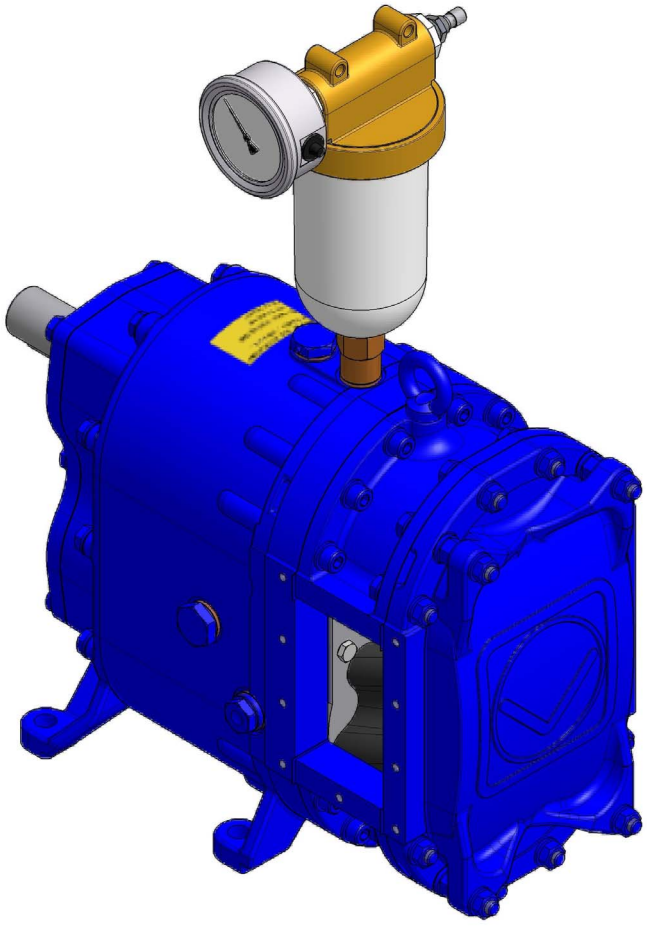
Operating and Maintenance Manual

Rotary Lobe Pump
V100QHD



Contents

Dear customer,
By buying this Vogelsang rotary lobe pump, you have acquired a high quality product. If you want your pump to function reliably over a long period of time, it has to be serviced at regular intervals, as stipulated in the instructions. Therefore, this manual should be at the disposal of the operators and maintenance personnel at all times and they should adhere to the manual carefully.

We do not accept any liability for any damage sustained resulting from failure to adhere to these maintenance instructions.

ATTENTION! Please read before first operation!

Our operating and maintenance manuals are updated at regular intervals. With your improvement proposals, you would help us make this manual more user-friendly.
Please fax your proposals to our design department +49 5434 83 10, or e-mail krampe@vogelsang-gmbh.com.

Notes

Legend of symbols

	**Warning advisories (technical), safety advisories!**
	**Technical or general information!**

1 Intended Use

The VOGELSANG rotary lobe pump is a positive displacement pump.
This pump is suitable for the following fluids:

- fluids with high solids content (observe max. ball diameter)
- highly viscous fluids
- shearing stress sensitive fluids
- fluids loaded with gas
- all other free-flowing fluids

If you are in doubt, please ask us.
Any other use is contrary to the intended purpose. The manufacturer is not liable for damage or wear caused by incorrect use.

2 Safety Notes

Before start-up

- Read and follow the operating and safety notes carefully.
- Familiarise yourself with all facilities and operating options.
- Note all the items in the "Checklist before start-up" in the "Start-up" chapter.
- Ensure that access to rotating parts is not possible.

Warning and safety labels

- The warning and safety labels fitted provide important information for safe operation.
- In the interests of your own safety, pay attention to these labels.
- The warning and safety labels must not be removed and must be replaced immediately if damaged or lost (see chapter "Warning and safety labels").

Pumping dangerous materials

If contact with the medium cannot be ruled out during maintenance or repair work, appropriate safety measures must be taken (protective goggles, protective gloves, etc.).
Warning! In certain circumstances, this dangerous material may have reached the buffer chamber or the drive unit.

Safety devices

Pressure can be limited, for example, using

- a current limiter on the motor
- a pressure relief valve
- a pressure switch to switch the system off
- an overload coupling

Prevent the pump from **running dry**, for example, using

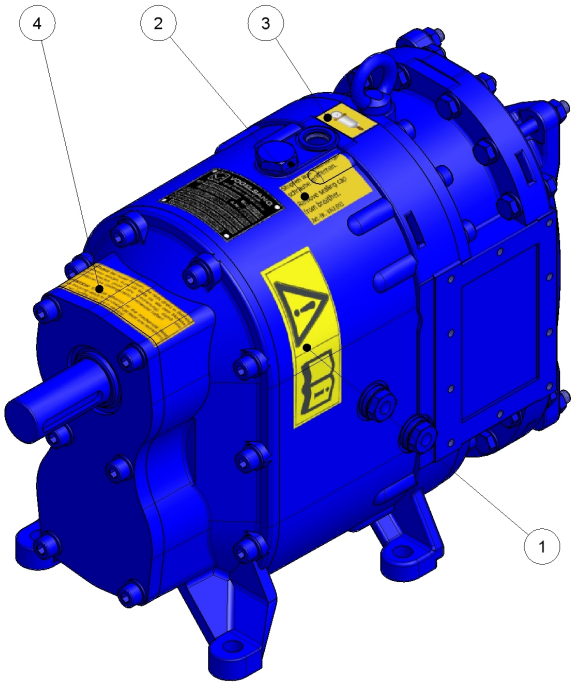
- a temperature monitor
- a level gauge
- a flow rate gauge

Safety devices must regularly be checked for proper function, especially after maintenance and repair work and before putting into operation.

Warning!
Before carrying out maintenance and repair work, switch off the drive.
Ensure that the drive cannot be switched on by mistake.

Use the **eye bolts** on the pumps only for lifting the pump without mounting parts (for example, the motor)! See chapter on "Transport".

2.1 Warning and safety labels



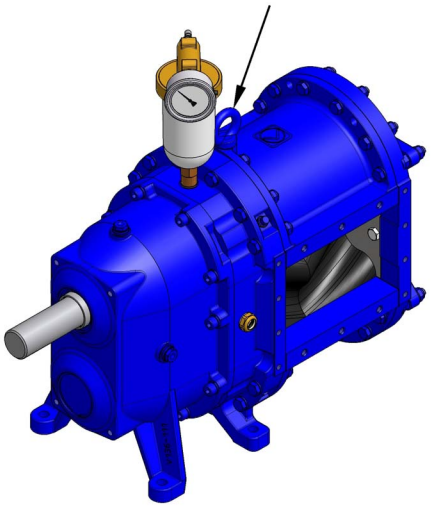
V100QHD

Fig. 1: Positioning of the warning and safety labels
(The figures shown here are examples only and do not reflect the precise positioning of the labels)

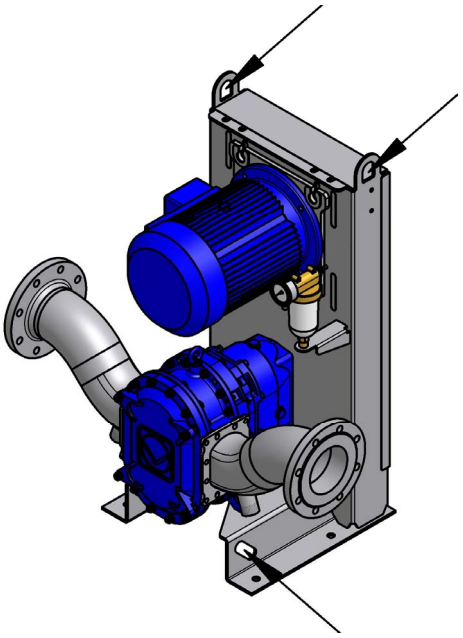
Pos.	Sticker	Part-no.	Meaning
1		VAU.133	Before starting up the machine, read the maintenance and operating instructions.
2	Stopfen aus Belüftungs-schraube entfernen. Remove sealing cap from breather. Art.-Nr. VAU.003	VAU.003	Text – see sticker
3		VAU.138	Buffer/quenching fluid tank
4	**ACHTUNG!** Bei neuen Pumpen, die nicht direkt in Betrieb genommen werden, muss die Welle ca. alle zwei Monate gedreht werden (mind. eine Umdrehung), damit die Dichtflächen der Gleitringe nicht aneinander haften! **ATTENTION!** To avoid adhesion of the mechanical seal faces the pump needs to be rotated (at least one revolution) every two months when not in service!	VAU.115	Text – see sticker (Only used for pumps with a mechanical seal consisting of the material combination SiSiC-SiSiC)

3 Assembly

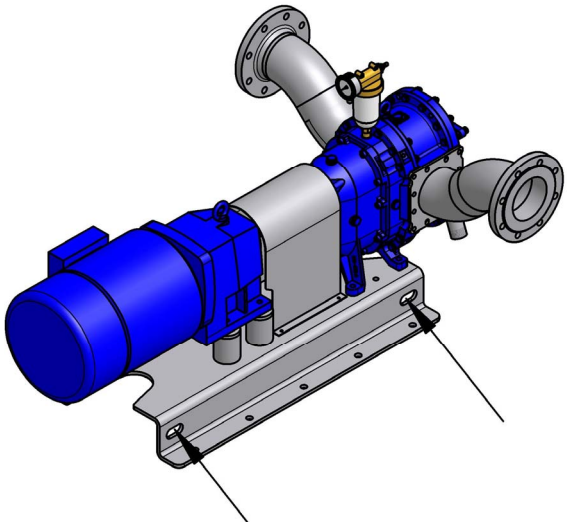
3.1 Transport



pump body



base, type belt drive bended



base, type inline

Fig. 2: Transport aids

If the pumps are transported in suspension, use the fitted transport aids, for example, eye bolts* or lifting brackets, see fig. "Transport aids".

Use the **eye bolts** on the pumps only for lifting the pump without mounting parts (for example, the motor)! See chapter on "Transport".

* max. permissible weight with one eye bolt M8: 140 kg

3.2 Assembly of pump and motor on base

To prevent wear, vibrations and noise,

- the base for pump and motor must not be out of alignment or under stress by the mounting bolts
- the **alignment of coupling must be checked and corrected before start-up**, see fig. "Alignment methods"

Retighten all motor and pump mounting screws on the base **after 20 operating hours.**

For pumps with belt drive check the belt tension acc. to 'accompanying sheet':

- at start-up
- before and after longer out-of-service periods
- after the first 10 operating hours
- every 2000 operating hours, once per year minimum

Use the **eye bolts** on the pumps only for lifting the pump without mounting parts (for example, the motor)! See chapter on "Transport".

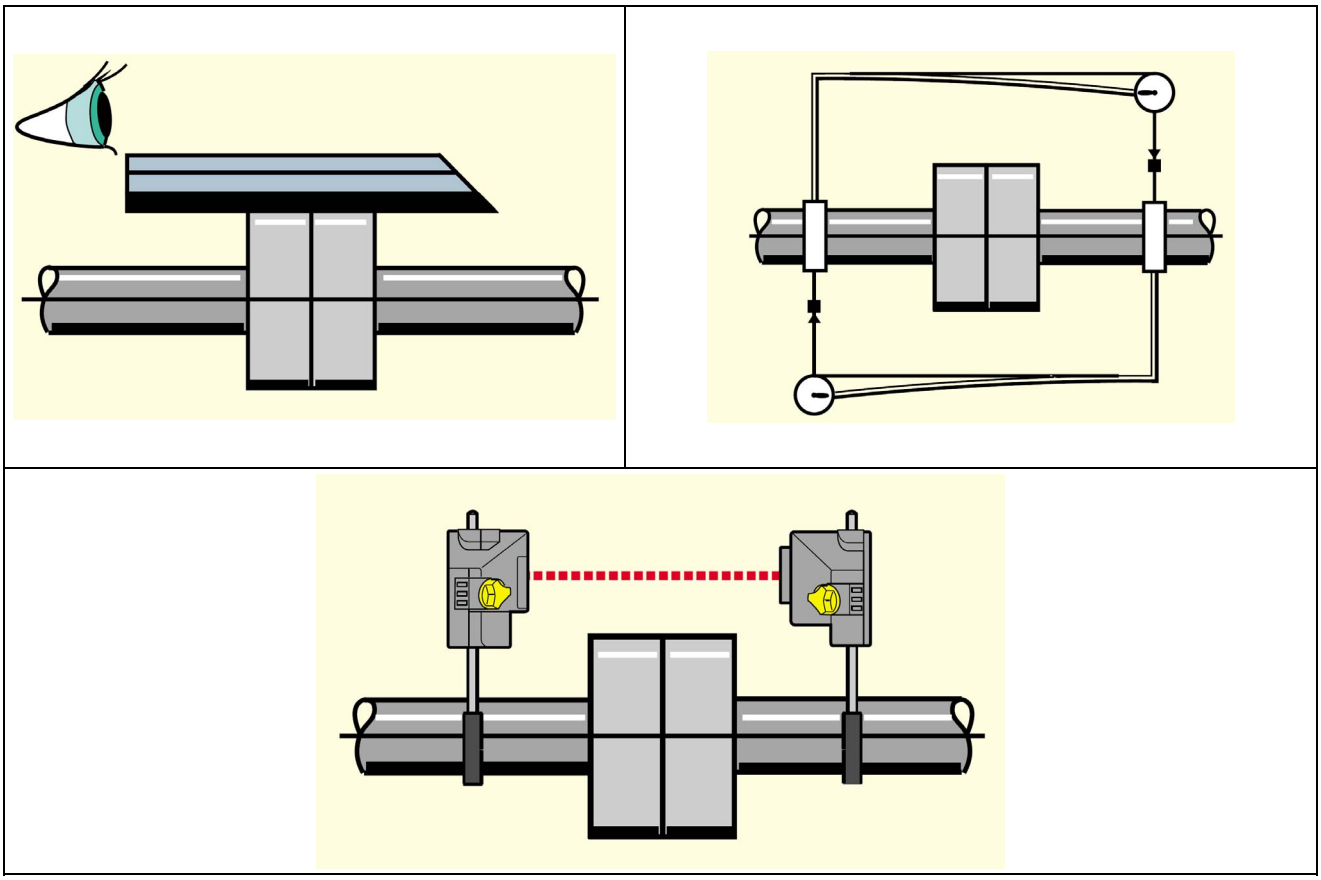


Fig. 3: Alignment methods

3.3 Assembly of rotary lobe pumps without base

Ensure that the pump is free of constraints while installation and while operating, too.

3.4 Installing the rotary lobe pump in pump systems and vehicles

- When installing the pump, ensure that there is easy access for maintenance work. If the hex head screw plugs for draining the gearbox oil and buffer/quenching fluid are not easy to reach, drain hoses may be used (part-no. PBT.013 and/or PBT.014).
- The connectors must be mounted free from stresses. In other words, the connectors have to be exactly one in front of the other even without screws.
- May be installed either upright or horizontally.
- Position the pressure and suction connections pointing upwards. This will ensure that the fluid remains in the pump after it is switched off.
- If the pump is installed horizontally, position the suction side facing downwards.
- If the pump is to be suspended, please contact us.

Important! Connector with sight glass may only be installed on suction side.
Do not exceed the maximum suction height of 8 m (26.2 ft). This is the maximum distance between the lowest and highest points of the suction pipe.

If the diameter of the suction pipe is too small, the maximum suction height will be reduced by the friction loss.
Please contact us for a calculation.

3.5 Pipelines and nominal pressures

Only use the pipeline diameters, wall thicknesses and materials recommended by us or by our representatives. This is essential for ensuring that the system functions properly!

Warning! Suction lines whose diameter is too small may restrict the suction capability of the pump (risk of cavitation).

Only use high-pressure pipes on the pressure side:

- **up to** nominal diameter 150 mm - high pressure pipes with nominal pressure 16 bar (232 psi).
- **from** nominal diameter 200mm - high pressure pipes with nominal pressure 10 bar (145 psi), except when the permissible operating pressure of the pump is ≥ 10 bar.

If you are uncertain about anything, please contact us!

Pump systems must be protected from excessive pressure!

3.6 Long suction lines over 30m (100 ft)

Long suction lines must be laid with a slope of at least 2 x pipe diameter in the direction of flow, ensuring that the pipeline can never run dry.

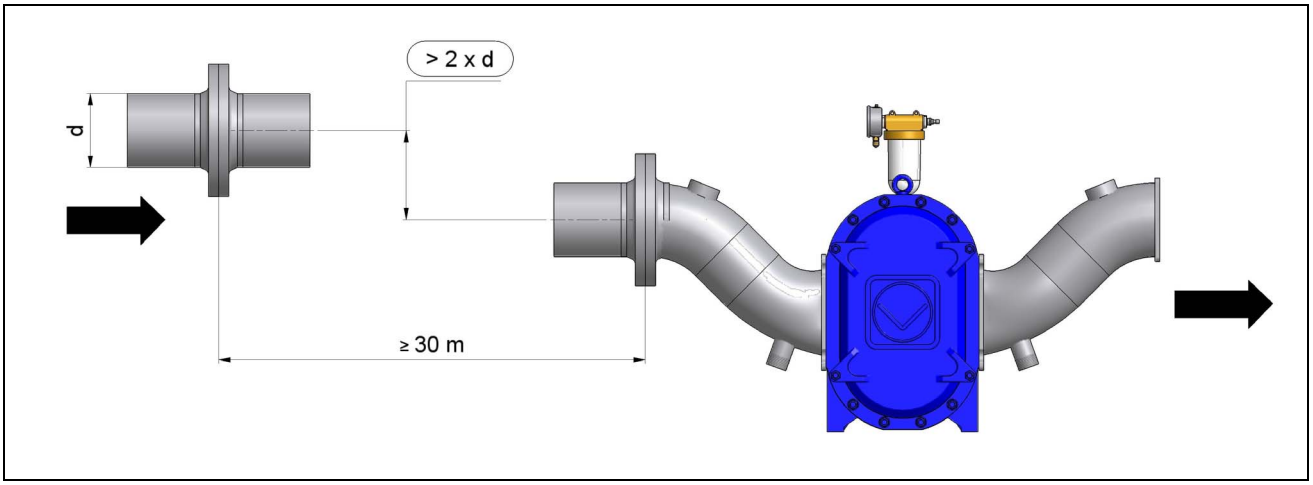


Fig. 4: Long suction lines

3.7 Temperature and pressure control

For running pumps with automatic mechanism, a temperature and pressure monitoring unit (optionally available from Vogelsang) is required. See also point on "Safety devices" in the chapter on "Safety instructions".

4 Start-up

4.1 Check list before start-up

- ☐ Is the pipework sealed and free from leakage?
- ☐ Is free passage in the pipework guaranteed?
  Positive displacement pumps may never be operated against a closed pipework (e.g. valves)?
- ☐ Is the coupling correctly aligned?
- ☐ Is the tension of belt drive okay?
- ☐ Is the optional buffer chamber arrangement correctly installed? Is the buffer chamber correctly pressurized?
- ☐ Are grade and level of oil in pump gearbox and buffer chamber okay?
- ☐ Is the sealing prechamber greased (only if grease nipples installed)?
- ☐ Are all safety devices installed and is the proper function guaranteed?
- ☐ Are the drain cocks closed and is the pump filled with fluid?
- ☐ Is the "STOP" switch easy to reach?
- ☐ Is the direction of flow okay? Check the direction of rotation of pump.
- ☐ Put the pump into operation and check suction and discharge pressure, speed and pump performance.

4.2 Before start-up of pump in case of longer stock holding period/shutdown

Attention! Pump with mechanical seal - combination of material: SiSiC-SiSiC!
To avoid adhesion of the mechanical seal faces this pump needs to be rotated (at least one revolution) every two months when not in service!

5 Pump drives and direction of flow

The rotary lobe pump is essentially suitable for use in either direction of motion.

Important! The sight glass has to be installed on the suction side.
If the sight glass is on the pressure side (pumping backwards), the pressure may not exceed 2 bars (29 psi).

5.1 Drive units

5.1.1 Direction of rotation

If you are using motor-driven pump (such as an electrically powered motor, hydraulic motor) with one drive shaft, select the direction of rotation by determining the direction of the drive motor.

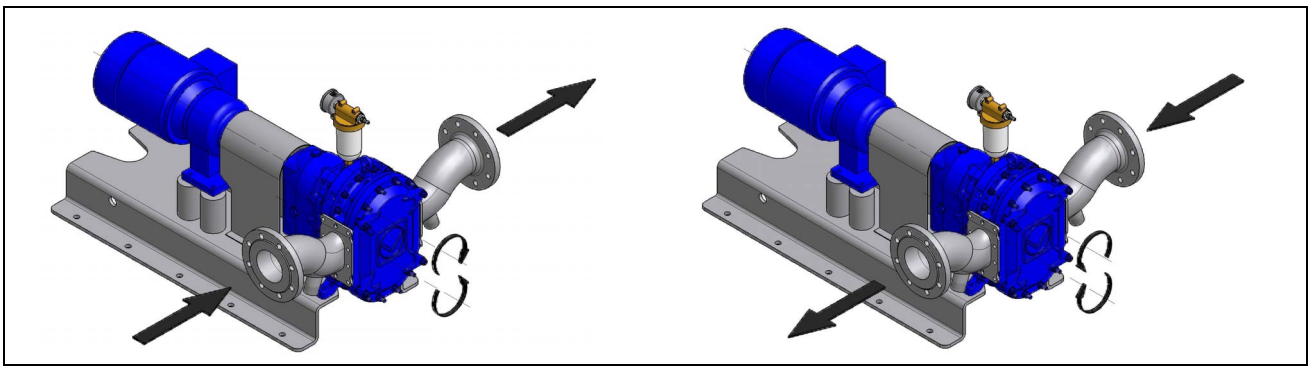


Fig. 5: Motor driven pump

5.1.2 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)

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

5.2 Pump systems

The pressure and suction sides are rigidly defined by the rotation of the pumps.
If you are having suction difficulties, you can temporarily fill the suction line by reversing pump direction.
However, this cannot be done with pipelines that are secured by means of check valves / non-return valves.

5.3 Sight glass in the pump connector

Important! The sight glass has to be installed on the suction side.

If the sight glass is on the pressure side (pumping backwards), the pressure may not exceed 2 bars (29 psi)**.**

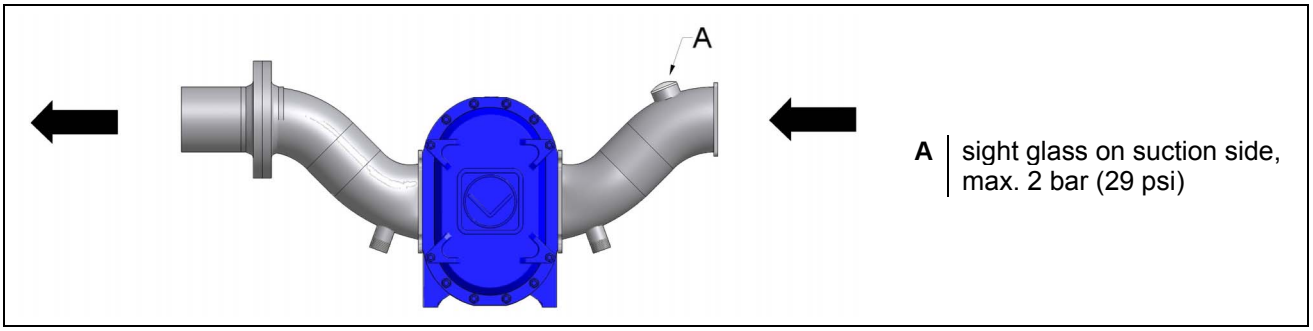


Fig. 6: sight glass

6 Advisories For Using Rotary Lobe Pumps

Foreign objects	Keep the pipes as free as possible from foreign objects such as stones, wood residues, etc. These foreign objects lead to increased wear of the rotary lobes and the pump housing segments.
Highly viscous liquids	When using the pump for viscous sludges or slurries, depending on the liquid / sludge being pumped, the pump speed must be reduced according to the fluid's viscosity. This prevents cavitation from occurring.
Wintertime operation	If there is a risk of frost, the pump must be drained by dry running the pump in either direction, until all liquid is drained out of the pump. Therefore you may use the drain valves in the connectors. For a complete draining you must remove the cover. Warning! Before start-up, fill up with liquid again.
Periods of hot weather	During hot weather, gas may form in closed pipe systems. Because of higher pressures, this gas may damage the pump or pumping systems. Prevent the medium from becoming trapped in the pump.
Removing from service	Drain the pump by opening the cover and flush if necessary, for example in case of critical medium.

7 Maintenance

7.1 Buffer/Quenching fluid

Pump type	V100QHD
Buffer/quenching fluid per buffer chamber in [ml]	240*

*Reference value, depends on the structure of the buffer chamber

Please check your order confirmation to see if your pump is filled with a buffer/quenching fluid not on the following table. If that is the case, use this buffer/quenching fluid only.

- Do not use oils for pumps with EPDM O-rings, silicone oil excepted.
- In case of dry buffer chamber do not fill the pump with **any** fluid.

For standard pumps the following oils are recommended to ensure optimum function of the mechanical seals:

For pumps up to 1000 min^{-1} maximum:

VOGELSANG Standard Oil
mineral oil Titan Gear MP90
SAE 90
Art-No. BSS.006

alternatively:

white oil W530
DAB10
Art-No. BSS.010

For electr. leakage control:
hydraulic oil
Renolin PG100
Art-No. BSS.021

For pumps more than 1000 min^{-1} :
(for above mentioned pumps up to 1000 min^{-1} usable, too)

hydraulic oil Renolin B15 VG46
Art-No. BSS.014

alternatively:

hydraulic oil Plantohyd 40N
biodegradable
Art-No. BSS.016

For electr. leakage control:
Hydraulic oil
Renolin PG46
Art-No. BSS.017

The load-carrying capacity has to be ≥ 12 !
(viscosity break down rating)

7.1.1 Inspecting and changing the buffer/quenching fluid

Check the buffer/quenching fluid for visible contamination:

- after the first 20 operating hours
- then every 200 operating hours

If strong contamination is visible, change the buffer/quenching fluid.
Change the buffer/quenching fluid every 2000 operating hours (see chapter "Service Instructions").
Change the mechanical seal in case of strong leakage.

Note!
A slight contamination of buffer/quenching fluid such as a slight rise or fall of buffer/quenching fluid - level is determined by the hydrodynamic lubrication-film of mechanical seal.

7.1.2 Buffer chamber assemblies

7.1.2.1 Pump with pressurized buffer fluid tank

The pressurized buffer fluid tank, **PSG.014**, with manual pump AHP.001, provides a steady defined buffer chamber pressure (buffer chamber pressure = tank pressure).
In addition the canister is for a safe monitoring of the buffer chamber (see fig. "Buffer chamber monitoring").

Setting up
First remove the plug from the buffer chamber. Then completely fill the buffer chamber.
After that, screw the tank PSG.014 directly into the casting of the buffer chamber. Fill the tank until about 1/4.
Then set the expected tank pressure with a manual pump or a compressed air supply.

Tank pressure
The tank pressure should be about 0.5 bar higher than the middle pressure in the pump.
Tank pressure = 0.5 bar + (pressure on the suction side + pressure on the pressure side) / 2.

Example:
One pump primes with 0.4 bar under pressure and presses with 2.0 bar overpressure.
Pressure on the suction side: – 0.4 bar, pressure on the pressure side: 2.0 bar.

$$\text{Tank pressure} = 0.5\ \text{bar} + \frac{(-0.4\text{bar} + 2\text{bar})}{2} = 1.3\ \text{bar}$$

Tank pressure is 1.3 bar.
However the tank pressure should be max. 5 bar.

Trouble indication
After a possible running period, trouble with the sealing system would be directly noticed in form of:

- strong pollution of the buffer fluid in the tank
- escape of buffer fluid (tank is empty)
- increasing of buffer fluid (tank is full)

Refilling
First depressurize the buffer chamber through the air valve. Then unscrew the upper housing (hold the union nut tight while avoid loosening the lower screw connection – see picture below). After that fill the buffer fluid in the tank. Finally reset the pressure. (see fig. "Fill buffer chamber").

Change of lobes
Before changing the lobes, depressurize the **buffer chamber** and prime it again after changing.

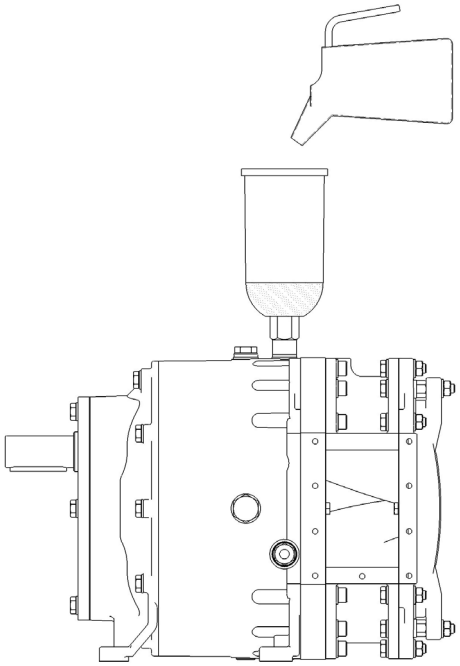


Fig. 7: Fill buffer chamber

Art.-No. PSG.014
(with buffer fluid tank, pressure gauge, filling-valve, manual pump)

Opening for refilling buffer fluid

Fig. 8: Buffer chamber monitoring

7.1.2.2 Pump with pressure valve

(see fig. "Pump with pressure valve, without buffer fluid tank"):
Remove pressure valve for inspection of buffer fluid and for filling shortages in quantities into the buffer chamber.

Attention! Air pocket must be present!

7.1.2.3 Pump with unpressurised quenching fluid tank (Pos. 7)

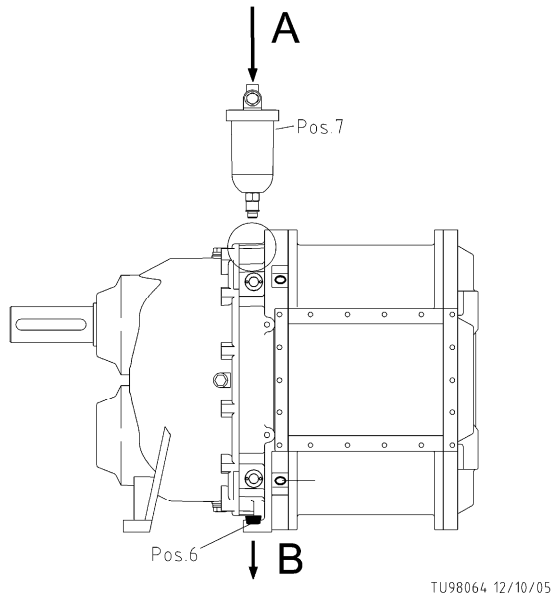
(see fig. "Pump with unpressurised quenching fluid tank, without pressure valve"):

- The quenching fluid tank must always be a quarter full with quenching fluid to allow for thermal expansion.
  Note: The level of quenching fluid in the tank can vary because of operational conditional heating of the pump.
- Unscrew the upper housing of the quenching fluid tank. Hold the union nut tight while avoid loosening the lower screw connection.
- Fill shortages of quantities into the quenching fluid tank.

7.1.2.4 Pump with plug (for special designs, only, for example submersible pumps)

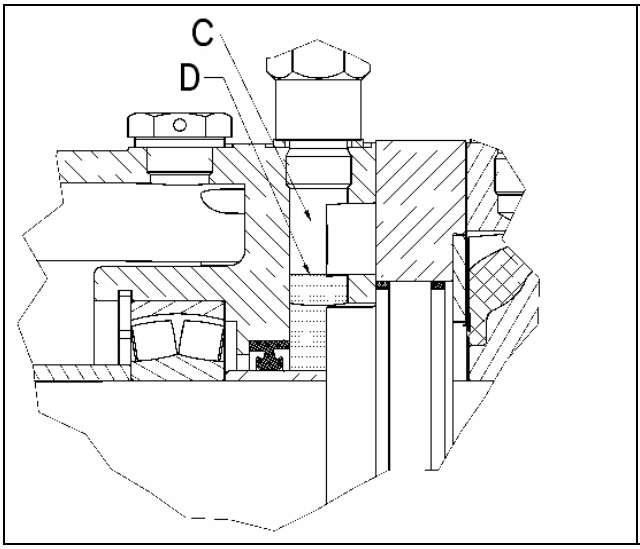
Remove the upper plug (instead of pressure valve) for filling shortages in quantities into the buffer chamber.
(Buffer fluid level: see fig. "Pump with pressure valve, without buffer fluid tank").

Attention! Air pocket must be present!



Pos. 6	Hex head screw plug (tightening torque for mounting: 60 Nm)
Pos. 7	Quenching fluid tank
A	fill
B	empty

Fig. 9: Pump with quenching fluid tank, without pressure valve



C	Air pocket
D	Oil level

Fig. 10: Pump with pressure valve, without buffer fluid tank

7.1.2.5 Pump with dry buffer chamber

Intended use:
This seal is typically used, when no buffer chamber liquid is allowed in the pump medium.
This seal can only be used, if pumping pure, non abrasive liquid e.g. water.

Food grade oil (white oil) can be used in the gear box – part. No. BSS.010 as gear oil.

Warning!
Pumps with dry buffer chamber sealing system must not run dry!
Before start-up remove plug from vent screw (5). Before putting into operation the pump must completely be filled up with liquid.

Combination of seal rings for this sealing system:
Design: Block ring
Combination of material: SS304/SS316Ti tungsten carbide coated / carbon

Assembly:
The buffer chamber tank (3) with connecting pipe (4) is connected under the buffer chamber housing. The tank must be installed below the buffer chamber to collect possible leakage. The level of liquid in the buffer chamber tank is allowed to reach maximum up to the bottom of the buffer chamber, see fig. "Installation example - dry buffer chamber".

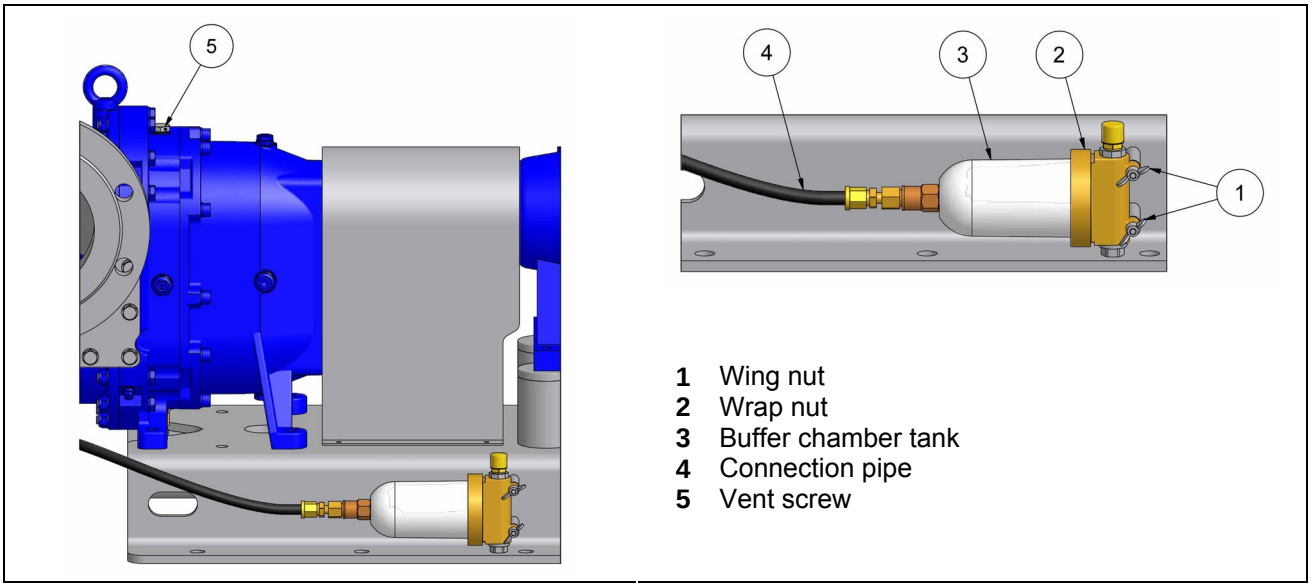


Fig. 11: Installation example - dry buffer chamber

Control the buffer chamber
If the buffer chamber tank (3) is filled with leakage (for example pump medium or condensed water), loosen the wing nut (1), unscrew the tank cover (wrap nut (2)) and drain the buffer chamber tank.
If the buffer chamber tank is filled with leakage more than a half within a month, please contact our service department.

7.1.2.6 Pump with circulation system for buffer chamber

Caution! If the pump is fitted with a circulation system for buffer chamber, observe the instructions for this system. Please contact us.

7.1.3 Draining and flushing the buffer chamber

(applicable only if mechanical seal is defective)
Each time before the mechanical seals are changed, the buffer chamber must be drained and flushed.
In case of pressurized buffer fluid tank or pressure valve, depressurize the buffer chamber before draining or flushing.
Then unscrew all external buffer chamber assemblies (see chapter "Buffer chamber assemblies") and the lower hex head screw plug (pos. 6) to allow the buffer/quenching fluid to drain out of the buffer chamber.
In case of heavy contamination, clean buffer chamber.
Screw on lower hex head screw plug (pos.6) (tightening torque = 60 Nm) and install the various assemblies in reverse sequence.
If the bottom hex head screw plug is not accessible it is possible to install an extended connection (on request).

Attention! The **VOGELSANG Standard oil** Titan Gear MP90 - Art.-No. BSS.006 has a high viscosity. When using this oil please ensure that the buffer chamber drains out completely. This may take half an hour.

7.2 Changing of gearbox oil

Change the gearbox oil (see fig. "Gearbox oil change"):

- for the first time after a period of 20 operating hours.
- every 2000 operating hours.

Changing the quenching oil has to be carried out after changing the gearbox oil.

The oil should be checked and filled up (when the gearbox is not running):

- every 500 operating hours, however not more than 3 months between fill ups.
  - fill the oil until it reaches the control opening [C].

Lubricant:
VOGELSANG standard oil
Mineral oil Titan Gear MP90
SAE 90
Combustion point: 215°C
Art-No. BSS.006

If you need other lubricants, please ask us for a table (TINF lubricants) of alternative oils.
Quantity of oil [l]: 1 litre

Attention! If the pump is installed in a vertical position (pump drive shaft at the top), the quantity of gear oil is 1.5 litres instead of 1 litre. In this case a screw plug (Art. No. NSK.081) replaces the breather (Art. No. NSK.137).

Breather (pos.1) – if existing -always mounted **on the top** of the pump, **magnetic hex head screw plug (pos.2) at the side** of the pump.

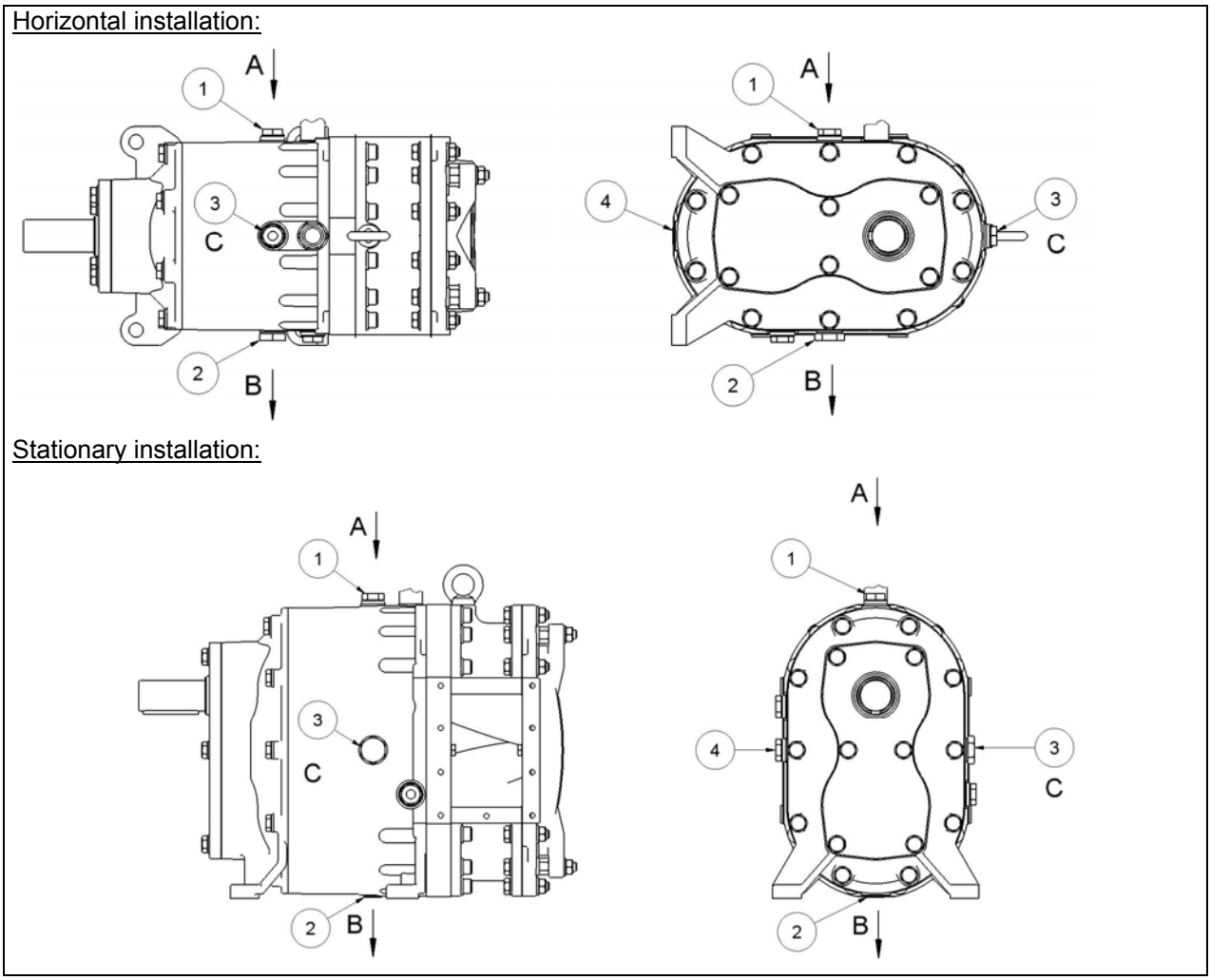


Fig. 12: Gear oil change

1 Breather
2 Hex head screw plug
3 Magnetic hex head screw plug
4 Hex head screw plug

A Fill
B Empty
C Check

Tightening torque for mounting the hex head screw plug → 60 Nm

8 Repair

8.1 Conversion and spare parts

Modifications or changes to the unit are only permissible after consultation with the manufacturer. Only spare parts approved by the manufacturer or original spare parts can be used. The use of other parts invalidates the guarantee for any resulting damage.

Caution when pumping dangerous materials:
Take appropriate safety measures: see "Safety notes" chapter.

Before opening the cover, if possible:

- Shut off the connected pipes
- Empty the pipe as much as possible using drain valves

Warning! The remaining liquid flows out of the pump when the cover is opened.

8.2 Rotary lobe change

(see fig. "rotary lobe change")

1. Depressurize the buffer chamber.
2. Remove the nuts (1) at the cover plate.
3. Take off the cover plate (2) and the O-ring (3).
4. Loosen the strain screws (5) in the lobe. Remove the pressure disk (6) and the spring washers (7) with a suitable screw or screw in the pressure rod of the lobe puller (see spare parts list) through pressure disk (6) and spring washers (7) into the shaft, until pressure disk comes off.
5. Pull the lobes (8) from the shaft; (lobe puller – see spare parts list).
6. Assemble HiFlo™-lobes in pairs, i.e. simultaneously to the upper and the lower shaft.
7. The new lobes have to be installed in a reverse sequence (see fig. "HiFlo™ rotary lobe installation"). Before installing the new lobes, clean contact surfaces of lobes and sealing components very carefully!
8. Insert the spring washers correctly into the pressure disk (see fig. "Position of pressure disk and spring washers in the lobe").
9. Press spring washers and pressure disk carefully into the lobe to prevent the spring washer from falling into the groove (see fig.).
10. Screw on pressure disk and spring washers with strain screw.
11. Fix the O-ring (3) to the cover plate (2).
12. Screw on the cover plate with nuts.
13. Fill buffer chamber (see chapter "Maintenance").

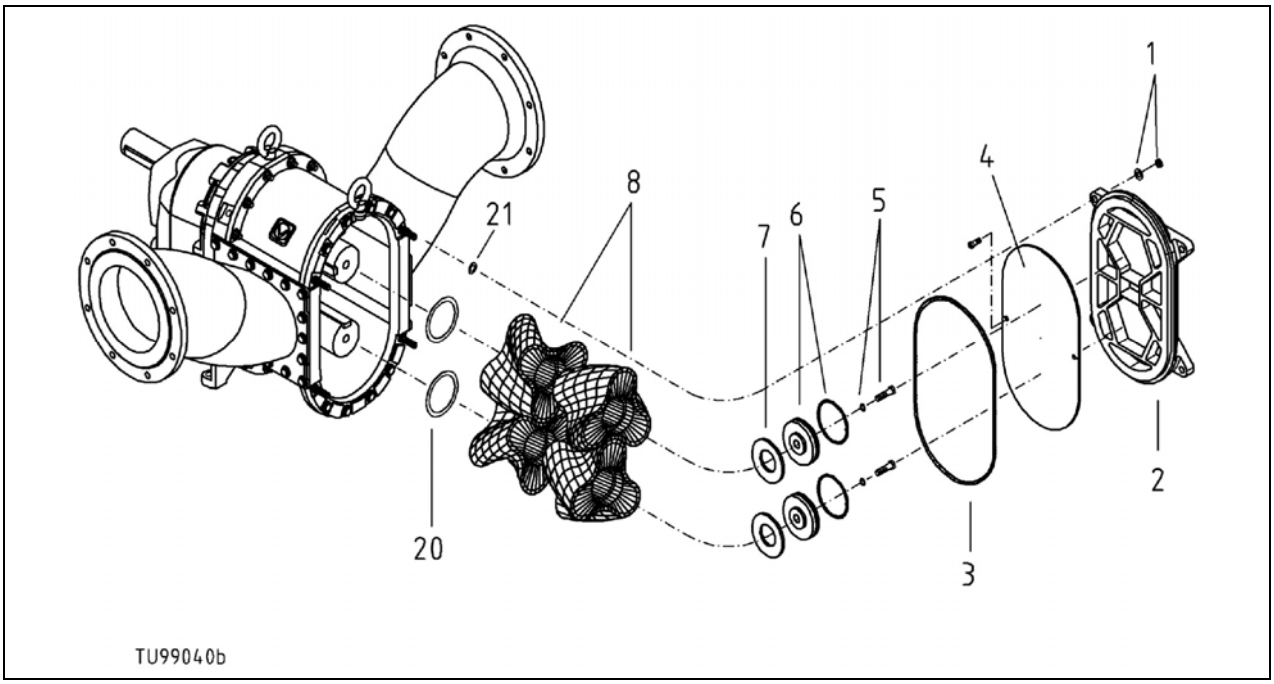
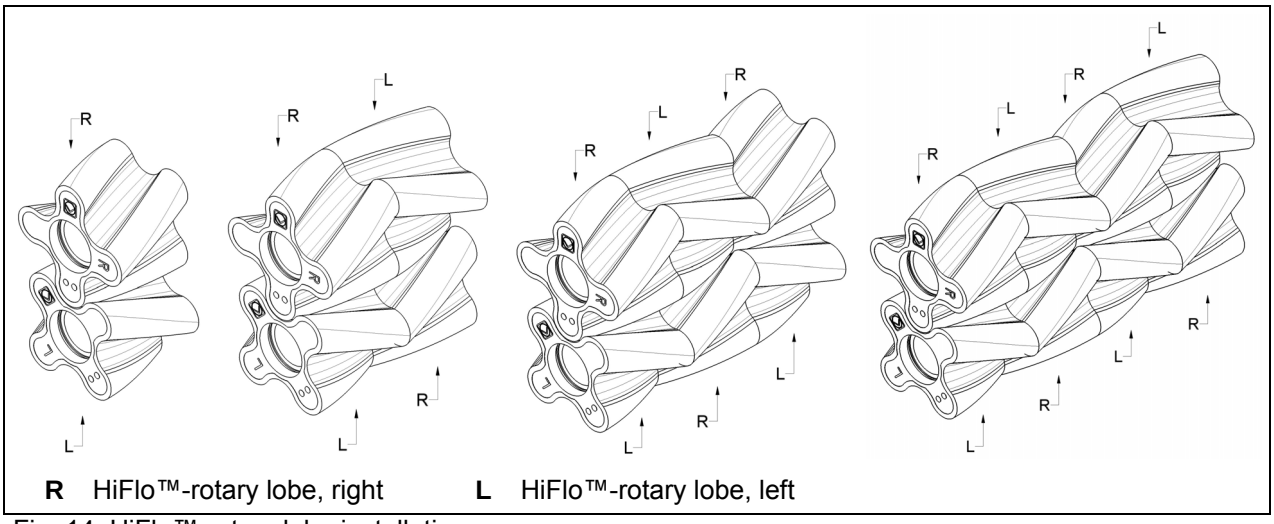


Fig. 13: Rotary lobe change



R HiFlo™-rotary lobe, right **L** HiFlo™-rotary lobe, left

Fig. 14: HiFlo™-rotary lobe installation

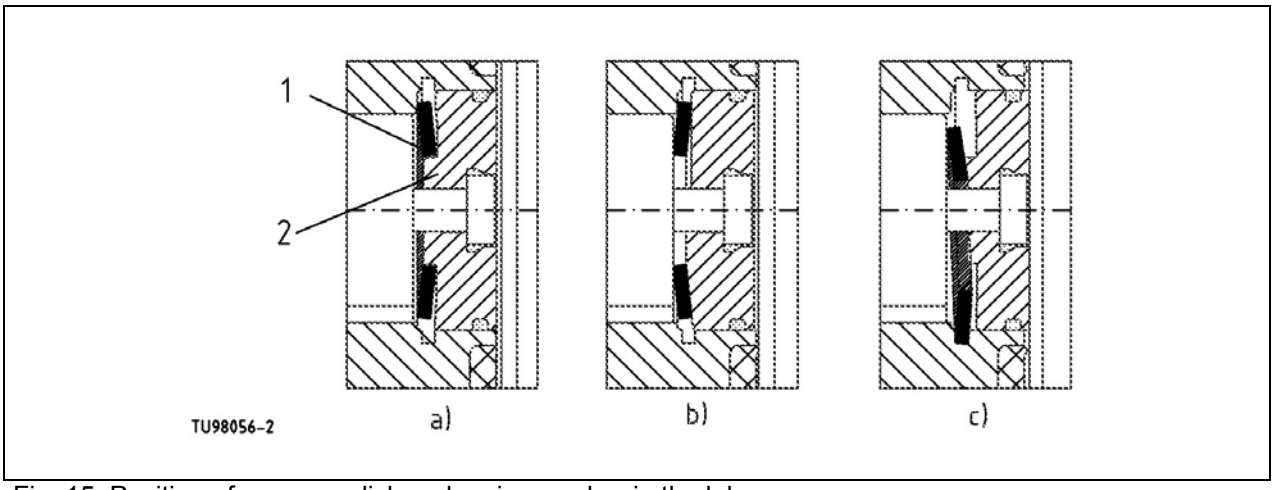


Fig. 15: Position of pressure disk and spring washer in the lobe

1 Spring washer
2 Pressure disk

a) correct
b) not correct
c) not correct

8.2.1 Tightening torque for mounting the pressure disk

Pump type	Tightening torque of strain screw
V100QHD	45 Nm (M10, 10.9)
V100QHDVVA	42 Nm (M10, A4)

Attention! Before mounting of **stainless steel** screws / nuts:
Clean threads and contact surfaces. Then apply Anti-Seize Paste (Art-No. BKL.014) evenly and in sufficient quantity on screw head/nut contact surface and on thread with a brusher, putty knife etc. to avoid seizing of stainless steel.

8.2.2 Additional components for V100QHDVVA (stainless steel) pumps

VVA = All parts of the pump which are in contact with the medium are stainless steel components.

(see fig. "Rotary lobe change")
An additional sealing ring, including pressure disk (6) and spring washers (7), protects the lobe core.

8.3 Change of wear plates

Attention! Wear plate (10) has a special curved design. Pay attention to correct position (see fig. "Wear plate - curved design")

Tightening torque of wear plate screws: 8 Nm

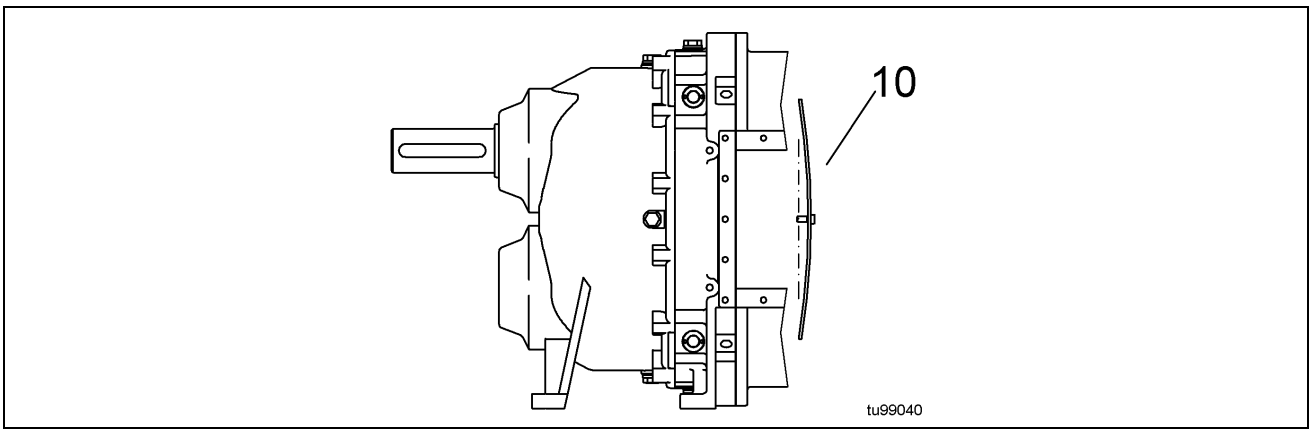


Fig. 16: Wear plate - curved design (10)

8.4 Change of component mechanical seals

In addition to the parts from replacing the rotary lobes and wear plate, the following parts have to be removed (see fig. "Mechanical seal change"):

1. Drain buffer chamber fluid and gearbox oil.
2. Pull spacer washer (11) and O-ring (12) from the shaft with a small screwdriver.
3. Remove seal holder (13) with one half of mechanical seal (15B).
4. Remove second half of mechanical seal (15) with a screwdriver.
5. Before installing the new mechanical seals, it is necessary
   - remove carefully the burrs at the keyway
   - clean all parts of mechanical seal very carefully
   - be careful **not to contaminate the mechanical seals**!

   Only then an optimum function of mechanical seal is assured.
6. The O-rings (14A,B) have to be pulled dry over the mechanical seals (15A,B).→ Only the contact screws of the O-ring and sealing support are brushed with oil.
7. Put one half of mechanical seal (15A) into the pump's seal carrier (16). (O-ring on the top) into assembly tool.
8. Using the assembly tool, press the mechanical seal into the sealing support in the pump. Press the second half of the mechanical seal (15B) with the assembly tool into the seal holder (13)
9. Before the mechanical seals are assembled, it is necessary to moisten the slide faces with **clean** hydraulic oil. Install seal holder (13).

The rest of the parts have to be installed in reverse sequence. Before installing the new lobes, clean **contact surfaces** of lobes and sealing components **very carefully**.

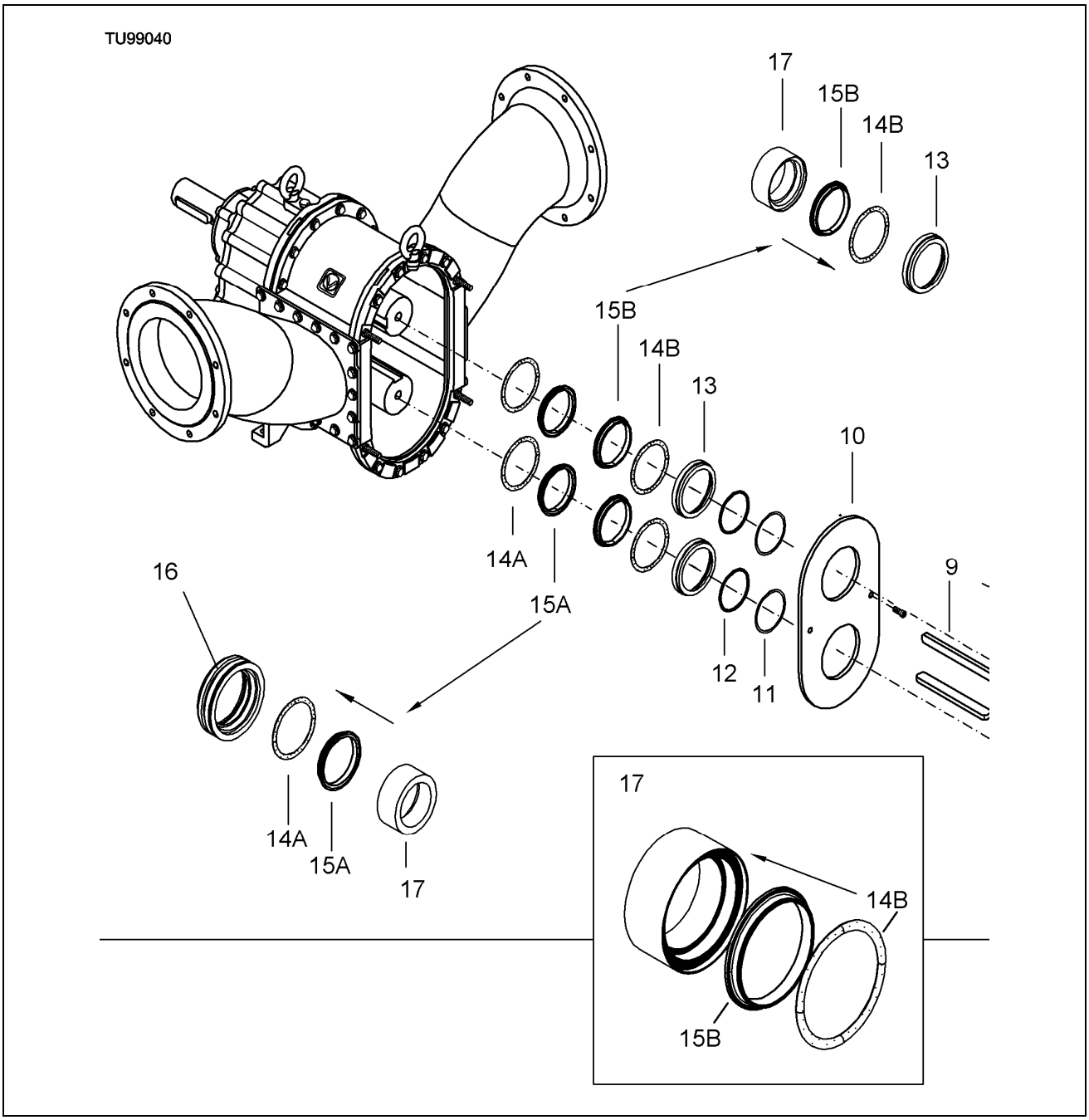
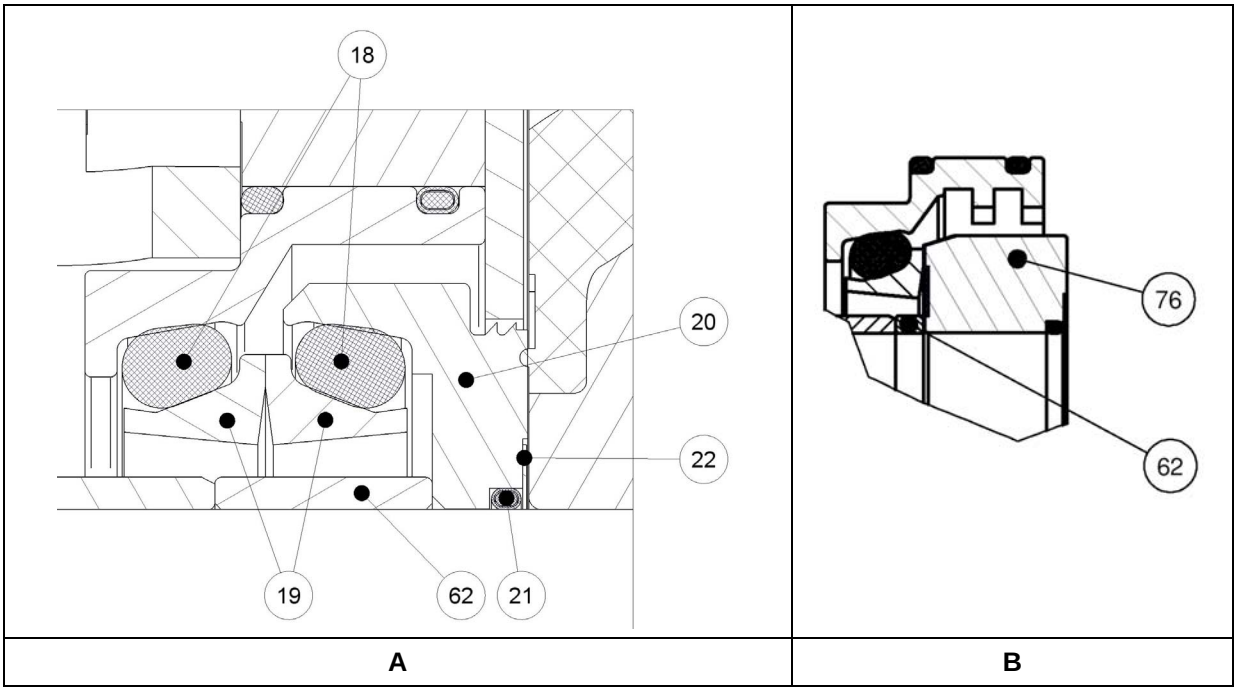


Fig. 17: Mechanical seal change

9	Key
10	Wear plate
11	Shim
12	O-ring
13	Seal holder
14A	O-ring seal support
14B	O-ring seal holder
15A	Mechanical seal - seal support
15B	Mechanical seal -seal holder
16	Seal support
17	Installation tool

8.5 Conversion of a mechanical seal (HD alignment) on the mechanical seal on the block ring



A	B

Fig. 18: Converting a mechanical seal (HD alignment) **[A]** to block ring mechanical seal **[B]**

Removing the old gasket [A]:

- Drain the buffer chamber and gearbox oil.
- Disassemble the O-ring (21) and the support ring (22).
- Remove the seal support (20) together with the old seal ring (18) as well as the O-ring (19) from the shaft.
- Disassemble the old distance sleeve (62).
- Remove and replace the seal ring (18) together with the O-ring (19) in the housing support.

Installing the new gasket:

- Mount the new distance sleeve (62) **[B]**.

  Before assembling the new mechanical seal, clean and oil the sealing surfaces.
- Mount the new lip seal race (block ring) (76) **[B]**.
- Replace the O-ring (21) and the support ring (22).

Attention!
The O-ring (21) must not be damaged on the keyway during assembly.

8.6 Adjusting of pump housing segments

Should the pump housing shells wear out, they can be readjusted.

- loosen the connector parts and screws at the pump housing segments.
- unscrew the cover plate.
- adjust the dowel pins in the housing segments as shown in fig. "Adjustment of housing segments"
- screw on all screws at the pump and the connector parts such as the cover plate.

Please note: Before installation apply the sealing material 'Curil' on every housing segment and seal them with asbestos-free gaskets.

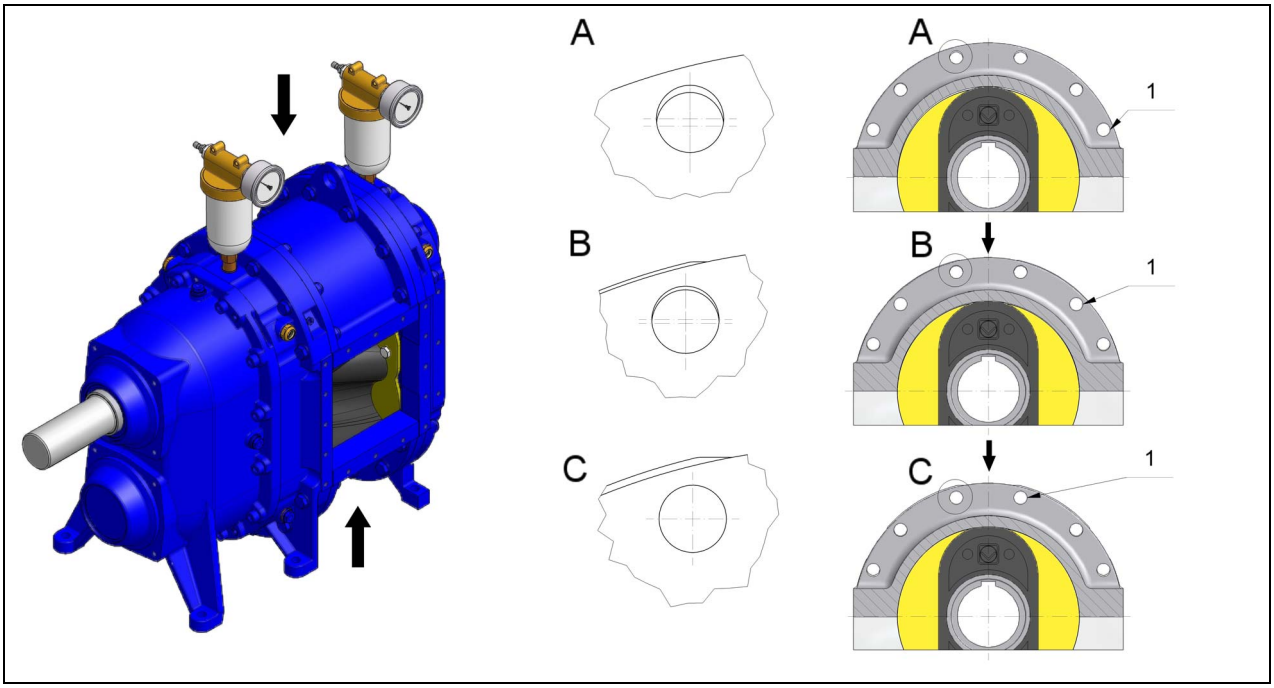


Fig. 19: Adjustment of pump housing segments

1	Position of dowel pin	
A	Original position	
		V100QHD
B	First adjustment	0,5 mm
C	Second adjustment	1,0 mm

8.7 Reducing the starting torque

The starting torque of a pump can be reduced by mounting shims.
Increasing the gaps between lobes and wear plates however reduces the volumetric efficiency.

1. Increasing the gap between lobes and wear plate at the gear box (see table "Increasing gap" and fig. "Rotary lobe change")

For increasing the gap the shims art-no. NUS.056 (45x55x0.5) replace the shims art-no. NUS.033 (45x55x0.3).
Mount these shims (pos. 20) before the first lobe on the shaft.
In addition put one shim on each of the four distance nuts of the cover plate to adjust the gap accordingly.

2. Increasing the gap between lobes and wear plate on the cover plate (see table "Increasing gap" and fig. "Rotary lobe change"):

Put the spacer washers (pos. 21) on the four distance nuts of the cover plate.
Putting altogether more than two shims (pos. 21) on each distance nut, you have to lay a thicker O-ring (art-no. DOR.092) under the cover plate to attain safe sealing further.

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

Gap: lobe – gear box	NUS.056 (45x55x0.5) **replaces** NUS.033 (45x55x0.3)	**Increasing the gap: → +0.2**
Gap: lobe – cover plate	NUS.063 (8 x 14 x 0.2)	**Increasing the gap: → +0.2**

Table "Increasing gap"

9 Service Instructions In Tabular Form

	Before starting up the pump after longer storage periods/decomissioning (every 2 months)	Start-up*	Before and after longer out-of-service periods	After the first 10 operating hours	After the first 20 operating hours	Every 200 operating hours	Every 500 operating hours, at least every three months	Every 2000 operating hours, at least once a year	When strong contamination is present
Pumps with a mechanical seal consisting of the material combination SiSiC-SiSiC: In the case of new pumps with this type of seal that are not placed immediately into operation, the shaft needs to be rotated (at least one revolution)	X								
Remove the plastic plug from the breather (if one is present)		X							
Check belt tension (for pumps with belt drive) as per the relevant accompanying sheet		X	X	X				X	
Tighten the screws to the base					X				
Check the quenching fluid					X	X			
Change the quenching fluid								X	X
Gearbox oil change					X			X	
Check gearbox oil							X		

*see chapter "Checklist before start-up"

10 Service Plan

Warranty is valid only when service intervals acc. to chapter "Service instructions" have been followed and performed.

Pump number:	

Remove plastic plug from breather (if existing)	Check belt tension acc. to accompanying sheet	Tighten the screws to the base	Check the buffer/quenching fluid	Change the buffer/quenching fluid	Check the gear oil	Changing of gear oil	Other			Operating hours	Total capacity	Date	Name	Signature

11 Trouble-shooting

Pump is not pumping	Pump stops after start	Suction flow breaks away after start	Irregular pumping	Pump performance too low	Pump blocked	Power consumption too high	Drive belt slips	Leakage at the pump	Pressure and level variations in the buffer chamber	Extreme pressure and level changes in the buffer chamber	Dry buffer chamber: Buffer chamber tank is filled more than a half	Pump too hot	Motor too hot	Noises & vibration	**Cause**	**Action to be taken**
x															Pump does not prime	Fill the pump with fluid
x															Incorrect direction of rotation	Change direction of rotation of the pump
					x	x		x				x	x	x	Pipe causing pump housing warping	Check the alignment of the pipe to the pump, if necessary provide a compensator or fix the pipe
x		x	x	x										x	Leakage in the suction pipe	Check suction-side pipe system for leakage
															Gas generation	Vent the suction pipe and pump chamber, fill with fluid
		x	x											x	Suction pipe clogged	Check the free-flow of the suction-side pipe system
					x		x							x	Foreign matter in medium	Clean the system, install a strainer in the suction pipe
x		x	x	x										x	$NPSH_A$ too low (pump cavitates)	Increase suction pipe diameter, shorten suction pipe length, simplify suction pipework, reduce suction height, reduce speed, adjust medium temperature
							x								Belt tension too low	Tighten in accordance with manufacturer's specifications
														x	Coupling not correctly aligned	Check the alignment and align according to manufacturer's specifications if necessary
x	x		x	x	x									x	Belt drive slips	Tighten in accordance with manufacturer's specifications
	x				x	x	x					x	x	x	Stiff running caused by: Swollen lobe elastomer	Check the chemical resistance of the lobe elastomer
															Stiff running caused by: Accumulation of solid matter in the gaps	Clean pump chamber, increase the gaps (see chapter "Repair"), adjust the drive
												x		x	Oil level in the gearbox is not okay	See chapter "Maintenance"

Pump is not pumping	Pump stops after start	Suction flow breaks away after start	Irregular pumping	Pump performance too low	Pump blocked	Power consumption too high	Drive belt slips	Leakage at the pump	Pressure and level variations in the buffer chamber	Extreme pressure and level changes in the buffer chamber	Dry buffer chamber: Buffer chamber tank is filled more than a half	Pump too hot	Motor too hot	Noises & vibration	**Cause**	**Action to be taken**
									X						Operation related variations	See chapter "Maintenance"
										X					Mechanical seal damage	Change mechanical seals
															Faulty repair	See chapter "Repair"
											X				Sealing leakage	See chapter "Pump with dry buffer chamber"
X	X			X	X	X	X	X				X	X	X	Operating pressure too high	Reduce operating pressure
	X	X		X		X	X					X	X	X	Medium viscosity above the nominal value	Reduce speed, increase medium temperature
				X											Medium viscosity below the nominal value	Increase speed, decrease medium temperature, change wear parts, reduce gaps (see chapter "Repair")
															Gap too large	
				X	X			X	X			X			Medium temperature above nominal value	Reduce medium temperature
	X	X			X	X			X				X		Medium temperature below nominal value	Increase medium temperature (after consulting Vogelsang)

12 Specifications

12.1 Material description for rotary lobes with elastomeric coating

Material	Hardness (shore A)	Chem. components	Resistant up to °C	Pump medium	Properties
SBR	70	Butadiene, styrene	60°C	Liquid manure	Wear-resistant
NBR	70	Butadiene, acrylonitrile	80°C	Sewage sludge, petrol, oil, grease, diesel oil, spindle oil	Oil-resistant
NBR, white	70	Butadiene, acrylonitrile	80°C	Oil, butter, linseed and olive oil, lard	Food grade oil
EPDM-SL (EPDM-Sewage-Line)	70	Ethylene propylene	80°C	Water, liquid manure, sewage sludge, biogas substrate	Water resistant
EPDM, white	70	Ethylene propylene	80°C	Water, mash, slightly acidic products	Food grade oil
FPM	70	Fluorocarbon gum	80°C	Solvents, salt water, oil, petrol, acids	Acid-resistant and alkali-resistant
PU (Werobust)	70	Polyurethane	50°C	Abrasive medium	Wear-resistant

Attention! Note max. operating pressure:

- The elastomer coating **'FPM'** is usable for rotary lobes only up to max. 6 bar operating pressure.
- Seal rings of material **'Duronit'** are allowed only up to 10 bar real operating pressure.

12.2 V100QHD – Technical data

pump size of series V100QHD/VX100Q	Theoretical capacity* n_{max} = 1000 [min^{-1}]			Max. operating pressure**		Max. operating torque (valid for NBR elastomers)
	[l/rev]	**[l/min]**	**[m^3/h]**	**[bar]**	**ALU*** [bar]**	**[Nm]**
45	0.29	290	20	10	7	65
64	0.42	420	25	9	5	80
90	0.59	590	35	7	3	90
128	0.84	840	50	4	2	85

* All data are as to theoretical capacity. The actual capacity depends on the various operating conditions.

** Valid only for short operation times. For continuous operation, please contact our technicians. The service life of the rotary lobes is reduced by high temperatures, especially in combination with high pressure.

*** Please note the reduced max. operating pressure for pumps with gearbox housing made of aluminium.

Ball diameter:

- Maximum ball diameter: Ø 20 mm.

13 EC-Manufacturer's Declaration

VOGELSANG

EC Manufacturer's Declaration
in accordance with the Machinery Directive 98/37/EC Annex II B

Hugo Vogelsang, Maschinenbau GmbH
Holthöge (Gewerbegebiet)
D- 49632 Essen (Oldb.)

We declare that the following pump is not a complete machine. Installation of this machine component must be in accordance with the safety instructions which are included in the Operating and Maintenance Manual. The machine must not be put into service until the machinery into which it is incorporated has been declared to be in conformity with the Machinery Directive .

Category of machine:	Rotary lobe pump
Machine type:	.....
EC Directives:	Machinery Directive (98/37/EC) :1998

Applied harmonized standard:
DIN EN ISO 12100-1 :2004; DIN EN ISO 12100-2 :2004
DIN EN ISO 13857:2008
DIN EN 349 :2008
DIN EN 1037:1996

Applied national standards and technical specifications:
DIN 4844-1 :2002; DIN 4844-1 :2002; DIN 4844-1 :2002
DIN 24295 :1981
DIN 31001-1 :1976
DIN v 8418 :1988
DIN v 66055 :1988
DIN EN 690 :1995

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