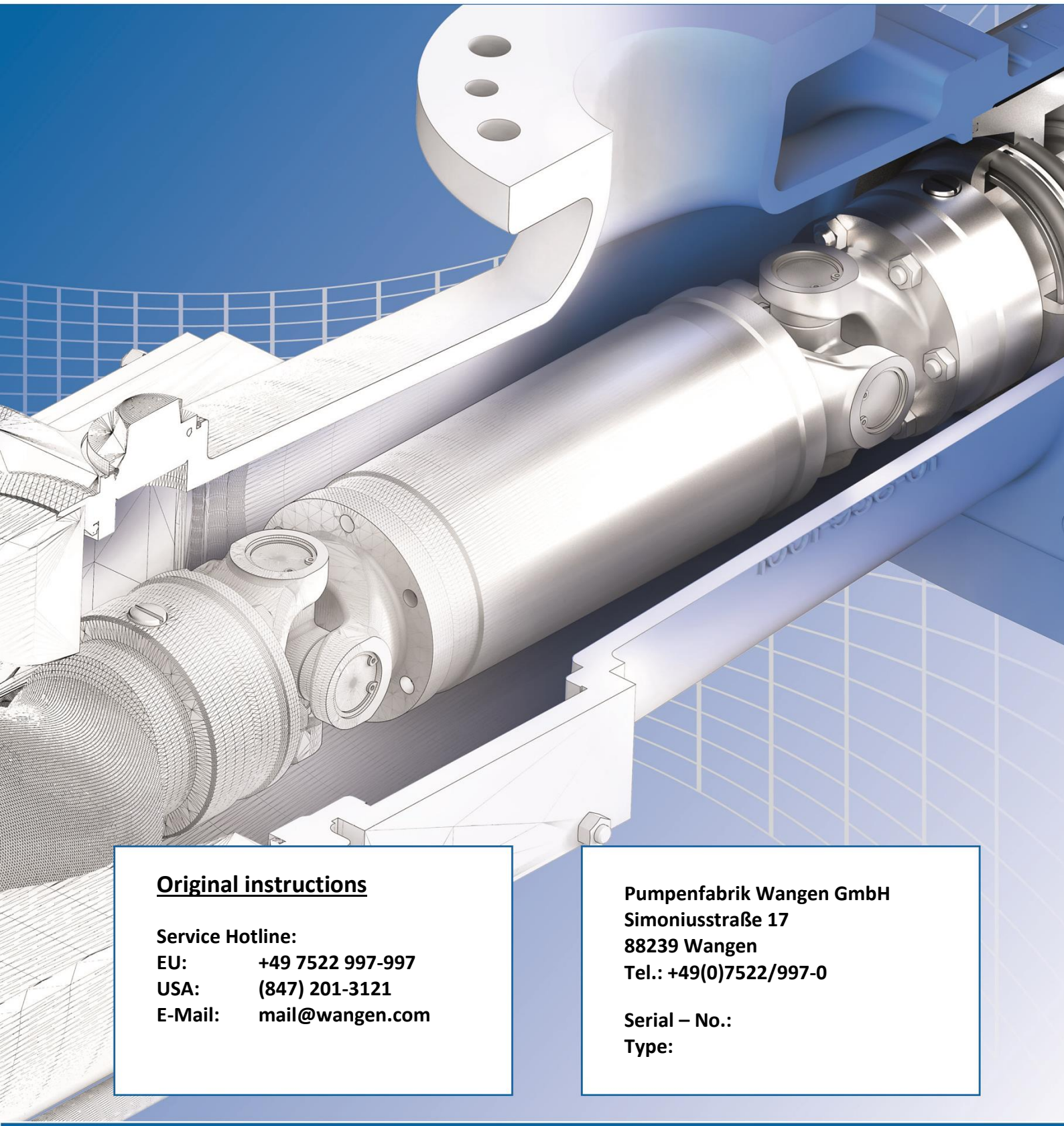

Original instructions

Service Hotline:
EU: +49 7522 997-997
USA: (847) 201-3121
E-Mail: mail@wangen.com

Pumpenfabrik Wangen GmbH
Simoniusstraße 17
88239 Wangen
Tel.: +49(0)7522/997-0

Serial – No.:
Type:

Technical Documentation

Table of contents

Certificates (optional)

Data Sheet

Dimension Drawing (optional)

Instruction Handbook

Additional Valid Documents:

Exploded View Drawing with Parts List

Accessories

Drive Unit Documentation

Instruction Handbook KL

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Chapter 1

1 Safety Notes

1.1 Important Hints

- Read these instructions before installation and start-up.
- This instruction describes the use in all its life cycle.
- Comply at all times with the safety notes contained herein
- Never install damaged products.

The safety notes in these instructions Handbook are structured as follow:

Symbol	Signal word	Meaning	Consequences if disregarded
Example:  General danger  Specific danger, e.g. electric shock	Danger	Imminent danger	Severe or fatal injuries
	Warning!	Possible dangerous situation	Severe or fatal injuries
	Caution!	Possible dangerous situation	Minor injuries
ATTENTION	Notice	Possible damage to property	Damage to the pump or its environment
		Important information about explosion protection	Removal of explosion protection and resulting dangers
	Tip!	Useful information or tip	

1.2 Qualified Personnel

The operator has to instruct the user on the basis of instruction handbook. The minimum age is 16 years. At the work on the machine an expert person has to supervise youth and trainees.

All mechanical work must be carried out by trained specialists only. Specialists in this context are persons who familiar with the setup, mechanical installation, maintenance and repair works for progressing cavity pumps. Further, they are qualified as follow:
They are trained in mechanical engineering e.g. as a mechanic (final examinations have been passed) and they are familiar with this instruction handbook.
All electrical engineering work may be carried out by qualified electricians only. Qualified electricians in this context are persons who are familiar with the electronic installation, start-up, and maintenance and troubleshooting for pump aggregates. Further, they are qualified as follow:
They are trained in electrical engineering, e.g. as an electrician or mechatronics technician (final examination must have been passed) and they familiar with the instruction handbook.

All works in further areas of transportation, storage, operation and waste disposal may be carried out only by persons who familiar with this instruction handbook and are trained appropriately.

Chapter 1

1.3 Other applicable documentation

Observe following added documents:

Document	Description
Data sheet	Technical data, performance- and operation limits, application conditions
Dimension sheet	Dimension sheet of pump with fixing points
Parts list	Exploded view with parts list
Mounting instruction	Special design or incomplete Machine
ATEX - instruction	Operation of pump in an explosive area
Drive unit documentations	Instruction handbook for Drive unit
Documentation of Accessories	Instruction handbook for accessories
Declaration of decontamination	Repair of pump

1.4 Safety instructions for operation, maintenance, inspection and assembly work

Warning!

During operation, pump and drive unit may have rotating or movable parts as well pressurised parts and possible hot surfaces!
Possible dangerous situation: Severe or fatal injuries!

- **Prior to carrying out any work on the machine, this must be shut down.**
- **Switch the drive unit into a voltage-free condition and secure against any unauthorized and accidental restart.**
- **During and after operation pumps have hot surfaces (may be the case)**
- **Before opening up the pump, ensure that the plant has been depressurised!**
- **When opening up the pump, comply with all regulations concerning the flow medium.**
- **Refit all safety devices before restarting the pump.**
- **When restarting the machine, follow the instructions and safety notes contained in the chapter “Start-up”.**

Warning!

The pump or parts thereof may fall or tip over.
Possible dangerous situation: Severe or fatal injuries!

- **The pump or parts of it can be very heavy and must be moved with a suitable lifting device.**

Chapter 1

1.5 Designed Use

The pumps are intended for industrial use and may only be used in accordance with the information provided in the instruction handbook. Its may only be used to pump of stipulated medium.

The working points (Flow rate, nominal pressure, rotation speed) in the pump specification (→ data sheet) are defined as values limits, which must not be exceeded.

A change in delivery conditions (e. g. flow rate, flow path, pressure level, pipe diameter, throttle devices) may cause major changes in the operating conditions. In such cases, compare the new operating conditions with the details provided in the pump specification. If the changed conditions should exceed the details provided in the pump specification, it will be necessary to contact the manufacturer for advice.

Using this pump in potentially explosive atmosphere is prohibited, unless explicitly specified otherwise.

1.6 Predictable Misuse

- Only use the pump for pumping of the stipulated medium.
- Do not exceed the stipulated rotational range.
- The contents of solids in the medium to be pumped must not be exceeding definite value limits of particle size and solid content.
- Make sure that no foreign matter or particles e.g. metal parts, stones, etc. can get into the pump. Medium contamination by foreign matter may cause damage to the pump elements!
- Do not use a non-operative pump as a shutoff device!

1.7 Operating Restrictions

The progressing cavity pump is a positive displacement pump, which is theoretically capable of building up an infinitely high pressure. In the event of a pressure line being closed, pressure built up in this way can reach a multiple of permissible plant pressure values. This may cause serious damage to plant components and involve a risk of personal injury.

ATTENTION	**Possible damage**

- **Do not operate against closed shutoff devices!**
  There is a risk of fracture as well as personal injury!
- **Secure the pump by means of approved safety devices (excess pressure protection)!**
- **KL 100 – pump with reinforced bearing is only allowed for normal flow direction. (Counter-clockwise direction). If a clockwise rotation should be required, then only with a maximum pressure of 1 bars.**
- Do not use a non-operative pump as a shutoff device! With a shutdown drive unit, any one-sided pressurisation of the pump may cause to rotate independently. Damage to the pump cannot be excluded in such cases.
- The continuous application of alternating loads on the pump (e.g. motor/generator operation or right/left-handed rotation) reduces the service life of the pump and the gear unit as a result of heavy loading of the rotating parts and of the seal and must be avoided.
- Comply with all statutory regulations applying to the delivery of dangerous media.
- Medium contamination by foreign matter (metal parts, stones, etc.) may cause damage to the pump elements! Take suitable action to ensure that no foreign matter or particles likely to cause damage can ingress into the pump!
- Comply with all statutory regulations applying to the delivery and storage of hazardous substances, all local construction supervisory regulations, and any resulting conditions and restrictions for the operation of eccentric screw pumps (requirements regarding dry-run protection, drive unit equipment etc.

1.8 Special Safety Notes for Hopper Pumps / open able housings

For taking up the flow medium, the hopper in hopper pumps is open at the top. The hopper pump has been designed to be fitted into a machine or plant and must not be operated without appropriate protective devices on the hopper.
Pumps, which are for cleaning purposes designed with an open able housing, must not be used without appropriate protective devices either.
Pumps that will be driven by a plug-in shaft or quick change units must be only driven in left-hand direction. The contrariwise direction of rotation will drive out the rotor and plug-in shaft.

Danger!

Rotating cardan shafts or rotating screw conveyors in the pump can trap hands and other body parts.
Imminent danger: Severe or fatal injuries.

- **During pump operation, it must not be possible to insert your hands or other body parts into the hopper!**
- **Screw conveyor operation may cause serious hand and other bodily injuries!**
- **Secure any flexible parts of the hopper and suction housing with suitable limit switches, which comply with EC-guidelines.**
- **Use suitable fixed or locked/separating protective devices to ensure that it is impossible to reach the screw conveyor with any limb, or that any opening of protective devices will cause the plant to shut down immediately!**
- **Make sure that pumps with plug-in shaft or quick change units run only at the given direction.**
- **Prior to carrying out any cleaning and maintenance work on the drive unit, this must be switched into a voltage-free condition and secured against any unauthorized and accidental restart!**

1.9 Special Safety Notes for Immersion pumps

Immersion pumps take up the medium directly over the pumping set.
This danger area is in the medium at normal working process.

Danger!

Rotating cardan shafts or rotating screw conveyors in the pump can trap hands and other body parts.
Imminent danger: Severe or fatal injuries.

- **Use suitable fixed protective device to ensure that it is impossible to reach the pump inlet of vertical pumps with any limb!**

1.10 Special Safety Notes for Pumps with Heating Jacket

The suction casing / hopper of these pumps are equipped with a heating jacket and corresponding connections for medium to flow through. This allows the pump casing to be heated.
The casing is designed for a pressure up to **3 bars**, unless a different pressure has been permitted in the data sheet.

Attention **Possible damage**

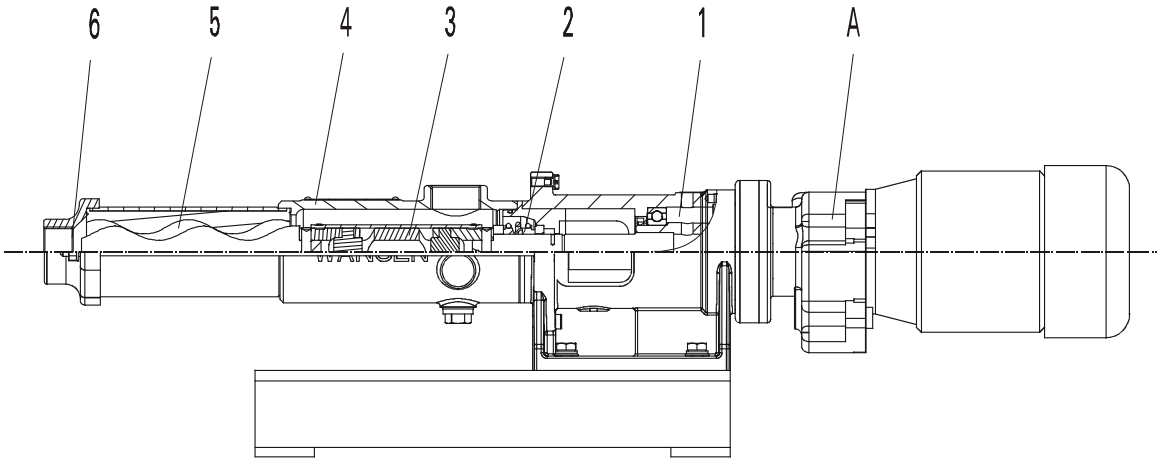
- **The heating circuit is to be run exclusively with water.**
  Make sure by proper pressure control devices the nominal pressure will not be exceeded. The medium which may escape while the pressure control device is responding must be drained riskless into a pressure-free area. Make sure in this draining path no shutoff devices are installed

Chapter 2

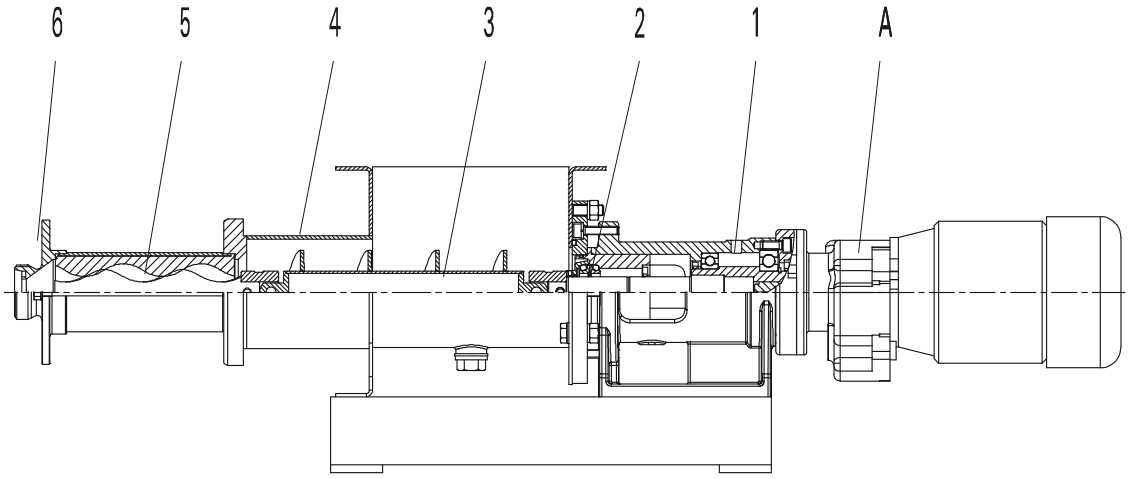
2 Set-up and General Description

2.1 Pump set-up KL 20

- **Only for information**



Suction Pump

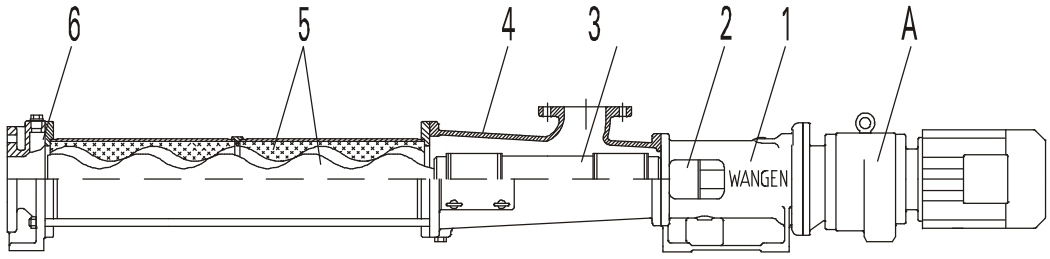


Hopper Pump

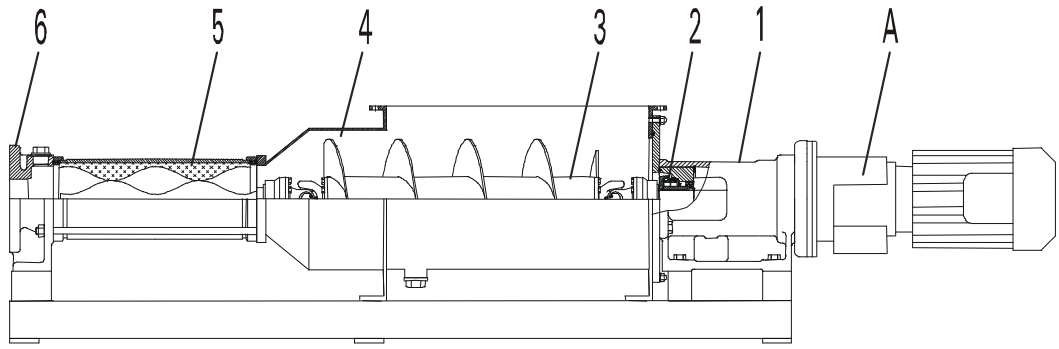
A Drive Unit
1 Bearing Chair
2 Sealing Unit
3 Joint (by Hopper Pump with Feed Screw)
4 Suction Housing / Hopper Housing
5 Pump Set (Rotor/Stator)
6 Discharge Nozzle

Chapter 2

2.2 Pump set-up KL 30 – KL 100

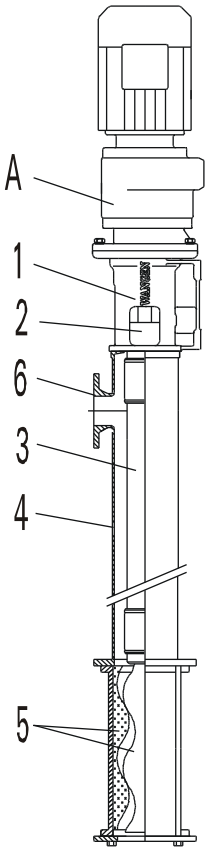


Suction pump



Hopper pump

Vertical pump



A	Drive Unit
1	Bearing Chair
2	Sealing Unit
3	Joint (by Hopper Pump with Feed Screw)
4	Suction Housing / Hopper Housing / Immersion Tube
5	Pump Set (Rotor/Stator)
6	Discharge Nozzle / Outlet Nozzle

Chapter 2

2.3 General Description

WANGEN helical progressing cavity pumps are rotating displacement pumps for delivering low to high viscosity media.

The pump elements proper comprise a rotor made of steel materials and a stator made of elastomer materials. The rotation of the rotor within the stator causes the delivery chambers to be opened and closed in a continuous sequence. This causes the medium to be delivered continuously from the inlet/suction end through to the pressure end.
The special delivery principle of these pumps enables low pulsation and a delivery, which is approximately proportional to pump speed. A correct dimensioning of the pump is decisive for perfect functionality. The pump will be customized by the manufacturer in line with the details specified by the customer regarding the medium to be pumped.

Pumps for use in the foodstuffs and beverage industry are designed and built to the recommendations of DIN EN 1672-2 ‘Food processing machinery - Basic concepts’. This does not include pipe connections, which require special cleaning procedures. These must be cleaned manually by the operator. The cleaning cycle is dependent on the food and the relevant hazard from. This is set by the operator. Correspond to the pipe connections according to DIN 11864, according to DIN EN 1672-2 there is no health risk. The operator does not define any special cleaning measures.

Non-corroding materials suitable for cleaning and/or disinfection are being used for the product-contacting parts of these pumps. Elastomer materials and seals correspond to the BfR (German Federal Institute for Risk Assessment) recommendations and the FDA guidelines respectively (US Food and Drug Administration) and the Regulation (EC) No 1935/2004.

WANGEN pumps or pump assemblies are designed and constructed to comply with all health and safety requirements of the EC Machine Directive. When compliance with all requirements has been shown, each machine will be certified by an EC Declaration of Conformity (including CE marking) or a Declaration for partly completed machines (if the machine is not yet ready to be used).

The declaration of conformity issued by Pumpenfabrik Wangen applies to the supplied machine in connection with the use, according to regulations, of the drive (helical geared motor, helical gear to be assembled to an IEC standard motor) as described in the data sheet with defined power and defined torque as prime mover of the pump. Subsequent interventions or changes made on the pump are subject to the sole responsibility of the customer who, in this event, becomes liable for warranting the conformity with the EC regulations.

2.4 Distinctive features of hopper pumps

Mediums without flow ability demand a feeding device to the rotor / stator system to assure a sufficient filling of the pump chamber. It is realized through a feed screw, which is mounted on the cardan shaft. Instead of a suction housing as a pick-up for the material to be conveyed, a hopper feed casing with added tunnel is used. There is a large rectangular opening in the hopper feed casing which picks up the mainly as filling occurring material. In the conic / cylindrical designed tunnel, a supply pressure in interplay with the feed screw is build up, which supports the filling of the pump chamber.

2.5 Noise Emissions

Each pump will be manufactured and tested according to the currently applicable technical documentation. The A-evaluated permanent noise level will normally be < 70 dB (A).
This does not include the drive unit and pipe system.
It is also assumed that the pump operates without cavitation, and that the pump unit is properly mounted on a level concrete plate or steel construction resistant to torsion flexing.

Chapter 3

3 Packaging, Transportation, Storage, Disposal

3.1 Packaging

If there are no specific customer requirements in this regard, one-way packaging will be used for shipping WANGEN progressing cavity pumps. Examine the shipment immediately upon receipt for any transportation damage. If any such damage is found, immediately inform the shipping and forwarding company. Damaged products must not be taken into service.

3.2 Transportation

	**Warning!** **By an incorrect transport the pump can fall down or upset.** **Possible dangerous situation: Severe or fatal injuries.**

- **Only use lifting gear and load lifting facilities with sufficient load carrying capacity for loading / unloading!**
- **Lift pumps only by load handling attachment (chains, tightropes) (see following pictures).**

3.2.1 Transport of horizontal pumps

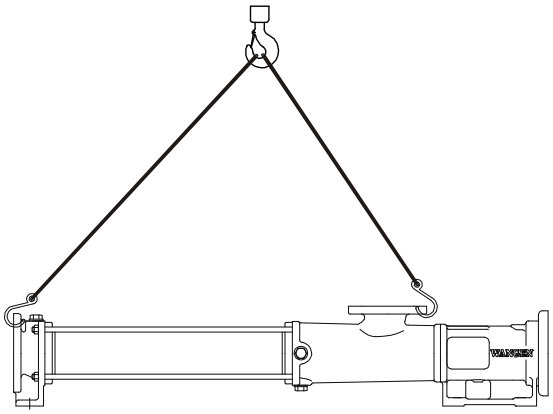


Fig. 3-1 KL-S Pump

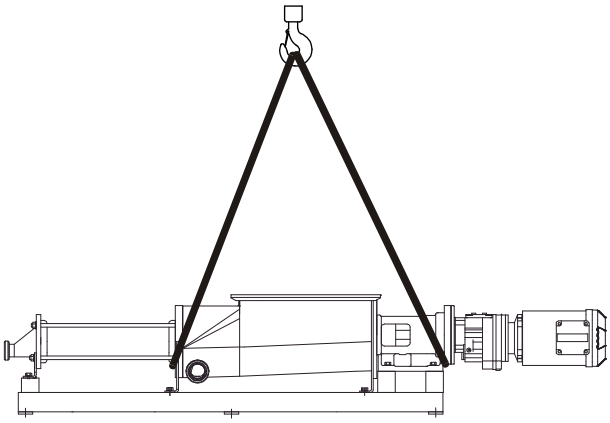


Fig. 3-2 KL-R Pump with base plate and drive unit

ATTENTION	**Possible damage**

- **Please note that some drive units may cause pump assemblies to be very top-heavy.**
- **Never use the eyebolts of the drive unit to lift the entire assembly. These attachment points are to be used only for the engine and/or transmission!**

Chapter 3

3.2.2 Transport of vertical pumps

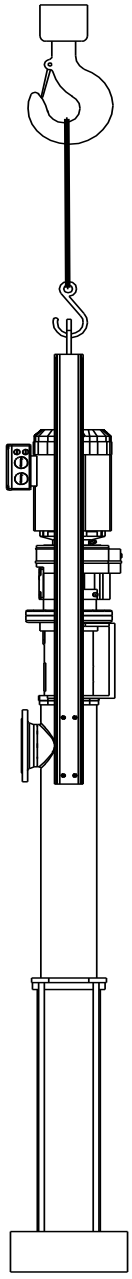


Fig. 3-3 KLT with hanging bracket

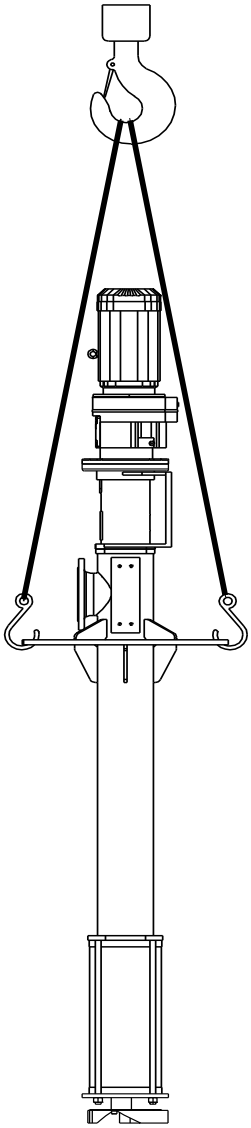


Fig. 3-4 KLT with mounting flange

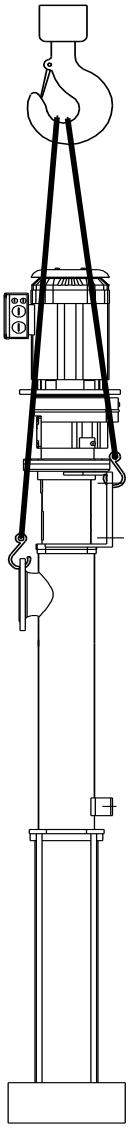


Fig.3-5 KLT with console on immersion tube

ATTENTION	Possible damage

- **Never use the eyebolts of the drive unit to lift the entire assembly. These attachment points are to be used only for the engine and/or transmission!**
- **Basically, the pump is to be transported via the hanging bracket.**
- **In cases in which the pump has no hanging bracket, it must be transported properly using suitable load handling attachments (ropes, chains) as shown in Figures 3-4 and 3-5.**

Chapter 3

3.3 Storage

WANGEN progressing cavity pumps are sufficiently preserved for storage in normal environmental conditions.

If the pump is to be stored for a longer period, prepare the unit as follows:

- Smear stator with silicon oil (factory preservation of new pumps).
- Protect pump against dust, dirt, water, direct sunlight and other damaging environmental influences. All non-painted surfaces are to be covered by means of acid-free and resin-free grease.
- For pumps with rotors not made out of stainless steel (e.g. from 1.2436), remove the stator and cover the rotor in grease.

If the pump is to be taken out of use for periods in excess of 6 months, remove the stator in order to avoid pressure marks in the elastomeric material.

3.4 Disposal

Housing components, rotors, shaft-sealing rings are to be disposed of as scrap steel (“stainless steel scrap metal”). Stators, O-rings, and parts of the mechanical seal made of carbon/ceramics are to be disposed of as residual waste materials. Oil and grease from joints and seals is to be collected and to be disposed of according to local regulations.

Chapter 4

4 Installation

4.1 Direction of Rotation

The direction of rotation is stated in the data sheet as well as on the pump type plate and must be absolutely kept for the avoidance of damage of the shaft seal (dependent on direction of rotation mechanical seals). The direction of delivery (flow direction) will be determined by means of the direction of pump rotation.

4.2 Fastening of horizontal pumps

The pump is mounted by means of the mounting lugs on the base plate or the mounting holes provided on bearing chair (KL20);
the mounting lugs on the base plate or the mounting holes provided on bearing chair and discharge nozzle. (KL30 - KL 80). The pump has to be mounted on firm and level ground, e.g.

- sufficiently dimensioned level concrete base plate;
- a level and warp resistant steel construction.

The foundation must be designed so that it can take the weight of the pump aggregate on the entire surface. It must fully absorb the load exerted on the foundations and ensure the stability of the pump aggregate.

The diameter of holes at bearing chair and discharge nozzle support or the straight plates of the base plate describe the bolt diameter respectively the diameter of the anchor dowels.

4.3 Fastening of vertical pumps

As a rule vertical pumps or pumps are mounted vertically get fixed on a hanging bracket or special devices. (E.g. fixing flanges → see Data Sheet).

For all KLT pumps from series KLT 50 onwards, the fastening must be made as described in the following:

- by suspending on the hanging bracket (fixed setting) or
- using the fastening on the lower bracket on the immersion tube and fixation via the bearing block of the pump.
- using the mounting flange, with which the pump is firmly attachment via this flange, or
- using a 'tripod' which stands upright and is secured against slipping and using the bearing block of the pump.

For immersion pumps (with a mounting flange and a homogeniser) whose discharge height is over 5 metres, an additional collection basket must be installed on the tank floor that securely prevents the oscillation of the pump.

ATTENTION	**Possible damage**

- **With sizes KL50T, KL65T, KL80T and KL100T, fastening via the bearing block of the pump alone may result in a fracture of the bearing block housing.**

Chapter 4

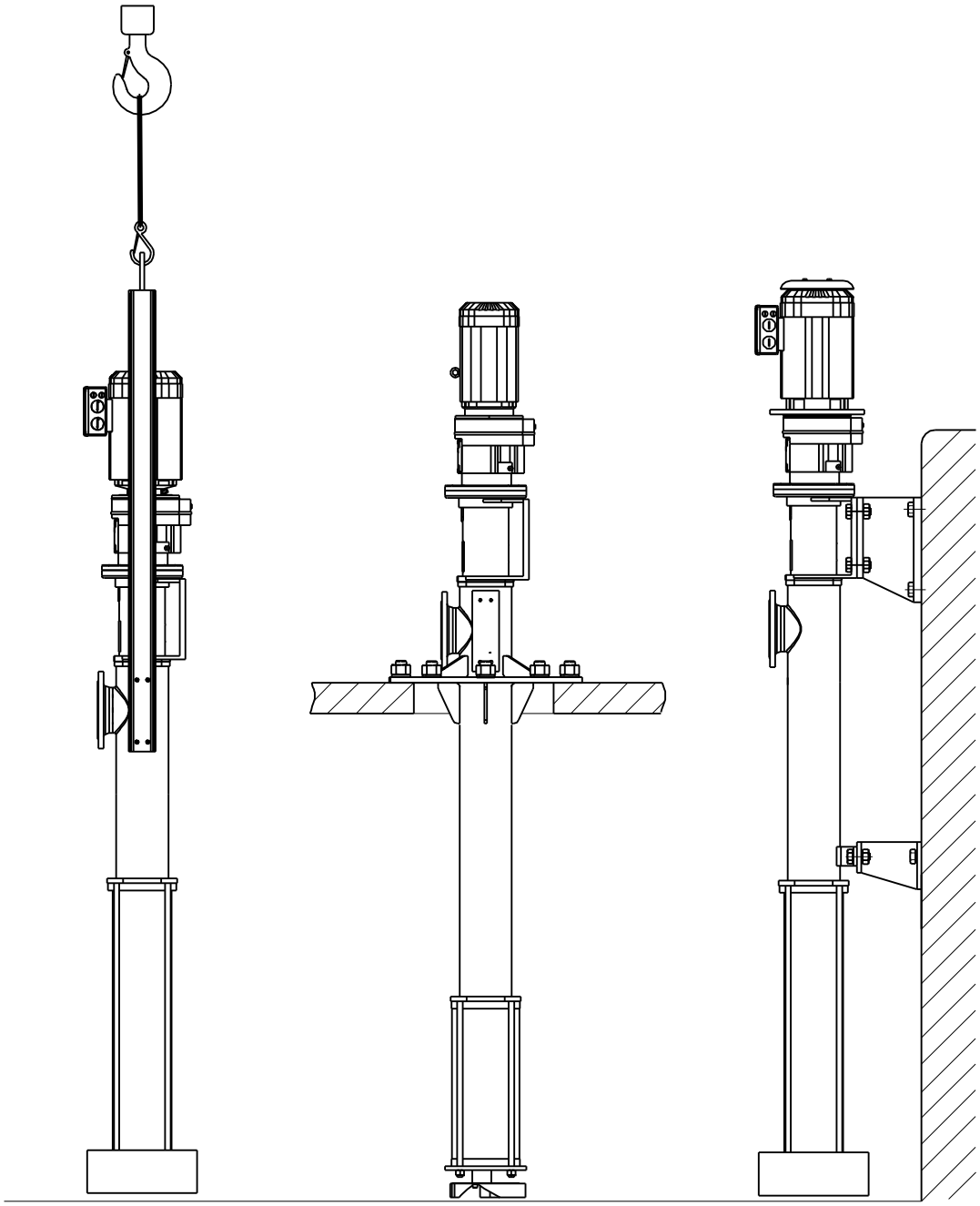


Fig. 4-1 KLT with hanging bracket Fig. 4.2 KLT with mounting flange 4.3 KLT fixed to bearing chair and bracket

The adjacent figure shows attachments for different forms of the KLT pump.

ATTENTION	**Possible damage**

- **Use suitable screw connections and concrete anchors for the connections in the concrete of the silo wall.**
- **In so doing, use the hole diameters of the flanges, brackets and drill holes on the bearing block as a basic orientation.**

Chapter 4

- **Normally, the mounting is done by using a screw connection (machine bolts and anchor dowels). Note the following bolt dimensions and maximum torques:**

bolt dimensions	Maximal torque
M 8	25 Nm
M 10	50 Nm
M 12	90 Nm
M 16	220 Nm
M 20	430 Nm

(The values apply to shoulder studs of strength class 8.8, according to DIN 931-B or EN 24014

ATTENTION **Possible damage**

- **Check the tightening moments of the tie rods after remounting with a torque wrench. Keep belongs tightening moments on.**

Type of pump	Tightening moment
KL 20 (M 8)	25 Nm
KL 30 (M 12)	50 Nm
KL 50 (M 16)	90 Nm
KL 50 (M 20)	150 Nm
KL 65 (M 24)	210 Nm
KL 80 (M 24)	240 Nm
KL 100 (M 24)	280 Nm

Chapter 4

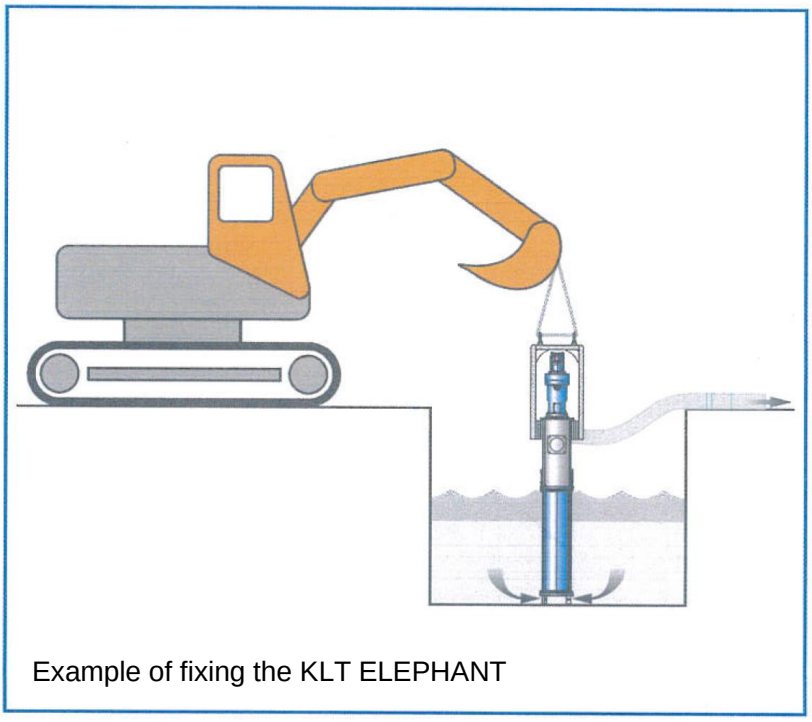
4.4 Fixing the KLT “Elephant”

The KLT "Elephant" is a special submersible pump, which is suitable for vertical fixation (using excavators, telescopic handlers, jib cranes, etc.).

For horizontal mounting of the pump, see Chapter 4.2.

	**Warning!** **Improper fixation can lead to the pump falling or tipping over.** **Possible consequences: Death or severe injury.**

- **Use only lifting gear with sufficient lifting capacity.**
- **Hoists must have a safety hook which prevents the load slipping out.**
- **For fixation of the pump, use only suitable lifting tackle (steel cables according to the norm DIN EN1792 or chains complying with DIN 81814) with adequate load-bearing capacity.**
- **Make the pressure connection of the pump as far as possible via a flexible pressure pipe. Bear in mind that these can cause unexpected blows by sudden surges of pressure.**
- **The danger zone around pump and hoist areas is to be made secure, so that it is out of the reach of the upper and lower limbs.**



Example of fixing the KLT ELEPHANT

Chapter 4

4.5 Piping

Correctly dimensioning the piping for use at the pressure end of the pump will be imperative in order to ensure that any unnecessary pressure build-up is avoided when pumping viscous media. The pressure provided in the data sheet must not be exceeded.

Observe the supply pressure stated in the data sheet with regard to pressure resistance in the pipe.

Flush out pipe system and supply devices before fitting, and remove all foreign matter.

If possible, pass the intake or suction pipe such that the pipe cannot empty itself in the event of a pump shutdown (shutoff devices, siphon, etc.). This avoids dry-running at start-up.

4.5.1 Connecting the pipes

Flush out und clean the pipes.

About elastic seals connect pump with Pipe system.

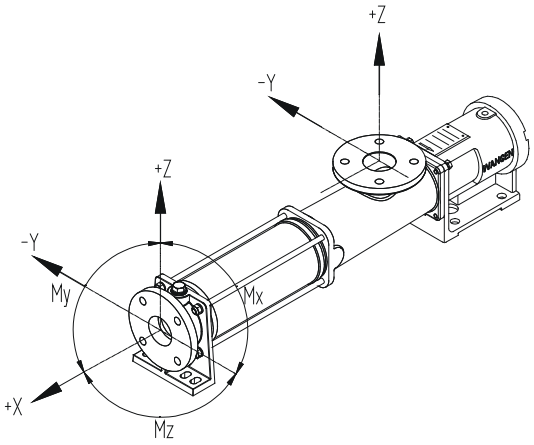
For dismantling the pump, provide shutoff devices and adjusting pieces for use on the piping at the pressure end of the pump.

Directly behind the discharge nozzle secure the pump by means of approved safety valve or pressure monitoring.

ATTENTION	**Possible damage**

- **Do not use the pump unit to support pipes! Pipes are to be mounted as much as possible free of all forces and torques.**
- **When making pipe connections, observe the permissible forces and torques at these connections (see following table)!**
- **Bolted connections must not be loaded with torques resulting in the pipe becoming clamped or loosened inside the pump housing.**

Chapter 4



with $F_{tot} = \sqrt{Fx^2 + Fy^2 + Fz^2}$ and $M_{tot} = \sqrt{Mx^2 + My^2 + Mz^2}$

4.5.2 Series KL 20

Suction nozzle

nom. pipe ∅	F (x,y,z) [N]	F (tot) [N]	M (x) [Nm]	M (y, z) [Nm]	M (tot) [Nm]
1 ¼“	50	87	5	20	29
32 mm	50	87	5	20	29
65 mm	70	121	7	28	40

Discharge nozzle

nom. pipe ∅	F (x,y,z) [N]	F (tot) [N]	M (x) [Nm]	M (y, x) [Nm]	M (tot) [Nm]
1 ¼“	35	61	3	12	17
32 mm	35	61	3	12	17
65 mm	50	87	4	16	23

4.5.3 Series KL 30 – KL 100

nom. pipe ∅	F (x,y,z) [N]	F (tot) [N]	M (x,y,z) [Nm]	M (tot) [Nm]
80	700	1000	310	450
100	840	1200	380	550
150	1190	1700	560	800
200	1540	2200	730	1050

Chapter 4

4.6 Permissible Pressure in the Suction/Hopper Casing

The permissible internal pressure load in the suction casing is:

- for all pumps **max. 1 bar**

unless a different internal pressure (e.g. for clockwise running submergible pumps) has been permitted in the data sheet.
The hopper casing must not be subjected to initial pressure.
It is intended for the taking-up of the pumped medium and is to be loaded exclusively with the static pressure of the medium in a height of **3 m**
unless a different filling height has been permitted in the data sheet.

The permissible internal pressure load inside the pressure connection is specified in the datasheet.

4.7 Space Requirements for Operation and Maintenance

- **Design a free space to provide on the pump (see dimension sheet) to allow maintenance tasks to be performed (e.g. stator/ rotor replacement) without having to dismantle the pump. In order to facilitate fitting, use adjusting pieces and suitable shutoff devices!**
- **Remember to provide some additional free space for adequate ventilation of the drive motor (see drive unit documentation)**

The open space for the pump should at least be:

- in flow direction 1.5 times stator length
- on drive unit single drive unit length
- at each pump end 0.5m

4.8 Electrical Connection

Danger!

E.g. electric shock!
Possible dangerous situation: Severe or fatal injuries.

- **Connect of motor may only carried out by qualified personnel!**
- Before connecting the motor check that your actual mains voltage and frequency correspond to the details provided on the type plate of the motor.
- Before connecting the motor, check the phase sequence with regard to the direction of rotation. Connect the motor in such way that the pump runs in the given direction of rotation to avoid damage to the sealing unit.
- Note that the PTC sensor of the geared motor must be connected to the terminals provided to a PTC actuation unit or to a variable-frequency drive with a PTC input (each available as an option).
- Soft starters or variable frequency drives must be suitable for high starting currents. Therefore, oversized devices should be used for heavy starting.
- Design an **emergency stop device** to shut down the pump in hazardous situations immediately.

Chapter 4

Connection in the terminal box:

	Line frequency		At field weakening range			
Winding voltage	50 Hz	60Hz	50Hz	87Hz	60Hz	104Hz
230/400V	Y	Y	Y	Δ	Y	Δ
400/690V	Δ	Δ	Δ	-	Δ	-
220-230/380-400V	Y	-	Y	Δ	-	-
254-266/400-460V	-	Y	-	-	Y	Δ
380-400/660-290V	Y	-	Y	-	-	-
440-460V	-	Δ	-	-	Δ	-

For detailed information on the attachment of the terminal links, see appendix SEW Chapter 5 on page 61 (de, en). The operating instructions of the drive is available as a PDF-file on CD-ROM. The CD-ROM is part of the documentation.

4.9 Drive elements

Warning!

Drive elements move quickly during operation.
Risk of trapping and crushing.
Possible dangerous situation: Severe or fatal injuries

- **Drive elements must have protection against contact.**

4.9.1 Drive shaft

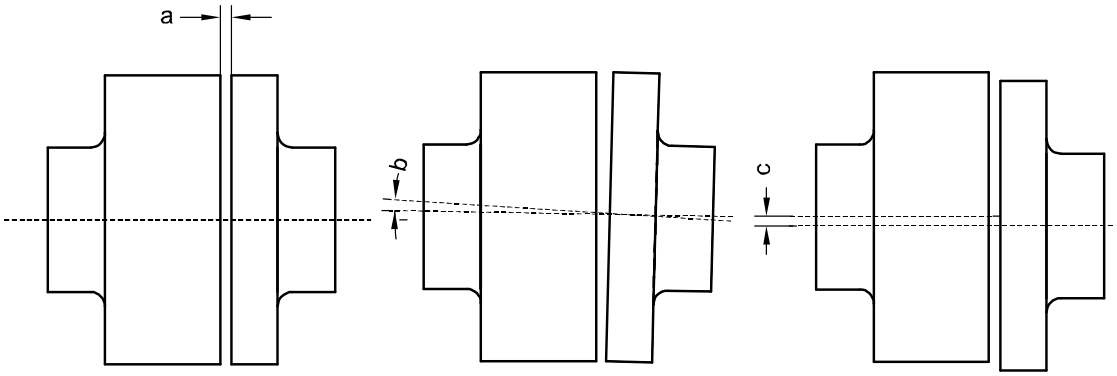
The contact protection of the drive shaft consist two guards in the control holes on the bearing bracket. These protecting covers can be removed only with a tool.

4.9.2 Coupling elements

Wangen eccentric screw pump with a bare shaft (cylindrical shaft with key) has to connect about an elastic coupling.

ATTENTION **Possible damage**

- **Do not mount the coupling with hammer blows.**
- **Only mount the coupling elements with a mounting device. Use the centre bore at the thread on the shaft for the positioning.**



- **The coupling half have to align against each other.**

- Make the following adjustments according to the coupling manufacturer's specifications when mounting couplings.
  a = Maximum - and minimum clearance
  b = Angular offset
  c = Axial misalignment

4.10 Connection other drive systems

- Diesel engines normally are delivered without oil- and fuel charge. After mounting the aggregate fill in necessary oil- and fuel charge.
- For connecting the motor, always follow the instructions provided by the drive unit manufacturer.

4.11 Mounting and adjusting of additional equipment components

Mount additional equipment components (odometers, dry-run protectors etc.) according to the specific instructions attached (→ Annex).

4.12 Shaft seals

4.12.1 LWD – seal with pressure less oil quench

As a rule, the pumps are supplied with a built-in venting screw. On some models, pumps built to specifications and pumps with special sealing media, however, the sealing cartridge may be fitted with a screw plug for transport purposes. Before starting up the pump for the first time, check the venting of the shaft seal. If necessary, replace the screw plug in the sealing cartridge with the venting screw supplied.

ATTENTION	Possible damage

- **If the pump is not vented, pressure may rise as the lock medium heats up during operation. This will cause the lock medium to be pressed into the suction chamber of the pump. Make sure the seal is properly filled (→ Chapter 7 maintenance).**

4.12.2 Stuffing box seal

Built-in stuffing box seals must be slackened before being started up for the first time. To do this, loosen the nuts of the stuffing box gland and then tighten them again only slightly. After approx. 10 minutes in operation, tighten the stuffing box until only a small quantity of the medium leaks out to lubricate the seal (approx. 1-2 drops per minute) (→ chapter 7).

4.12.3 Stuffing box seals with buffer water ring

This kind of stuffing box seal is equipped with a lock water ring. Connect the stuffing box to a lock water supply system before starting up the pump. In most cases, it will be enough just to activate the supply. The pressure in the lock water area should be approx. **1 bar** higher than the pressure in the pump suction housing.

4.12.4 Mechanical seal, single-acting

Pumps with mechanical seal are to be used exclusively in the fixed rotational direction, unless the mechanical seal is made for both rotational directions (→ data sheet). Make sure the permissible pressure load of the seal unit is not passed.

Make sure the mechanical seal really does come into contact with the medium and therefore is lubricated and cooled.

4.12.5 Face (LWD) seal with mechanical seal (double-acting)

This type requires a quench fluid. The quench fluid is proposed to the sealing case under pressure. The pressure of the quench fluid should be approx. **1-2 bar** higher than the counter pressure on the side of the media. The maximum pressure in the seal should not exceed **10 bars**.

4.12.6 Mechanical seal, double-acting, back to back arrangement

This type requires a buffer fluid. The quench fluid is proposed to the sealing case under pressure. The pressure of the quench fluid should be approx. **1-2 bar** higher than the counter pressure on the side of the media (suction housing).

4.12.7 Mechanical seals, double-acting, tandem arrangement

This type also requires a buffer fluid in the sealing case. The pressure in the intermediate sealing compartment must be lower than the pressure in the product chamber of the pump. If this type of seal is subjected to quench pressure, this will cause the seal on the medium side to open, which can pollute the medium.

ATTENTION	Possible damage

- **Connect double acting mechanical seals to a local locking pressure system!**

Chapter 5

5 Commissioning

5.1.1 Set up commissioning

	**Warning!** **Rotating parts or pressurised spout liquids can cause fatal injuries.** **Possible dangerous situation: Severe or fatal injuries.**

- **Do not work on rotating pump!**
- **Only qualified personnel must to commissioning the pump.**

5.1.2 Pump

Normally, the stator has been preserved by means of silicon oil. If the medium to be pumped is not compatible with silicon, the pump must be cleaned before it is first taken into service.

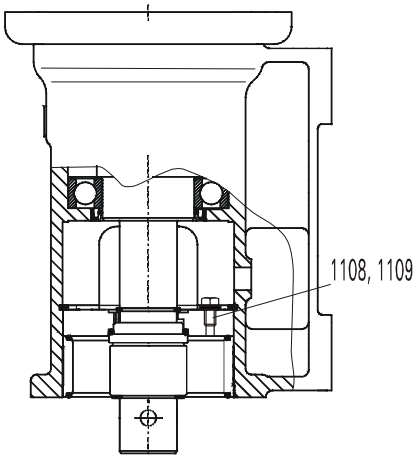
5.1.3 Shaft seal system

1. Check shaft seals (design → data sheet).
2. LWD shaft seal: Is the vent plug screwed? Is the seal filled correctly?
3. Are connect double acting mechanical seals to a lock pressure system?

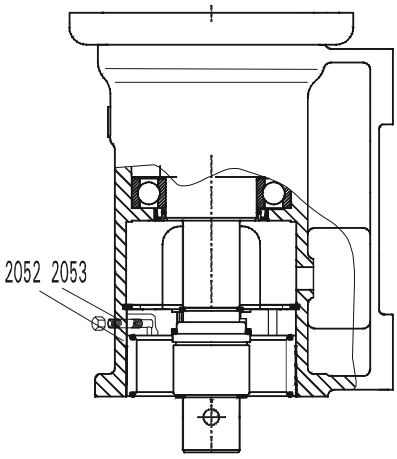
ATTENTION	**Possible damage**

- **Ventilated single mechanical seal at vertical pumps and verticaly mounted pumps during commissioning. (Ventilation into bearing chair; breather plug 1108 or cover nut 2052)**

KL 50 – 100



KL 30



- **Pumps with mechanical seal (dependent on direction of rotation mechanical seals) are to be used exclusively in the fixed rotational direction. A false direction of rotation could destroy the sealing unit!**
- **Before operating the double mechanical seals you have to connect it to a locking pressure system. An operation without locking medium could destroy the mechanical seal.**
- **Pumps with plug-in shaft or a quick change connection must be driven in a left hand direction. The contra wise direction of rotation will drive out the rotor**.

5.1.4 Pumps for food applications

If the WANGEN pump is to be used to convey food, you will have to clean it before putting it into operation and before each production run. This cleaning can be performed as follows:

- **Basically, by disassembling the pump and cleaning its various parts with the necessary cleaning products.**
- **In individual cases by the so-called C.I.P. - Cleaning (cleaning in place), provided the form of cleaning is allowed for this medium.**

It is a submersible pump or a suction pump in a dead-space design with a special tangential CIP – socket **and** the system is configured so that the operation as well the cleaning without removal or reconstruction can be performed.

In Hopper pumps or suction pumps with conveying screw further activities must be taken for cleaning, such as the use of spray lances or high pressure cleaning equipment so that the hopper and the conveying screw be clean.

After the first time, following changes to the system, to the cleaning process, or the cleaning medium must, under the CIP cleaning by disassembling the pump, the effectiveness of cleaning to be checked, i.e. whether the pump is clean.

A recommended C.I.P. procedure is as follows:

- Towns water pre.-rinse to get out product left over inside the pump.
  Temperature 10 – 20°C, max.70°C
- 1 – 2 % volume Sodium Hydroxide / water,
  for 10 – 20 min at 60 – 80°C
- Towns water,
  for 5 – 10 min at 60 – 80°C
- 1 – 1.5% volume Nitric acid / water
  for 5 – 10 min at 50 – 70°C
- Towns water for 5 – 10 min
  Temperature normal 10 – 20°C, max. 70°C, for a period of 5 – 10 min

The flow rate of the rinsing liquids should not be lower than 1.5 m/s during C.I.P. procedure.

ATTENTION	**Possible damage**

- **Prove the chemical resistance by using stators made from solid materials (plastics, bronze)**

When under C.I.P treatment, the stator has to undergo thermal and chemical stress. It is therefore important to ensure that the pump is operating in STOP AND GO function during C.I.P. treatment which is two to three starts with one to two rotations in the course of one minute. This will provide sufficient cleaning of the rotor / stator conveying cavities and it is also reduces the mechanical stress additionally on the stator through deformation work.

Chapter 5

	**Warning!**
	Rotating parts or pressurised spout liquids can cause fatal injuries. **Possible dangerous situation: Severe or fatal injuries!**

- **Do not work on rotating pump!**
- **Switch the plant into a voltage-free condition and secure against any unauthorized and accidental restart!**
- **Use protective gloves and safety glasses at work with aggressive detergents!**

1. Connect pump to CIP cleaning system.
2. Start pump.
3. Clean pump and tube system.
4. Shut off pump, remove CIP - medium restless.

	- **The CIP – cycle have to correspond to all current regulations and directives for food industry. Especially the stability of materials must be observed.** - **If you have developed your own CIP processes for your process media, check with the pump supplier that the pump is suitable for the process in question where there is any doubt. In this connection pay special attention to the elastomeric material and pump design.**

5.2 ATEX pumps

In areas where there is a risk of explosion, these pumps must be operated in accordance with the requirements in Directive 2014/34/EU (ATEX – directive).

- **When starting up these pumps, follow the safety instructions for explosion protection in Chapter 1.**
- **Before starting, make sure especially;**
- **that the information on the nameplate of the pump accords with the information for the area of use and**
- **The required monitoring devices have been installed according to the hazard concerned and are operating properly.**

Chapter 5

5.3 Bio-Mix pumps

ATTENTION	Possible damage

- **Make sure that pump aggregates will be adequate ventilated.**
- **Before starting, make sure that all the lines are properly connected and that the valves are open.**
- **By using suitable measures (rock catchers), make sure that no foreign material enters the pump which may cause damage.**
- **The pump is not suitable for mincing the solid phase.**
- **If the WANGEN BIO-MIX pump feed via the feeding pump fresh gassing substratum, the hopper room is also vented through forced ventilation to the outside. The fan should be such that the air in the hopper room x 1 is exchanged per minute. In the vent the current rules are observed.**

1. Start the supply pump (supply device) for the liquid substrate (re-circulated material, slurry, separated medium etc.) simultaneously with the Bio-Mix-pump.
2. After switching on both pumps, start feeding in the well-disintegrated solid phase (maize silage etc.).
3. Control the amount supplied from the liquid phase according to the different DS contents. (frequency converter, torque controller)

ATTENTION	Possible damage

- **When shutting down the plant, first make sure that the supply of solid phases has been terminated and then shut down the Bio-Mix pump. The feeding of liquid phases has to be shut down after the inducer was flooded. (I.e. the hopper is filled)**

i	• **The material being pumped into the fermenter should not have a DS-content greater than 13-15%.** • **The mixing ratio of solid to liquid substances can be from 1:2 (water/maize) to 1:5 (re-circulated material/maize). This is mainly dependent on the DS content of the liquid phase since a DS content of 35% can be assumed for maize silage.**

Chapter 5

5.4 Switching - on

Check before switching on:

- **Make sure that pump with drive unit has correct mounted and connected.**
- **Are they Circuit points leak-proof and zero-potential connected?**
- **Shaft seal okay?**
- **Did you have installed necessary safety devices?**
- **If necessary locking pressure systems connected?**

1. Before starting the pump, check it for contamination and any foreign matter.
2. Fill the pump with your medium for pumping. This filling is used to lubricate rotor and stator, and to avoid dry running of the pump unit.
3. Open valves full.
4. Switch on drive unit.
5. After first start check at nominal pressure pump and pipe connection are leak proof.

5.5 Operation

Warning!
Do not operate against closed shut off devices! **Pipe work can burst!** **Possible dangerous situation: Severe or fatal injuries!**

- **Secure the pump by means of approved safety devices (overpressure monitoring)!**

ATTENTION	**Possible damage**

- **After the pump has been started, ensure at all times that the suction housing in the pump is continuously provided with pumping medium.**
- **Use suitable monitoring and shutdown devices to protect the pump against dry running. Dry-running of the helical rotor pump will damage the stator!**
- **Whenever there is no pumping medium in the intake pipe, the pump must be shut down immediately!**

Chapter 6

6 Shutdown

Warning!

Rotating parts or pressurised spout liquids
Possible dangerous situation: Severe or fatal injuries!

- **Do not work on rotating pump!**

6.1 Switch-of

1. Shutdown the pump by turning off its electrical energy supply.
2. Shutdown valves.

Caution!

Risk of burns due hot pump parts.
Possible dangerous situation: Minor injuries!

- **Use protective gloves!**

6.2 Draining

Drain and clean the pump after shutdown, in particular if:

- **The pump is sited in the open air and it is possible for the pumping medium to freeze due to weather conditions,**
- **The pumping medium is prone to deposit formation, or cooling, or if the pumping medium hardens due to a chemical reaction taking place.**

6.3 Decommissioning

If the pump is to be taken out of service for an extended period, take the following action:

- **Clean well the pump and flush it with soap water.**
- **For shutdown periods in excess of 6 months, remove the stator in order to avoid pressure marks in the elastomeric material, which would cause a higher starting torque when the pump is subsequently re-started.**
- **For pumps with rotors not made out of stainless steel (e.g. from 1.2436), remove the stator and cover the rotor in grease (Design see data sheet).**
- **Open drain plugs and cleaning covers to draining the pump!**

Chapter 7

7 Service and Maintenance

Warning!

Rotating parts! Risk of trapping and crushing!
Possible dangerous situation: Severe or fatal injuries!

- **Do not work on rotating pump!**

7.1 Service after Start-up

Following approximately 50 hours of operation, you should check all bolt connections on the pump or pump unit, excepting only the packing box seal; retighten, if necessary.

7.2 Inspection and Service Notes

Interval	Component	Task	→ Chapter
Actual wear is significantly influenced by different media and pressure requirements. Calculate the necessary inspection/service intervals on a plant-specific basis.	stator	replace if worn	Chap. 9.2
	rotor		Chap. 9.4
	joint		Chap. 9.6
	shaft sealing	check for leakage, if it leaks all the time, replace	Chap. 9.7
acc. to manufacturer	drive unit / motor	lubricate / replace bearing	drive unit data

7.3 Lubrication

There is no fixed lubrication intervals defined for this pump.

Their bearing points are equipped with maintenance-free roller bearings, which have all been permanent lubricated. It is recommended to replace these bearings after 20.000 hours of operation or at the latest after 5 years, whichever occurs first. (Pumps in an explosion area 10.000 hours of operation or at the latest 3 years)
up to range KL 80 the roller bearings are provide in the factory with grease. Replacement of roller bearings: Fill the cavities between the rolling elements full with grease.

In general, fill the space between the bearings with grease. This lubrication is to reduce friction and better heat dissipation from the shaft seals.
The lubricant quantities required for this purpose will be as listed in the **table 3**.

In the interests of a long service life of your pump you should introduce shortened replacement intervals in particularly difficult operating conditions such as

- high relative humidity,
- an aggressive environment,
- major temperature variations, etc.

Lubricate all drive unit bearings in accordance to the instructions provided by the manufacturer.

Chapter 7

7.4 Maintenance of rock catchers for bio-mix pumps

The hopper of bio-mix-pumps (heavy duty), has been constructed that into the hutch as well the tunnel can settle stones or other foreign materials which must not into the pump. The stones or other foreign materials can pick up by vents in the hutch and the tunnel. Drain the pump if possible daily and pick up the foreign material from hutch and tunnel to avoid damages at the pump aggregate.

Warning!

Rotating parts. Risk of trapping and crashing
Possible dangerous situation: Severe or fatal injuries!

- **Do not work on rotating pumps!**
- **Clean and maintain the pump only it stands still!**
- **Switch the plant into a voltage-free condition and secure against any unauthorized and accidental restart!**

7.5 Joint Maintenance

The joints of WANGEN helical rotor pumps do not need any maintenance.

The filled cardan shaft joints are provided in the factory with a high efficiency gear lubricant oil (viscosity class SAE 90) or lubricant for foodstuffs industry. (Food industry oil) If a change of the sleeve is necessary, the lubricant will have to be exchanged as well. A special filling is possible. Please see
table 1 for the correct amount of lubrication needed.

7.6 Maintenance of shaft seals

7.6.1 Face Seal (LWD Cartridge)

WANGEN eccentric screw pumps complete with drive unit seal (**LWD**) are provided in the factory with quench fluid. In the event of a repair or a replacement of the drive unit seal become necessary, this filling needs to be replaced.

To this end, the sealing case will be filled up to a 2/3 level (check by actual level by means of level inspection glass).

The position of the breather plug 1108 defines the maximum level in the LWD cartridge.
Check the level of the face seal at least monthly by means of the level inspection gauge. If necessary, replenish the existing quench fluid.

The drive unit seal (LWD) are provided in the factory with a high efficiently gear lubricant oil (viscosity class SAE 90) or lubricant for foodstuffs industry. (Food industry oil) A special filling is possible. The lubricant quantities required for this purpose will be as listed in the **table 2**.

7.6.2 Mechanical seal, single-acting

The used mechanical seals comply with DIN 24960. These seals are maintenance-free. There may be minor leaks from time to time as a result of foreign bodies in the medium, which get stuck between the seal faces. This could happen during the operation and is no fault.

Permanent leaks (meaning that the medium leaks out of the bottom of the bearing seat) are a symptom of worn seal faces or damaged elastomeric rings.
Make sure the mechanical seal really does come into contact with the medium and thus is lubricated and cooled.

For mechanical seals in double-acting, back-to-back arrangement

a buffer fluid is necessary. The pressure of the buffer fluid should be checked regularly as a fall in pressure below the pressure level in the intake chamber can cause the medium to penetrate the sealing compartment.

For mechanical seals, double acting, tandem arrangement

it will again be necessary to check the necessary buffer fluid regularly. The pressure in the intermediate sealing compartment must be lower than the pressure in the product chamber of the pump. If this type of seal is subjected to quench pressure, this will cause the seal on the medium side to open.

7.6.3 Stuffing box seal

Never tighten a stuffing box seal too much as this will cause overheating in the packing area which in turn may destroy the seal.
If the stuffing box is too slack, on the other hand, air may be sucked in.

7.6.4 Shaft seal rings

The shaft seal rings, which are used for sealing of the shaft, are also maintenance-free.
Permanent leaks are a symptom of a worn drive shaft (settled down) or worn elastomeric rings.

Chapter 7

7.7 Lubricant fill quantities

Table 1: Lubricant quantity for different sizes of joints

Line of products / series	Lubricant quantity (Litre)
KL 20S	0.02 per each side of the joint
KL 30S/T	0.07 per each side of the joint
KL 50S/T	0.25 per each side of the joint
KL 80S/T	0.90 per each side of the joint

Table 2: Lubricant quantity for drive unit seal (**LWD**)

Line of products / series	Lubricant quantity (Litre)
KL 20S/T/R	0.015
KL 30S/T/R	0.035
KL 50S/T/R/RQ	0.15
KL 65S/T/R/RQ	0.19
KL 80S/R/RQ	0.3

Table 3: Lubricant quantity for roller bearings

Line of products / series	Lubricant quantity (kg)
KL 80	approx. 3.50
KL 100	Approx. 10.00

ATTENTION	Possible damage

- **Do not mix synthetic lubricants either with each other or with mineral lubricants!**

Chapter 7

7.8 Dismounting pump

Warning!

Rotating parts or pressurised spout liquids
Possible dangerous situation: Severe or fatal injuries

- **Do not work on rotating pump!**
- **Switch the plant into a voltage-free condition and secure against any unauthorized and accidental restart**
- **Workings on electrical plant must carry out by qualified persons!**
- **Demounting of pump must carry out only by qualified persons!**

1. Shutdown pump by turning off its electrical energy supply.
2. Shutdown valves.
3. Let the pump cooling.
4. Drain pump. Collect and depollute leakages.
5. Switch the plant into a voltage-free condition and secure against any unauthorized and accidental restart.
6. For pumps with drive through a flexible coupling, dismount coupling guard and withdraw the drive with clutch part.
7. Remove connecting of auxiliary systems (Seal systems, feeler gauges etc.)
8. Demounting pump from plant.

7.9 Send pump back for repair

- **Repair works will be carry out if you give an account of decontamination.**

1. Drain and clean the pump.
2. Sealing all holes and of the pump.
3. Send pump with duly completed declaration of decontamination on the manufacturer.
4. Enclose the pump information about operation conditions and reasons of repair.

Chapter 8

8 Faults and Remedies

Warning!

Rotating parts or pressurised spout liquids can cause fatal injuries.
Possible dangerous situation: Severe or fatal injuries!

- **In case of a fault, stop the pump immediately!**
- **Switch the plant into a voltage-free condition and secure against any unauthorized and accidental restart!**
- **After clearing the fault, inspect the pump and plant before putting the pump into operation again!**

Faults on pumps and pump units may be attributed to hydrodynamic, mechanical or electrical causes. The following table shows a selection of possible faults.

8.1 Checklist for mechanical and hydrodynamic faults

Type of Fault	Possible Cause	Remedy
Pump does not start	Blockage caused by foreign matter	Remove foreign matter
	Deposits after shutdown	Immediately clean pump
	Medium hardens (due to temperature or chemical conditions)	
	Solids contents is too high	Check conveying conditions, if necessary, change engineering data.
	Stator swollen up	Check temperature of medium, check resistance of stator elastomeric relative to the medium.
	Stator swollen due to excessive loading.	Adjust pump operation time and cooling time to speed.
	Plant pressure too high	Compare pump nominal pressure to plant conditions; if necessary, change engineering data.
Pumping rate decreases or is no longer reached	Shutoff devices partially closed blockage in the pipe	Fully open shutoff devices, remove blockage.
	Stator and/or rotor worn	Replace
	Air locks in medium	Check intake pipe, media supply, and seals.
	Shaft seals are defective	Replace shaft seals.

Chapter 8

Type of Fault	Possible Cause	Remedy
Pump does not suck	Incorrect direction of rotation.	Correct direction of rotation, observe direction arrow.
	Suction pipe blocked.	Clean suction pipe.
	Valves not open completely.	Open valve completely.
	Dry running stator possible damaged.	Replace stator, check dry-run protection for correct connection.
Excessive pump noise	Joints are worn	Replace joints.
	Joints worn, gear unit damaged due to overloading or alternating load.	Replace damaged parts, check project planning of plant, monitor pressure; reduce excessive pressure. Avoid high alternating loads.
	Cavitation speed too high or suction pipe too narrow or blocked.	Check engineering data, if necessary, select lower speed, increase pipe cross-section.
	Drive train deflected too widely	Use wide-angle drive shaft or set up drive machine of pump in alignment.
Leak in mechanical seal (GRD)	Seal rings worn.	Replace mechanical seal.
	Excessive pressure in suction housing.	Reduce pressure.
	Spring action from medium. (Medium settles into the spring of the seal) This prevents the adjustment of the seal rings.	Clean seal regularly. Mount another mechanical seal .
	Medium collects on the seal rings.	
Quench of face seal (LWD) leaks on the atmosphere side	Shaft sealing ring of mechanical seal worn.	Replace shaft sealing ring and shaft holder of seal.
Quench of face seal / mechanical seal leaks on product side	Cavitation	Inspect suction housing to verify whether the pressure is too low in comparison with the vapour pressure of the medium
		Monitor the valves during pump operation to verify that valves are completely open.
		Pipe overgrown, clean pipe

8.2 Electrical Faults

Faults in the electrical drive system of the pumps or pump unit may have many different causes (mains connection, dimensioning of the drive unit, motor protection, etc.).

Remove faults in connection with the electrical drive system by following the instructions contained in the attached manufacturer’s operating and maintenance manual.

Chapter 9

9 Disassembly and reassembly

Warning!

Rotating parts, pressurised spout liquids and hot surfaces
Possible dangerous situation: Severe or fatal injuries

- **Do not work on rotating pump!**
- **Switch the drive unit into a voltage-free condition and secure against any unauthorized and accidental restart!**
- **Drain the pump and all connected pipes, and check surface temperature before opening the pump!**
- **Let the pump cool down.**

Warning!

The pump or parts thereof may fall or tip over.
Possible dangerous situation: Severe or fatal injuries!

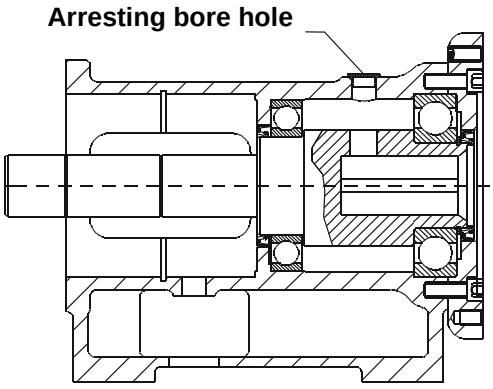
- **The pump or parts of it can be very heavy and must be moved with a suitable lifting device.**

Chapter 9

9.1 General notes for disassembly and reassembly

ATTENTION	Possible damage

- **Lock the drive set into position by inserting a bolt into the bore provided for this purpose at the top of the bearing chair (remove protective cap).**
- **Turn drive set to engage the bolt into the drive shaft bore: (Fig. 9-1) Drive set will then have been secured against any further rotational movement. Do NOT forget to remove this locking bolt before restarting the pump.**
- **If the drive unit is switched on when in a locked condition, there is a risk of fracture and a personal injury hazard! Always use a new plug to close off the locking bolt bore.**



Bolt- diameter for arrest

KL20	**10 mm**
KL30	**12 mm**
KL50	**20 mm**
KL65/KL80	**25 mm**
KL100	**G 1”**

Fig. 9-1

Check the tightening moment of the tie rods after remounting with a torque wrench. Keep on below tightening moments.

Type of pump	Tightening moment
KL 20	25 Nm
KL 30	50 Nm
KL 50	90 Nm
KL 65/ KL 80 / KL 100	240 Nm

- **Always renew the O-rings that have been removed.**
  The item numbers stated hereto a function number in the parts list.

Chapter 9

9.2 Stator

9.2.1 Suction pumps KL 20

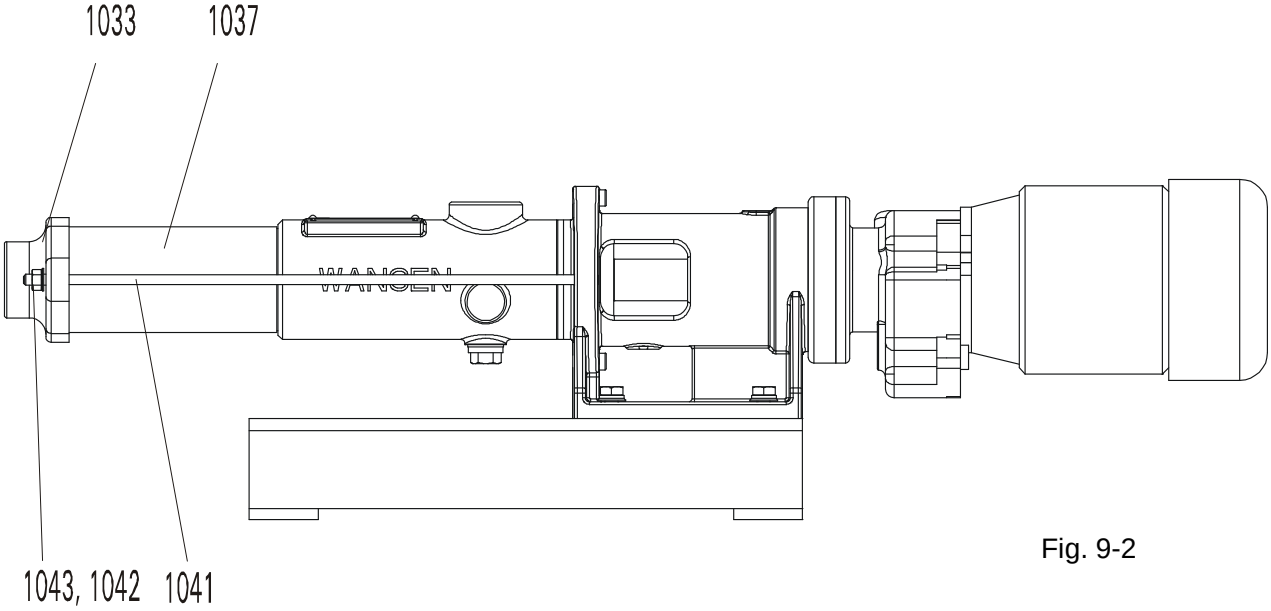


Fig. 9-2

Dismounting:

1. Lock drive shaft (→ 9.1)
2. Unscrew tie rod nuts 1043, take off washer 1042.
3. Remove discharge nozzle 1033.
4. Unscrew tie rods 1041.
5. Withdraw stator 1037 by turning it right-handed. (by looking from the direction of the drive)

Mounting:

1. Fit stator by turning it left-handed. (by looking from the direction of the drive) grease it with proper lubricant (e.g. silicon oil, soft soap, if it is compatible with the medium)
2. Screw tie rods 1041 into drive flange.
3. Insert discharge nozzle 1033 and washer 1042.
4. Refit tie rod nuts 1043 and tighten evenly.

9.2.2 Suction pumps KL 30 – KL 100

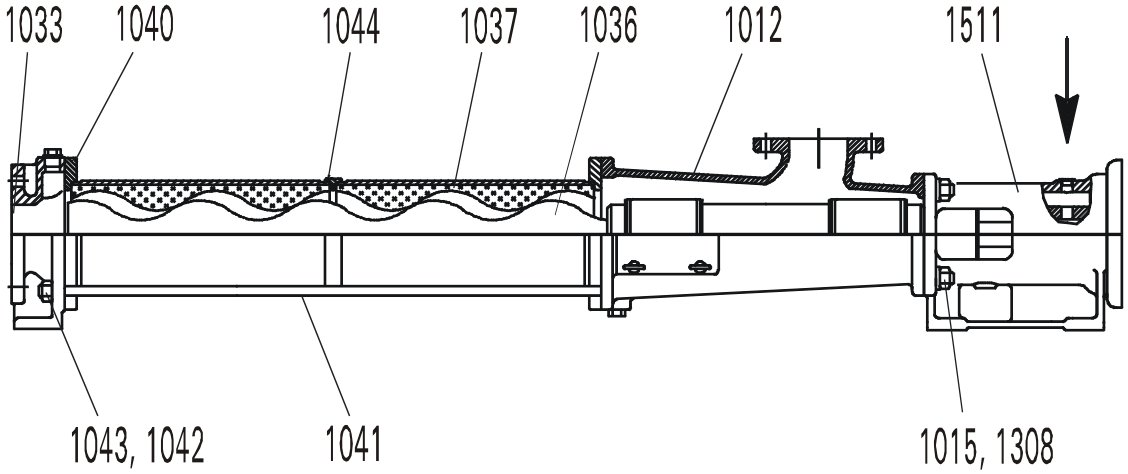


Fig. 9-3

Dismounting:

1. Lock drive shaft (→ 9.1)

   Undo and remove the mounting bolts of discharge nozzle 1033. Unscrew tie rod nuts 1043 and remove discharge nozzle 1033 complete with insertion ring 1040.
2. Unscrew tie rods 1041.
3. Withdraw stator 1037 toward the front by means of a rotary movement (opposite to the rotational direction of the pump). For larger stators it is recommended to use chain tongs for this purpose. Arrest pump set. (→ Fig. 9-1)

Mounting:

1. Place spacer ring 1040 complete with inserted O ring onto suction casing flange (adjust by means of stud bolts).
2. Smear rotor with lubricant (e.g. silicon oil) and slide on stator 1037 by means of a rotary movement (use a piece of wood for support). Ensure that the stator slides into spacer ring 1040 on the suction casing flange. Remove stud bolts (start with the bottom bolts) and screw in tie rods 1041.
3. For two-part pump sets, insert intermediate ring 1044 after the first stator has been fitted, then slide on the next stator.

With stators with a funnel shaped entry side, note the installation orientation. The funnel shaped entry side of the stator shows:

- **to the suction housing / hopper at counter-clockwise rotation of the pump**
- **to the discharge nozzle at clockwise rotation of the pump**

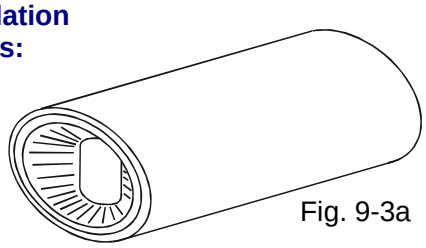


Fig. 9-3a

For two-part pump sets, the funnel shaped entry side of the first stator shows to the suction housing / hopper the other one shows to the discharge nozzle.

4. Place second spacer ring 1040 complete with inserted O-ring onto stator.
5. Fit discharge nozzle and evenly tighten tie rod nuts crosswise.

9.2.3 Hopper pump

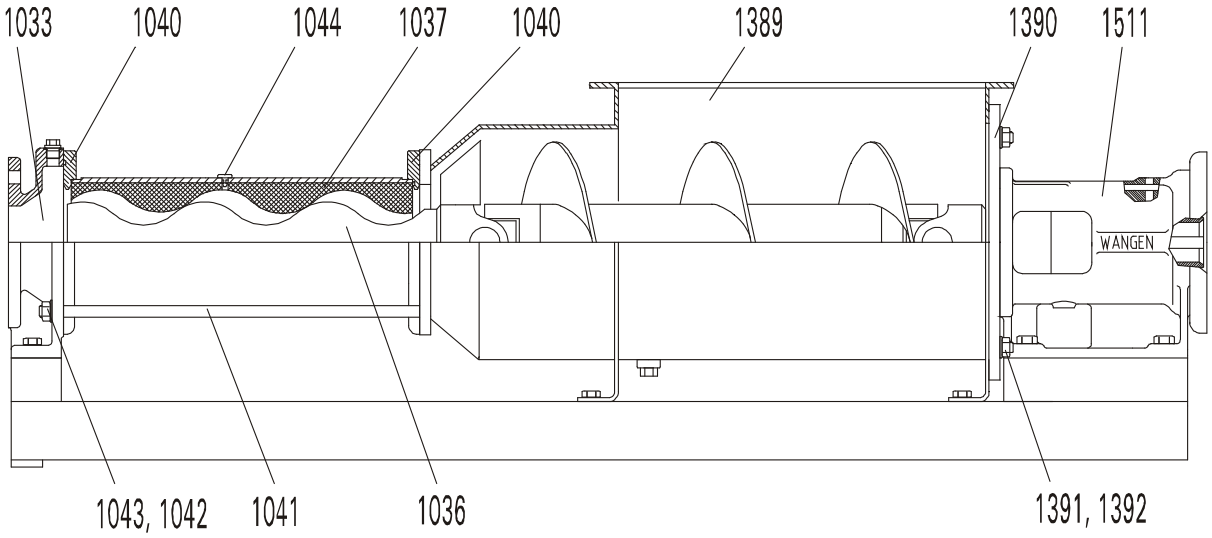


Fig. 9-4

Dismounting:

1. Lock drive shaft (→9.1)

   Undo and remove the mounting bolts of discharge nozzle 1033. Unscrew tie rod nuts 1043 and remove discharge nozzle 1033 complete with spacer ring 1040.
2. Unscrew tie rods 1041.
3. Withdraw stator 1037 toward the front by means of a rotary movement (opposite to the rotational direction of the pump). For larger stators it is recommended to use chain tongs for this purpose. Arrest pump set. (→ Fig 9-1)

Mounting:

1. Place spacer ring 1040 complete with inserted o-ring onto the hopper casing flange 1389 (adjust by means of stud bolts).
2. Smear rotor with lubricant (e.g. silicon oil, soft soap if it is compatible with the medium) and slide on stator 1037 by means of a rotary movement (use a piece of wood for support). Ensure that the stator slides into spacer ring 1040 on the hopper-casing flange 1389. Remove stud bolts (start with the bottom bolts) and screw in tie rods 1041.
3. For two-part pump sets, insert intermediate ring 1044 after the first stator has been fitted, then slide on the next stator.
4. Place second spacer ring 1040 onto the stator.
5. Fit discharge nozzle and evenly tighten tie rod nuts crosswise.

9.2.4 Tie rod type vertical pump KLT

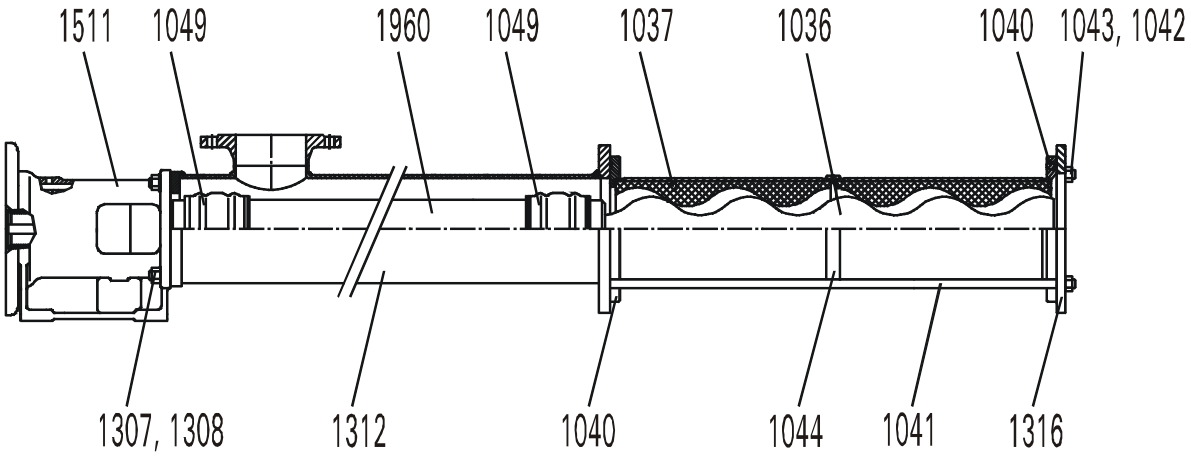


Fig. 9-5

Dismounting:

1. Lock drive shaft (→9.1)

   Unscrew tie rod nuts 1043 and remove taper lock ring 1316 complete with spacer ring 1040.
2. Unscrew tie rods 1041.
3. Withdraw stator 1037 toward the front by means of a rotary movement (opposite to the rotational direction of the pump). For larger stators it is recommended to use chain tongs for this purpose. Arrest pump set. (→ Fig. 9-1)

Mounting:

1. Place spacer ring 1040 complete with inserted O ring onto immersion pipe flange (adjust by means of stud bolts).
2. Smear rotor with lubricant (e.g. silicon oil, soft soap if it is compatible with the medium) and slide on stator 1037 by means of a rotary movement (use a piece of wood for support). Ensure that the stator slides into spacer ring 1040 on the immersion pipe flange.
3. For two-part pump sets, insert intermediate ring 1044 after the first stator has been fitted, then slide on the next stator.
4. Remove stud bolts (start with the bottom bolts) and screw in tie rods 1041.
5. Place second spacer ring 1040 complete with inserted O-ring onto stator.
6. Fit Taper lock ring and evenly tighten tie rod nuts crosswise.

9.2.5 Cartridge type vertical pumps KLT

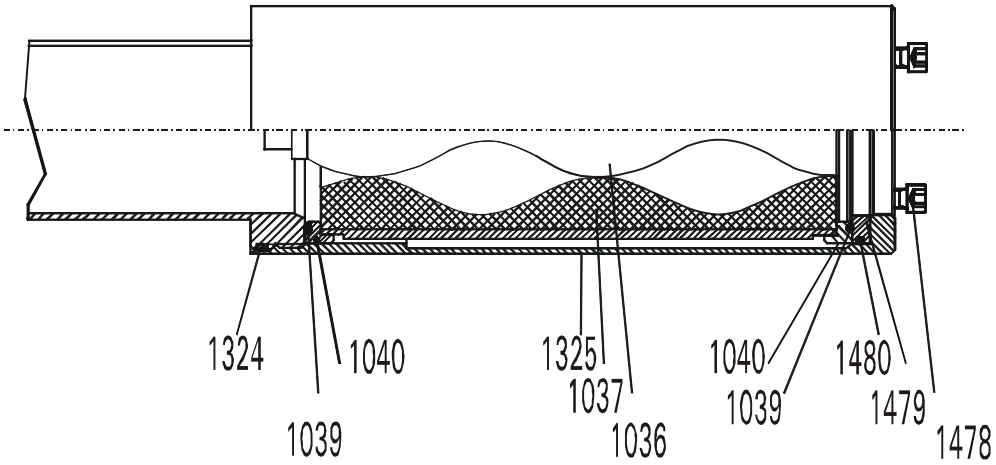


Fig. 9-6

Dismounting:

1. Remove clamp screw 1478.
2. Unscrew cartridge 1325.

ATTENTION	**Possible damage**

- **Cartridge tube has a left-hand thread.**

3. Take down first spacer ring 1040 and clamp ring 1479.
4. Withdraw stator 1037 toward the front by means of a rotary movement (opposite to the rotational direction of the pump). For larger stators it is recommended to use chain tongs for this purpose. Arrest pump set. (→ Fig. 9-1)
5. Take down second spacer ring 1040. Renew the o-rings 1039 at both spacer rings and the clamp ring 1479.

Mounting:

1. Put the spacer ring on the stator and within mounting.
2. Smear rotor with lubricant (e.g. silicon oil) and slide on stator 1037 by means of a rotary movement (use a piece of wood for support).
3. Put the second spacer ring on the stator, put clamp ring into the cartridge. Carefully push over cartridge tube and fix it.
4. Tighten evenly clamp screws 1478.

9.3 Joint bolts with sealed joint connection

9.3.1 KL 20

At this range the connecting bolts are designed as well as rivet pin than dowel pin. At pumps for food the connecting bolts are sealed with screws and O-rings in this case. (→9.3.2)

9.3.2 KL 30 – KL 100

The joint bolts are sealed with screws and O-rings in this case. For safe hold, the screws are secured with protective glue. Replace those bolts as follows:

Dismounting:

1. Undo and remove both screws 1957 of a side of the joint with a screwdriver.
2. Remove washers 1961 and O-rings 1958. (Washers 1961 do not apply to types KL30S, KL50S and KL80S)
3. Push out old bolt 1959.

Mounting:

1. Insert a new one.
2. Insert new O-rings 1958 (put on washers), coat the screws with protective glue (e.g. Loctite 270, as used in the factory), screw in and tighten.
3. Renew by every replacement of rotor or drive shaft the O-ring 1962, to achieve a constant sealing of the connections.

Figure shows a side of the joint connection

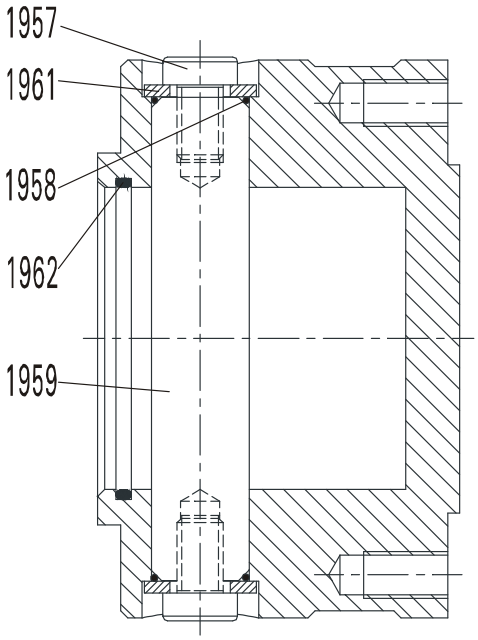


Fig. 9-7

Chapter 9

9.4 Rotor

9.4.1 KL 20

- **Always use a suitable support (piece of wood) when driving in / driving out rivet and dowel pin in order to avoid damage to the drive shaft or the mechanical seal.**

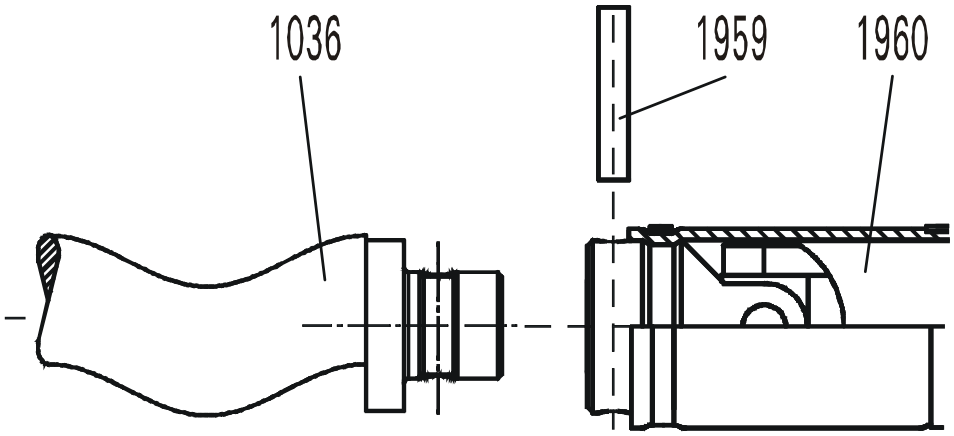


Abb. 9-8

Dismounting:

1. Remove stator. (→ chapter 9.2)
2. Pull off suction / hopper housing.
3. Drive out rivet pin 1959 from the joint at the rotor side.
4. Withdraw the rotor from the joint. and insert the new one.

Mounting:

1. Insert a new rotor. Insert rivet pin, rivet both sides.

Chapter 9

9.4.2 KL 30 – KL 100

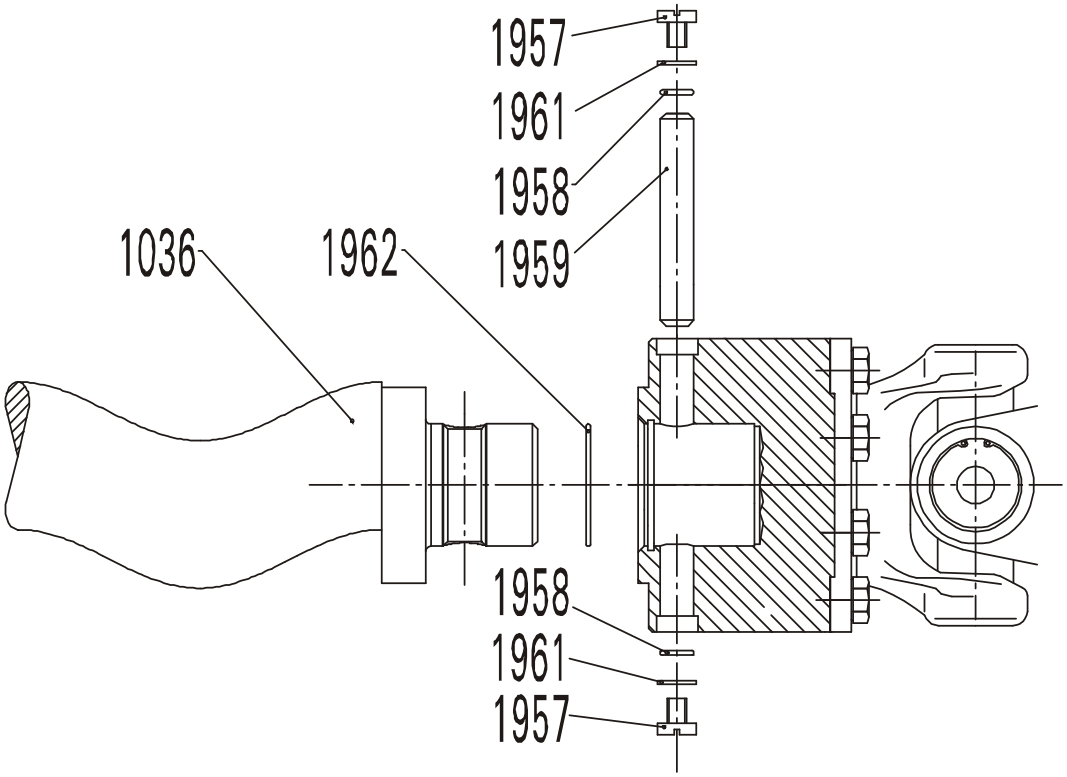


Fig. 9-9

Dismounting:

1. Remove stator. (→ Chapter 9.2)

Suction pumps

2. Undo and remove nuts 1308 between suction housing 1012 and bearing chair1511.

At hopper pumps:

3. Undo and remove screws 1398 of the fastening of the bearing chair and nuts 1393 on the bearing chair flange. Pull out bearing chair 1511 as far as possible than undo and remove nuts 1391 of the bearing chair flange.
4. Pull bearing chair 1511 with joint and rotor out of housing / immersion pipe.
5. Undo and remove both screws 1957 of a side of the joint with a screwdriver / Allen key.
6. Remove washers 1961 and O-rings 1958. (Washers 1961 do not apply to types KL30S, KL50S and KL80S)
7. Push out old bolt 1959. and replace with a new one after changing the rotor.

Mounting:

1. Replace the rotor. Insert new O-rings 1958 (put on washers), coat the screws with protective glue (e.g. Loctite 270, as used in the factory), screw in and tighten.
2. Renew by every replacement of rotor or drive shaft the O-ring 1962.
3. Refit all other parts by following the above instructions in reverse order.

Chapter 9

9.5 Cardan joint

9.5.1 KL 20

- **Mechanical seals are tightened over the spacer ring and / or joint. Hold on spacer ring during pull off the joint.**

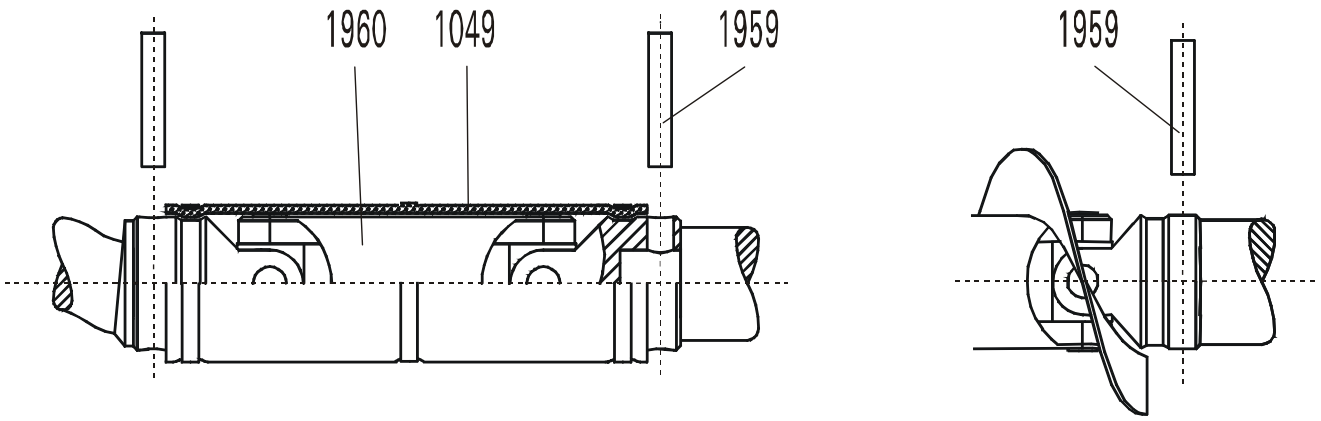


Abb. 9-10

Dismounting:

1. Remove rotor.
2. Drive out rivet pin 1959 from the joint at the rotor end.
3. Remove old joint.
4. Clean pin of drive shaft and rotor and grease it slightly.

Mounting:

1. Push on new joint.
2. Fix with new rivet pins 1959.

9.5.2 Plug-in shaft KL 20

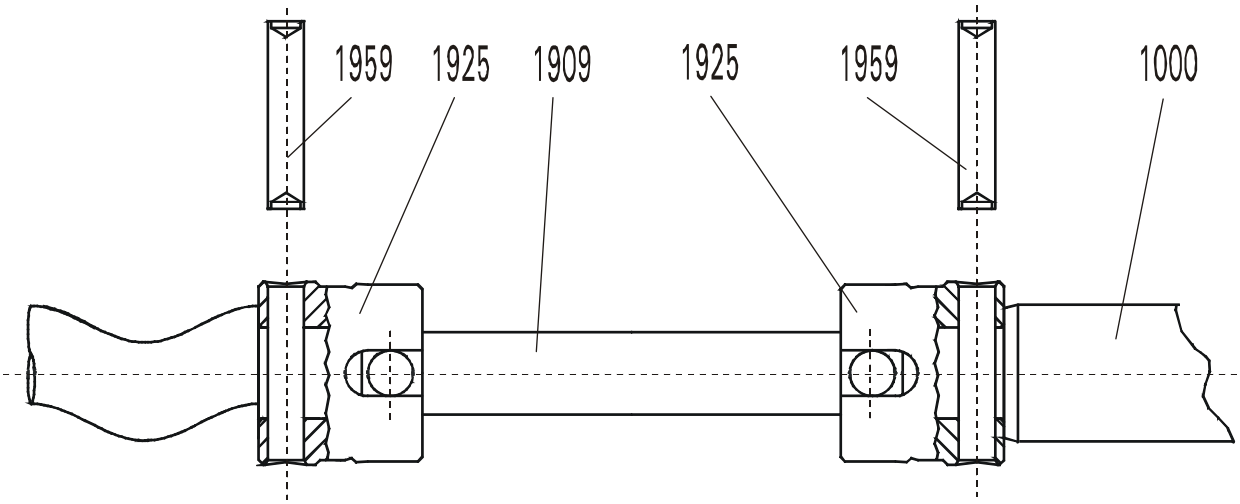


Fig. 9-11

Dismounting:

1. Remove rotor
2. Remove joint.
3. Check connecting parts 1925, if damaged change it.
4. When you change the connecting parts drive out rivet pins 1959 with a punch.

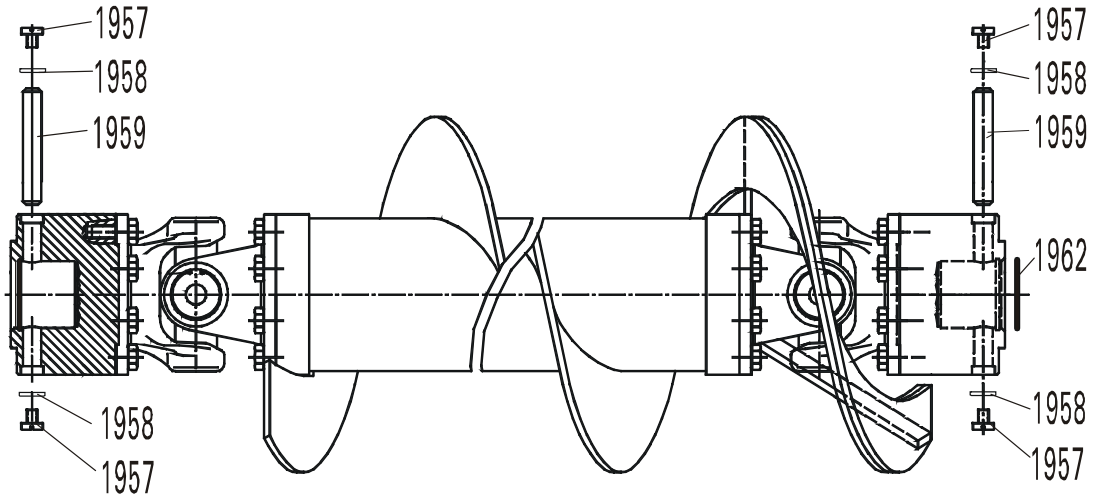
Mounting:

1. Fix new connecting parts with new rivet pins.
2. Insert a new joint.
3. Insert rotor.

ATTENTION	**Possible damage**

- **Pumps with a plug-in shaft must be driven in left-hand direction. (Seen by drive unit) The contrariwise direction of rotation will drive out the rotor and plug-in shaft.**

9.5.3 Cardan joint KL 30 – KL 100



Hopper pump
Suction pump

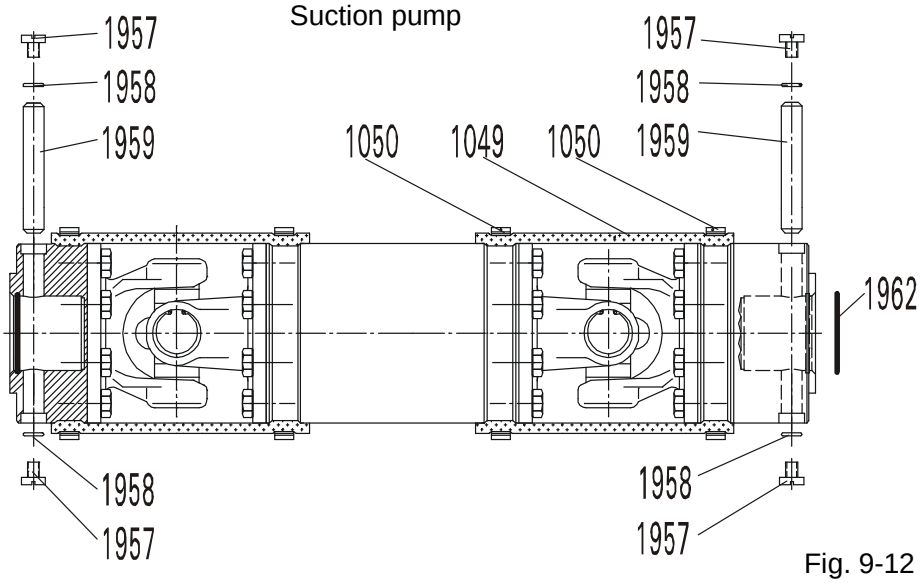


Fig. 9-12

Dismounting:

1. Remove rotor.
2. Undo and remove both screws 1957 of a side of the joint with an Allen wrench.
3. Remove washers 1961 and O-rings 1958. (Washers 1961 only to types KL65)
4. Push out bolt 1959 and pull off joint from drive shaft.

Mounting:

1. Slide joint onto drive shaft and make sure the bores on joint and drive shaft match.
2. Insert the connecting bolt 1959.
3. Connect joint with rotor. Ensure that the connection bores are all in alignment.
4. Refit all other parts by following the above instructions in reverse order.

9.5.4 Stainless steel cardan joint KL 30 – KL 100

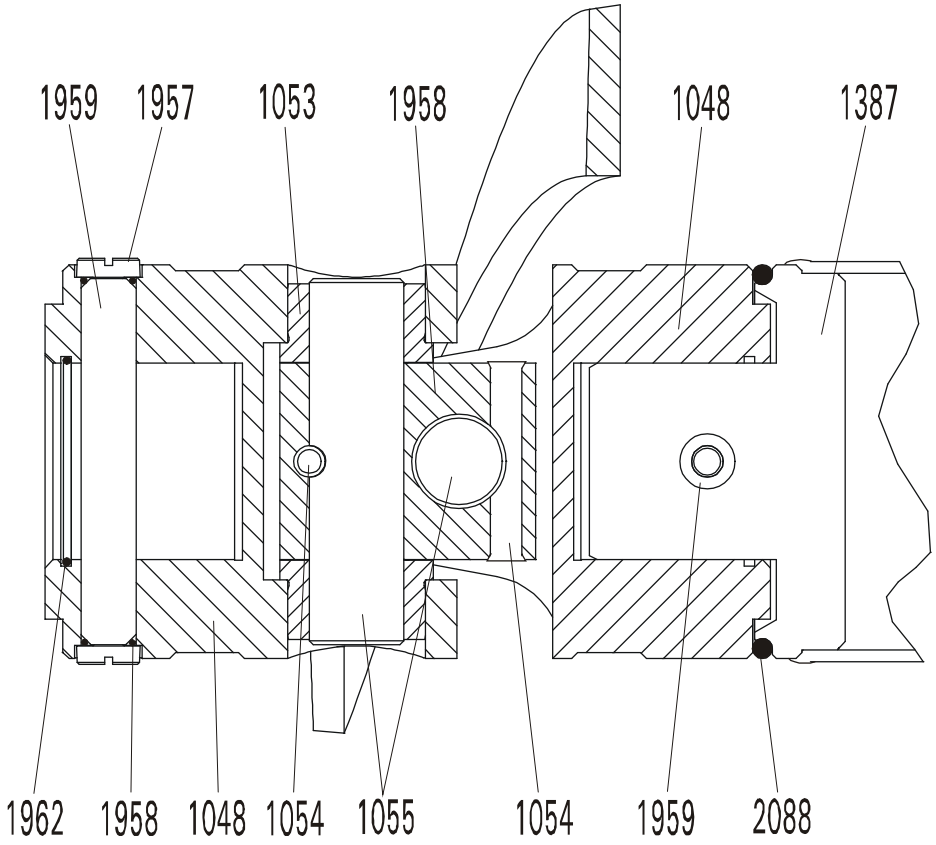


Fig. 9-13

Dismounting:

1. Remove rotor.
2. Undo and remove both screws 1957 of a side of the joint with a screwdriver / Allen wrench. Push out connecting bolt 1959.
3. Remove joint 2094.
4. Undo and remove both screws 1957 of the drive side of the joint. Push out connecting bolt 1959.
5. Check connecting parts 2094 and middle part 1387 if damaged change them.

Mounting:

1. Mount pump in reverse order.

	• **Always renew the O-rings that have been removed. (O-ring 1962 and O-ring 2088).**

Chapter 9

9.6 Joint sleeve

9.6.1 KL 20

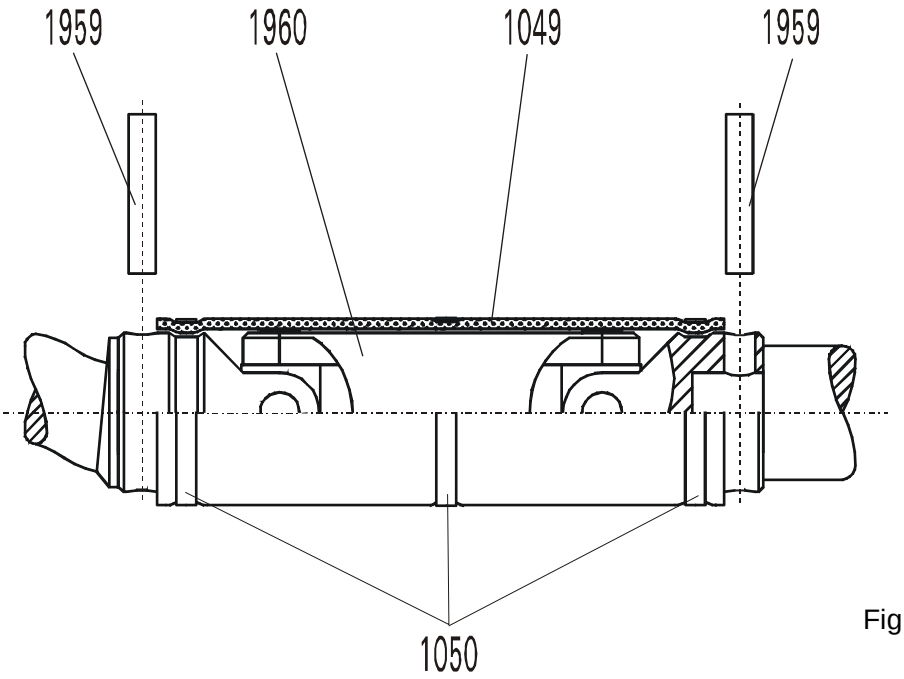


Fig. 9-14

Dismounting:

1. Remove joint. (→ chapter 9.4)
2. Remove old sleeve clamp.
3. Pull off sleeve.
4. Clean joint.

Mounting:

1. Slide new sleeve onto joint and mount the middle sleeve clamp.
2. Bring joint to a vertical position; fill the top joint part with oil. (→ chapter 7)
3. Push the sleeve clamp onto sleeve and fix it.
4. Turn around joint, fill with oil and mount sleeve clamp.
5. Mount pump in reverse order.

- **To make the filling of the joint easier, push a screw driver between sleeve and joint.**

9.6.2 Joint sleeve KL 30 – KL 100

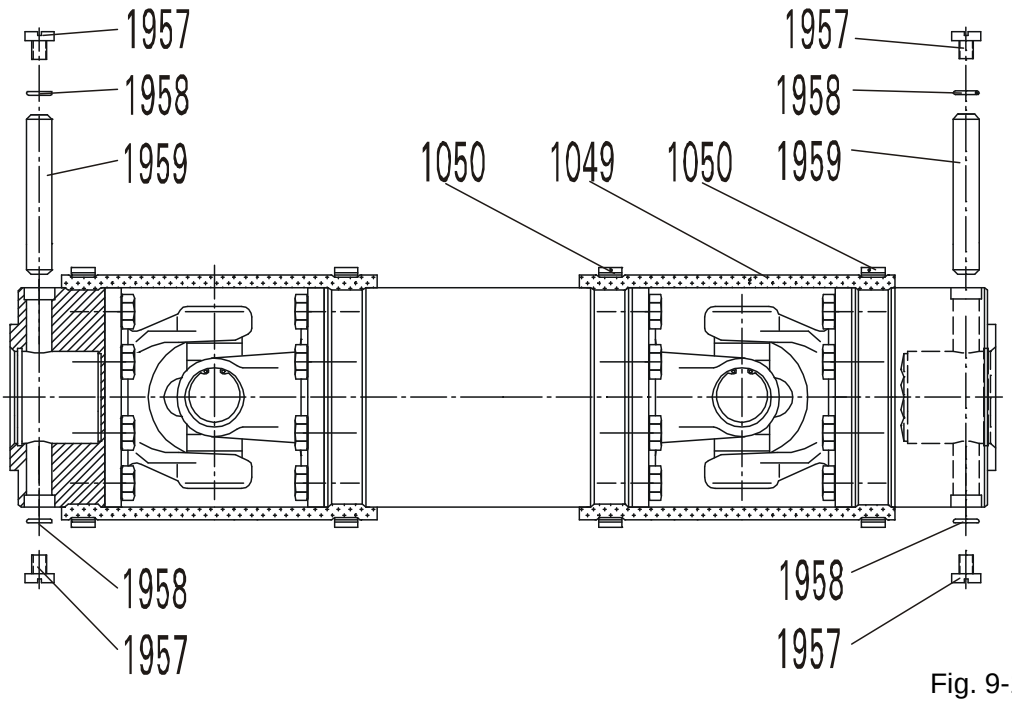


Fig. 9-15

Dismounting:

1. Remove rotor. (→ Chapter 9.4)
2. Remove existing clamps by opening clamp locks. Then withdraw sleeve(s) 1049.
3. Check joints. Replace, if necessary. (→ Chapter 9.5)

Mounting:

1. Slide new sleeve over joint and mount clamps. (The clamps will be closed by means of a trade standard BAND-IT closing tool).

Joints with joint oil (stainless steel cardan joint):

2. Just mount the middle clamp (or the ones inside),
   Erect cardan joint vertically and fill one side of the shaft with oil (→ chapter 7)
   Push outside clamp over the sleeve and mount it.
   Turn the joint and fill other side with oil, push the clamp and fix it.
3. Mount the pump in reverse order.

9.7 Shaft seal

ATTENTION	Possible damage

- **In the following the replacement of the shaft sealing in the form of cartridge seals and single acting mechanical seals is described.**
- **Complex sealing systems like double acting mechanical seals and special seal arrangements require however a high measure of specialized knowledge with the replacement of the sensitive parts.**
- **For this reason we recommend to leave these special seals in the manufacturer replacement.**
  Only so we can guarantee for the quality of the shaft sealing.

9.7.1 LWD-Cartridge KL 20

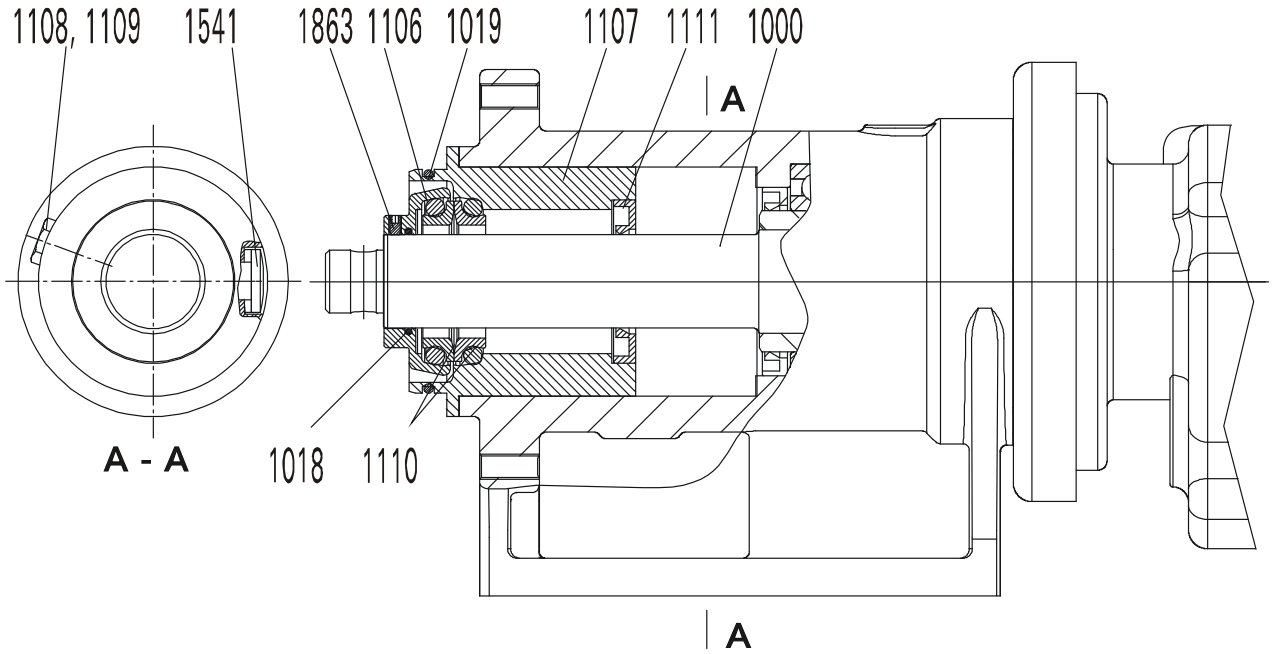


Fig. 9-16

Dismounting:

1. Remove joint.
2. Remove protective cap 1109 of breather plug 1108 (use screwdriver to lift up).
3. Rotate seal casing 1107 downwards by means of plug 1108, open, and collect all the oil draining out.
4. Undo set screws 1863 on the shaft receptacle.
5. Pull off shaft receptacle 1106 with face seal 1110 and seal housing 1107. Collect rest of oil.

ATTENTION	Possible damage

- **Make sure to replace shaft seal ring 1111 in the seal housing 1107. If the drive shaft in the area of the shaft seal ring is worn (formation of grooves), it has to be replaced as well to ensure a perfect sealing performance in direction of the drive unit.**
- **The contact surfaces of the O-rings in the mounting must be free of grease. Also ensure not to damage or contaminate the micro finished sliding surfaces.**

Mounting:

1. Clean and lightly grease drive shaft. Evenly push LWD sliding rings over the O-rings by using the mounting tube onto the seal housing 1107 and the shaft receptacle 1106. Push seal casing 1107 on the drive shaft and turn till the charging hole faces upwards.

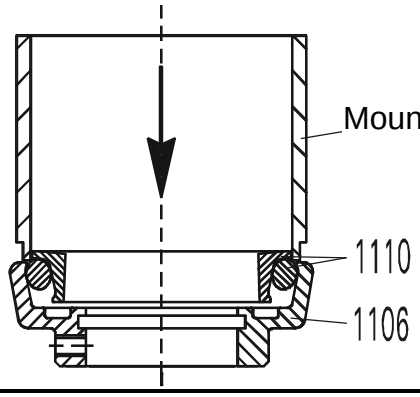


Fig. 9-17

ATTENTION	Possible damage

- **Ensure before mounting that the sliding rings sit evenly and parallel in their corresponding receptacles.**

2. Cover face seal rings with a thin, clean oil coating. Positioning receptacle for LWD with fitted seal rings onto drive shaft. (the seal surfaces will face each other)

   Push on joint and mount with rivet (dowel pin).) (The initial tension of the sealing is adjusted by doing this) Tighten set screws 1863.
3. Fill in oil. Screw in plug and screw in vent plug.
4. Refit all other parts by following the above instructions in reverse order..

9.7.2 LWD-Cartridge KL 30 – KL 100

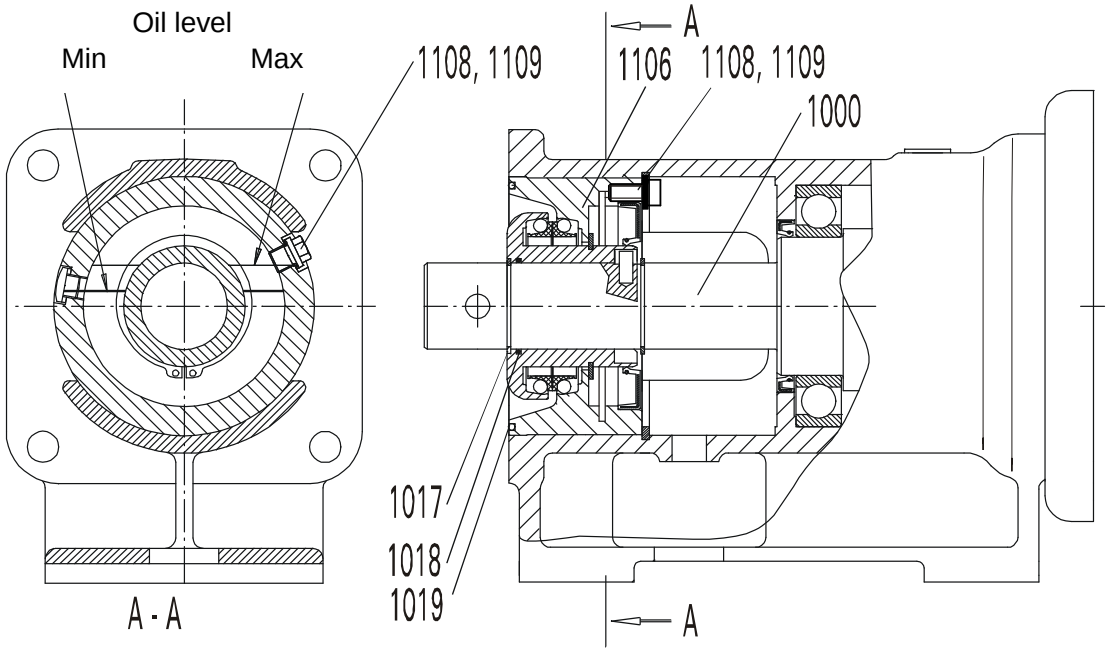


Fig. 9-18

Dismounting:

1. Remove joint. (→ Chapter 9.6)
2. Remove protective cap 1109 of breather plug 1108 (use screwdriver to lift up).
3. Remove snap ring 1017.
4. Rotate seal casing downwards by means of plug 1108, open, and collect all the oil draining out.
5. Withdraw LWD cartridge from shaft.
6. Renew O ring 1018. Clean and lightly grease drive shaft 1000 and seal seat in the bearing chair.

Mounting:

1. Slide on LWD cartridge, (groove of seal seat 1106 must engage in tension pin 1021) mount circlip 1017.
2. Rotate seal housing in an upward direction (top edge = bearing chair window) and fill with oil (→ Chapter 7). Screw in plug and press on cap.

- **A cylindrical head cap screw has built in some cartridges to vent the seal. This is necessary to vent a locking pressure system or to vent the seal in an explosive atmosphere.**

9.7.3 Barrier ring (Bio - Mix Pumps)

1. Remove LWD - Cartridge (→ 9.7.2).
2. Pull out the old ring with a hook. (The ring will be destroyed).
3. Clean seat of the barrier ring and the housing.
4. Grase slightly a new ring and fit it into the housing.
5. Push a feeler gauge (0.1 mm) between seal seat and barrier ring.
6. Careful insert the barrier ring with a mounting tube.
7. Pull out feeler gauge.
8. Mount LWD - Cartridge (→ 9.7.2).

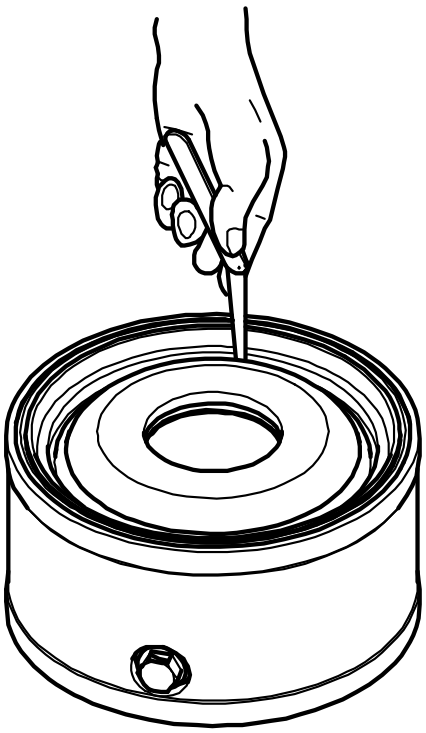


Abb. 9-18a

- **About the feeler gauge the air will be vent.**

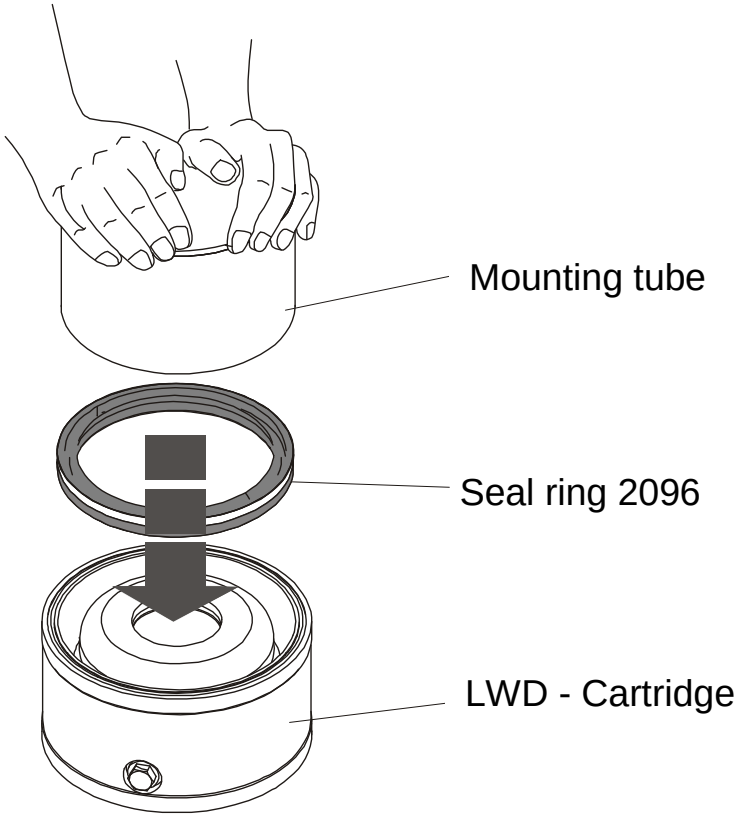


Abb. 9-18b

9.7.4 Mechanical seal KL 20

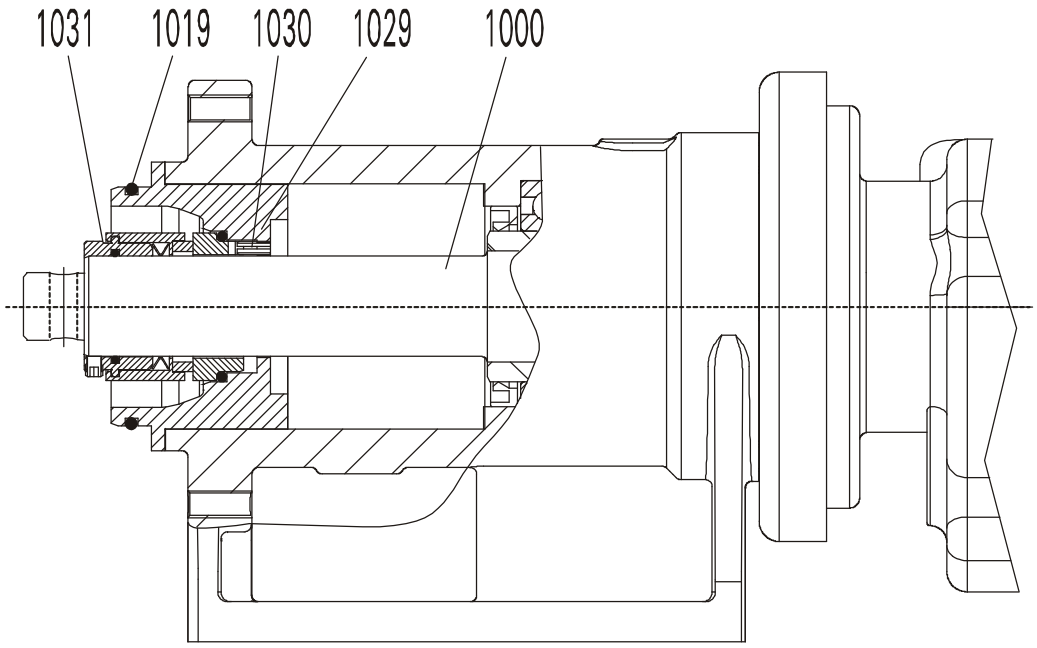


Fig. 9-19

Dismounting:

1. Remove joint. (Flexi joint by submergible pumps)
2. Take off mechanical seal 1031 and spacer ring 1062 (if necessary).
3. Clean drive shaft.

Mounting:

1. Push stationary part with O-rings evenly into the seal casing 1059. The groove in the sealing body must engage in dowel pin 1058.
2. Push dynamic sealing unit onto the shaft.
3. (Slide on conical spring in winding direction. The wire lug on the spring must engage in the groove of the sealing element.)
4. Slide on spacer ring.(if necessary)
5. Mount joint.
6. Reassembly of pump in reverse order.

ATTENTION	**Possible damage**

- **For mechanical seals independent of rotational direction: tighten the bolts on the lock ring after the joint has been fitted.**

9.7.5 Mechanical seal KL30 – KL100

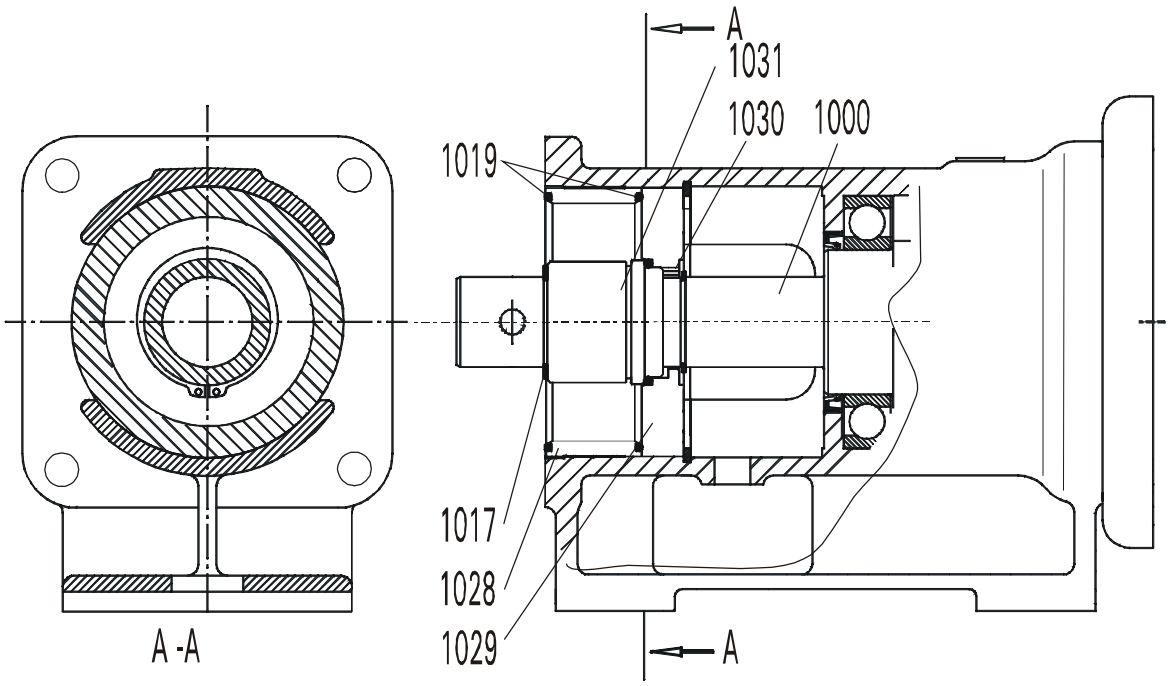


Fig. 9-20

Dismounting:

1. Remove joint (→ chapter 9.6) and pull off distance ring 1017.
2. Remove distance ring. For mechanical seals independent of rotational direction: undo the bolts on the lock ring.
3. Withdraw the complete mechanical seal.
4. Clean sealing seat by means of a standard solvent.

Mounting:

1. Press stationary part complete with O-ring evenly into the seal plate 1029. The groove in the sealing body must engage in dowel pin 1030. Insert mechanical seal housing 1028 with O-Ring 1019 in bearing. Slide dynamic sealing element onto shaft. The wire lug on the spring must engage in the groove of the sealing element. Slide on distance ring.
2. Fit and secure snap ring 1017.
3. Fit joint.
4. Reassemble pump by following the instructions for disassembly in reverse order.

ATTENTION	**Possible damage**

- **For mechanical seals independent of rotational direction: tighten the bolts on the lock ring after the joint has been fitted.**

9.7.6 Stuffing box packing KL 20

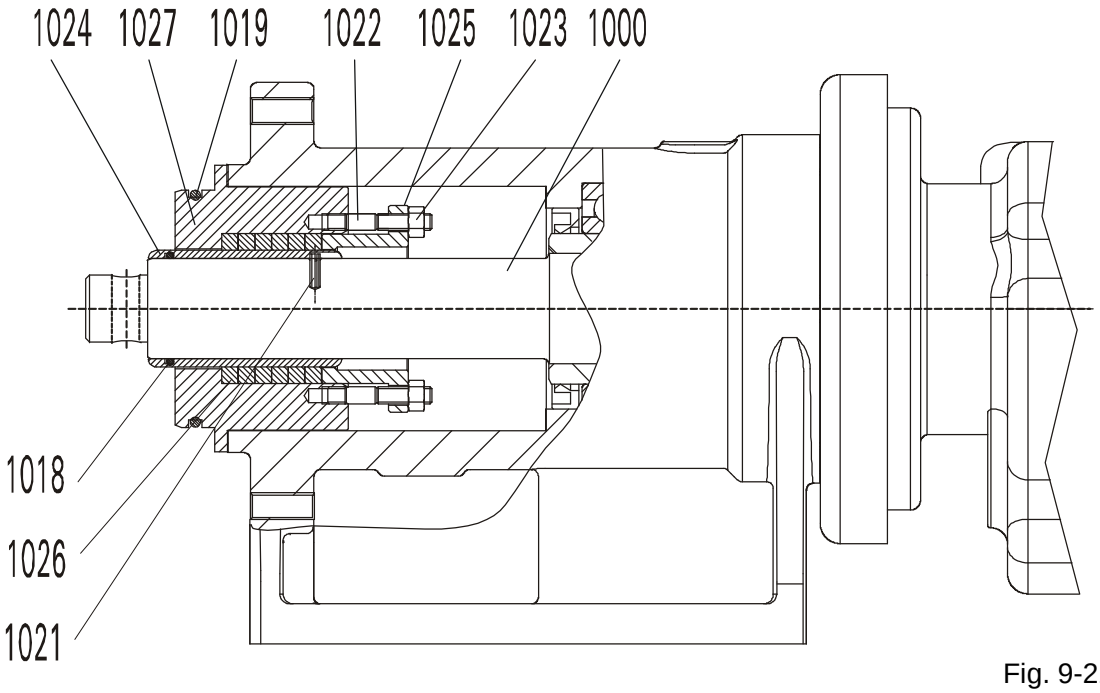


Fig. 9-21

Dismounting:

1. Remove joint
2. Unscrew nuts 1023 of the stuffing box gland
3. Pull off stuffing box housing 1027.
4. Pull off stuffing box gland and remove packing rings.
5. Pull shaft sleeve 1024 out off drive shaft and clean it.

Mounting:

1. Lightly grease drive shaft and set in shaft sleeve with O-ring 1018. The groove in shaft sleeve must engage in dowel pin 1021.
2. Insert new packing rings 1056 into stuffing box 1027; ensure that the rings are each offset by 90°. Fit gland and turn in gland nuts.
3. Grease inside stuffing box and set into bearing chair.
4. Reassemble pump, lightly hand tighten gland.
5. Allow pump to operate for 10 minutes in normal operating conditions in order to settle the packing. In the event of major leakage, re-tighten the gland nuts.

ATTENTION	**Possible damage**

- **The gland must be allowed to leak slightly in order to ensure it is lubricated. Do not over tighten the packing. If contact pressure is too great, the packing may burn off.**
- **If there is a flushing ring into the stuffing box seal, it will be behind third packet gland. (Seen from drive side)**

9.7.7 Stuffing box packing KL 30 – KL 100

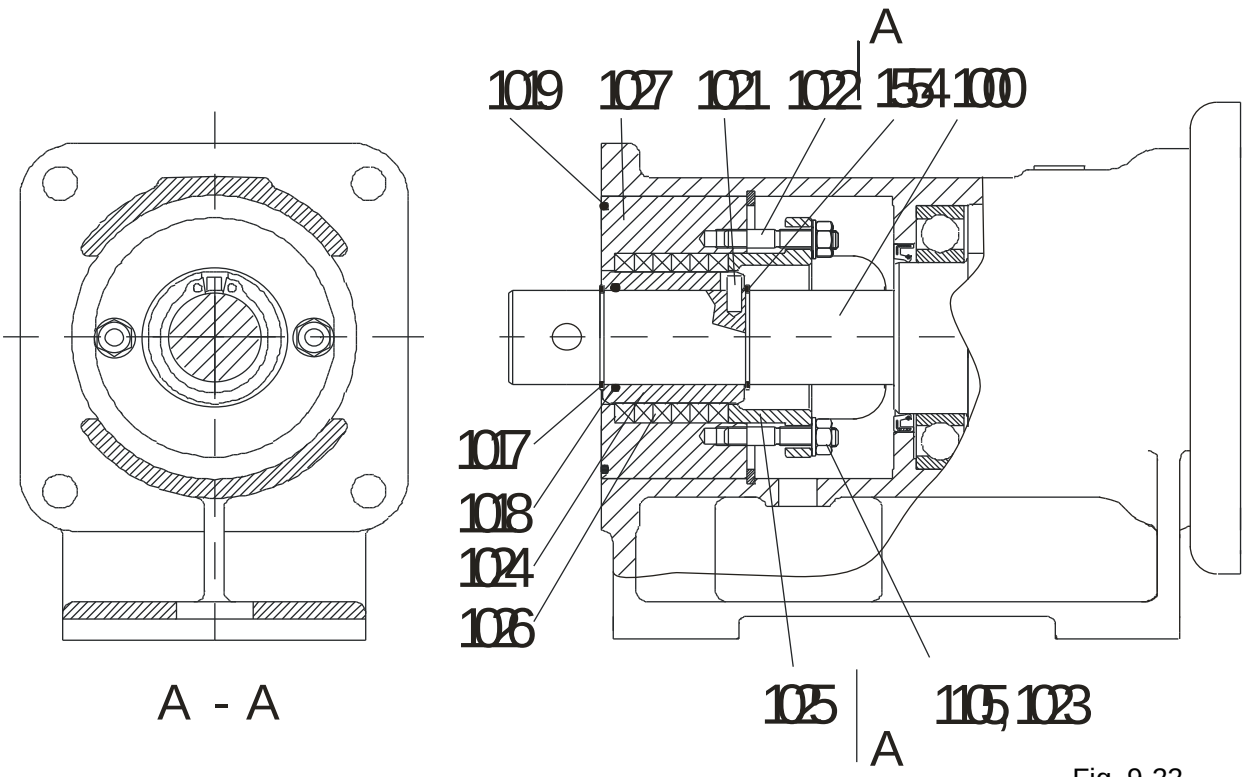


Fig. 9-22

Dismounting:

1. Undo nuts 1023 and fully push back stuffing box gland 1025 towards the drive end.
2. Use packing withdrawal tool or hooks to remove the old packing.

Mounting:

1. Insert new shaft seal rings; ensure that the joints are each offset by 90°.
2. Lightly hand tighten gland.
3. Allow pump to operate for 10 minutes in normal operating conditions in order to settle the packing. In the event of major leakage, re-tighten the gland nuts.

ATTENTION	**Possible damage**

- **The gland must be allowed to leak slightly in order to ensure it is lubricated. Do not over tighten the packing. If contact pressure is too great, the packing may burn off.**
- **If there is a flushing ring into the stuffing box seal, it will be behind second packet gland. (Seen from drive side)**

9.7.8 Stuffing box (cartridge) KL 30 – KL100

Dismount:

1. Remove joint (→ chapter 9.6)
2. Dismount snap ring 1017.
3. Unscrew nuts 1023 of the stuffing box gland.
4. Pull off stuffing box cartridge.
5. Clean drive shaft 1000, check on firm seat of snap ring 1554 (the back one) if necessary exchange it.

Mounting:

1. Lightly grease drive shaft and set in new cartridge.
   The groove in shaft sleeve must engage in dowel pin 1021.
2. Insert new O-ring 1019 into cartridge.
3. Reassemble pump by following the instructions for disassembly in reverse order.
4. Lightly hand tighten gland.
5. Allow pump to operate for 10 minutes in normal operating conditions in order to settle the packing. In the event of major leakage, retighten the gland nuts.

ATTENTION	**Possible damage**

- **The gland must be allowed to leak slightly in order to ensure it is lubricated.**
  Do not over tighten the packing. If contact pressure is too great, the packing may burn off.

9.7.9 Mechanical seal with bellow, independent of rotational direction KL 20

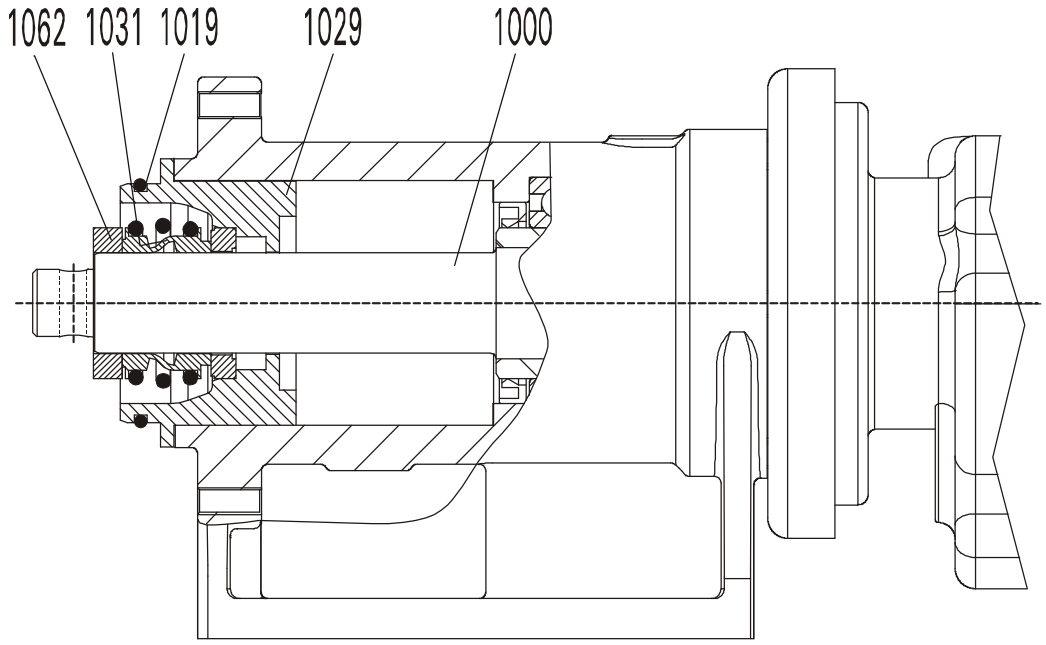


Fig. 9-23

Dismounting:

1. Remove joint
2. Remove mechanical seal 1031;
   Remove spacer ring. Pull off the elastomeric bellows with rotating part of the seal.
3. Pull off seal housing 1029 and remove counter ring with its seal ring.
4. Clean drive shaft carefully.

Mounting:

1. Insert counter ring with seal ring into the seal housing 1029. Using low surface-tension water (minimal detergent content), push the elastomeric bellows (the rotating part of seal 1031) onto the driving shaft with a screwing motion, and push on distance ring1062. Mount joint and fix it with rivet (dowel pin) on the drive shaft. (The initial tension of the sealing is adjusted by doing this)
2. Check parts on correct firm seat after mounting.
3. Reassembly of pump in reverse order.

9.7.10 Mechanical seal with bellow, KL 30 – KL100

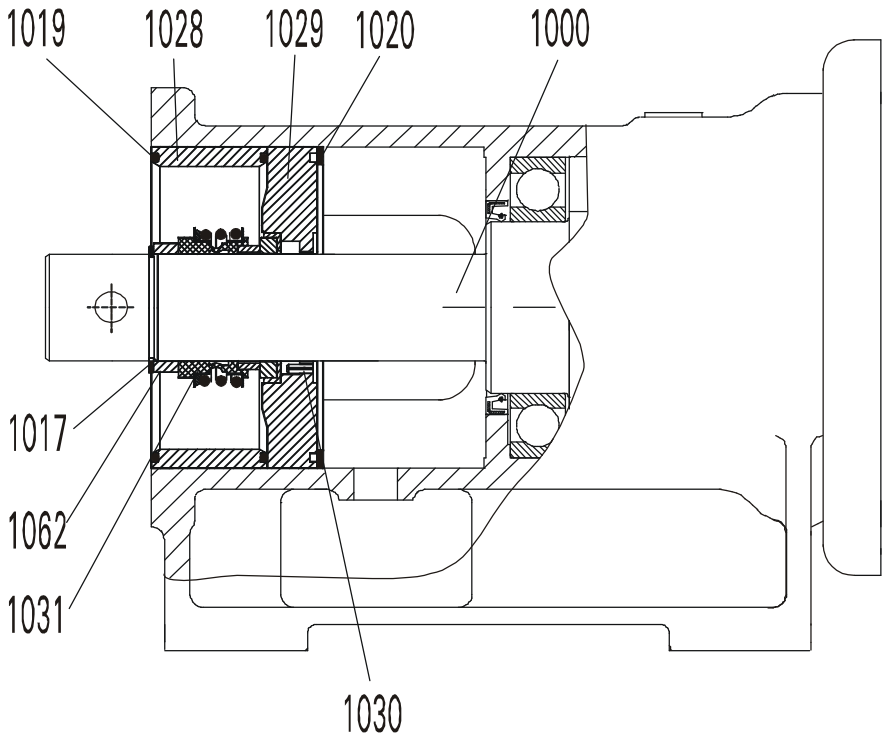


Fig. 9-24

Dismounting:

1. Remove joint. (→ Chapter 9.6)
2. Remove snap ring 1017.
3. Remove rotating mechanical seal 1031:
   Remove spacer ring 1062. Pull off the elastomeric bellows the rotating part of the seal.
   Remove counter ring with its seal ring.
4. Pull off mechanical seal housing 1028 with seal plate 1029 and stationary part of the sealing.
5. Clean seal housing 1028 and driving shaft 1000 carefully. Check of damages.

Mounting:

1. Mount the mechanical seal carefully while keeping it scrupulously clean:
   Insert seal plate1029 to bearing chair housing.(against circlip 1020) Using low surface-tension water (minimal detergent content), push the elastomeric bellows (the rotating part of seal 1031) onto the driving shaft with a screwing motion, push on distance ring. Set snap ring 1017 onto the driving shaft and carefully push against the spacer ring using a suitable mounting tube until it locks into the appropriate groove.
2. Reassemble the pump in the reverse order.

9.7.11 Rotary lip seal KL 20

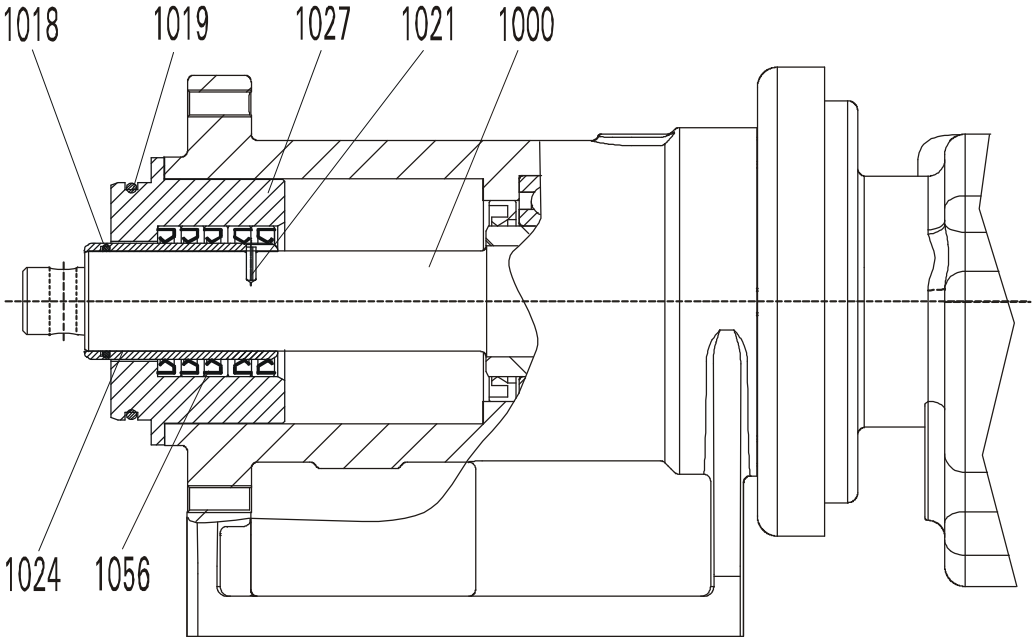


Fig. 9-25

Dismounting:

1. Remove joint.
2. Pull off sealing housing 1027. Press out shaft sealing rings.
3. Pull out shaft sleeve 1024 and clean it. Change O-ring 1018.

Mounting:

1. Grease shaft sleeve lightly and pull onto the drive shaft. The groove in shaft sleeve must engage in dowel pin 1021.
2. Insert shaft sealing rings. Slide on sealing housing.
3. Insert new O-ring 1019.
4. Reassemble the pump in the reverse order

ATTENTION	**Possible damage**

- **Attend to the adjustment of the rings.**
- **If there is a flushing ring into the shaft seal, it will be behind third shaft sealing ring. (Seen from drive side)**

9.7.12 Rotary lip seal – cartridge KL 30 - KL 100

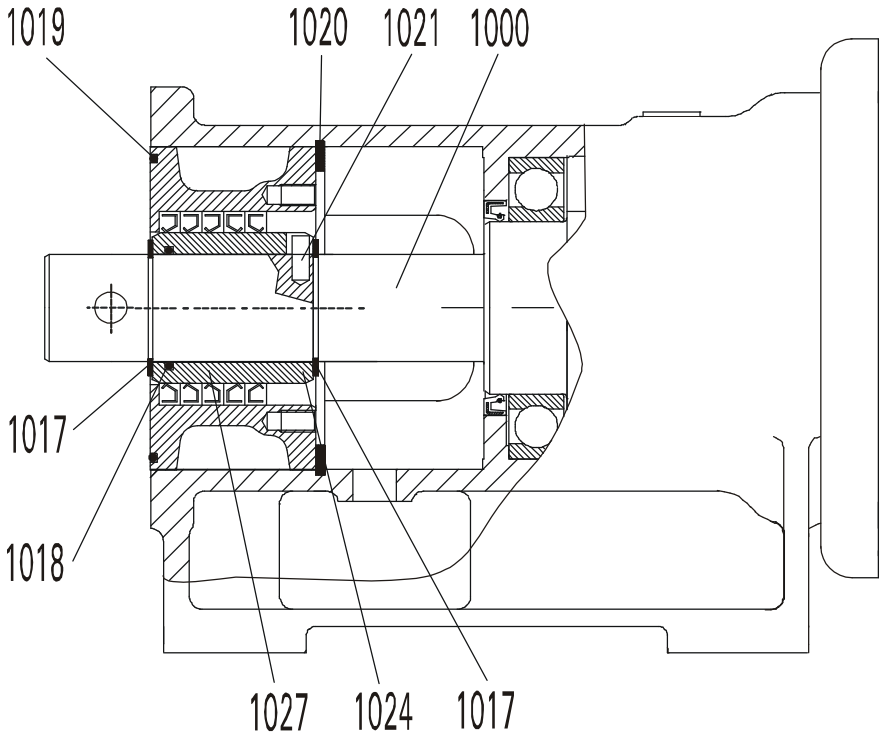


Fig. 9-26

Dismounting:

1. Remove joint. (→ chapter 9.6)
2. Remove snap ring 1017.
3. Pull off the complete sealing cartridge 1113 out of drive shaft (→ spare part list).
4. Clean drive shaft 1000, check on firm seat of snap ring 1017 (the back one) if necessary exchange it.

Mounting:

1. Grease drive shaft easily and push on new sealing cartridge.
   Groove of shaft sleeve 1024 must engage in dowel pin 1021.
2. Insert new O-ring 1019 in cartridge.
3. Reassemble the pump in the reverse order.

ATTENTION	**Possible damage**

- **Attend to the adjustment of the rings.**
- **If there is a flushing ring into the shaft seal, it will be behind second shaft sealing ring. (Seen from drive side)**

Chapter 9

9.8 Driving parts

9.8.1 Drive unit

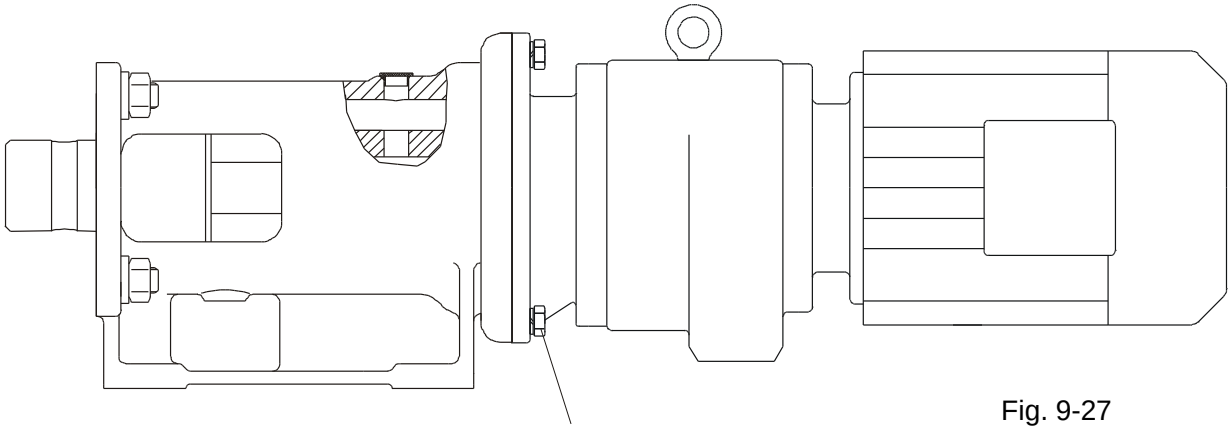


Fig. 9-27

	**Caution!** **Risk of trapping and crushing by dismounting drive unit.** **Possible dangerous situation: Minor injuries**

- **Use lifting tool to secure drive unit against tilting over.**

Flange diameter 160 mm

1. Undo and remove mounting bolts 1011 with spring rings 1118 on drive unit flange 1104.

Prise off drive unit by placing two levers into the recesses provided in the drive unit flange for this purpose.

Flange diameter 200 mm and larger

1. Use lifting gear to secure drive unit against tilting over.
2. Undo and remove mounting bolts 1011 with spring rings 1118 on drive unit flange 1104.
3. Screw in prise-off bolts into the drive unit flange.
4. Disassemble drive unit by evenly tightening these bolts.

9.8.2 Drive shaft and roller bearings

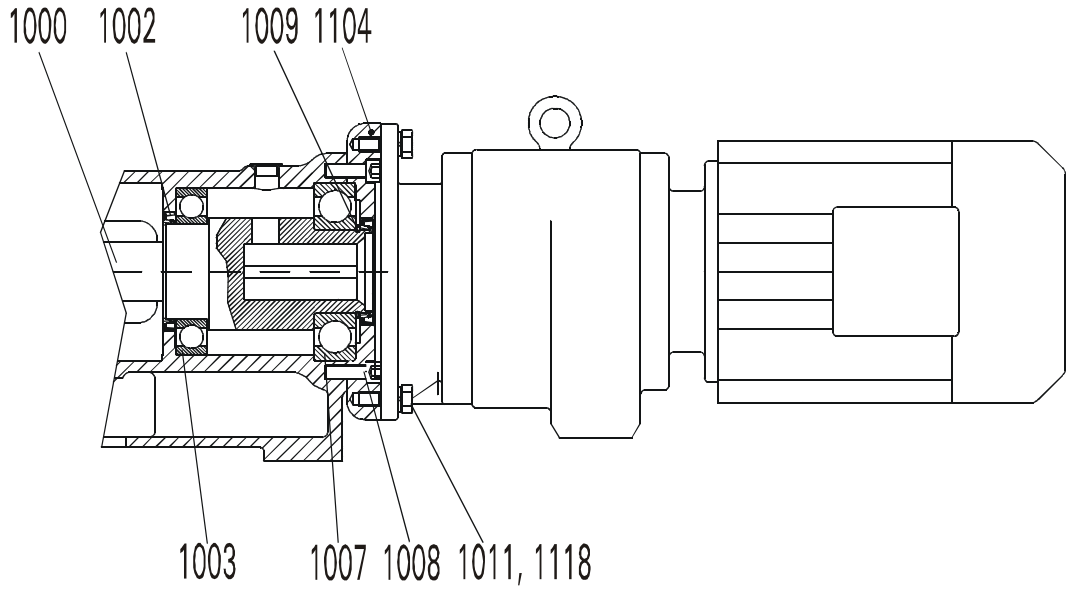


Fig. 9-28

Dismounting:

1. Remove joint. (→ Chapter 9.6)
2. Remove sealing unit. (→ Chapter 9.7)
3. Remove drive unit. (→ Chapter 9.8)
4. Undo and remove flange bolts 1008 and remove drive unit flange 1104.
5. Remove shaft seal and replace by a new seal when refitting.
6. Use a press to press-out drive shaft 1000 in drive end direction.
7. Remove snap ring 1009 and withdraw drive end bearing 1007.
8. Press out roller bearing 1003.
9. Replace shaft seal 1002.

Mounting:

1. Press new roller bearings 1003/1007 onto the new drive shaft.

ATTENTION	**Possible damage**

- **Heat roller bearing to approximately 90°C before fitting.**

2. Use snap rings to mount bearing onto shaft.
3. Press drive shaft complete with roller bearings into the bearing chair.
4. Mount bearing casing flange and tighten bolts.
5. Slide in drive unit and tighten flange bolts.

Chapter 9

9.9 Bio Mix Pumps

9.9.1 Feeding screw

Warning!

Rotating parts, pressurised spout liquids and hot surfaces.
Possible dangerous situation: Severe or fatal injuries

- **Do not work on rotating pump!**
- **Switch the drive unit into a voltage-free condition and secure against any unauthorized and accidental restart!**
- **Drain the pump and all connected pipes, and check surface temperature before opening the pump!**

Dismounting:

1. Drain the pump. Open the cleaning covers 1276 on hutch and the cleaning covers 1522 and 2061 on tunnel.
2. Clean hutch, tunnel and feeding screw.
3. Lock the dive set (see chapter 9.1 instruction handbook)
4. Support feeding screw (wooden block). Undo and remove both screws 1957 on drive side. Remove washers 1961 and O-rings 1958 (washers 1961 only at range KL65).
5. Pull out connecting joint 1959.
6. Undo and remove screws 1625 on the discharge nozzle and tunnel and remove nuts 2069 and 2071.
7. Pull out pump set with tunnel till the feeding screw is reached.
8. Undo and remove both screws 1957 on rotor side. Remove washers 1961 and O-rings 1958 (washers 1961 only at range KL65). Pull out connecting joint 1959.
9. Pull out feeding screw from rotor and remove with a lifting device.
10. Check sealing of the tunnel if necessary change it.

Mounting:

11. To assemble the pump, proceed in reverse order.

Warning!

Rotating parts, pressurised spout liquids and hot surfaces
Possible dangerous situation: Severe or fatal injuries

- **Refit all safety devices before restarting the pump.**
- **When restarting the machine, follow the instructions and safety notes contained in the chapter “Commissioning”**

9.9.2 Protective joint sleeve

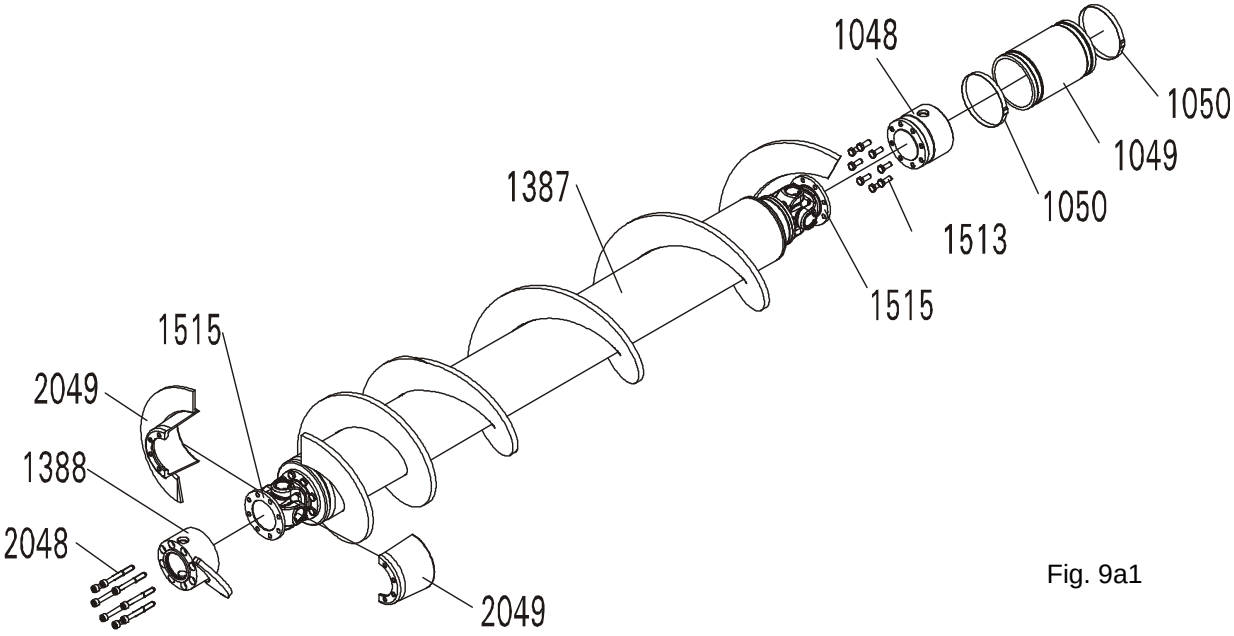


Fig. 9a1

Dismounting:

1. Undo and remove socket head cap screws 2048.
2. Remove the connecting part 1388 and the two halves of the protective joint sleeve 2049.
3. Fit the Connecting part 1388 and one part of the sleeve on the joint and adjust with two screws. Fit the second part and adjust with the screw. Apply some locking agent to all the screws (e.g. Loctite 270, company locking agent) and screw in the screws and tighten.

Mounting:

1. To assemble the pump, proceed in reverse order.

ATTENTION	**Possible damage**

- **Fit the connecting part and the joint sleeves in such a way that the screw helix carries on continuously (see Fig. 9a1).**
- **Use new socket head cap screws of strength class 10.9 in accordance with DIN 912 to fit the protective joint sleeves. Tightening torque: M 10 = 70 Nm, M 12 = 120 Nm.**

Chapter 10

10 Replacement Parts Stock

10.1 Replacement parts

Wear and thus the service life of the major pump components is significantly influenced by various different factors such as;

- operating pressure,
- speed of rotation,
- condition of the delivery medium,

duration of plant operation.

The most important replacement parts that you should normally keep in stock for each pump in order to achieve low MTTR values (mean time to repair) are listed in the table below (recommendations according to DIN 24 296).

Number of alike pumps per plant part		
Replacement parts	**up to 3 pumps**	**from 4 pumps onwards**
stator	1	2
rotor	1	2
set of seals (O ring)	1	2
cardan shaft (complete) (*)	1	2
shaft seal (*)	1	2
joint / sealing oil (*)	1	2

(*) depending on type of pump (→ data sheet)

ATTENTION	**Possible damage**

- **Use exclusively original WANGEN replacement part, so that the operability of the pump will not be impaired.**

10.2 Replacement part orders

When ordering replacement parts always quote

- pump type and
- pump number!

The required details can be found in the pump type plate. In addition, the pump number is stamped into the top of the bearing chair near its transition to the suction casing. We shall not be liable in any way for any incorrect deliveries due to the details provided being inaccurate.
Direct replacement part orders at the following address:

Pumpenfabrik Wangen GmbH,
Simoniusstraße 17,
D - 88239 Wangen

Telephone: **0049-7522/997-0**
Fax: **0049-7522/997-108**
Email: **mail@wangen.com**

Additional valid documents

Exploded View Drawing
with Parts List