lobe again.
19. Push O-ring and support ring onto the shaft.
20. Before installing the lobes, clean the contact surfaces of lobes and gaskets very carefully.
21. Install lobes, wear plates and Q cover.
22. Top up buffer or quenching fluid.
23. Readjust pressure in the buffer chamber.
24. Top up the gear oil.

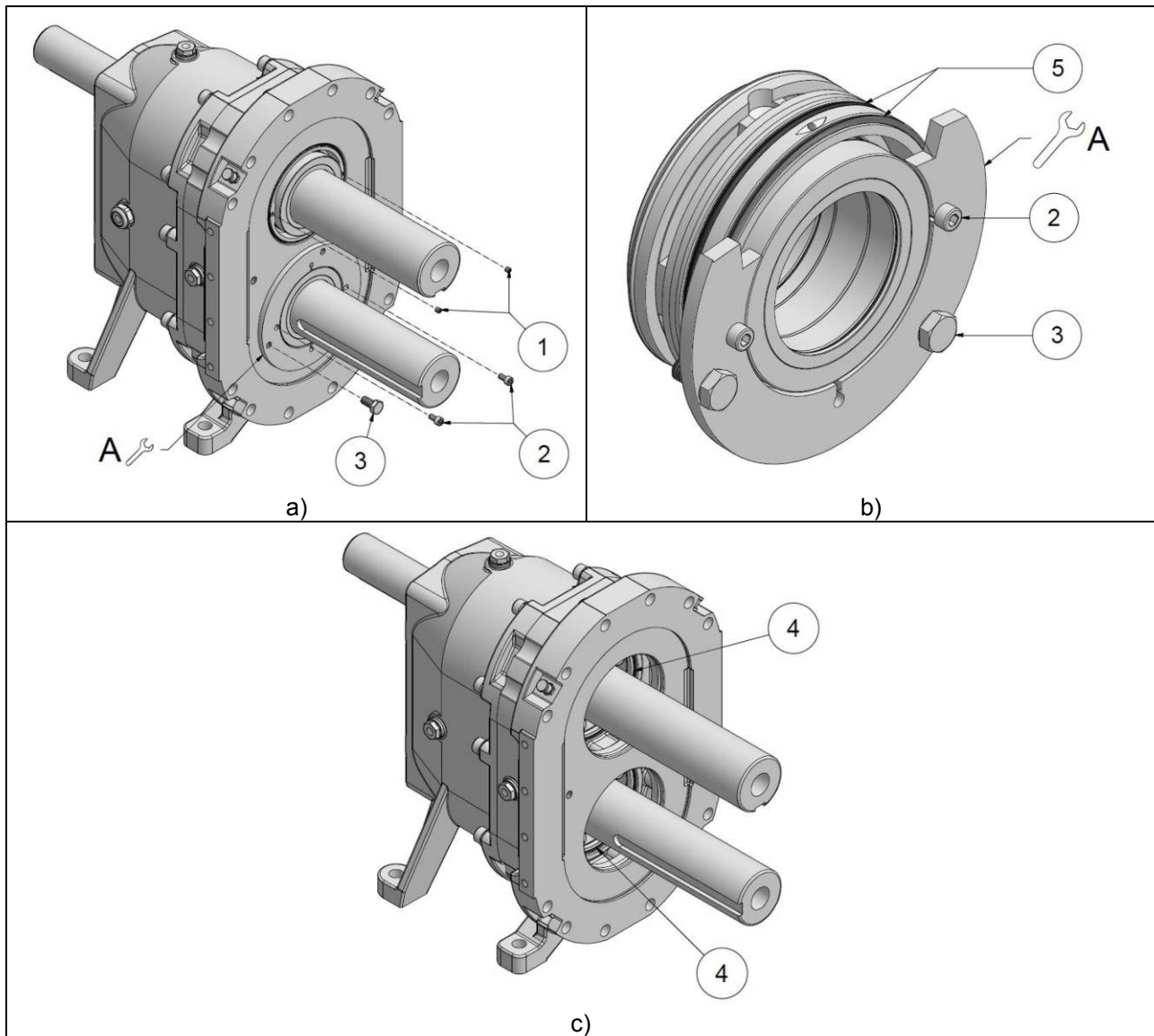


Fig. 24: Cartridge mechanical seal on the gearbox

- | | | | |
|---|---------------------|---|-------------------------------|
| 1 | Set screw | 4 | O-ring (bearing seal housing) |
| 2 | Cylinder head bolt* | 5 | O-ring (seal carrier) |
| 3 | Hexagon head bolt* | A | Installation tool* |

* included in tool with part no. WKZ0456

9.6 Closing the Q cover

→ Fig. "Opening/closing the Q cover"

1. Thoroughly clean the contact surfaces before installing the Q cover (2).
2. Pull the O-ring (3) onto the Q cover.
3. Set the Q cover in place.
4. Install and tighten the hexagon nuts (1) again.
Attention! Do not tilt the Q cover while doing this, but press it evenly by hand (no tools). Make sure the O-ring is seated correctly.

9.7 Adjusting of pump housing segments

The pump housing segments of the Vogelsang rotary lobe pump can be adjusted to reduce the top clearance between the lobe and the pump housing segment. The top clearance must be at least as large as one adjustment.

1. Remove the Q cover → Chapter "Opening the Q cover".
2. Undo the connectors and bolts on the pump housing segments.
3. Move the top and bottom clamping sleeves in the pump housing segments → Fig. "Adjustment of pump housing segments".
4. Before installation of the pump housing segments, apply flange sealant, set a flat gasket in place and coat that gasket with flange sealant as well.
5. Screw all bolts back onto the pump and the connectors.
6. Install the Q cover → Chapter "Closing the Q cover".

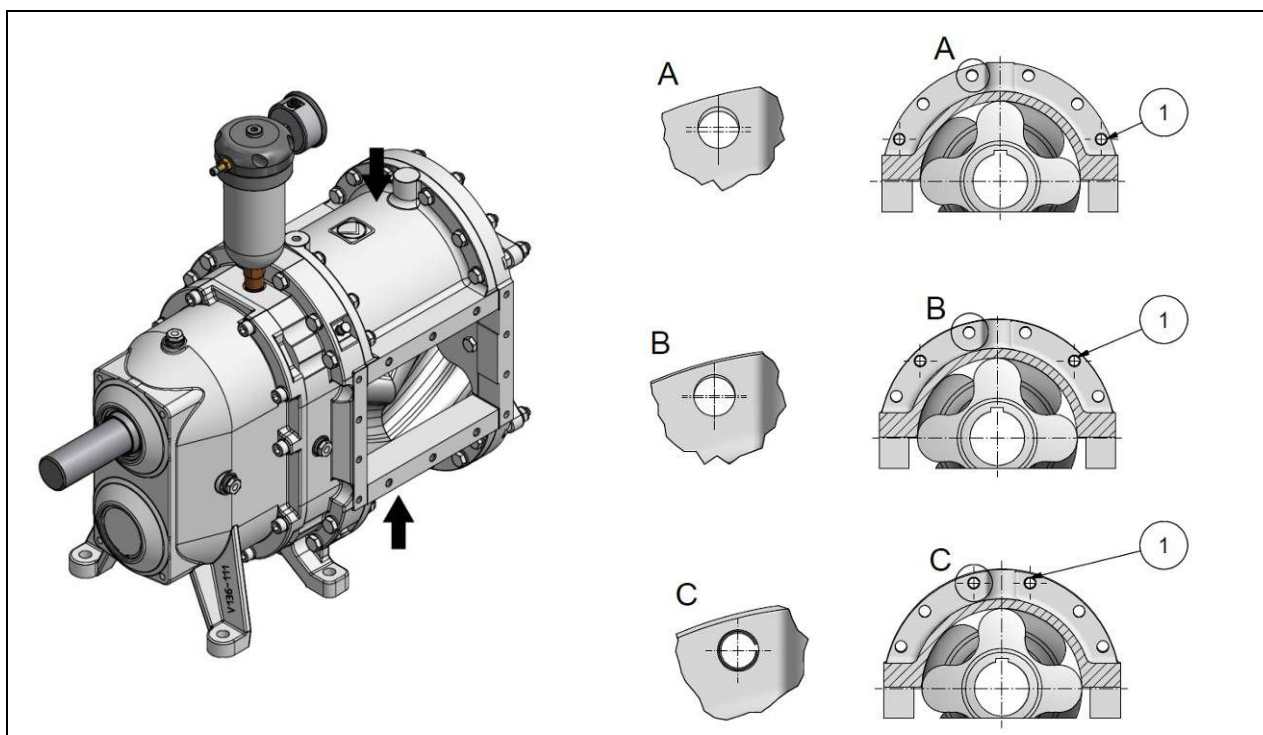


Fig. 25: Adjustment of pump housing segments

- | | |
|---|---------------------------------|
| 1 | Position of the clamping sleeve |
| A | When delivered |
| B | First adjustment |
| C | Second adjustment |

VX136
 0.7 mm
 1.4 mm

9.8 Reducing the starting torque

The starting torque can be reduced by installing thinner wear plates or by installing shims between lobes and wear plates.

Please note: increasing the gap between lobes and wear plates reduces the volumetric efficiency.

Increasing the gap by installing thinner wear plates

(except VX136QVVA series)

Increasing gaps → + 1 mm

At gearbox side: Replace the wear plate PFL.B009 (5 mm) with PFL.B009.T1 (4 mm)

Cover side: Replace the wear plate PFL.B002 (4 mm) with PFL.B002.T1 (3 mm)

Increasing gaps → + 0.3 mm

At gearbox side: Replace the wear plate PFL.B009 (5 mm) with PFL.B009.T2 (4.7 mm)

Cover side: Replace the wear plate PFL.B002 (4 mm) with PFL.B002.T2 (3.7 mm)

Increasing the gap by installing shims

Increasing the gap → + 0.2 mm on the Q cover:

Put one new shim 10 x 16 x 0.2 (NUS.062) on each of the four distance nuts of the Q cover.

Increasing the gap → + 0.2 mm on the gearbox:

1. Put one new shim 60 x 75 x 0.2 (NUS.061) on each shaft in front of the first lobe.
2. In addition put one shim (part no. NUS.062) on each of the four distance nuts of the Q cover to adjust the gap accordingly.

Attention! If more than two shims are placed on each distance nut of the Q cover, a thicker O-ring (part no. DOR.093) must be placed under the Q cover to maintain reliable sealing.

In case of wear on lobes or plates, the gaps can be reduced again accordingly.

10 Troubleshooting

10.1 Troubleshooting

Troubleshooting

	Help → Chapter "Help"
• No pump delivery	A, B, D, E, G, J, R
• Pump stops after start	J, K, M, R, S, V
• Intake flow breaks away after start	D, E, G, S, V
• Irregular pump delivery	D, E, G, J
• Capacity too low	D, G, J, R, S, T, U
• Pump blocked	C, F, J, K, M, R, U, V
• Power consumption too high	C, M, R, S, V
• Drive belt slips	F, H, M, R, S
• Leakage on the pump	C, R, U
• Pressure and level variations in the buffer chamber	O, U, V, W
• Leakage at the mechanical seal	P, W
• Extreme pressure and level changes in the buffer chamber	P
• With a dry buffer chamber: buffer chamber tank more than half full	Q
• Pump too hot	A, C, M, N, R, S, U
• Motor too hot	C, K, L, M, R, S, V
• Noises & vibrations	C, D, E, F, G, I, J, K, M, N, R, S

10.2 Help

	Possible cause	Possible remedy	Observe notices and safety notes → Chapter
A	Pump is not priming	Fill the pump with fluid.	
B	Incorrect direction of rotation	Change the pump's direction of rotation.	"Flow direction"
C	Pipe causing pump housing warping	Check the orientation of the pipe to the pump. If necessary, provide a compensator or secure the pipe.	"Installation in pipes"
D	Leakage in the suction pipe	Check the suction-side pipe system for leakage.	
	Gas formation	Vent the suction pipe and pump chamber, top up fluid.	
E	Suction pipe clogged	Check the free flow of the pipe system on the suction side.	
F	Foreign matter in medium	Clean the pump unit. Install strainer in the suction pipe.	
G	NPSH _a too low (medium evaporates during feeding)	Increase the suction pipe diameter, shorten the suction pipe length, simplify suction pipe assembly, reduce the suction height, reduce the speed, adjust the medium temperature.	"Installation in pipes"
H	Belt tension too low	Tighten in accordance with manufacturer's specifications.	"Base, support surface for machine"
I	Coupling not correctly aligned	Check the orientation and align according to manufacturer's specifications if necessary.	
J	Belt drive slips	Tighten in accordance with manufacturer's specifications.	

	Possible cause	Possible remedy	Observe notices and safety notes → Chapter
K	Faulty electrical connection	Check electrical equipment.	"Drive"
	Error in the hydraulic system	Check the hydraulics.	
L	Motor speed too low during variable frequency drive operation	Install external fan, increase motor speed.	"System control": Variable frequency drive operation
M	Stiff running caused by swollen lobe elastomer	Check the medium resistance of the lobe elastomer.	"Specifications": Material description for rotary lobes
	Stiff running caused by accumulation of solid matter in the gaps	Clean pump chamber; increase the gaps → Chapter "Reducing the starting torque"; adjust the drive.	"Repair", "Drive"
N	Oil level in the gearbox is not OK	→ Chapter "Gearbox"	"Maintenance"
O	Operation-related fluctuations in buffer chamber	→ Chapter "Buffer chamber"	"Maintenance"
P	Mechanical seal damage	Change the mechanical seal, → Chapter "Cartridge mechanical seal change"	"Repair"
	Faulty repair of the mechanical seal		
	Buffer fluid tank leaking	Check buffer fluid tank for leaks.	"Maintenance"
Q	Seal leaking	→ Chapter "Dry buffer chamber"	"Maintenance"
R	Differential pressure too high	Reduce differential pressure.	"Specifications"
S	Medium viscosity above the nominal value	Reduce speed. Increase medium temperature.	"Intended use"
T	Medium viscosity below the nominal value	Increase speed, decrease medium temperature, replace wear parts.	"Repair"
	Gaps too large	Reduce gaps → Chapter "Reducing the starting torque" but with the procedure reversed	"Maintenance"
U	Medium temperature above the nominal value	Reduce medium temperature.	"Intended use", "Specifications":
V	Medium temperature below the nominal value	Increase medium temperature (after consulting Vogelsang).	Material description for rotary lobes
W	Mechanical seal elements not in the best position	Pressurise the buffer chamber once with the max. permissible buffer chamber pressure (tank pressure) (single mechanical seal: 5 bar, double mechanical seal: 10 bar). Then restore the design pressure.	"Buffer chamber" "Pressurisable buffer fluid tank"
		Put the buffer chamber into operation in its non-pressurised state (buffer fluid tank closed) and observe the buffer chamber fluid level and pressure.	
		Adjust the tank pressure (buffer chamber pressure) to be higher than its design pressure. Observe max. permissible buffer chamber pressure (tank pressure): Single mechanical seal: 5 bar, double mechanical seal: 10 bar	

11 Putting out of operation and disposal

1. Disconnect pump from the power supply or the PTO drive. Observe notices and safety notes → **Chapter "Drive"**.
2. Disconnect pump from the pipe. Observe notices and safety notes → **Chapter "Installation in pipes"**.



WARNING

Risk of injury by crushing or impact!

Pipes under flexural strain can spring back under spring energy.



- Personnel must wear suitable protective clothing.
 - Take care when undoing screws and bolts.
3. Drain working materials.
 - Drain the gear oil from the pump gearbox. Observe notices and safety notes → **Chapter "Gear oil – inspection and change"**.
 - Drain the buffer or quenching fluid from the buffer chamber. Observe notices and safety notes → **Chapter "Draining and cleaning the buffer chamber"**.
 4. Drain the pump and remove residual medium. Observe notices and safety notes when opening the pump cover → **Chapter "Repair"**.



Environmentally friendly disposal

Working materials such as oils, hydraulic fluids and dangerous media should be treated as hazardous waste and disposed of properly.

5. Hand over the pump for scrap. Observe notices and safety notes → **Chapter "Transport, storage"**.

Maintenance and service plan

12 Maintenance plan

At start-up → Chapter "Checklist before start-up" and before and after long shutdowns:

- Lubricate grease nipples
- On pumps with belt drive, check belt tension as per the 'Accompanying sheet for belt drives'

After the first 10 operating hours:

- On pumps with belt drive, check belt tension as per the 'Accompanying sheet for belt drives'

After the first 20 operating hours:

- Tighten the bolts for the base
- Check the buffer or quenching fluid
- Change the gear oil

Every 200 operating hours:

- Check the buffer or quenching fluid

Every 500 operating hours, at least once every three months:

Check gear oil

Every 2000 operating hours, at least once a year:

- On pumps with belt drive, check belt tension as per the 'Accompanying sheet for belt drives'
- Change the buffer or quenching fluid
- Change the gear oil

When there is severe contamination:

Change the buffer or quenching fluid



ATTENTION!

To avoid adhesion of the mechanical seal ring surfaces, the shaft on new machines with a mechanical seal with the mating materials SiC-SiC that are not started up immediately needs to be rotated (at least one revolution) every two months.

VOGELSANG



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