



BAUER

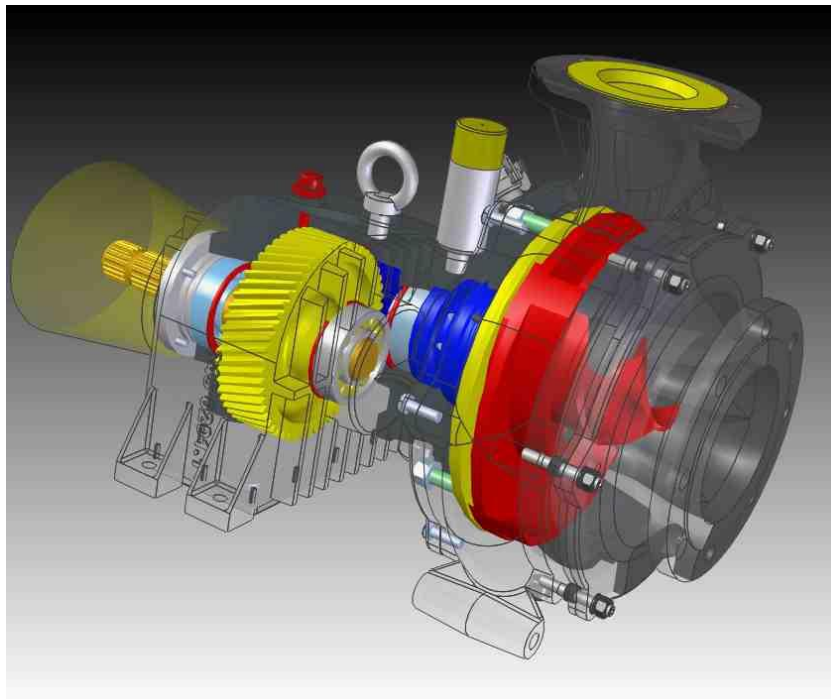
FOR A GREEN WORLD

OPERATING MANUAL

for

Gear Pump

Magnum SX 1000
SX 2000
with self-priming unit



Version IX-2008

Gear Pump
SX 1000
SX 2000
English



INTRODUCTION

Thank you very much for purchasing a BAUER gear pump!

We are pleased to offer you a **BAUER gear pump** featuring state-of-art technology and top quality. This manual describes how to operate and maintain the **BAUER gear pump**. For reasons of clearness and due to the many possibilities this manual does not contain everything down into detail. In particular, it cannot possibly take into consideration every conceivable aspect of operation and maintenance.

If you need further information or if you should be faced with any particular problems for which this manual does not offer sufficient details please feel free to contact **BAUER company** at Kowaldstraße 2, A-8570 Voitsberg for the information you need.

Please note that the content of this operating manual neither constitutes part of nor does it alter any previous or existing agreement, promise or legal relationship. Any commitment on the part of **BAUER** is a result only of the individual purchase contract that also contains the complete and only valid warranty arrangement. Said contractual terms of warranty are neither extended nor limited by the content of the present operating manual.

All information contained in the present manual is based on the latest product details available at the time of printing.

BAUER reserves the right to change without prior notice, without assuming any liability!

BAUER gear pumps are designed for safe and reliable operation provided they are operated in compliance with the present instruction manual. In spite of the simplicity of the pump we therefore request that you read this manual carefully before putting your **BAUER gear pump** into operation! All instructions given for handling, operating and servicing the pump must be strictly observed. Provided these instructions are followed the pump will operate trouble-free to your full satisfaction for many years!

Non-observance of our instructions may result in injury or equipment damage!

This operating manual should be considered an integral part of the gear pump. Suppliers of new and used pumps are advised to put down in writing that this manual was handed over together with the pump.

Please make this manual available to your operating personnel. You are kindly requested to state the pump type and serial number of the gear pump in all inquiries, correspondence, warranty problems or parts orders. These details are specified on the nameplate.

PRODUCT DETAILS

Type designation:	Gear pump
Type number:	MAGNUM SX 1000; SX 2000
Serial number ¹ :	_____
Dealer:	Name: _____
	Address: _____

	Phone/Fax: _____
Date of delivery:	_____
Manufacturer:	Röhren- und Pumpenwerk BAUER Ges.m.b.H. Kowaldstr. 2 A - 8570 Voitsberg Phone +43 3142 200 - 0 Fax: +43 3142 200 -320 /-340 e-mail: sales@bauer-at.com www.bauer-at.com
Owner or operator:	Name: _____
	Address: _____

	Tel. / Fax: _____

Note: Please make a note of the type and serial number of your gear pump and its accessories! Be sure to specify these details every time you contact your dealer.

¹ In all warranty claims and correspondence relating to this machine it is essential to specify the complete serial number group including all letters. This applies to the machine itself and to any components involved. We cannot emphasise this point often enough.

GENERAL SAFETY INSTRUCTIONS

Symbols and terms



The CE symbol that has to be affixed on the machine by the manufacturer outwardly demonstrates compliance of the machine with the directives for machines and other relevant EU directives.

**WARNING!**

This "Warning" symbol refers to important safety instructions in this manual. Whenever you see this symbol be aware of possible injury hazards. Read the note following the symbol very carefully and inform the other operators accordingly.

CAUTION!

Non-observance of this instruction may cause damage to or destruction of the machine or individual components.

NOTE!

It is important to observe this note or condition!

Qualified operators are persons who on account of their training, experience and instruction as well as their knowledge of relevant standards, rules, precautions to be taken for accident prevention and operating conditions, have been authorised by the person in charge of plant safety to perform the individual tasks required and in doing so are able to recognise and avoid potential hazards. Among other things knowledge of first-aid procedures is also required.

Product liability

As defined by the product liability law every farmer is also an entrepreneur!

According to §9 PHG (Product Liability Law), liability for damage to corporeal things caused by defective products is expressly excluded. This exclusion of liability also applies to parts not manufactured by BAUER itself but purchased from external suppliers.

Duty to furnish information

Even if the customer passes on the machine later-on he is obliged to hand the operating manual on to the new receiver too. The receiver of the machine must be instructed with reference to the mentioned regulations.

Intended use

- BAUER gear pump is built exclusively for normal use in agricultural applications (intended use).
- Any use beyond this normal use is considered non-conforming. Manufacturer is not liable for damage resulting from such non-conforming use, the sole liability for damage from non-conforming use is with the user.
- Intended use also includes compliance with the manufacturer's operating, maintenance and service instructions.
- The BAUER gear pump may be used and operated only by persons who are familiar with the device and aware of the hazards involved.
- All relevant rules for accident prevention as well as any other generally valid specifications and regulations relating to safety, work medicine and traffic law must be strictly observed.
- Unauthorised modification of the machine releases the manufacturer from liability for damage resulting therefrom.

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1. GENERAL INSTRUCTIONS FOR SAFETY AND ACCIDENT PREVENTION

Check the machine for operational safety before every start-up.

1. In addition to the instructions contained in this manual, all specifications generally valid for safety and accident prevention must be observed!
2. The warning and instruction signs affixed to the machine give very important instructions for safe operation. Observing them serves your own personal safety!
3. Never put the machine into operation unless all guards and safety devices are completely mounted and in their proper working position!
4. Acquaint yourself with all equipment components and controls as well as their respective functions before starting to work. It is too late when the device is already running!
5. The operator's clothes should fit tightly. Avoid wearing loose clothes!
6. When handling slurry always keep in mind that the gasses produced are highly toxic and extremely explosive in combination with oxygen. Therefore, open fires, light tests, sparking and smoking are strictly forbidden!
7. Utmost care is required with regard to gasses in slurry and dung channels at open valves to the preliminary pit, before the main pit, or at cross channels. The same applies to mixing and withdrawal points when mixers or pumps are running!
8. When handling slurry always ensure sufficient ventilation!
9. Keep the machine clean to avoid fire hazards!
10. Be careful when pump is running continuously: gear housing gets hot! (burning hazard)

Tractor-driven machines

1. Before starting inspect the area around the machine (Children) ! Make sure your view is unrestricted!
2. Riding on the machine during transport is forbidden!
3. Couple the machine according to instructions and fasten it only at the specified points!
4. Be especially careful when coupling the machine to the tractor or uncoupling it!
5. Always adjust the supports in the proper position when coupling or uncoupling the machine (stability)!
6. Always mount balancing weights properly at the points provided!
7. Observe restrictions pertaining to axle load, total weight, and transport dimensions!
8. Inspect and mount all items required for transport such as lighting, warning signals and possible safety devices!
9. Mounted or trailed machines as well as balancing weights influence road behaviour, steering and braking capacity. Therefore make sure that proper steering and braking are possible!
10. Consider the projection and/or centrifugal mass of the machine when driving in curves!
11. It is forbidden to stay in the working range of the machine while it is operating !
12. Keep out of the turning and swivelling range of the machine!
13. Only operate hinged hydraulic frames when nobody is in the swivel range!
14. Externally powered machines (e.g. hydraulic) bear a crushing and shearing hazard!
15. Nobody is allowed between the tractor and the implement unless the tractor is secured by the parking brake and /or wedges under the wheels!
16. Hinged supports must always be folded up and secured before driving away!
17. Secure the machine and the tractor against rolling!

Tractor-mounted machines:

1. Before a machine is linked to or detached from the three-point linkage, the control device must be shifted to a position in which unintentional lifting or lowering is impossible!
2. When using the three-point linkage the linkage parameters of both tractor and attached machine must correspond, if not, they have to be matched accordingly!
3. The three-point linkage bears crushing and shearing hazards!
4. When operating the external control of the three-point linkage never step in-between tractor and the machine!
5. When the machine is in the transport position always make sure that the tractor's links are always properly secured on the sides.
6. When driving on the road with the machine lifted the control lever must be locked against lowering!

Trailed machines

When a machine is coupled to the drawbar make sure that the coupling point provides sufficient flexibility!

Power take-off (applies only to PTO driven machines)

1. It is not allowed to use any other types of PTO drive shafts except those prescribed by the manufacturer!
2. Drive shaft guard tube and guard cone as well as the PTO guard – also on the machine side - must be mounted and in good working order!
3. When using a PTO drive shaft always observe the specified overlap in transport and working position!
4. Never connect or disconnect the PTO drive shaft unless the PTO is stopped, the engine turned off, and the ignition key pulled out!
5. Make sure the drive shaft is always connected and secured properly!
6. Attach safety chain to keep the drive shaft guard from rotating with the shaft!
7. Before you turn on the PTO make sure that the selected tractor PTO speed corresponds with the permissible implement speed!
8. Before starting the PTO make sure that nobody is standing in the danger zone of the machine!
9. Never turn on the PTO when the engine is turned off or during a transport drive!
10. When working with the PTO nobody is allowed near the turning PTO or drive shaft!
11. Warning! The PTO shaft may continue turning due to its centrifugal mass after the PTO has been turned off! Keep clear of the machine during this time and do not touch until the PTO shaft stands absolutely still!
12. For cleaning, greasing, or adjusting the PTO driven implement or drive shaft, PTO and engine must be switched off and the ignition key pulled out!
13. Place the disconnected drive shaft on the provided support!
14. When drive shaft has been removed put the guard on the PTO shaft!
15. If a defect occurs repair it immediately before starting to work with the machine!

Hydraulic system

1. Hydraulic system is under high pressure!
2. When connecting hydraulic cylinders and motors, make sure the hydraulic hoses are connected as specified!
3. Before coupling the hydraulic hoses with the tractor's hydraulic system make sure that the entire hydraulic system is pressureless both on the tractor and implement side !
4. Inspect the hydraulic lines at regular intervals and replace them immediately in case of defects or ageing. Replaced hoses must comply with the technical specifications of the implement manufacturer!
5. When looking for leaks use only suitable equipment because of the injury hazard involved!
6. Liquids emerging under high pressure (hydraulic oil) may penetrate the skin and cause serious injuries! An injured person must see a doctor immediately! Danger of infection!
7. Before working on the hydraulic system the machine must be lowered, the system depressurised and the engine turned off!



Electric-driven implements

1. All work beyond normal maintenance of the implement should be performed only by a professional electrician!
2. Defective or broken plugs and sockets must be replaced by a professional electrician!
3. Never pull a plug out of the socket at the flexible electric cord!
4. Extension cables for power supply should be used only temporarily! Never use such lines permanently as a substitute for the required fixed installations!
5. Flexible lines laid across traffic areas on the farm must have at least 5 m ground clearance!
6. Always turn off the power supply before you do any work on the machine!
7. Check all electric lines for visible defects before you put the machine into operation! Replace defective cables and do not start the machine before that!
8. Never use electric-driven implements in damp situations or locations exposed to fire hazard unless they are adequately protected against moisture and dust!
9. Covering electric motors may cause heat concentration with high temperatures which could destroy the operating equipment and cause fires!

Hand-operated devices (valves)

1. Because of the slurry gasses produced in the lines, no slurry is allowed to remain in closed pipelines – bursting hazard!
2. Lay the pipelines with sufficient inclination and make sure that the selected closing order of valves allows all lines to be drained completely!
3. Protect the valves against unauthorised handling!
4. If a valve gets jammed do not apply force! Use only the operating levers supplied with the implement!
5. Observe the permissible maximum operating pressure of valves and pipelines when pumps are operated!
6. Service only when the tanks are empty!

Maintenance

1. Never perform any maintenance, service or cleaning work or fault elimination steps unless the drive is turned off and the engine is standing still!
2. Check proper fit of all nuts and bolts regularly and tighten them, if necessary.
3. If maintenance work is required on the lifted machine always secure it by means of appropriate supports!
4. When exchanging tools with cutting edges always use proper tools and wear safe protective gloves.
5. Dispose of oil, grease and filters according to local laws and regulations!
6. Always turn off power before working on the electric system!
7. Before electric welding on the tractor and mounted machines the generator and battery cables must be disconnected!
8. Spare parts must meet manufacturer's minimum technical specifications! This is the case for instance with original spare parts for instance!

2. GENERAL



WARNING!

Apart from the mechanical hazards resulting from moving or pressurised parts, the operation of slurry handling devices may also involve danger resulting from slurry gasses. These gasses (carbon dioxide CO₂, ammonium NH₃, hydrogen sulphide H₂S, methane CH₄) could cause poisoning as well as explosions. When operating in particular mixers, agitators, recirculation systems, stirring nozzles and slurry aeration systems one must always make sure that no gasses are allowed to penetrate into the stable from outside tanks (installation of siphon or stop valve). When slurry is handled inside the stable area sufficient forced ventilation in the stable area must be secured.

BAUER products are designed and manufactured carefully and subject to a system of continuous quality control. MAGNUM slurry pumps fully meet the requirements of the agricultural practice. They are best suited for delivering all kinds of slurries from thin liquid slurry to viscous mixtures containing solids such as straw, fibres or clots. A special chopper guarantees trouble-free performance without blockages. Short set-up times, easy handling and maximum performance reliability are further advantages of this pump series. Pump drive is mechanical from a drive shaft onto the PTO input shaft of the pump's gearbox.

Although the pump is simple in design you should study this manual carefully and strictly observe all operating and service instructions contained. On this condition your slurry pump will operate to your full satisfaction for many years!

Make this manual available to all operators handling the equipment. Serial number and pump type are stamped in on the nameplate. Please specify these data in your inquiries, correspondence, warranty matters and parts orders. We warrant for this pump according to our General Terms of Sale.

Intake line:

Being equipped with a suction flange, a standard spiral suction hose (HK194 equalling 8") and a suitable fitting pipe with a coupled funnel can be used as an intake line.

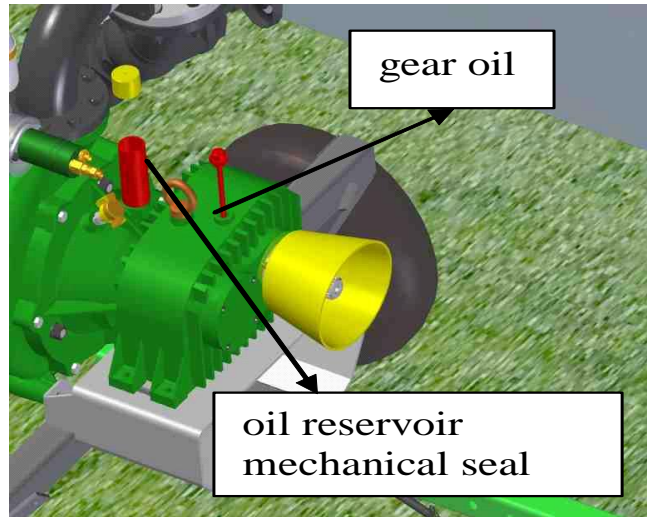
Discharge line:

It is absolutely necessary to install a gate valve inside the discharge line in order to avoid pump cavitation when filling the line. Pump cavitation can damage the mechanical seal and make pump and drive shaft break because of excessive pump vibration.

The gate valve is only installed for safety and control reasons during the filling of discharge lines.

3. PUTTING INTO OPERATION

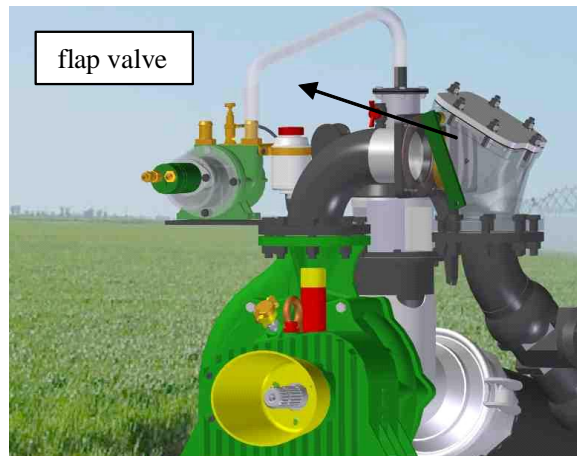
MAGNUM slurry pumps are designed with a special chopper on the suction side. This chopper guarantees trouble-free operation even if the pumped slurry contains solids like straw, fibrous materials, and clots or sludge up to not more than 12 %. Maximum permissible slurry temperature: 80°C.



WARNING!

Check oil level in the gearbox and in the oil reservoir before every start!

Position the pump as close to the pumped medium as it is safe to do so.



- Attach the intake line to the pump's suction connection.
- Always use the shortest possible suction line
- Check tightness and good condition of suction line
- Always make sure the pumped medium is homogeneous
- Difficult suction conditions can seriously affect the pump performance and lead to cavitation

- Connect the discharge line and close the gate valve.
- Flap valve shuts automatically when suction gets started.
- Connect tractor and pump by means of the PTO drive shaft.
- Connect hydraulic hoses to tractor



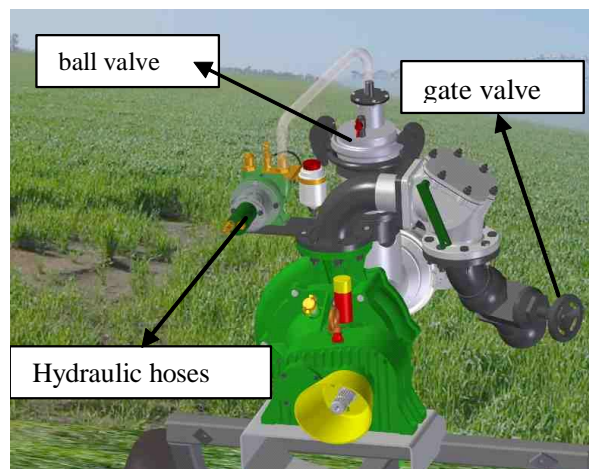
WARNING!

Refer to separate PTO drive shaft manual for length adjustment, profile tube overlapping and maintenance!



WARNING!

**Use exclusively PTO drive shafts with safety coupling.
Max torque 1200 Nm**



- Close ball valve before starting suction
- Start self-priming and fill intake line
(If suction needs more than 2 minutes check system for problems)
- Stop self-priming after the suction noise has changed and start PTO shaft at tractor with approx 300 rpm.
- Slowly open the gate valve and keep PTO speed constant until the pumped medium is distributed by the spreading device at the end of the discharge line. Now increase speed (if PTO speed is too high during filling the pump works without back pressure (cavitation)).
- Increase PTO speed gradually until the desired operating pressure and discharge rate are reached.

**NOTE!**

The pump does not always need to be operated at maximum operating speed. Always choose a speed that is just sufficient to obtain the desired performance. Failure to this instruction could increase fuel consumption, pump wear-out rates and possibly damage other parts of the pumping system.

NEVER WORK THE PUMP IN CAVITATION !**WARNING!**

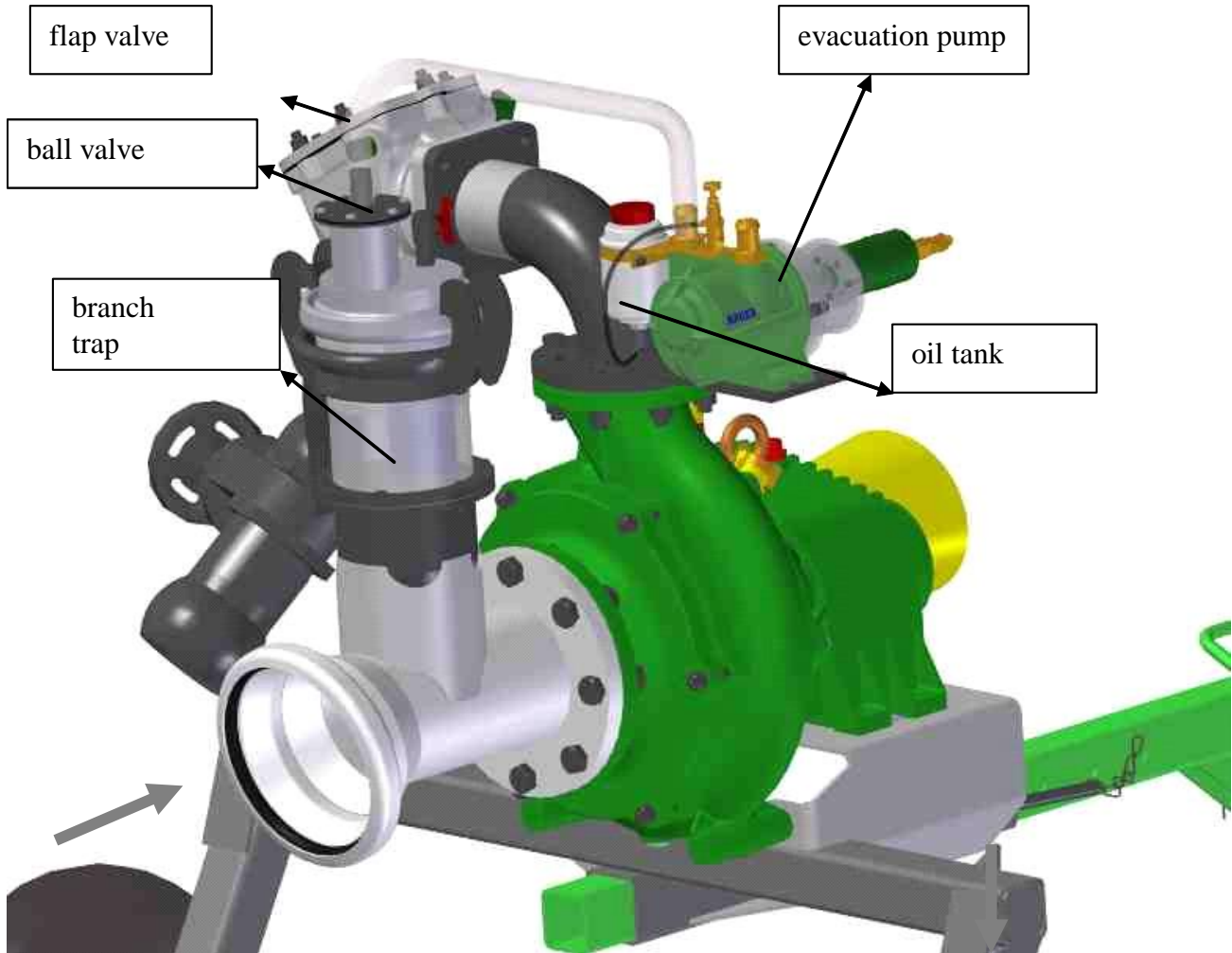
If the pump is not filled after this procedure, check all connections and hoses for absolute tightness. A trapped ball or a rubber that has not been positioned correctly could be another cause for failure. Leave the oiler open to ensure optimum performance of the self-priming unit

**WARNING!**

Do not engage or disengage the PTO shaft abruptly to avoid shocks and pressure hammers.

3.1 Hydraulic self-priming system (SSE) for centrifugal pumps

Function and design



The **centrifugal pump** is not able to take in the medium (water or slurry) itself – this is done by the self-priming device.

In the suction pipe, negative pressure is generated by means of the **evacuation pump**; thus the pipe and the pump are filled with the medium.

Slurry must by no means get into the evacuation pump!

This is achieved by means of a valve system in the **branch/trap**.

Do not mix up valve balls (they are the same size, but are different in weight!).

The **lever** (on the outside of the flap valve) is only used for indicating the operating condition. The flap valve need not be pressed closed with the lever during the suction process.

The **spring** supports closing of the flap valve after the centrifugal pump has been switched off.

With the **hydraulic self-priming device**, the centrifugal pump should not run during suction. The self-priming device can be operated directly from the tractor.

Near the end of the suction process switch on the centrifugal pump and switch the evacuation pump off. (Do not let the evacuation pump continue to run, this would only cause unnecessary heating and wear).

Once the **pumping process has been finished**, the flap valve closes automatically and the suction line remains filled (!). At the next start, there is no need to switch on the evacuation pump – the centrifugal pump starts delivering immediately.

For **emptying the intake line** open the **ball valve** at the branch/trap.

Operating instructions:

- Make sure the oil tank of the evacuation pump is filled.
- Close the ball valve (on branch/trap) before starting suction process.
- For emptying the pressure line it will be useful to mount a tee fitting with gate valve.

Error / - Possible causes / ⇒ Remedies / Comments

The (hydraulically driven) evacuation pump does not rotate.

- Hydraulic lines (on the tractor) incorrectly connected
- ⇒ Connect lines anew

Do not operate the evacuation pump with incorrect direction of rotation, as this would prevent lubrication. This is the reason why there is a flap valve on the hydro-motor.

The (hydraulically driven) evacuation pump rotates too slowly; the suction process takes too long

- Tractor speed too low; too little hydraulic oil delivered
- ⇒ Increase tractor speed

Avoid overspeeding of the hydraulic motor! (The maximum speed of 1550 rpm corresponds to an oil flow of 20 l/min). This is why there is a throttle on the hydraulic motor to limit the amount of oil and thus the speed. If, however, there is not enough oil provided by tractor hydraulics, the hydro motor will not reach full speed.

The evacuation pump does not take anything in – the lever on the flap valve can be moved easily

- (a) leakage in the intake line
 - (b) intake line clogged
- ⇒ re (a) Check intake line and seals
- ⇒ re (b) Rinse branch/trap

When the evacuation pump is taken into operation, the flap valve is closed because of the negative pressure – the lever on the flap valve can only be moved with great effort. In case of leakage or clogging, no negative pressure can be built up.

Note: If the intake hose is only pushed through the surface scum of the slurry pit, or if the content of the pit is not properly mixed, solid components may be taken in and clog the intake line.

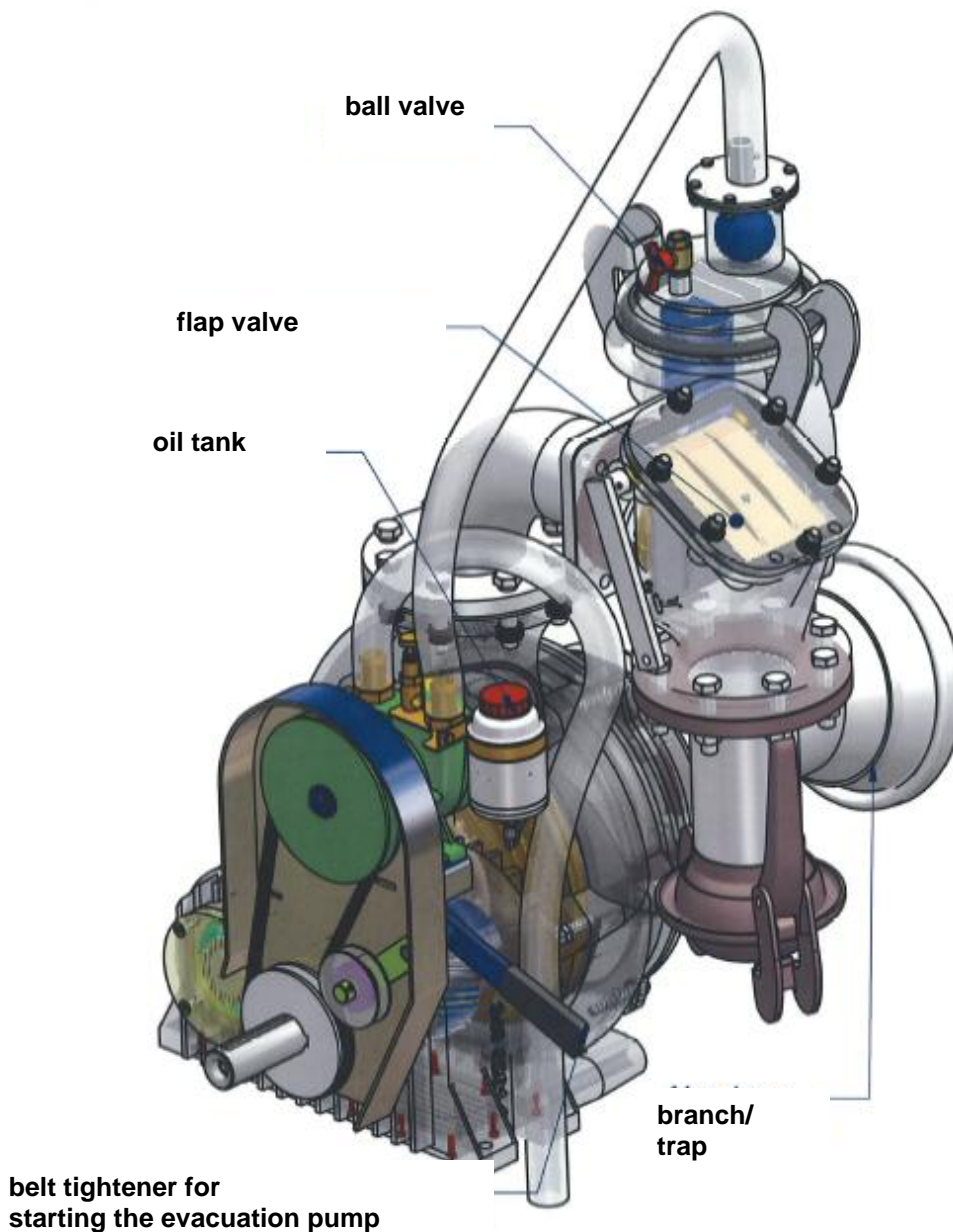
The suction process takes very long and the centrifugal pump cannot deliver any more; the water column (liquid slurry) breaks down:

- (a) slight leakage in the intake line
- (b) suction head too high; medium too viscous
- ⇒ re (a) Check intake line and seals
- ⇒ re (b) Reduce suction head and/or add water

The evacuation pump is slightly more powerful than the centrifugal pump. If there are slight leakages or if the suction head is too high, the evacuation pump may just be able to fill the intake line, but the centrifugal pump will no longer be able to intake the medium.

Note: If the liquid slurry is very viscous, only half the suction head compared to water can be achieved.

3.2 Mechanic self-priming system (SSE) for centrifugal pumps



The **centrifugal pump** is not able to take in the medium (water or slurry) itself – this is done by the self-priming device.

In the suction pipe, negative pressure is generated by means of the **evacuation pump**; thus the pipe and the pump are filled with the medium.

Slurry must by no means get into the evacuation pump!

This is achieved by means of a valve system in the **branch/trap**.

Do not mix up valve balls (they are the same size, but are different in weight!).

The **lever** (on the outside of the flap valve) is only used for indicating the operating condition. The flap valve need not be pressed closed with the lever during the suction process.

The **spring** supports closing of the flap valve after the centrifugal pump has been switched off.

With the **mechanic self-priming device**, the centrifugal pump is running. For this the pump must be filled with 2 liters of water by the means of the rinsing connection to avoid dry running of the mechanical seal.

Start-up:

Fill pump with water at rinsing connection.

Start pumping unit and actuate lever of V-belt tightener until suction noise changes. Rotation speed of pumping unit should not exceed approx. 1500 to 1600 rpm.

Operating instructions:

- Make sure the oil tank of the evacuation pump is filled.
- Close the ball valve (on the branch/trap) before the suction process starts

Error / - Possible causes / ⇒ Remedies / Comments

Suction takes too long

- Speed of pumping unit too low
- ⇒ Increase speed

The evacuation pump does not take anything in – the lever on the flap valve can be moved easily

- (a) leakage in the intake line
- (b) intake line clogged
- ⇒ re (a) Check intake line and seals
- ⇒ re (b) Rinse branch/trap

When the evacuation pump is taken into operation, the flap valve is closed because of the negative pressure – the lever on the flap valve can only be moved with great effort. In case of leakage or clogging, no negative pressure can be built up.

Note: If the intake hose is only pushed through the surface scum of the slurry pit, or if the content of the pit is not properly mixed, solid components may be taken in that clog the intake line.

The suction process takes very long and the centrifugal pump cannot deliver any more; the water column (liquid slurry) breaks down:

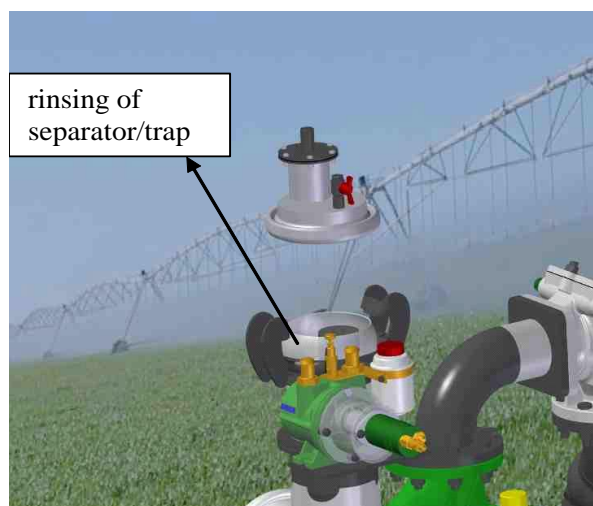
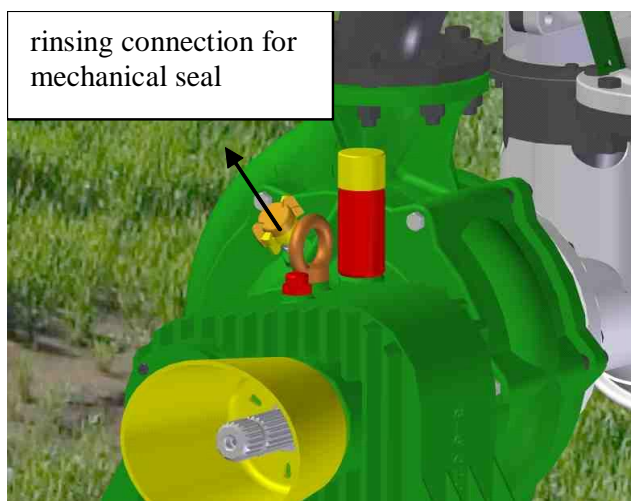
- (a) slight leakage in the intake line
- (b) suction head too high; medium too viscous
- ⇒ re (a) Check intake line and seals
- ⇒ re (b) Reduce suction head and/or add water

The evacuation pump is slightly more powerful than the centrifugal pump. If there are slight leakages or if the suction head is too high, the evacuation pump may just be able to fill the intake line, but the centrifugal pump will no longer be able to deliver the medium.

Note: If the liquid slurry is very viscous, only half the suction head compared to water can be achieved.

4 SERVICE AND MAINTENANCE

It cannot be emphasised often enough how much proper service and maintenance influence performance reliability and service life of a machine.



WARNING!

The pump and all its accessories should be cleaned immediately after use. As long as the slurry has not dried up it can easily be rinsed off with water. Shortly rinse the pump at low speed with clear water fed through the rinsing connection after every use.

The best way to clean the interior of pipes and fittings is to pump water through the system for several minutes.

- The pump should be stored in a weather-protected place, preferably in a shelter. In areas where frost is likely during the winter season the pump housing must be drained completely by turning the impeller and opening the plug to spill out the remaining water.
- The gearbox oil should be exchanged for the first time after 50 operating hours and then every 1000 operating hours, but at least once a year.
- The mechanical seal is made of high-strength materials. The oil reservoir provides it with liquid (hydraulic oil – e.g. 0.4 l Shell Tellus S22) so the seal will not even be destroyed if the pump runs dry for a short while.
- Functional check-up of the mechanical seal is limited to visual inspection of the oil level in the oil reservoir. If liquid emerges from the oil reservoir while the pump is running or if the predetermined oil level cannot be reached, the sealing must be checked for damage (foreign objects).
- Always replace both rotary and stationary seal ring at the same time.



- We recommend to rinse the pump with water before it is dismantled. In doing so, foreign objects can be washed out and the mechanical seal would be tight again.
- Observe local laws and regulations when disposing pumps and pump components after repairs and service or when a pump is withdrawn from service. This applies in particular to residual slurry in the pump body.

5 INSTRUCTIONS FOR SAFE AND TROUBLE-FREE RUNNING OF MAGNUM SLURRY PUMPS

When putting a Magnum slurry pump into operation be sure to observe the following:

1. Equip the intake line with ORIGINAL Bauer coupling parts
Never mount the intake line hanging from the pump (no strain relief).
Always mount the intake line in a rising position (no sagging – air pockets)
The intake line must be absolutely leak-tight.
Always dimension the intake line in accordance with the required discharge rate.
Always use an 8" line (HK 194) when working with Magnum pumps of the SX series.
2. Before each putting into operation it is absolutely necessary to check the oil level in the gearbox and in the oil reservoir.
3. At first putting into operation of a pump with mechanic self-priming device (hydraulic ones excepted) the pump must be filled with 2 liters of water in order to avoid damaging the mechanical seal.
4. **During suction by the means of evacuation pump (compressor without flap valve) make sure the gate valve inside the discharge line has been closed.**

CAUTION! If priming takes longer than 60 to 90 seconds, some points need checking:

- 4.1 Check if intake line is tight (rubber sealing ring, gaskets and hoses)
 - 4.2 Check gate valve inside pressure line
 - 4.3 Check compressor hoses and gaskets
 - 4.4 Check if the ball got stuck in the branch line / trap
 - 4.5 Check if compressor lamellas are blocked (compressor overheated – this can only happen after very long continuous operation or if the pump is soiled)
 - 4.6 Defective mechanical seal
5. When priming is finished, fill up the pipeline by slowly opening the gate valve inside the discharge line

CAUTION! Whenever discharge lines have got big diameters, the gate valve is opened very fast and speed is increased in the same time (so that no back pressure will be built up), pumps very quickly start cavitating. Under this operating conditions seal damage is very in short.

Also note that at low pump speed and open gate valve, the pump always will remain in critical operating condition (cavitation), if only the speed is increased without building up back pressure.

Cavitation

Cavitation means the immediate coming and going of steam bubbles in a liquid stream. Steam bubbles appear when the static pressure of the liquid decreases because of the growing absolute speed or when the geodesic head sinks to the level where the steam pressure matches the temperature of the liquid.

Yet, before material is removed because of the immediate break-up of the steam bubbles, cavitation causes an increasing noise level and a run with disturbances, because the pump efficiency rate and the manometric head go down. If cavitation becomes more and more heavy the impeller channels may be completely blocked by steam bubbles so that discharge is stopped at all.

If the pump is **operated over a longer period while cavitation is ongoing**, the disturbed run of the pump can cause the pump shaft to vibrate and **damage the mechanical seal**.

Slide ring sealing

The slide ring sealing HJ 977 GN is independent of rotational directions and is, because of its spring alignment, ideal for material containing solids and highly viscous material.

To function properly, it is important to comply with the given mounting length.

The oil reservoir must always be filled with oil.

After operation the sealing room must be cleaned quickly (rinsed) with a pure liquid (water).

If, for any reason, the cleaning is not done, the sealing might get aggluminated with the dried-up slurry, which has a negative effect upon a new start. , e.g. dry run, insufficient lubrication, cracks – failure of the sealing

6. When large pumping systems are involved, the entire system must first be filled with the gate valve half-closed and then the required operating condition must be established by speed increase and adjustment of the gate valve.
7. Except for suction – pumping against the closed gate valve is forbidden.
8. Note also: the higher the dry matter content, the lower the suction head (suction capacity).
9. In case of minor leakage (rubber ring with a small crack) the suction capacity of the evacuating pump will be sufficient for filling the intake line, but the centrifugal pump will be unable to build up pressure because the suction flow breaks off due to the air leak.

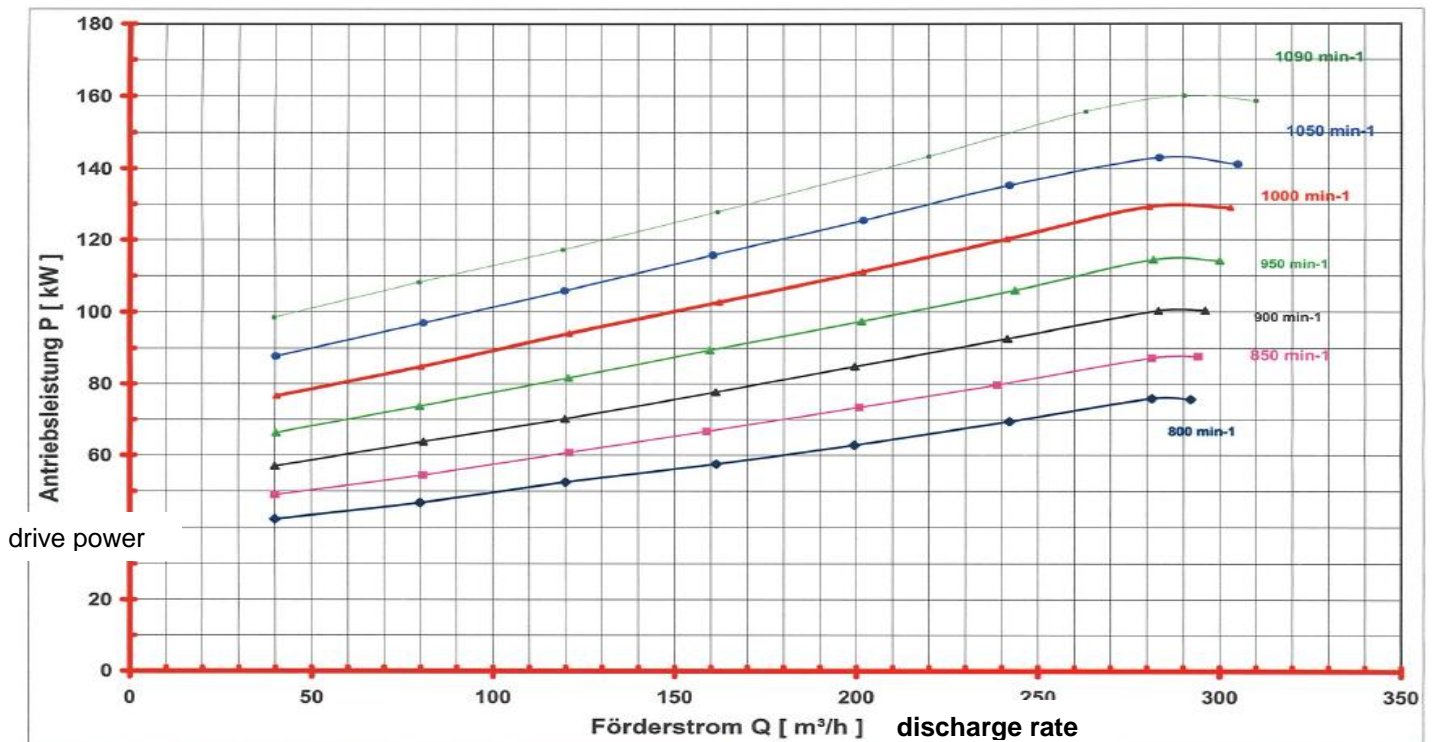
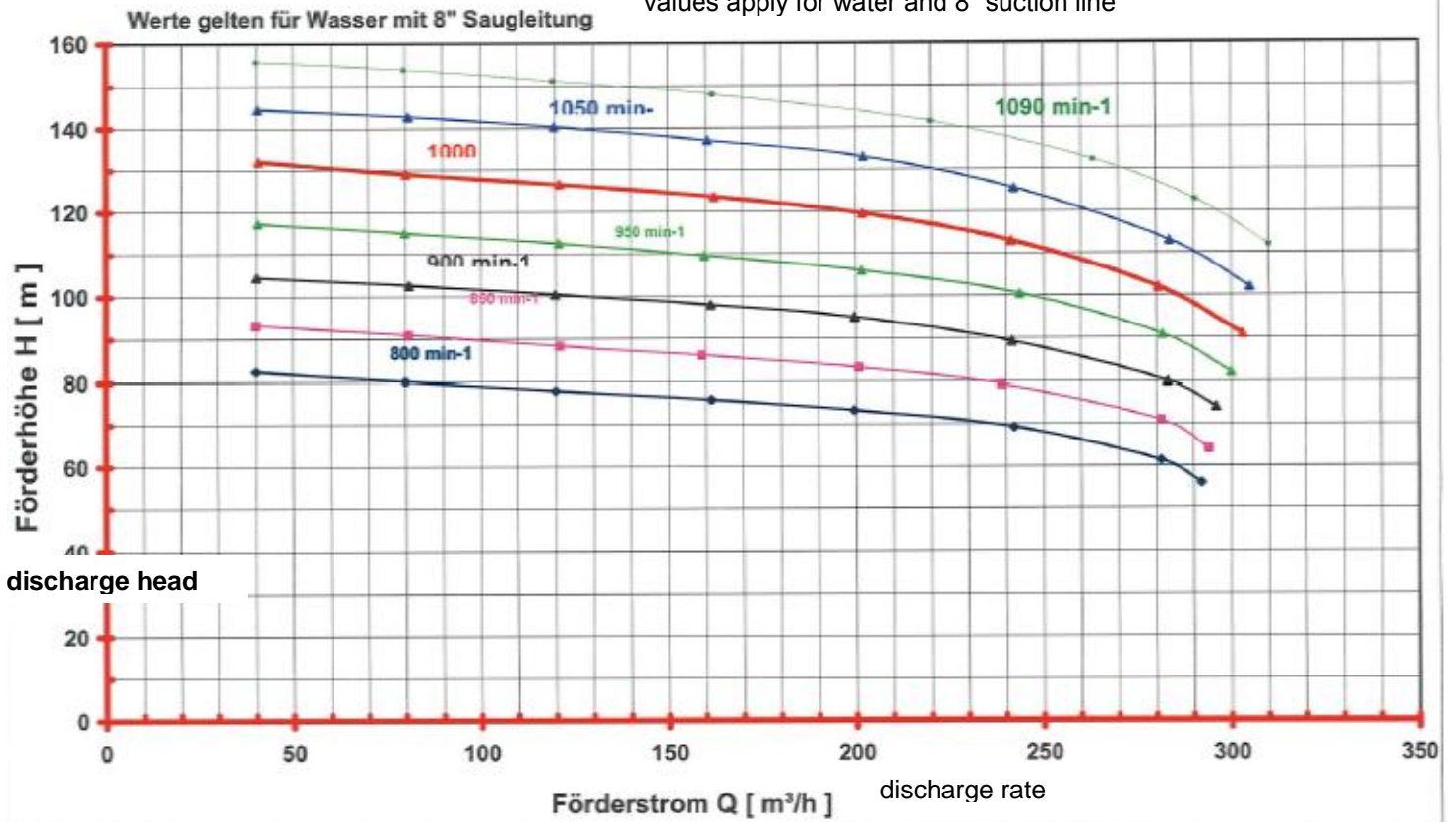
This problem cannot be solved by increasing the drive speed.

Increasing the speed of a pump which does not work (break-off of suction flow) for a longer time will increase the risk of dry run and subsequent seal damage.

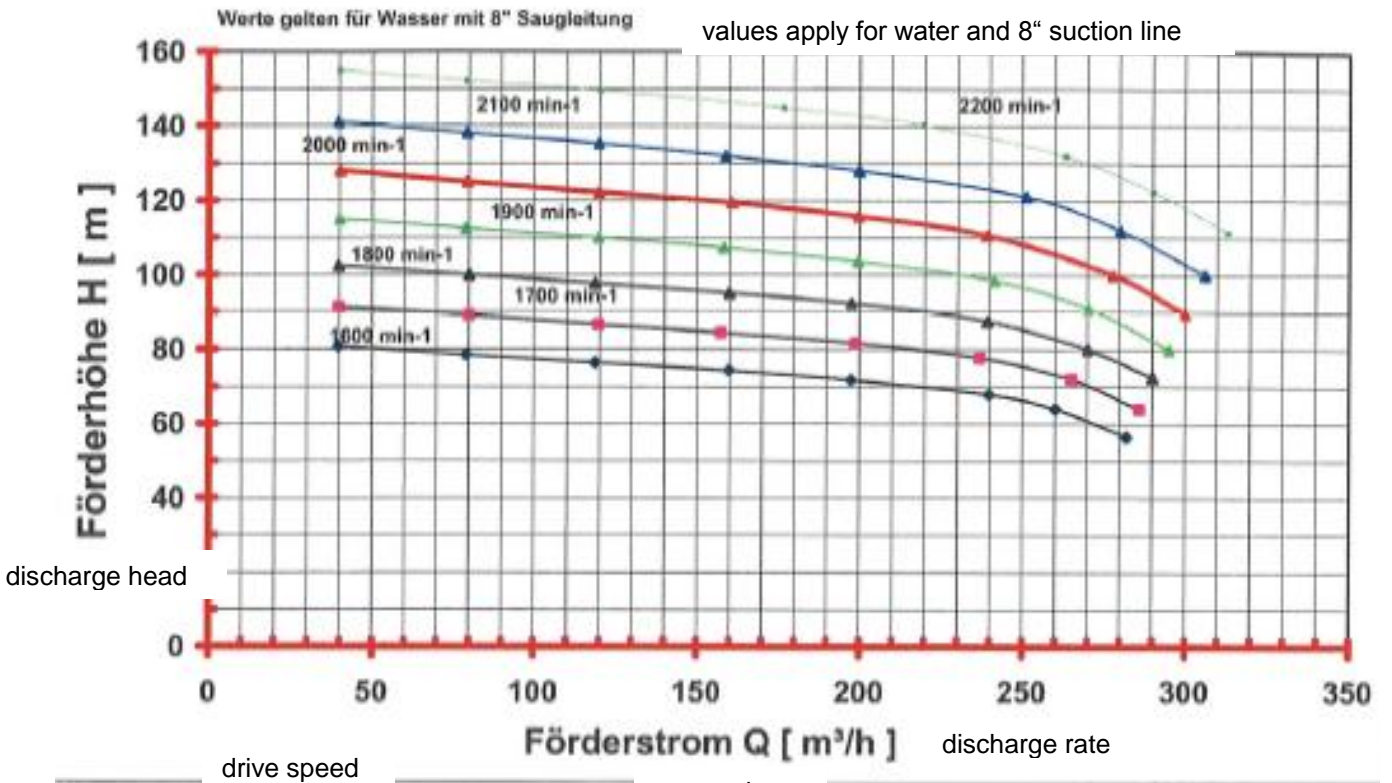
10. **Never exceed the maximum driving speed** indicated on the nameplate.
Higher driving speeds increase the circumferential speed at the mechanical seal which will heat up to such an extent that thermal stress cracking or insufficient seal face lubrication will be caused.
11. When the pump is working for a long time, always take care of the gearbox temperature (should not exceed 90°C).
12. Rinse and clean the pump after every use.

6 DISCHARGE RATE CURVES SX 1000

values apply for water and 8" suction line



7 DISCHARGE RATE CURVES SX 2000



Antriebsdrehzahl $n = 2000 \text{ min}^{-1}$
 Laufraddrehzahl $n = 2545 \text{ min}^{-1}$

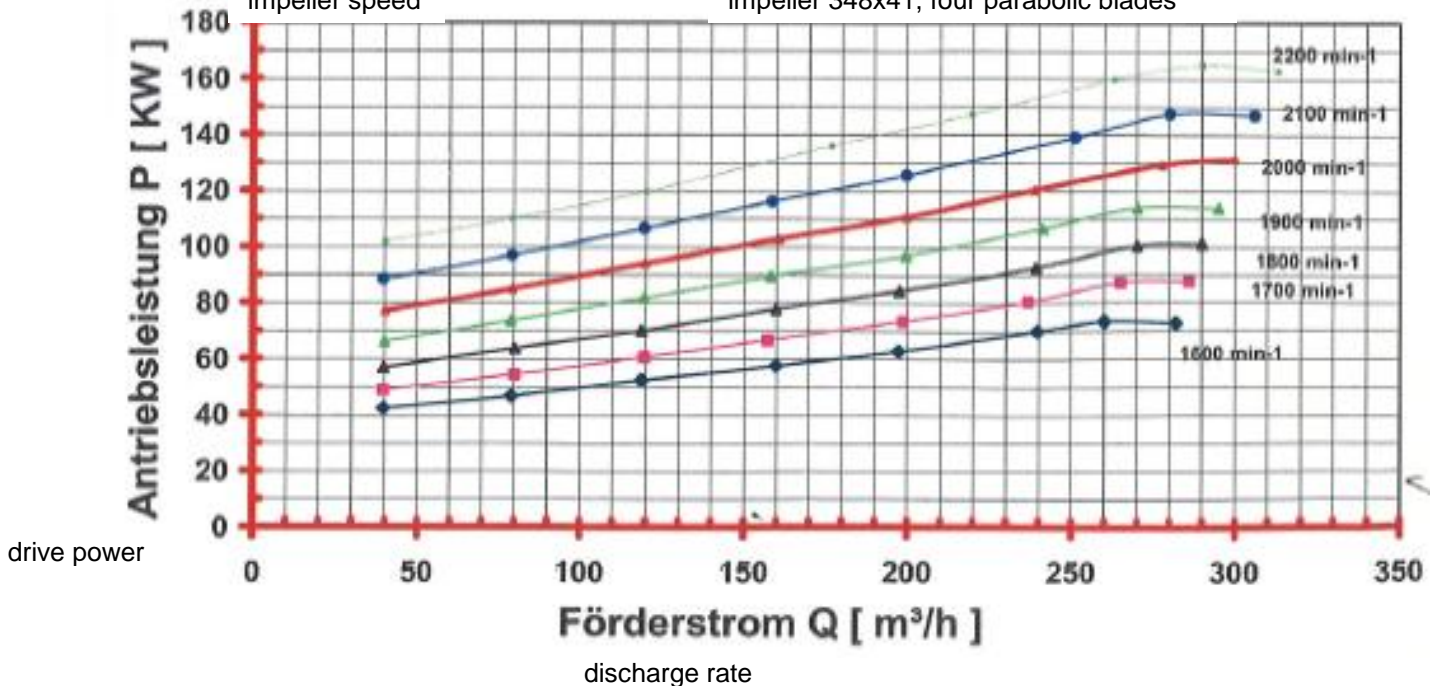
impeller speed

gear ratio

Getriebeübersetzung $i = 1:1,273$

Laufrad 348x41- vierschaukelig mit Rückenschaufeln

impeller 348x41, four parabolic blades



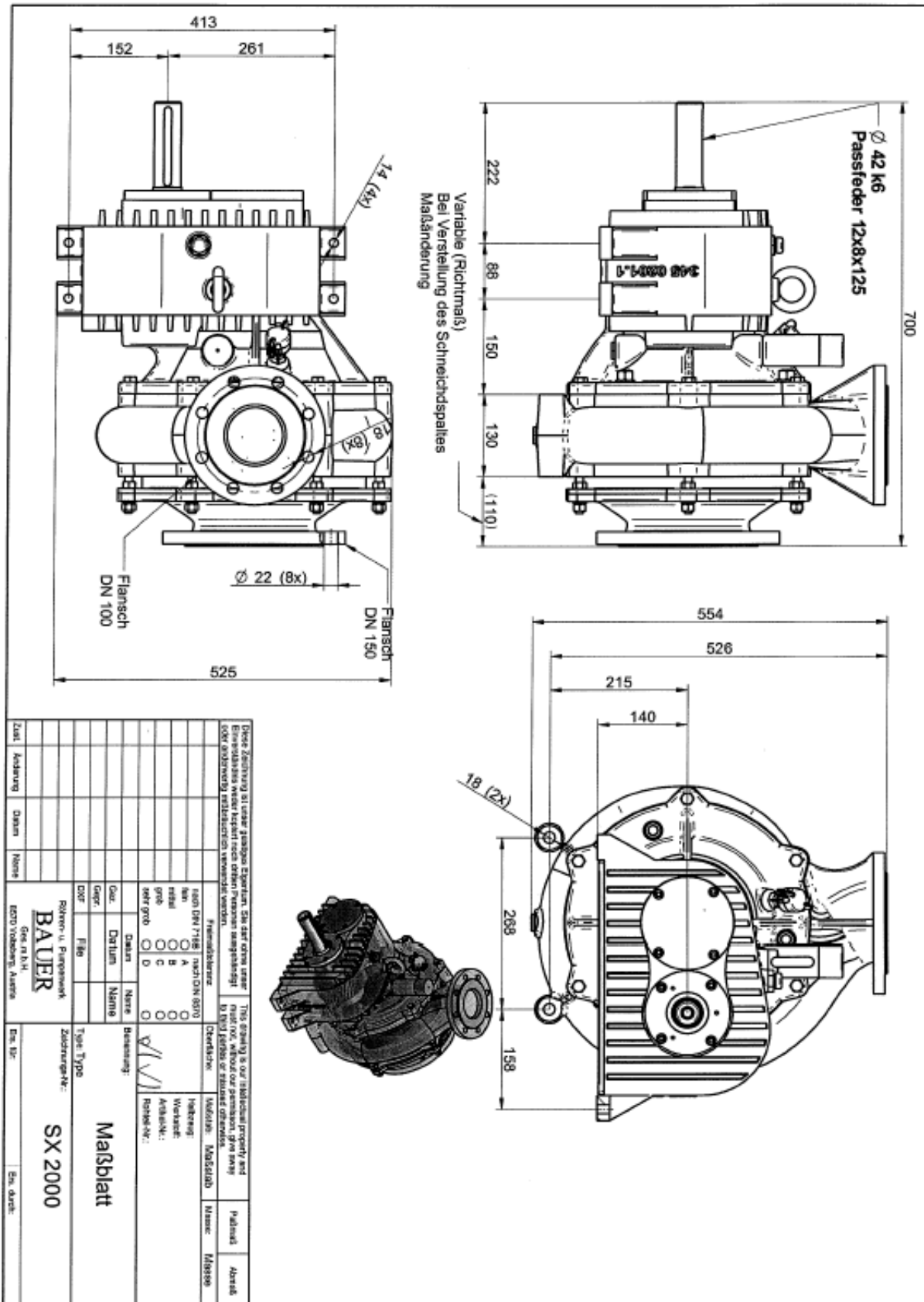
8 TECHNICAL DATA

		SX 1000	SX 2000
Driving power	[kW]	85 - 130	80 - 125
Driving speed	[1/min]	1000	2000
Discharge rate	[m ³ /h]	80 - 300	80 - 300
Discharge head	[m]	130-92	125 - 90
Oil filling – gearbox „ ISO VG 220 synthetisch Gear oil Mobil SHC 630 synthetisch	[l]	1,5	1,9
<u>1st oil exchange after 50 operating hours, then every 1000 hours or once a year</u>			
Oil reservoir for mechanical seal - hydraulic oil HLP 22 conforming DIN 51524 Part2 ISO VG 22	[l]		0,4
Oil filling for self primer – hydraulic oil HLP 22 conforming DIN 51524 Part2 ISO VG 22	[l]		0,2
GEAR OIL: conforming DIN 51517 Part3, ISO 12925-1 Type CKC, AGMA 9005-D94EP-5EP; ISO Viscosity Grade: 220			
High quality HYDRAULIC OIL , conforming DIN 51524 Part2, ISO Viscosity Grade: 22			

9 FAULT DESCRIPTION

Fault	Cause	Remedy
The pump does not deliver	Suction head too high.	Decrease suction head.
	Leak or blockage in the intake line.	Repair defective parts or remove blockage.
	Too much solids.	Add water.
	Wrong direction of rotation. Seal damage.	Reverse direction of rotation. Replace the seal.
Discharge decreases.	Too much back pressure	Remove foreign object.
	Intake line blocked.	Clean intake line.
	Impeller blocked.	Clean impeller.
Suction with self primer is interrupted.	Ball has got caught.	Open the coupling and close it again.
	Leaking joints or hoses.	Replace couplings or hoses.
	Defective mechanical seal.	Replace mechanical seal.

10.2 Dimension sheet SX 2000



11 MOUNTING INSTRUCTIONS FOR MECHANICAL SEAL Ø 50 FOR SX 1000 AND SX 2000



Accessories for mechanical seal assembly

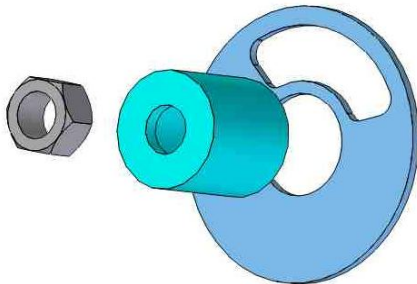
Loctite 242 for securing the threaded bolts of the mechanical seal.

Adhesive tape for covering the sharp edges of the key groove.

Molykote for lubricating the sliding faces of the O-rings.

Allen key for threaded bolts of the mechanical seal.

Knife for cutting the adhesive tape.



Assembly kit for adjustment of the functional length of the mechanical seal.

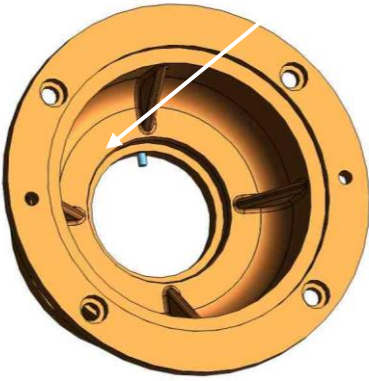
Sleeve

Disc

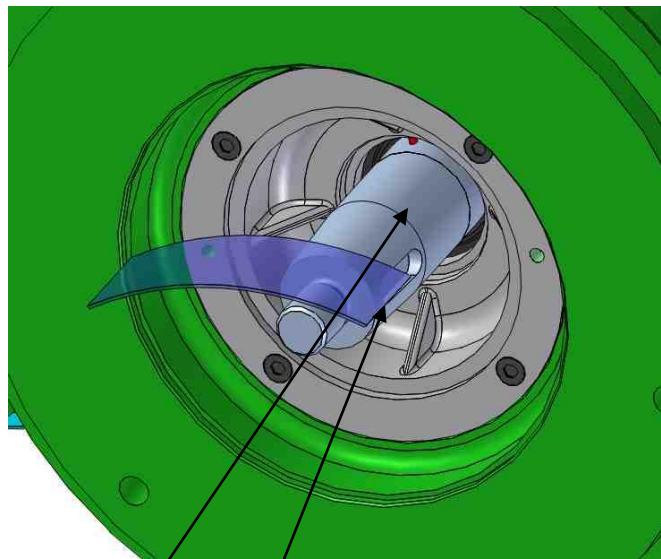
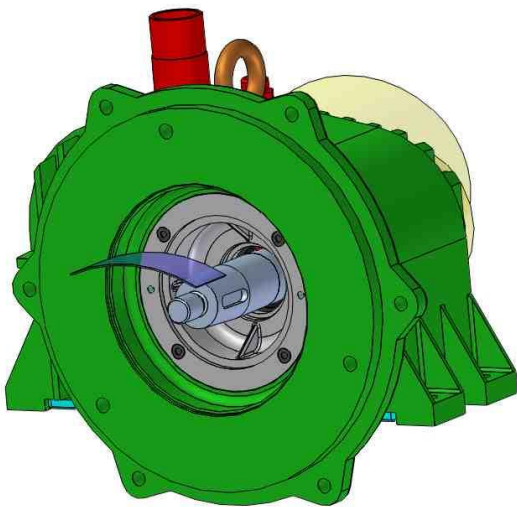
Nut



Do not forget to insert the anti-rotation lock pin of the stationary seal ring in the seat.



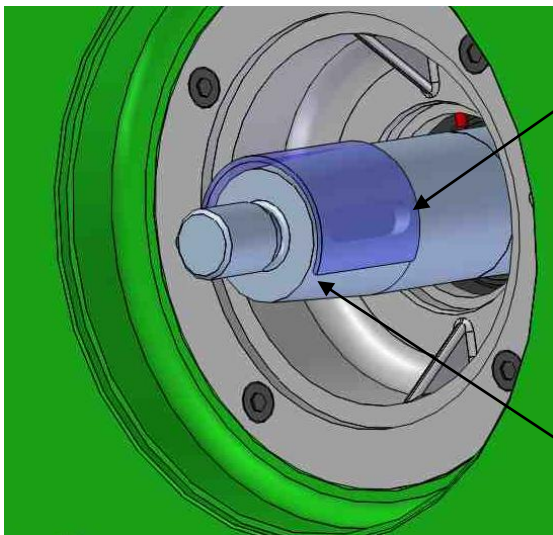
To protect the O-ring of the rotating element, cover the sharp edge of the key groove, only up to the end of the cone.

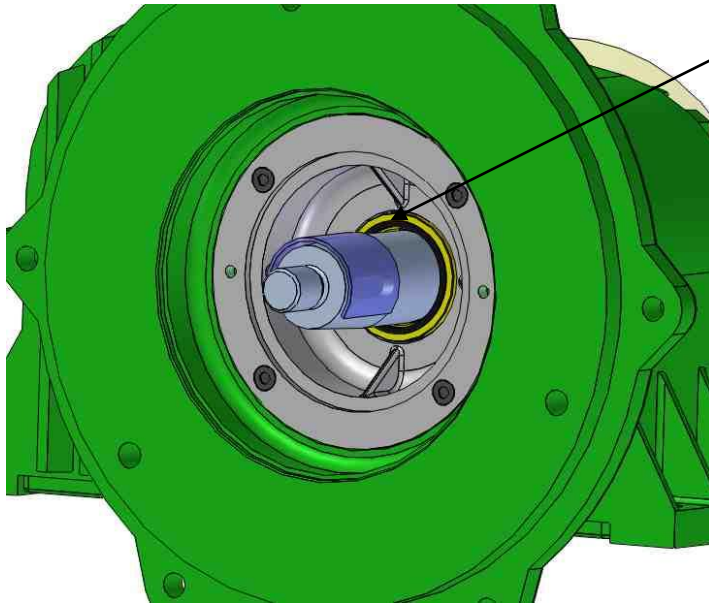


cone end

key groove

Moisten pump shaft with Molykote to reduce friction of O-rings.
(you may also use water, alcohol or silicone based grease)





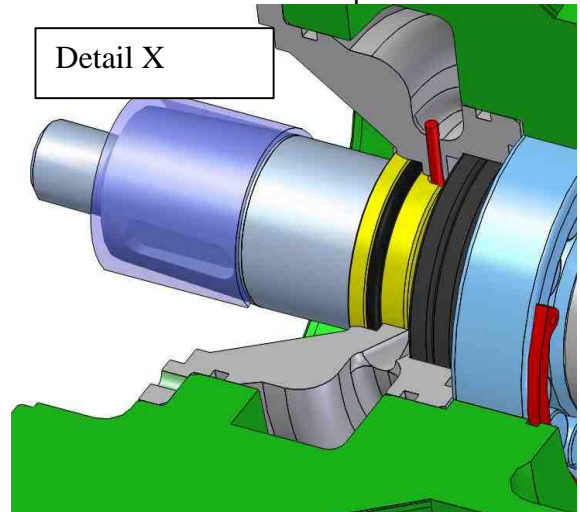
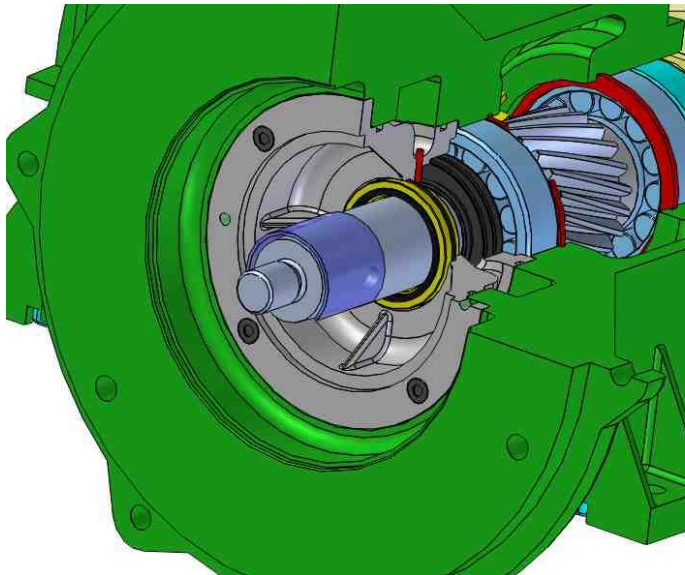
Mount the stationary seal ring

Groove and anti-rotation lock pin must be in alignment.

Stationary seal ring



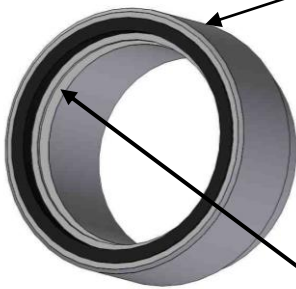
anti-rotation lock-pin



Detail X

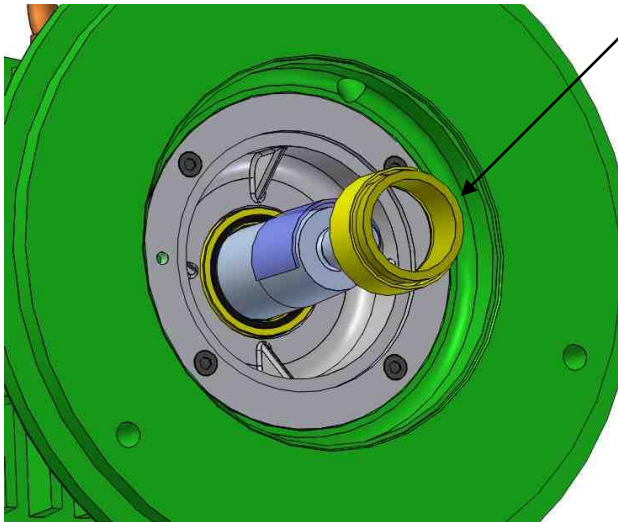
Preparing the rotating collar

Remove the threaded bolt

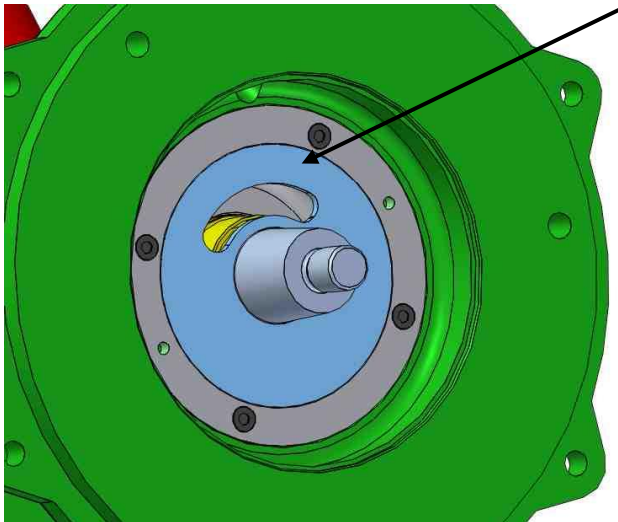


Moisten the thread with Loctite

Spray the O-ring with lubricant inside

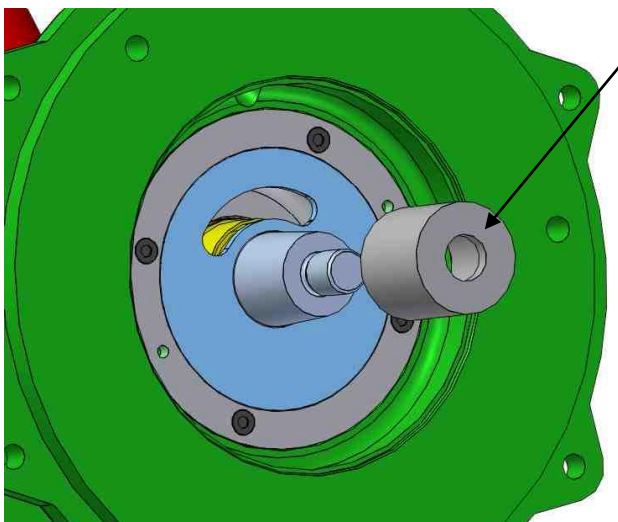


Press the mechanical seal on

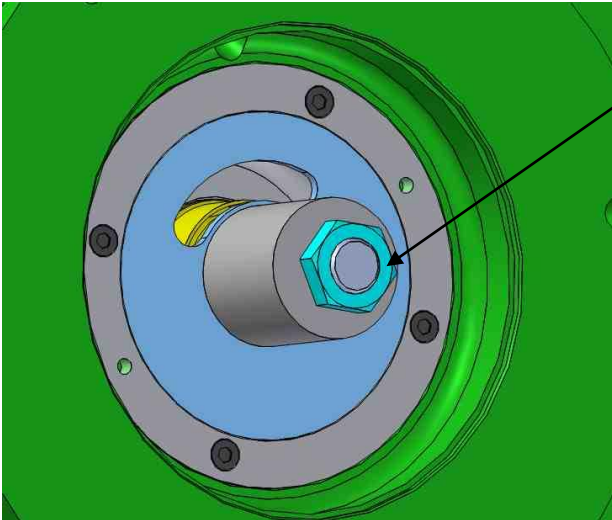


Insert the disk.

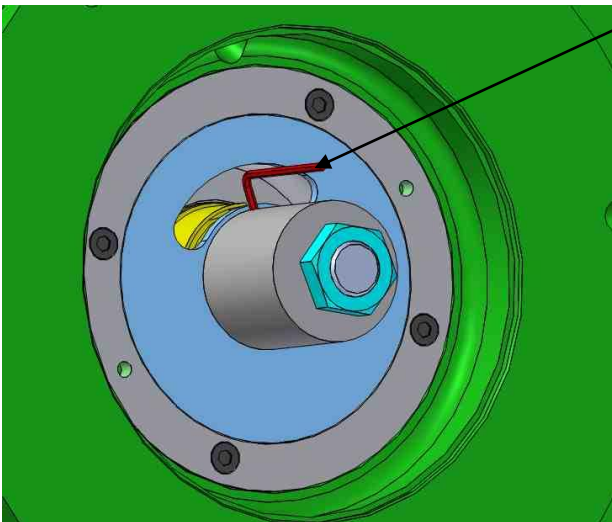
The disk must be positioned in such a way that the threaded bolts of the mechanical seal are accessible through the slot.



Mount the sleeve



Mount the space-adjusting nut - mounting length
 $47.5 \pm 0.5\text{mm}$.
Tighten the nut by hand.

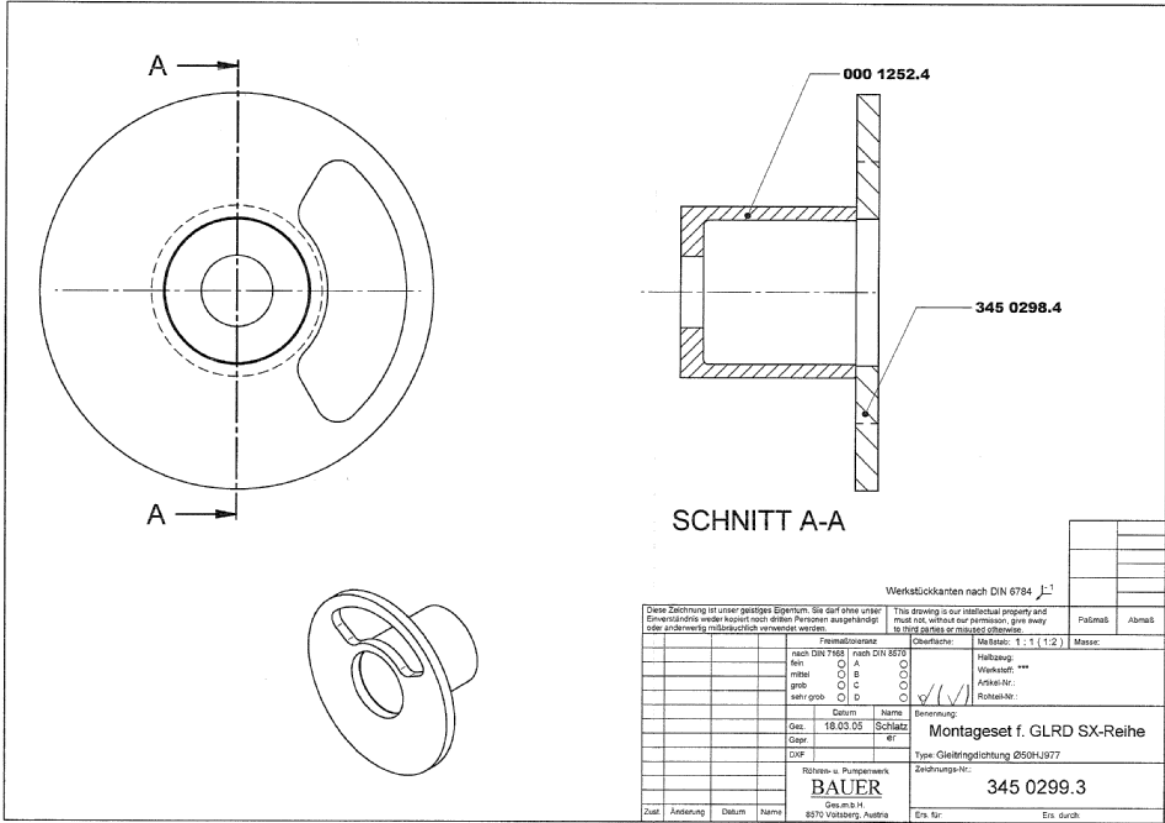


Use Allen key to tighten (fix) the threaded bolts
that have been moistened with Loctite.

Remove the adhesive tape

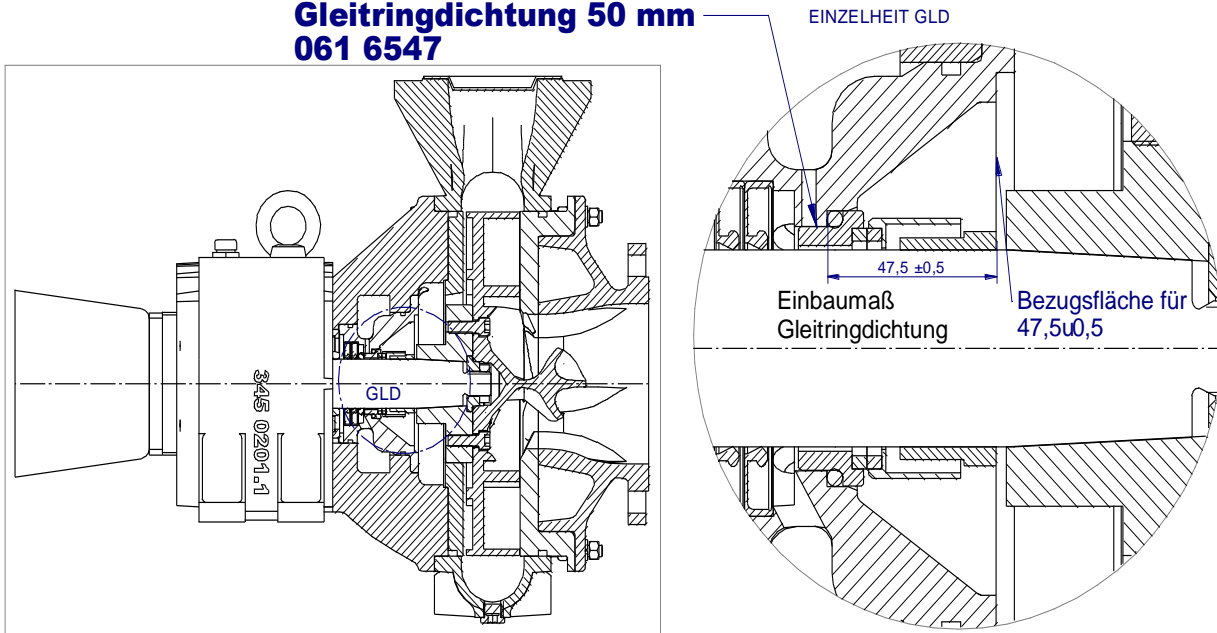
The assembly kit mentioned in the manual is available on request.

Assembly drawing for the mechanical seal with hub and impeller



12 CONFORMITY CERTIFICATE

Gleitringdichtung 50 mm 061 6547



EC Declaration of Conformity

according to EC Directive 2006/42/EC

The manufacturer

Röhren- und Pumpenwerk BAUER Gesellschaft m.b.H.
 Kowaldstraße 2, 8570 Voitsberg, Austria
 phone +43 3142 200-0; fax: +43 3142 200-320/-340

herewith confirms that the machine mentioned below

Designation of machine	Gear Pump Magnum SX
Machine type / basic units	SX 1000 and SX 2000
Consists of	Gear Pump with SSE

corresponds analogously to the requirements of the Machinery Directive 2006/42/EC.
 In case of a modification of the machine not accorded with FAN GmbH, this declaration will cease to be valid.

The following standards as amended have been applied analogously:

DIN EN ISO 12100-1	Safety of machines – Basic concepts, general principles for design, Part 1: Basic terminology, methodology
DIN EN ISO 12100-2	Safety of machines – Basic concepts, general principles for design, Part 2: Technical principles and specifications
DIN EN 60204-1	Safety of machines - Electrical equipment of machines, Part 1: General requirements
EN ISO 14121-1	Safety of machines – Risk assessment

Norms related to products

EN ISO 13857	Safety of machines, safety clearance to secure no touching hazard area with upper extremities.
DIN EN 349	Safety of machine, minimum clearance to avoid crushing body parts
DIN EN 809	Pumps and pump units for liquids - Common safety requirements

The documents belonging to the machine according to annex VII, part B have been attached.

Person in charge of documentation: Thomas Theissl, Kowaldstraße 2, 8570 Voitsberg, Austria,



Technical Designer in Charge



Commercial Manager