

Operating and Maintenance Instructions with Dismounting and Mounting Instructions

Eccentric Screw Pumps Series SLBP, SEBP, SNBP, SHBP, SNZBP, SEDBP, SNDBP

Operating data of the pump according to order data sheet

Order No.:

Ident No. of pump:

Machine No.:

Pump type:

1. General

1.1 Application and range of utilization

The eccentric screw pumps are self-priming, rotary positive-displacement pumps for handling and dosing liquid to highly viscous, neutral or aggressive, pure or abrasive, gaseous fluids or fluids which tend to froth, even with fibre and solids contents.

ATTENTION The range of utilization is to be taken from the order data sheet.

1.2 Performance data

The exact performance data applying to the pump are to be taken from the order data sheet and are engraved on the type plate.

1.3 Warranty

Our liability for shortcomings in the supply is laid down in our delivery conditions. No liability will be undertaken for any damages caused by non-compliance with the operating instructions and service conditions.

If at any later date the operating conditions happen to change (e.g. different fluid pumped, speed, viscosity, temperature or pressure conditions), it must be checked by us from case to case and confirmed, if necessary, whether the pump is suited for these purposes. In case no special agreements were made, pumps supplied by us may, during the warranty period, be opened or varied only by us or our authorized contractual service stations; otherwise, our liability for any defects will cease.

1.4 Testing

Prior to leaving our factory, all pumps are subjected to a leakage and performance test. Only properly operating pumps leave the factory achieving the performances assured by us. Thus, compliance with the following operating instructions ensures proper operation.

2. Safety

These operating instructions contain basic hints to be observed during installation, operation and maintenance. Therefore, prior to mounting and commissioning, these operating instructions must be absolutely read by the fitter as well as the pertinent expert personnel/operator and must always be available at the place of installation of the machine/plant.

Not only are the general safety hints listed under this main item »Safety« to be observed, but also the special safety hints such as for private use inserted under the other main items.

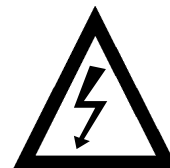
2.1 Marking of remarks in the operating instructions

The safety hints contained in these operating instructions which, in case of non-compliance, may cause danger to personnel, are particularly marked with the general danger symbol



Safety sign according to DIN 4844-W9

in case of warning against electric voltage with



Safety sign according to DIN 4844-W8

For safety hints, non-compliance of which may cause dangers to the machine and its functions, the word

ATTENTION

is inserted.

Hints directly attached to the machine such as

- Directional marker
- Sign for fluid connections

must by all means be observed and maintained in completely legible condition.

2.2 Personnel qualification and personnel training

The personnel for operation, maintenance, inspection and mounting must have the corresponding qualification for these operations. Range of liability, competence and the supervision of the personnel must be exactly regulated by the operator. If the personnel do not have the required knowledge, same must be trained and instructed. If required, this may be effected by the manufacturer/supplier on behalf of the machine operator. In addition, it must be ensured by the operator that the contents of the operating instructions are fully understood by the personnel.

2.3 Dangers in case of non-compliance with the safety hints

Non-compliance with the safety hints may result in both, danger to persons as well as environment and machine. Non-compliance with the safety hints may lead to the loss of any claims for damages.

In detail, non-compliance may, **for example**, entail the following dangers:

- Failure of important functions of the machine/plant
- Failure of specified methods for maintenance and servicing
- Danger to persons by electrical, mechanical and chemical influences
- Danger to the environment by leakage of dangerous substances

2.4 Responsible working

The safety hints mentioned in these operating instructions, the current national rules for the prevention of accidents as well as any internal working, operating and safety regulations of the operator are to be observed.

2.5 Safety hints for the user/operator

- If hot or cold machine parts lead to dangers, these parts must be protected against accidental contact at the site.
- Protection against accidental contact for moving parts must not be removed when the machine is in operation.
- Leakages (e.g. of the shaft seal) of dangerous materials to be handled (e.g. explosive, toxic, hot) must be discharged so as not to result in danger to persons and the environment. Legal stipulations are to be observed.
- Dangers by electrical energy are to be excluded (for details with regard hereto, please refer e.g. to the regulations of the VDE and the local energy supply associations).

2.6 Safety hints for maintenance, inspection and mounting operations

The operator shall see to it that all maintenance, inspection and mounting operations will be performed by authorized and qualified expert personnel who have sufficiently informed themselves by thoroughly studying the operating instructions.

Basically, operations at the machine are to be performed during standstill only. The mode of operation for stopping the machine described in the operating instructions must be absolutely observed.

Pumps or aggregates handling noxious fluids must be decontaminated.

Immediately upon termination of the operations, all safety and protective devices must be mounted again and/or made operational.

Prior to restarting, the items listed in section »6.1 Preparation for starting« are to be observed.

2.7 Independent reconstruction and spare parts production

Reconstruction of or changes to the machine are only admissible after consultation with the manufacturer. Original spare parts and accessories authorized by the manufacturer serve safety purposes. The use of other parts may cancel the liability for the consequences resulting therefrom.

2.8 Inadmissible modes of operation

The operating safety of the machine supplied is only ensured with due application according to Section 1 - General - of the operating instructions. The limit values given in the data sheet must by no means be exceeded.

3. Transportation and intermediate storage

3.1 Packing

The graphic symbols applied to the packing are to be observed.

During transportation and storage, suction and outlet side and auxiliary connections of the pump must be closed with plugs. During installation of the pump aggregate, the plugs are to be removed.

3.2 Transportation

Due to their weight, eccentric screw pumps and all pump aggregates are transported to the place of installation by means of a lifting appliance.

When transporting the pumps by means of a crane, the sling ropes must be placed safely around the suction casing.

In case of complete pump aggregates, a rope must be additionally fixed to the driving motor.

The sling ropes must be placed around the pump and/or the pump aggregate so that when being lifted, they are in exact balance.



The crane installation and the sling ropes must be sufficiently sized. The sling ropes must not be fastened to the suspension eyes of the motor.

3.3 Preservation and storage of eccentric screw pumps

Please refer to our Document VM 2102

4. Description

4.1 Structural design

Self-priming, single or two-stage eccentric screw pump. Rotor and stator are the conveying elements. The driving torque is transmitted onto the rotor via the pump shaft and the joint shaft.

Pressure casing, stator and suction casing are held together by external casing connecting screws (clamp bolts).

The shaft sealing housing or mechanical seal housing is arranged between suction casing and lantern bracket.

4.1.1 Bearing and lubrication

Joint shaft with liquid-tight encapsulated pin joints on both sides. Lubrication by joint oil.

Bearing of the driving/pump shaft is in the reinforced bearings of the drive.

4.1.2 Shaft seal

By uncooled stuffing box or by uncooled maintenance-free, unbalanced, single-acting mechanical seal.

4.1.3 Dimensions/branch position/flanges

The dimensions of the pump and/or pump aggregate, the branch position and flange dimensions are to be taken from the tables of dimensions.

4.2 Mode of operation

Self-priming, rotary, positive-displacement pump, the conveying elements of which are the rotating eccentric screw (rotor) and the fixed stator. Both meet in the cross-section at two (three with series SEDBP and SNDBP) points each which, regarded over the length of the conveying elements, form two (three with series SEDBP and SNDBP) sealing lines. The contents of the tight chambers formed as the rotor rotates are shifted axially and completely continuously from the suction to the outlet side of the pump. There is no turbulence despite the rotor rotation. The constant chamber volume excludes squeezing thus ensuring an extremely gentle low-pulsation delivery.

4.3 Aggregate construction**4.3.1 Drive**

By non-explosion-proof or explosion-proof electric motors, geared motors or variable-speed geared motors.

4.3.2 Base plate

The pumps of horizontal installation are, as a rule, mounted with the drive on a common base plate. Base plates are provided of the steel type of construction.

5. Installation/mounting**5.1 Installation**

The pumps can be installed horizontally or vertically with the drive upwards.

5.2 Foundation

The foundation design depends on the size of the pump and/or the pump aggregate and the local installation conditions.

For exact data on the pump and aggregate dimensions, please refer to our table of dimensions.

The foundation may be designed as concrete foundation or load-carrying foundation frame, for example of the steel type.

All foundation designs are subject to the following: The foundation must be designed so that it can take the weight of the pump aggregate on the entire surface.

5.3 Base plate

The base plate must be fixed on the foundation, stress-free.

5.4 Space required for maintenance and servicing

ATTENTION The pump must be accessible from all sides allowing necessary visual inspections to be performed.

For maintenance and service operations, sufficient space is to be provided, especially for the replacement of the conveying elements. Stator and rotor dismantling dimensions are given in the pump and/or pump aggregate table of dimensions. In addition, see to it that all pipelines can be mounted and dismantled without any difficulties.

5.5 Laying of pipelines**5.5.1 Nominal widths**

The nominal widths of the suction and pressure pipelines should be designed according to the nominal pump branch widths. For coarse deviations, especially on the suction side, kindly contact the works.

5.5.2 Supports and flange connections

By way of the flange connections, the pipelines must be connected to the pump, stress-free. They must be sup-

ported close to the pump and should allow of easy screwing to avoid deformations. After the screws have been slackened, the flanges must neither be inclined nor springy nor rest on top of one another under pressure. Any thermal stresses that may occur at the pipelines must be kept away from the pump by taking appropriate measures, e.g. by the installation of compensators.

5.5.3 Cleaning of pipelines prior to attachment

Prior to mounting the pump, the suction-side pipelines, gate valves and valves must by all means be flushed and/or cleaned.

Mounting residues such as screws, nuts, welding beads, steel pieces etc. will destroy the pump internals. Any claims under the warranty expire as soon as damages are caused by such residues.

5.6 Laying of auxiliary pipelines for additional facilities

All auxiliary pipelines for the supply of the shaft seal and the possible double shell casing for heating and cooling of the pump are to be connected, stress-free and sealing.

The heating/cooling liquid outlet is to be connected at the highest connection of the double shell casing, if any.

5.7 Safety and control facilities**5.7.1 Manometer and vacuummeter**

A manometer and vacuummeter are to be connected to the pressure and suction pipeline.

5.7.2 Safety element in the pressure pipeline

As soon as a stop valve is arranged in the pressure pipeline or if it is possible that the pressure pipeline will be clogged, a safety element must be provided, e.g.: bypass line with installed excess pressure valve, bursting diaphragm, protective motor switch etc.



Eccentric screw pumps are positive-displacement pumps and can theoretically generate an infinitely high pressure.

With the pressure pipeline closed, e.g. by clogging or by incidental closing of a valve, the pressure generated by the pump may reach a multiple of the admissible pressure of the plant. This may, for example, lead to bursting of pipelines which must be absolutely avoided especially for dangerous products handled. Thus, appropriate safety devices must also be installed in the plant (e.g. pressure switches).

5.8 Electric connections

Pinching of the power supply cables of the driving motor is to be effected by an electrical expert according to the switching diagram of the motor manufacturer. In doing so, the current VDE regulations and the regulations of the local energy and supply association are to be observed.

Danger by electrical energy must be excluded.

6. Starting/Stopping**6.1 Preparation for starting****6.1.1 Filling the pump with fluid**

ATTENTION The pump must not run dry! For initial start-up and after prolonged standstills, the pump must be filled with fluid.

Already a few rotations without fluid may damage the stator. Therefore, prior to starting, the suction casing must be filled with water or fluid to be handled to lubricate stator and rotor. After an extended standstill, i.e. if it must be assumed that the residual liquid in the pump has evaporated or after a repair, the filling process must be repeated.

After filling, the pump operates self-priming. Venting is not required as a liquid/gas mixture can easily be handled.

6.1.2 Switching in the additional facilities for shaft seals (if provided)

If the pumps are charged with a flushing/sealing liquid, the existing stop valves, prior to initial start-up of the pump, must be opened and set to the pressures listed below.

Supply of the stuffing box with flushing or sealing liquid (Designs P02, P03, P04).

Note: For maintaining their function, stuffing boxes with flushing or sealing chamber rings require a flushing and/or sealing liquid.

The required flushing and/or sealing liquid pressure in case of pumps with stuffing box is for stuffing box designs

P02 = 0.1 up to 0.5 bar (above internal suction casing pressure)

P03 = 0.5 bar (above internal suction casing pressure)

P04/P14 = 0 up to 0.5 bar

(for flushing and sealing liquid, please refer to Section 6.1.3 below).

6.1.3 Quality and properties of the flushing/sealing liquid

ATTENTION Any liquid may be used as sealing/flushing liquid in consideration of the corrosion resistance of all contacted parts and the consistency with the medium to be sealed. The fluid must be free from solids, must not tend to sedimentations, should have the highest possible boiling point as well as a good heat conductivity and low viscosity. Clean water of low hardness meets these demands to a high degree.

6.1.4 Switching in the additional facility for heating or cooling the double shell casings

If the pumps are equipped with this additional facility, any and all stopping devices for heating or cooling systems must be opened. The below-mentioned pressure and temperature limits must be observed.



Any media may be used as heating or cooling liquid in consideration of the corrosion resistance of all contacted parts. The maximum heating or cooling liquid pressure is 10 bar.

The maximum heating temperature must not exceed 100°C and the cooling temperature not be fallen below -40°C.

Note: For the design temperature, please refer to the order data sheet.

6.1.5 Break-away of the pump

In case of a new start or after an extended standstill, make sure that the pump is easily cranked by the prime mover. If this is not easily possible, e.g. because of the high adhesion between rotor and stator in new condition, boosting is possible by means of an appropriate tool at the pump shaft behind the shaft seal.

ATTENTION During this process, the pump shaft must not be damaged.

6.1.6 Control of the sense of rotation

The normal sense of pump rotation as viewed from the drive against the pump shaft is counterclockwise. With this type, the suction connection is on the shaft sealing side so that the shaft seal is relieved. In particular cases such as during suction from a vacuum or when handling fluids which cannot bear any gas inclusions, the pump is right-handed. Suction and outlet side are thus interchanged.

ATTENTION The sense of pump rotation must correspond to the directional marker „n“ in the pump type plate. Wrong sense of rotation may result in damages to the pump. For the control of the sense of rotation, the motor on/off switch is to be touched only briefly.

6.2 Starting

6.2.1 Start-up

Prior to start-up, all stop valves on the suction and outlet side are to be opened.

6.2.2 Drive

Switch motor in.

ATTENTION Consider product-specific particularities of the drive. **Please refer to the operating instructions of the drive manufacturer.**

6.2.3 Checking the delivery values

After the drive has reached its operating speed, the inlet pressure and the pump outlet pressure must be checked by means of vacuummeter and manometer. The motor must not be overloaded. The power consumption can be checked by means of an ammeter. In this connection, temperature and viscosity of the fluid to be handled must be checked. The values read must be checked against the order data sheet and/or acceptance report.

6.2.4 Protection against dry running

If no further fluid to be pumped arrives at the suction side, the thermal energy generated in the conveying elements of the eccentric screw pump due to dry friction and churning work is no more sufficiently dissipated as a result of which the stator elastomer is thermally destroyed already after a short period of time. For the conveying elements to be protected, various dry running protection systems are available, adapted to the respective operating conditions (please contact factory).

6.3 Stopping

6.3.1 Shut-down

Switch motor off.

6.3.2 Measures in case of prolonged interruption

If a prolonged interruption is projected and there is a danger of frost, the pump must be drained. For these purposes, turn screw plug (502) out of the suction casing (505). Thereafter, the pump must be preserved (please refer to our Document VM 2102).

7. Maintenance/Service

7.1 Maintenance

– For maintenance and service operations, the statements made under Section 2 »Safety« are to be observed. Regular control and maintenance of the pump and drive will extend the service life.

7.1.1 General control

1. The pump must not run dry.
2. The driving motor must not be overloaded.
3. Check suction and pressure pipelines for tightness.
4. During operation, an installed stuffing box must be slightly dripping.
An installed mechanical seal must not have any heavy leakage.
5. Pressure and temperature monitoring instruments are to be observed and compared with the order data sheet and/or acceptance report.
6. Observe additional facilities such as flushing or sealing of the shaft seal, if provided.
7. Observe additional facilities for heating or cooling of the double shell casings, if provided.

7.1.2 Maintenance of components**7.1.2.1 Joints of the joint shaft**

The joints of the joint shaft are lubricated with ALLWEILER special joint oil Type B or oil ET 1510 ISO 460 of Messrs. Tribol Lubricants GmbH, Mönchengladbach, Germany; for the use of the pumps for foodstuffs with ALLWEILER special joint oil Type BL or oil 1810/460 of Messrs. Tribol Lubricants GmbH, Mönchengladbach, Germany.

ATTENTION Other lubricants were not tested by us and can, therefore, not be recommended by us!

The joints are life-lubricated. However, if the pump must be opened for any other purposes, we recommend to check the joint collar for tightness and to change the joint oil after 8,000 working hours. The table under Section 7.1.2.5 shows the allocation of the pump size to the oil quantity in cubic centimeters and/or to the grease quantity in grams. For the change of the joint oil, please refer to the Dismounting and Mounting Instructions.

7.1.2.3 Shaft seal

Shaft sealing is either effected by means of a stuffing box or mechanical seal.

● Stuffing box

Increased leakages, if any, at the stuffing box during the first few hours of operation normally disappear automatically during the running-in period.

If necessary, slightly tighten hexagon nuts (202) at the gland (203).

Please note that the stuffing box must be slightly leaking. This causes dissipation of the frictional heat generated at the sealing surface.

If the leakage losses increase excessively, and if leakage cannot even be reduced by repeated slight tightening of the hexagon nuts (202), the packing rings have lost their elasticity of shape and must be replaced.

- Dismounting the old packing rings and cleaning the shaft sealing housing

Following the pressure relief of the pump and after removal of the gland, the old packing rings can be removed. A packing puller with flexible shaft serves as tool. Thereafter, the stuffing box chamber and the pump shaft must be carefully cleaned within the area of the packing rings. Worn pump shafts must be replaced (refer to the Dismounting and Mounting Instructions).

- Mounting the packing rings

ATTENTION In principle, only such packing rings are to be installed which correspond to the required operating conditions of the pump. For the dimensions and necessary quantity of the pre-pressed packing rings and ring cuts or cutting lengths, please refer to the table Section 7.1.2.5 below.

For cutting purposes, we recommend the straight cut perpendicular to the shaft. In order to achieve a gap-free parallel location of the cut ends when closing the packing ring, the cutting angle should be approx. 20° to both cutting ends (please refer to Figure 1 below).

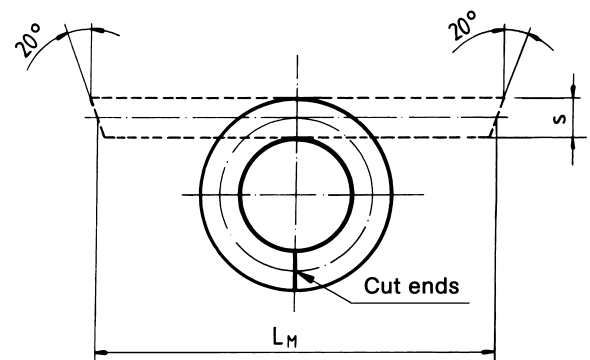


Figure 1: Cutting of packing rings

Pre-pressed packing rings or cut rings must be carefully untwisted axially and radially to such a degree only that they can just be pushed over the shaft. Bending-up the rings may result in damage by breaking.

During installation in the packing chamber, the packing rings must be carefully re-bent into angular shape. During this process, the kerfs must be set off by 90°. By means of the gland, each ring must be individually pushed into the stuffing box chamber with the cut ends foremost. Sealing chamber ring or flushing ring must be installed consistently.

ATTENTION Pointed items must never be used for these purposes as there is a danger of shaft damage and deformation of the packing materials.

- Commissioning of the stuffing box after re-packing

Prior to commissioning, the stuffing box must be only slightly tightened. During pump starting, 50 to 200 drops in a minute are admissible as seepage quantity.

During the starting process of approx. 30 minutes, a minimum leakage of 2 to 20 drops in a minute must be set by gradually and evenly tightening the gland (203) by means of the hexagon nuts (202).

ATTENTION During this process, the stuffing box temperature must not rise abnormally. Approx. 20 to 60hC above the temperature of the fluid pumped are admissible. In case of a sudden temperature rise, the gland must be immediately slackened and the running-in procedure repeated. The seepage may be drained through the tapped hole provided in the collecting trough of the lantern bracket.

Personal injuries and environmental damages resulting from the leakage of dangerous materials must be excluded.



● **Mechanical seal**

Unbalanced mechanical seals of any material pairings and types are employed. The mechanical seal is maintenance-free.

In case of heavy leakage due to wear, the mechanical seal must be replaced (please refer to the Dismounting and Mounting Instructions).

ATTENTION As dry running of a mechanical seal must be avoided, the pump may only be started in a filled condition.

7.1.2.4 Driving motors and (control) gears

Please refer to the operating and maintenance instructions of the manufacturers.

7.1.2.5 Packing ring dimensions (to Section 7.1.2.3) Lubricant quantities for joints (to Section 7.1.2.1)

Pump series	Pump size							
	SLBP	SEBP	SEDBP	SNBP	SNDBP	SHBP	SNZBP	
	-	50.1 50.2	75.1	25.1 25.2	38.2	12.4	25.2	
	99.1	100.1 100.2	150.1	50.1 50.2	75.2	25.4	50.1 50.2	
	199.1	200.1 200.2	300.1	100.1 100.2	150.2	50.4	100.1 100.2	
	400.1	380.1 380.2 550.1	560.1	200.1 200.2	300.2	100.4	200.1 200.2	
	720.1	750.1 750.2 1000.1	1200.1	380.1 380.2	560.2	200.4	380.1 380.2	
	1560.1	1450.1 1450.2	2300.1	750.1 750.2	1200.2	-	750.1 750.2	
	-	2700.1 2700.2	4250.1	1450.1 1450.2	2300.2	-	1450.1 1450.2	
Number of packing rings for design P01 ①	5	5	6	5	5	6	6	6
Dimensions of packing rings for cut rings	∅ 51/ 35x8	∅ 51/ 35x8	∅ 59/ 43x8	∅ 73/ 53x10	∅ 87/ 63x12	∅ 80/ 60x10	∅ 99/ 75x12	∅ 118/ 90x14
Dimensions of packing rings as blanks L _M x S	144,5 x 8	144,5 x 8	171,4 x 8	211,8 x 10	252,1 x 12	235,3 x 10	292,5 x 12	349,5 x 14
Oil quantity in cm ³ per joint	4	10	18	37	52	87	169	290

① In case of shaft seal types P02, P03 and P04, the number is reduced by 1 piece each.

7.2 Servicing (dismounting and mounting instructions)

General

On request, trained service engineers will be at your disposal for mountings and repairs.

In case of repairs performed by the customer's own personnel or our trained mechanics, it must be ensured that the pump is completely empty and clean.



This applies in particular to pumps which, in case of repair, are sent to our factory or to one of our contractual repair shops.

In protection of our staff and for reasons of environmental protection, we have to refuse to accept for repair any pumps filled with fluid pumped. Otherwise, we will have to charge the customer/operator with the costs for an ecologically acceptable waste disposal.

In case of repair of pumps operated with dangerous substances ① and/or fluids harmful to the environment, the customer/operator must advise hereof his own and/or our local mounting personnel or, in case of return, our factory and/or contractual service shop of his own accord. In such a case, evidence of the fluid handled, e.g. in the form of a DIN safety data sheet will have to be presented to us when requesting a service engineer.

① Dangerous substances are:

- Toxic substances
- Substances detrimental to health
- Caustic substances
- Irritants
- Explosive materials
- Fire-promoting, highly, easily and normally inflammable materials
- Carcinogenic substances
- Foetopathic substances
- Genes-changing substances
- Substances which are dangerous to human beings in any other way

When working locally, the customer's own and/or our mounting personnel must be referred to dangers which may be caused in connection with repairs.

The most important dismounting and mounting operations are described in these instructions. The mounting steps described in the individual sections must be consistently observed.

7.2.1 Dismounting the eccentric screw pump

Prior to commencing the dismounting, the following operations must be performed:

- Pinch off power supply cable to the motor. Motor must not be capable of being started.
- All stop valves in the suction and pressure pipeline must be closed.
- Drain the fluid to be pumped from the suction casing. For these purposes, screw out screw plug (502).
Note: Use collecting tank.
- Dismount supply and pressure pipeline as well as all auxiliary pipelines.
- Loosen screws at the pump feet, and screw out.

7.2.1.1 Dismounting the stator

- Remove hexagon nuts (609) and washers (610) from the clamp bolts (611).
- Withdraw pressure casing (504).
- Remove clamp bolts (611).

- Withdraw stator (402) from the rotor (401).

Note: In case of stiffness, simultaneously turn stator (402) by means of chain tongs. For these purposes, fix pump shaft (125).

- In case of stators of plastic material or metal, remove stator gaskets (403) and (404).

7.2.1.2 Dismounting the rotor and rotor-side joint

Dismounting of the rotor and the rotor-side joint is effected following the dismounting of the stator (402). Please refer to Section 7.2.1.1 above.

- Remove hexagon nuts (607) and fan-type lock washers (608) as well as hexagon screws (606).
- Withdraw suction casing (505) over the rotor (401). In doing so, see to it that the fine-machined rotor is not damaged.
- Remove gasket for suction casing (501).
- Cut lock at the joint clamp (306) by means of a metal cutting saw, and with a screw driver, press out to both sides. Remove joint clamp (306) from the joint collar (308) (please refer to Figure 2 below).

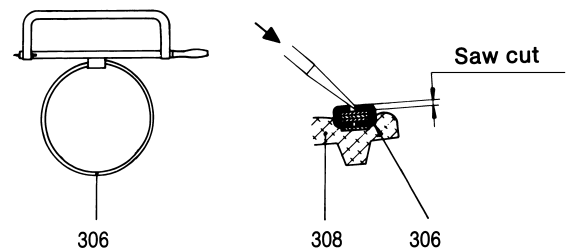


Figure 2: Removal of the joint clamp.

- By means of a screw driver, lift joint collar (308) and withdraw axially towards the joint shaft (307).



- Collect oil filling in a tank.

- Drive joint sleeve (304) over the collar of the joint shaft (307). In doing so, do not deflect joint shaft (307) (please refer to Figure 3 below).

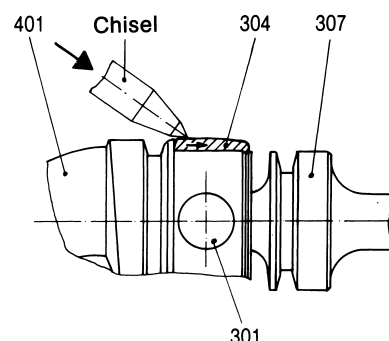


Figure 3: Dismounting the joint sleeve.

- Eject joint bolt (301).
- By means of a brass ejector, drive out half of the two bushes for joint bolt (303). For these purposes, incline joint shaft (307) (please refer to Figure 4 below).

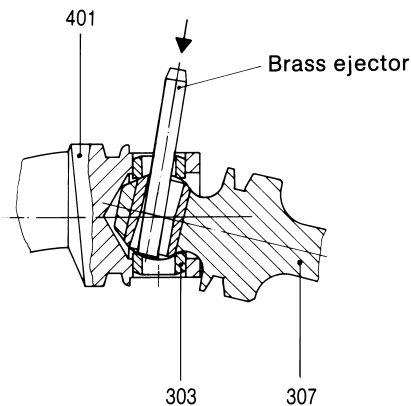


Figure 4: Dismounting the bushes for joint bolt.

- Remove rotor (401) from the joint shaft (307).
- Press joint bush (302) out of the joint shaft (307) (not required in case of Size 12.2).
- By means of a brass mandrel, completely drive bush for joint bolt (303) out of the rotor (401).

7.2.1.3 Dismounting the joint shaft and the drive-side joint

Dismounting of the joint shaft and the drive-side joint is effected following the dismounting of the stator (402) and the rotor (401). Please refer to Sections 7.2.1.1 and 7.2.1.2 above.

- Dismount drive-side joint, as described under Section 7.2.1.2 above.
- Withdraw joint shaft (307) from the pump shaft (125).
- Press joint bush (302) out of the joint shaft (307) (not required in case of Size 12.2).
- By means of a brass mandrel, completely drive bush for joint bolt (303) out of the pump shaft (125).

7.2.1.4 Dismounting the shaft seal and pump shaft

Note: In case of pumps with shaft seal by stuffing box, the packing rings can be exchanged without dismounting the pump shaft, as described under Section 7.1.2.3 above. Dismounting of the pump shaft is required whenever the pump is equipped with a mechanical seal. In case of damages to the pump shaft within the area of the shaft seal, the pump must also be dismounted, as described hereinafter.

- Dismount stator (402) (please refer to Section 7.2.1.1 above).
- Remove hexagon nut (607) and fan-type lock washer (608) as well as hexagon screw (606).
- Withdraw suction casing (505) over the rotor (401). In doing so, see to it that the fine-machined rotor is not damaged.
- Remove gasket for suction casing (501).
- Push driving pin (123) out of the pump shaft (125).
- Pull pump shaft (125) with all parts of the shaft seal out of the lantern bracket (122).

● Dismounting the stuffing box

- Remove hexagon nut (202), and remove gland (203).
- Withdraw shaft sealing housing (204) from the pump shaft (125).
- Remove stuffing box packing (207) in case of design P02 including flushing ring (208), and in case of designs P03 and P04 including sealing chamber ring (209) from the shaft sealing housing (204).

● Dismounting the mechanical seal, single-acting

- Withdraw mechanical seal housing (214) with atmosphere-side stationary seal ring (219) from the pump shaft (125).
Note: Particularly see to it that the casing with stationary seal ring is withdrawn concentrically and not canted to avoid damages to the stationary seal ring.
- Press stationary seal ring and O-ring out of the mechanical seal housing (214).
See to uniform pressure distribution.
- Drive out locking pin (220).
- Loosen hexagon sockets with cup points, if provided, in the rotating part of the mechanical seal (219), and withdraw mechanical seal from the pump shaft (125).
- **ATTENTION** Prior to loosening the hexagon sockets with cup points, mark and/or measure position of the mechanical seal on the pump shaft. Do not push O-rings over the screw pressure mark!

7.2.2 Mounting the eccentric screw pump

General

Mounting of the individual pump components is effected after careful cleaning analogously in reverse order.

7.2.2.1 Mounting the shaft seal and pump shaft

● Mounting the stuffing box

- Push shaft sealing housing (204) onto the pump shaft (125).
- In case of design P02 including flushing ring (208) and in case of design P03 and P04 including sealing chamber ring (209), mount stuffing box packing (207) into the shaft sealing housing (204).
Please also refer to Section 7.1.2.3 »Installation of new packing rings« above.

● Mounting the mechanical seal, general

Mechanical seals are high-quality precision parts. The mounting instructions of the mechanical seal manufacturers are to be observed. Careful handling and extreme cleanliness during mounting are a condition of proper functioning. To facilitate mounting, surfaces on which O-rings are sliding, may be lubricated with sliding compound such as silicon oil, Polydiol or soft soap.

ATTENTION Do not use normal oil.
Note: See to it that the parts sliding on each other are only exchanged in pairs. When using double PTFE-coated O-rings, see to it that the joint of the outer coating points against the mounting direction as otherwise, opening and/or withdrawal of the coating may be effected (please refer to Figure 5 below).

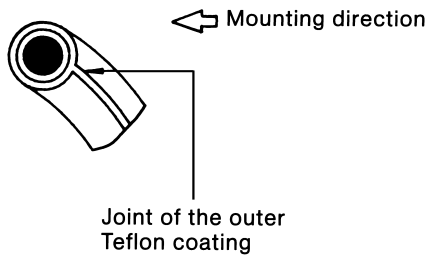


Figure 5: Joint of the outer coating points against the mounting direction.

● **Mounting the mechanical seal, single-acting**

- Drive locking pin (220) into the mechanical seal housing (214).
- Concentrically press stationary seal ring (219) with O-ring into the cleaned mechanical seal housing (214).
Note: Attend to uniform pressure distribution and to the locking pin. The locking pin (220) must not protrude to the inside.
- Push rotating part of the mechanical seal (219) onto the pump shaft (125).
Note: Exactly observe installation dimension and/or position of the mechanical seal, as marked for dismounting.
- Together with the screw locking means Loctite No. 241 or equivalent, insert and tighten hexagon sockets with cup points, if provided, in the rotating part of the mechanical seal (219).
- Push mechanical seal housing (214) with stationary seal ring (219) over the pump shaft (125).
Note: When pushing the mechanical seal housing onto the pump shaft, see to it that the mechanical seal housing is not canted to avoid damages to the stationary seal ring.

● **Mounting the pump shaft**

ATTENTION Prior to pushing the pump shaft (125), coat the surface of the shaft of the drive with paste 46 MR 401 of Messrs. Klüber, Munich.

7.2.2.2 Mounting the rotor and the joints

- By means of a brass mandrel, drive half of the bushes for joint bolt (303) into the rotor (401) and the pump shaft (125).
- Press joint bush (302) into the joint shaft (307) so that the longitudinal axis of the oval bore hole (marked by two notches) coincides with the longitudinal axis of the joint shaft and the joint bush equally protrudes from both sides of the joint shaft (please refer to Figure 6 below - is not required in case of Size 12.2).

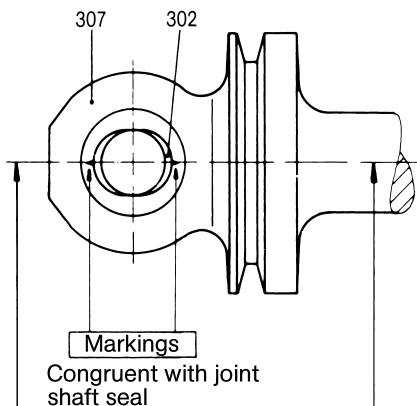


Figure 6: Pressing-in of the joint bush

- Push joint clamps (306), joint collars (308) and joint sleeve (304) onto the shank of the joint shaft (307).
- Push joint shaft (307) into the head of the rotor (401) and/or the pump shaft (125).
- Push joint bolt (301) into the joint bush (302), and completely drive in bushes for joint bolt (303).
- Polish joint sleeve (304) at the outside diameter, if necessary, with emery, and mount on the head of the rotor (401) and/or the pump shaft (125).
- Following the mounting of the joint sleeve (304), secure same against axial displacement on the head of the rotor (401) and/or the pump shaft (125).

ATTENTION For these purposes, drive face of the joint sleeve (304) into the groove at the head of the rotor (401) and/or the pump shaft (125) by means of a center punch blow (please refer to Figure 7 below).

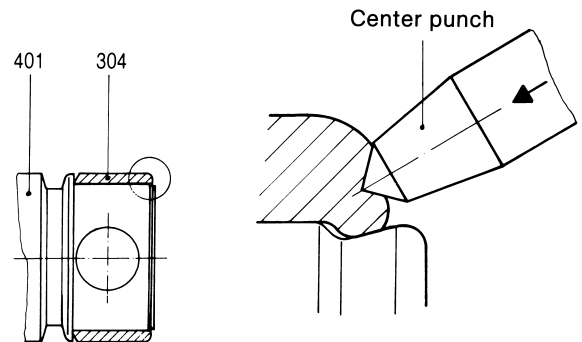


Figure 7: Securing the joint sleeve.

- By means of a screw driver, mount joint collar (308), lift top by means of a screw driver, run spray pipe of the oil bottle under the collar and fill joint chamber with ALLWEILER special joint oil Type B or oil ET 1510 ISO 460 of Messrs. Tribol Lubricants GmbH, Mönchengladbach, Germany. For the use of the pumps for foodstuffs with ALLWEILER special joint oil Type BL or oil 1810/460 of Messrs. Tribol Lubricants GmbH, Mönchengladbach, Germany.
- Check whether bent loop of the joint clamp (306) rests against the joint clamp lock. If not, press it against same by means of commercial flat pliers (please refer to Figure 8 below).

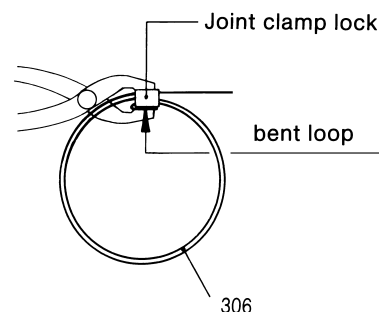


Figure 8: Press joint clamp loop against joint clamp lock.

- Place joint clamps (306) in the surrounding slots of the joint collar (308), and clamp.

Note: For these purposes, the following clamping tools must be used:
For pump sizes ≤
 SLBP 720.1; SEBP 380.1; SEBP 380.2; SEBP 550.1; SNBP 200.1; SNBP 200.2; SHBP 100.4; SNZBP 200.1; SNZBP 200.2; SEDBP 560.1; SNDBP 300.2
 the clamping tool bearing the designation PoK-It II.

For pump sizes ≥
 SLBP 1560.1; SEBP 750.1; SEBP 750.2; SEBP 1000.1; SNBP 380.1; SNBP 380.2; SHBP 200.4; SNZBP 380.1; SNZBP 380.2; SEDBP 1200.1; SNDBP 560.2
 the clamping tool bearing the designation Band-It together with the adapter J050.

The said tools may be obtained from us.
 When clamping the joint clamps, proceed as follows:

● **Clamping with clamping tool Band-It and adapter J050.**

- Introduce band end of the joint clamp (306) to the joint clamp lock into the clamping tool with adapter.
- Hold clamp end with the eccentric lever of the clamping tool, and clamp joint clamp (306) by turning the crank (Figure 9).

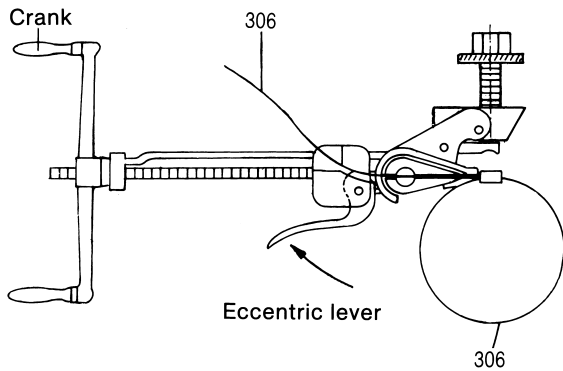


Figure 9: Clamping the joint clamp by means of clamping tool Band-It and adapter J050.

Note: Proper clamping of the joint clamps (306) is shown in Figure 10.

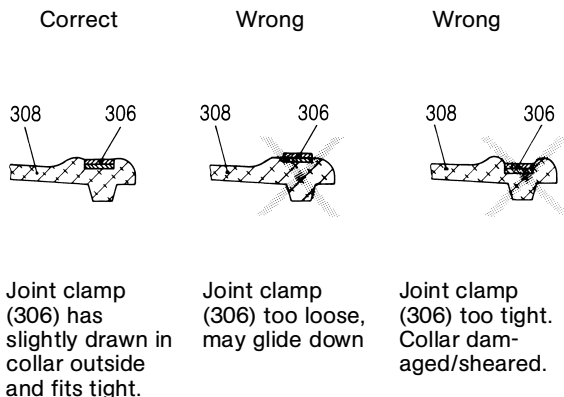


Figure 10: Clamping of joint clamps.

- Check whether on the entire circumference of the joint collar (308), the joint clamp (306) lies in the collar slot.

- Slowly turn clamping tool upwards through approx. 60° until the shearing hook grips behind the joint clamp lock (please refer to Figure 11 below).
- Tighten pressure screws by hand until the joint clamp is firmly clamped.

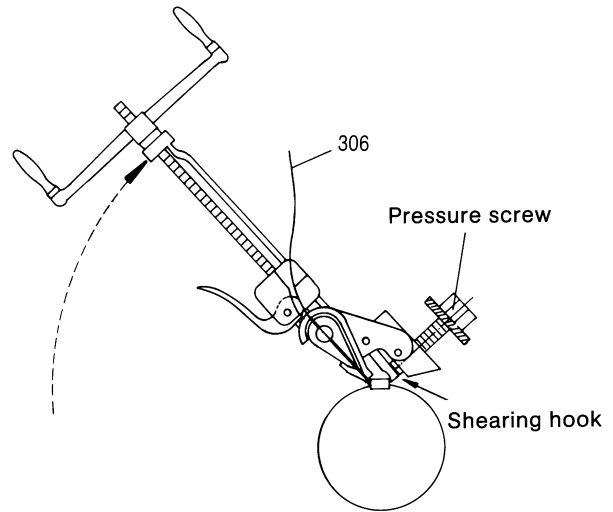


Figure 11: Shearing of the joint clamp.

- By means of a spanner or ratchet, turn pressure screw clockwise until the joint clamp is sheared.

ATTENTION If the joint clamp is slightly lifted on the sheared side, this must be compensated for by careful alignment. Hammering or beating against the joint clamp lock is not permitted as otherwise, there may be a danger of collar damage.

Note: In case of joint clamps of Hastelloy material, shearing with the clamping tool is not possible. After bending at the joint clamp lock, the joint clamp must be sheared by means of sheet metal shears and the cutting edges deburred (please refer to Figure 12 below).

● **Clamping with clamping tool Pok-It II**

- When using clamping tool PoK-It II, bend joint clamp (306) after clamping at the joint clamp lock by swinging the clamping tool so that the clamp cannot glide back through the lock. After bending at the joint clamp lock, the joint clamp must be sheared with sheet metal shears and the cutting edges deburred (please refer to Figure 12 below).

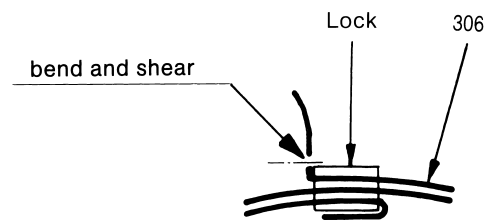


Figure 12: Bending and shearing of the joint clamp.

ATTENTION Check whether the joint clamp is bent so that it cannot glide back through the joint clamp lock (please refer to Figure 12 above). If this was not achieved, the joint clamp must be removed and replaced by a new one.

7.2.2.3 Mounting the stator

- Prior to mounting, coat stator (402) and rotor (401) with a sliding compound (silicon oil, Polydiol, soft soap or the like).

ATTENTION Do not use normal oil.

- In case of stators of plastic material or metal, insert stator gaskets (403) and (404).

Note: In case of stators of plastic material, the stator gasket (403) with O-ring must always be on the outlet side.

- Mount stator (402) on the rotor (401).

Note: In case of stiffness, simultaneously turn stator (402) by means of chain tongs. For these purposes, fix pump shaft (125).

- Screw up pressure casing (504), stator (402) and suction casing (505) with the clamp bolts (611) and hexagon nuts (609). In doing so, uniformly tighten hexagon screws.

7.3 Spare parts/replacement parts

In the following sectional drawings with parts list, all pumps mentioned are represented with the various shaft seal designs.

The parts marked in the parts list can be provided as spare parts/replacement parts.

Recommended spare parts/replacement parts:

R = large repair kit

r = small repair kit



For reasons of operating safety, only original spare parts delivered by us are to be kept on stock and installed. In this connection, we refer to the statements made under Section 2.7 above.

In case of spare parts/replacement parts ordering, the following are to be stated:

Machine numbers

Abbreviation of pump

Part number

Denomination and part quantity or Ident No. and quantity

Note: The machine number and the abbreviation of the pump are engraved on the type plate.

Note: The Ident No. and quantity can be seen from the attached separate spare parts list.

Part No.	Denomination	Piece
122	Lantern bracket	1
123	Driving pin	1
125	Pump shaft	R 1
141	Lubricating paste	R, r 1
201	Hammer head screw	2
202	Self-locking nut	2
203	Gland	1
204	Shaft sealing housing	1
207	Stuffing box packing	R, r ①
208	Flushing ring	1
209	Sealing chamber ring	1
212	Screw plug	1
213	Joint ring	1
214	Mechanical seal housing	1
219	Mechanical seal	R 1
220	Locking pin	1
301	Joint bolt	R, r 2
302	Joint bush	R, r 2
303	Bush for joint bolt	R, r 4
304	Joint sleeve	2
305	Joint oil	R, r ①
306	Joint clamps	R, r 4
307	Joint shaft	R, r 1
308	Joint collar	R, r 2
401	Rotor	R, r 1
402	Stator	R, r 1
403	Stator gasket outlet side	R, r 1
404	Stator gasket suction side	R, r 1
501	Gasket for suction casing	R, r 1
502	Screw plug	1 ③
503	Joint ring	1 ③
504	Pressure casing	1
505	Suction casing	1
506	Suction casing cover	2
507	Gasket	R 2
508	Stud bolt	8
509	Nut	8
510	Fan-type lock washer	8
601	Type plate	1
602	Round head grooved pin	4
603	Information plate	1
	Commissioning	1
604	Information plate Suction	1
605	Information plate Pressure	1
606	Hexagon screw	4
607	Hexagon nut	4
608	Fan-type lock washer	4
609	Hexagon nut	4 ④
610	Washer	4 ④
611	Clamp bolt	4

Recommended spare parts:

R = large repair set

r = small repair set

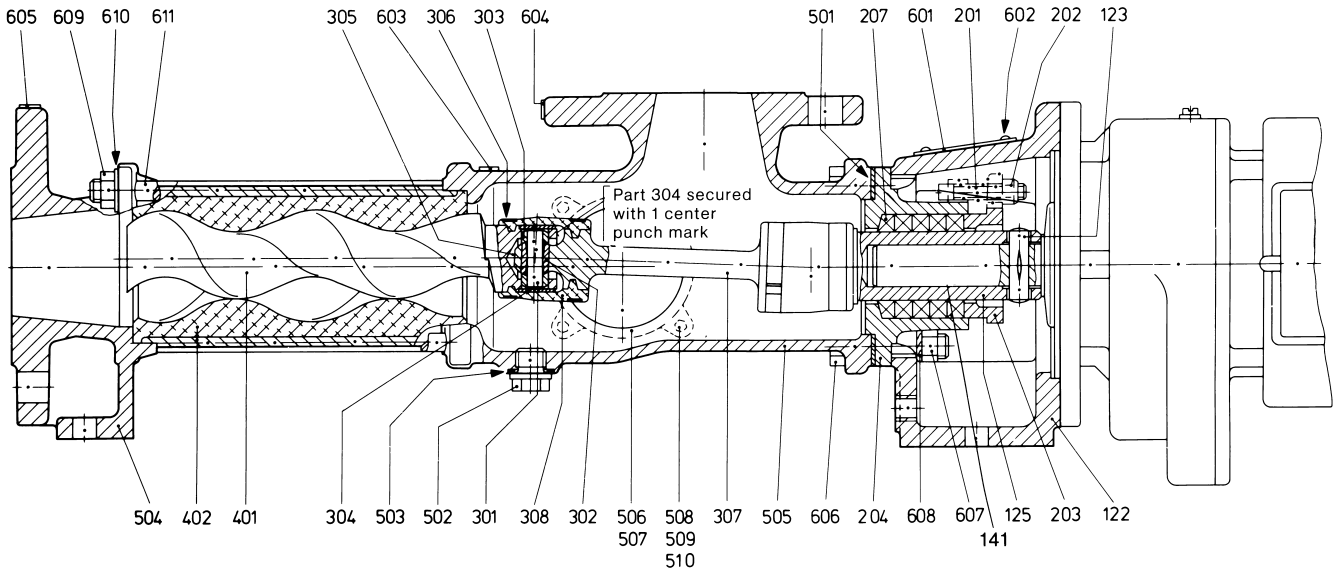
① see Section 7.1.2.5

③ 2 pieces with branch position 2 and 4

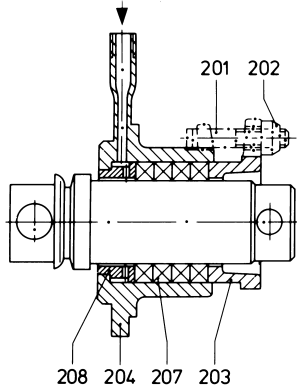
④ 8 pieces with Series SNBP, SNDBP

7.4 Sectional drawing and list of components for Series SEBP

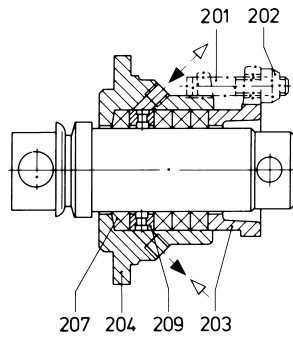
In the sectional drawing, the pumps of Series SLBP, SNBP, SHBP, SNZBP, SEDBP and SNDBP are similar.



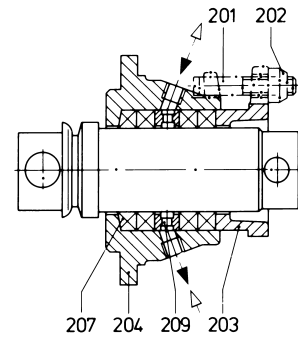
Shaft seal: **P01** Stuffing box of normal design (without sealing chamber ring/without flushing ring).



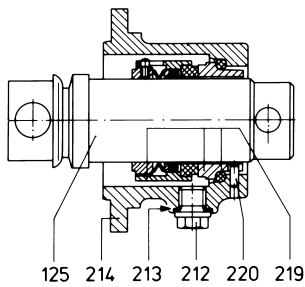
P02 Stuffing box with flushing ring



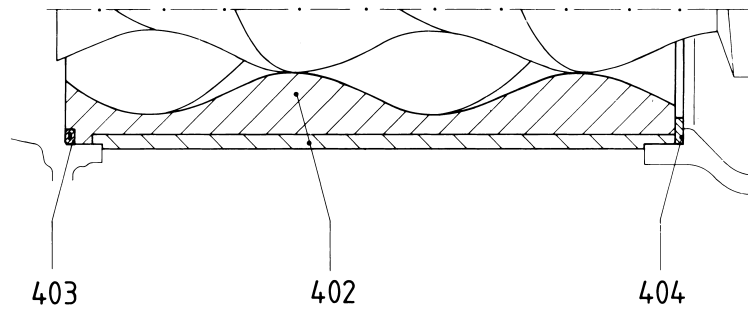
P03 Stuffing box with internal sealing chamber ring



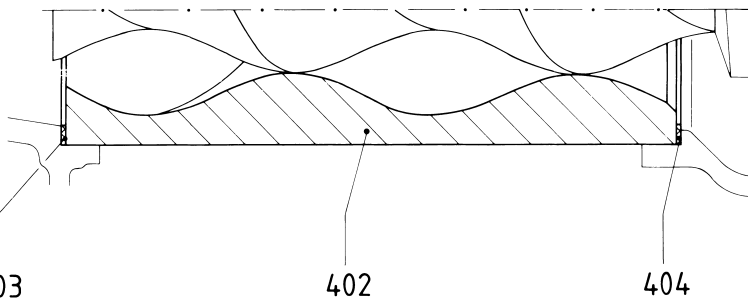
P04 Stuffing box with external sealing chamber ring



G00 to G03 Mechanical seal, single-acting, unbalanced



Stator of plastic material



Stator of metal

- ▶ Standard supply
- ▷ Possible supply

8. Operating troubles – Causes and remedial action

No.	Faults										Causes and remedy
	Pump does not start	Pump does not prime	Capacity is not reached	Head is not reached	Pump discharge irregular	Pump operating noisily	Pump has seized or has stopped delivering	Motor over-heating	Stator wearing prematurely	Shaft seal leaking	
	a	b	c	d	e	f	g	h	i	k	
											ALLWEILER eccentric screw pumps will operate satisfactorily at all times if they are used in accordance with the operating conditions given in our acknowledgement and if the operating instructions are observed.
1	●								●		Pressure between stator and rotor too great (new condition) or stator too tight rotate pump by hand using a suitable tool
2		●									Check direction of rotation in accordance with arrow on the pump; change motor rotation if necessary
3		●	●		●	●	●				Check suction line and shaft seal for leaks
4		●	●		●	●					Check suction head – if necessary, increase diameter of suction line – fit larger filters – fully open suction valve
5		●	●		●						Check viscosity of the pumped medium
6	●		●					●			Check pump speed – check speed and amperage of the drive motor – check voltage and frequency
7			●		●						Avoid airlocks in pumped medium
8	●		●				●	●	●		Check delivery head – open gate valve in the delivery line fully, remove blockage in the delivery line
9		●	●		●		●		●		Pump running completely or partially dry. Check whether sufficient pumped medium is present on suction side
10		●	●								Increase the pump speed for thin media and high suction volume.
11		●			●	●					Reduce the speed for viscous media – risk of cavitation
12						●					Check end clearance of the coupling rod pins; possibly coupling rod bush incorrectly fitted
13	●	●	●				●		●		Check whether foreign bodies in the pump; dismantle pump, remove foreign bodies – replace defective parts
14		●	●	●			●				Stator and rotor worn; dismantle pump and replace defective parts
15		●	●			●	●				Joint parts (f, g) and/or stub shaft (b, c) worn; dismantle pump and replace defective parts
16		●	●				●		●		Suction line partially or wholly blocked
17	●	●					●	●	●		Check temperature of the medium – stator expansion too great – stator jammed on rotor – possibly stator burnt out
18	●	●	●					●		●	Gland packing: Replace unserviceable rings (b, c, k) – loosen gland (a, h) – tighten gland (b, c, k)
19	●	●					●		●		Solid contents and/or size too large – reduce speed: fit strainer upstream of pump, with suitable mesh size
20	●	●							●	●	Solids settling out and hardening when pump shut down – flush out pump immediately – if necessary, dismantle and clean
21	●	●					●		●	●	Medium hardens after dropping below a certain temperature limit – heat pump

Subject to technical alterations.

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