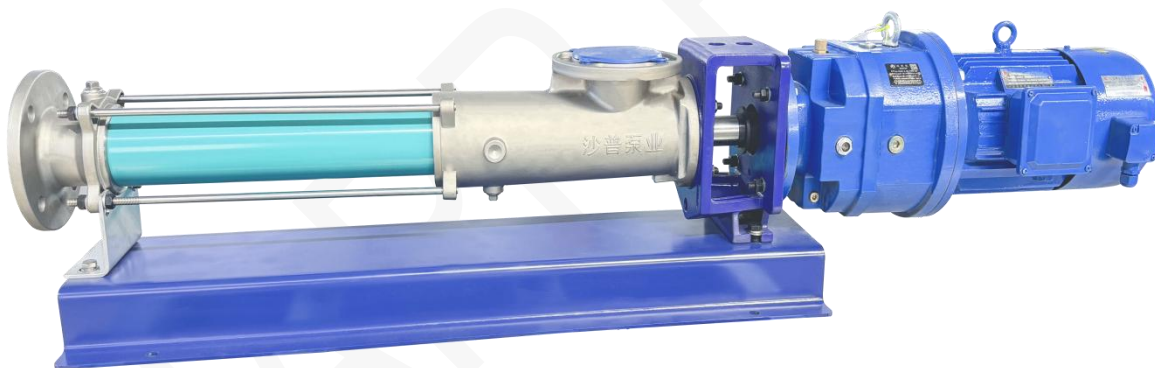




OPERATIONS AND MAINTENANCE INSTRUCTIONS OF PROGRESSIVE CAVITY PUMP



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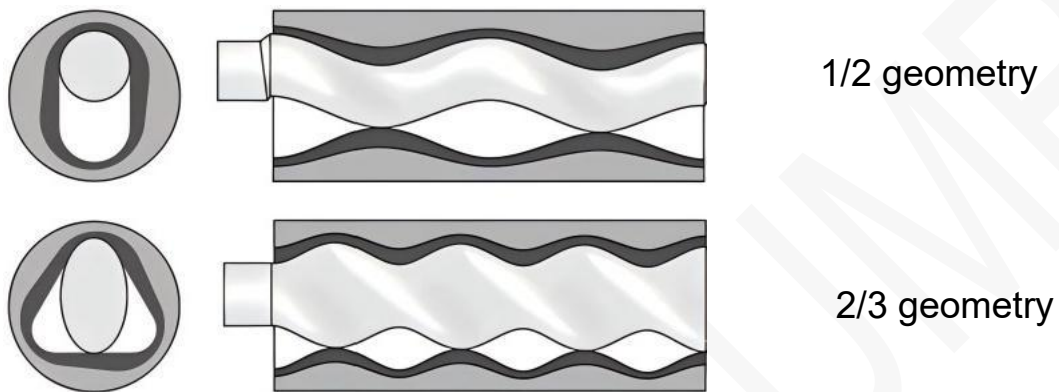
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Length and cross-sections through the stator with rotor
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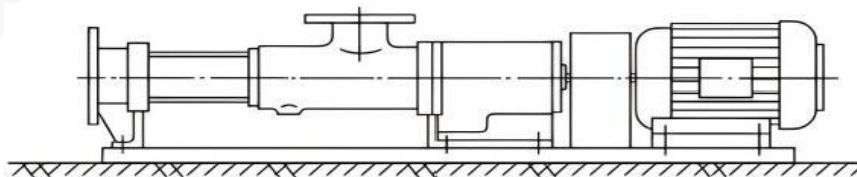
1 General Data

Noise emissions:

The maximum permitted noise emission level at a work place is 70 dB(A).

Noises generated by the drive and pipes are not included in the above emission value.

A prerequisite for the noise emission level of ≤ 70 dB(A) is that the pump is operated in a cavity free regime and is bolted to a concrete base.



	2 INSTALLATION INSTRUCTIONS	PAGE 2.0
2 Mounting and Installation If the Screw pump was stored and the rotor grease protected: Remove the grease before installing the stator. Clean the rotor thoroughly in order to avoid unsuitability of the grease with the stator material and the pumping medium. Screw the pump at all fixing points (bearing housing/drive stool,end stud,support feet)using all fixing bores securely down to the sub-structure(ground plate,machine frame, foundation etc.). 2.1 Direction of Rotation The direction of rotation of the pump is given on the model plate and in the order confirmation.The direction of delivery of the Screw pump is a function of the direction of rotation. Changes must be agreed upon and confirmed by the supplier. 2.2 Pressure If not explicitly confirmed otherwise in the order confirmation, the maximum permissible pressure(e.g.when turning clockwise) inside the pump housing(A) -for models with pump housing of cast iron 6 bar -for models with welded pump housing 10 bar. The maximum permissible pressures inside the end flange(B) is a function of the design applied for connections -with flange:maximum nominal pressure(e.g.PN 16) -with threaded internal socket:maximum 25 bar 2.3 Piping System ■ Arrange suction and pressure pipes so that when the pump is not running,the medium is stillpresent before and after the pump. Sufficient media should remain inside in order to lubricate the pump during restart.		

- Clean the pipe work and rinse thoroughly before installing the pump.
- Connect the pipe work ensuring that no external stress attacks the pump body.

The installation of compensators between the pump and the pipework is recommended:

- No risk of damage to the pump housing from pipelines "resting" on the pump.
- No risk of damage to the pump housing through vibrating pipelines.

2.4 Shaft Sealing

- Where applicable, ensure that adequate supply lines for the buffer, flushing or quenching fluid for the shaft seals are connected **before** the pump is put into **operation**.

2.5 Electrical Connection

All work relating to electricity shall only be made by **authorized and qualified personnel** and it should be in compliance with the requirements of the relevant national regulations!

Note for frequency converter operation:

It is absolutely necessary to connect the PTC-resistors of the drive in case of frequency converter operation to protect the drive against overheating.

	3 START-UP	PAGE 3.0
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3 Start-up

The Screw pump design requires strict attention to the following:

Never run the Screw pump dry!
A few rotations in dry condition will damage the stator!

- Before starting up for the first time, fill the pump with medium.
 In the case of high viscosity media fill with a liquid.
 Pump priming is vital to ensure lubrication of the rubber stator. Fill the piping on the pump suction side.
 In anti-clockwise rotation only: Fill the pump housing.

The Screw pump is a progressing cavity pump which can produce pressures that may cause the bursting of vessels or pipes.

The power transmission train (shaft, coupling rod, joints, rotor) of the pump may be overloaded thus resulting in damage or breakage.

Also the pump housing parts with their connections may be overloaded and break. here is a table in Section 4 of these Maintenance and Operating Instructions showing the pressure resistance of the pump housing parts.

Never run the pump against a closed inlet or outlet valve!

- **Open valves and vents before starting the pump!**
- **Check the direction of rotation by briefly switching on the pump motor.**

4 Temporary Shutdown

- After stopping the pump empty and if necessary rinse it if

- the medium might freeze due to the temperature surrounding the pump. Especially where there is a danger of frost if the pump is installed outside a building
- the medium tends to solidify or harden
- the medium tends to glue up the shaft seal.

- Stator:

When stored for a long period, the elastomer along the contact line between the rotor and stator may become permanently distorted (compression-set).

This will increase the break away torque. For this reason, the stator should be removed, and stored in a cool, dry place in air tight package to give protection against light and air.

- Rotor:

Remove **rotors** and store away, safe in the original packing.

Support **other rotors** on wooden blocks and cover to protect them from mechanical damage, after the stator has been removed.

Protect the rotor surfaces against corrosion with protective grease.

Remove the grease before re-installing the stator and clean the rotor thoroughly in order to avoid unsuitability of the grease with the pumping medium or the stator material.

- Stand-by pump:

A stand-by pump is sometimes used as a back-up for the main pump and, when standing idle for longer periods, should be operated from time to time. The pump may otherwise become seized when being started up. This is due to compression set i.e. distortion of the stator against the surface of the rotor.

5 Maintenance

5.1 Pumps in General

- The pumps should be regularly rinsed or cleaned if deposits of medium are likely to build up (sedimentation).

If the pump needs to be opened to do this, ensure that the pump and motor are switched off and cannot be turned on accidentally (eg. by removing the fuse).

Periodical standstill to allow for cleaning during operation depends on the medium and type of operation.

- The pump can be cleaned:
 - through the cleaning ports provided in the pump housing
 - manually by dismantling the pump
 - automatically (CIP cleaning) for special housings with a flushing section.

5.2 Lubrication

The Screw pump does not require frequent lubrication.

- Maintenance of the drive should be carried out according to the drive manufacturers instructions.

- Maintenance

- where no manufacturers instructions are available and
- when normal conditions of use exist:

- Strip down the drive unit
- Remove the bearings
- Clean all parts
- Renew the lubricant

every 5000 operating hours or at least every two years.

Special lubricants are often specified for mechanically controlled variable speed drives.

It is therefore important to follow the drive manufacturers maintenance instructions.

5.3 Lubricating the Pin Joints with SIM-pinJoint seals

- It is advisable to change the oil and check the seals of the pin joints:
 - when renewing worn joint parts
 - when opening the pump for any reason.

5.4 Double Mechanical Seal in "back-to-back" Arrangement with Buffer Fluid System

For correct operation a double mechanical seal requires a buffer fluid. This fluid is designed to lubricate the seals and remove the heat caused by friction. It is also apt to prevent the product handled from entering the sealing gap and it fills the gap between the product and atmosphere side.

As a buffer fluid, any pure and clean fluid may be used. The fluid, however, should not corrode with the wetted parts of the seal, and it should not damage the product

handled or harm the environment.

The buffer fluid must:

- be free from solids.
- not tend to form deposits.
- have a fairly high boiling point.
- possess good thermal conductivity.
- not harm the seal elastomers.

Clean soft water meets these requirements quite satisfactorily.

The picture overleaf shows the most common arrangement of a buffer fluid system in thermosyphon design. The circulation in the system results from the differences in density in relation to the buffer fluid temperature.

The buffer fluid pressure p_3 should be about 10 %, i.e. 2 bar at least, above the product pressure p_1 .

The outlet temperature should not exceed 60°C when water is used as a buffer fluid

As a rule, the outlet temperature should be about 40°C below the buffer fluid boiling point.

5.5 Lubricating Oil:

At a sudden break in a joint up to 450 ml of lubricating oil together with metal rubbings may enter the pumping medium. It is therefore of essential importance to regularly check the state of the joint seals and renew in time, if necessary.

If the pin joints operate without lubricating oil or seals, there will be no risk of contaminating the medium with oil. This operation, however, results in a higher amount of rubbed off metal parts through wear on the joints. These metal rubbings will inevitably and continuously come into contact with the pumping medium.

6 Removal and Fitting of End Stud, Stator and Pump Housing

The pump with attached pipework should be empty and must have cooled off! Disconnect the pipework on the suction side and pressure side of the pump.

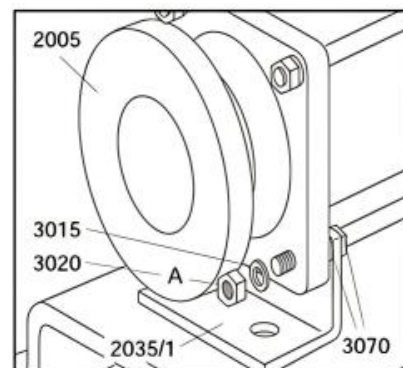
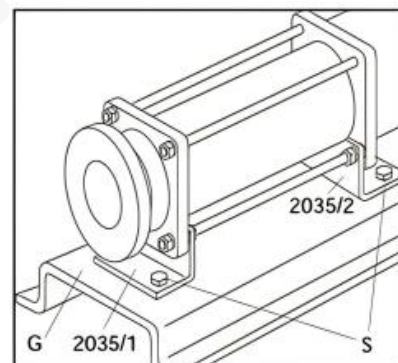
Caution for pumps with eramic rotors!

Where a pump is fitted with a ceramic rotor (1999) the following operations should be carried out with great care.

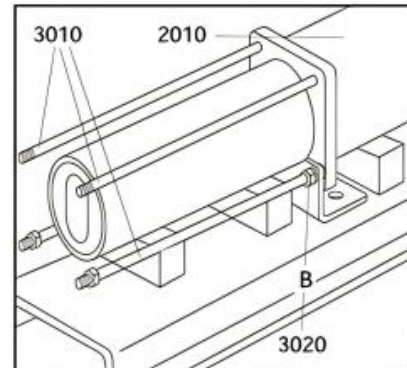
Do not use any force or sharp tools! Special care must be taken to prevent heavy strokes, vibrations or impact by a hammer.

Dismantling

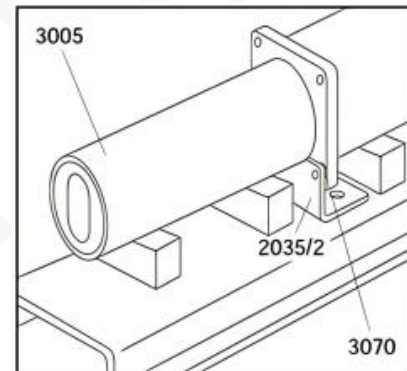
- Remove the securing screws(S) from support feet (2035) to baseplate(G).
- Unscrew the hex nuts A(3020) and remove with spring washers (3015), then withdraw the end stud (2005) and first support foot (2035/1) with washers (3070).



- Support pump housing(2010) and stator(3005) with wooden blocks.
- Loosen the hex nuts B(3020), where fitted, and remove the thru bolts(3010).

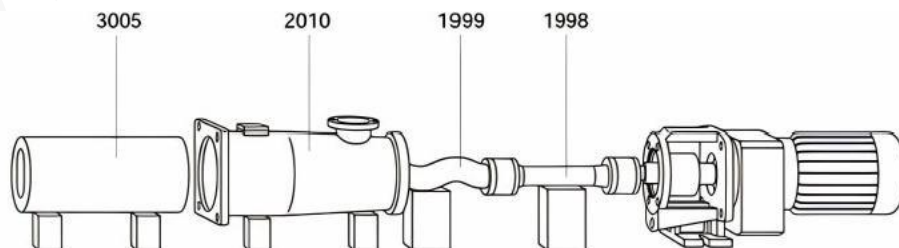


- Where fitted, remove the second support foot (2035/2) and the washers(3070).



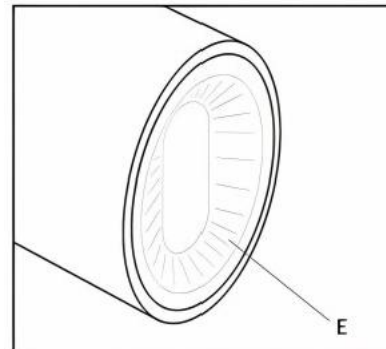
Caution for pumps with ceramic rotors!

When the stator (3005) is removed from the rotor(1999), the stator must be supported to prevent it from suddenly tilting away downwards. Removing the stator(3005) from the rotor(1999) is easier by using an extractor. This should be done slowly and with care in a rotating movement. When sliding pump housing(2010) over the rotor(1999), both coupling rod (1998) and rotor (1999) should be lifted as the ceramic rotor(1999) must not knock onto the pump housing(2010).

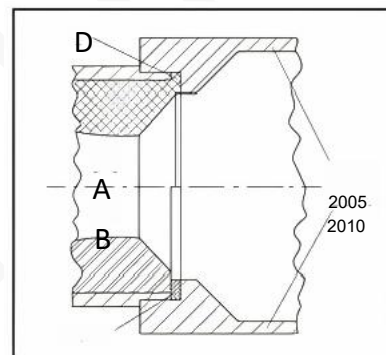


Assembly

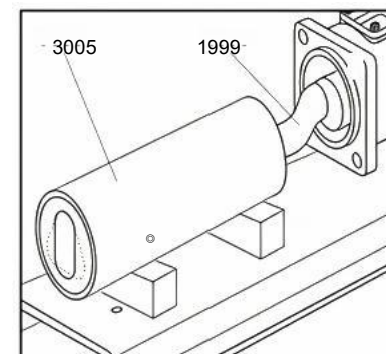
- Refitting is a simple reversal of this procedure.
When refitting the stator (3005) check direction of stator (3005) is correct! The funnel-shaped inflow side (E) of the stator (3005) must show to
-the pump housing (2010) when rotation is anti-clockwise
-the end stud (2005) when rotation is clockwise when viewed on pump shaft end.



- Elastomer stators (A) have integrated front side sealing profiles (D). They don't need additional gaskets for sealing off the end stud (2005) and the pump housing (2010).
- Solid stators (B) have no integrated front side sealing profiles. Therefore additional gaskets (8005) should be installed to seal off the end stud (2005) as well as the pump housing (2010).
Be careful when engaging the stator (3005) and rotor (1999). Do not trap your fingers!
Do not reach inside the stator!



- Push the stator (3005) with a rotating movement on to rotor (1999).
Apply an assembly device and some glycerine to ease engaging the stator (3005) and rotor (1999).



- When tightening hex nuts (2030) a gap will remain between drive stool (0085) and pump housing (2010).

Please do not try to close this gap by overtightening the nuts! Drive stool (0085) may break!



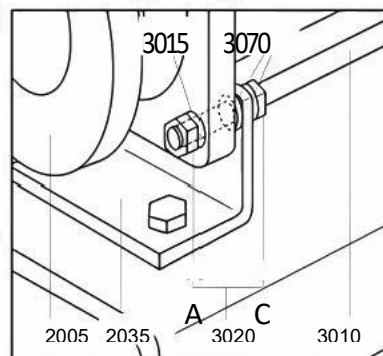
Torque values for hex nuts(2030):

Size	M6	M8	M10	M12	M16	M20	M24	M30
Require torque Nm	8	15	30	45	75	80	100	120

■ Fastening the end stud (2005):

Screw the hex nuts C(3020)down into the thru bolts (3010)as far as possible. Slip on the first washers(3070),the support foot (2035),the second washers (3070),the end stud (2005) and tighten with spring washers (3015) and hex nuts A (3020).

Finally, fasten the support foot (2035) from behind with the two hex nuts C(3020).



Ensure during refitting that the O-ring (8015) or, where a heating jacket (3025) is installed, the O-rings (8030) are in perfect condition and will sit correctly.

Ensure that the drain plug (2015) is not screwed too tightly into the pump housing (2010), since otherwise its conical thread may break the pump housing(2010).

The torque should be about 40-50 Nm.

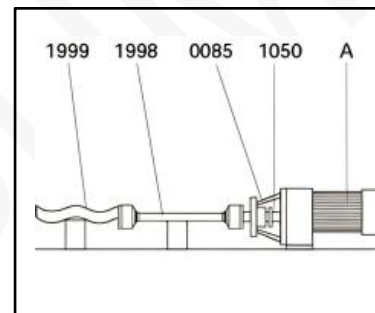
7 Dismantling and Assembly of the Rotating Parts with Pin Joints with SM-Pin Joint Seal

7.1 Removal of Rotor and Coupling Rod

Where a pump is fitted with a **ceramic** rotor(1999)the following operations should be carried out **with great care**.Do not use any force or sharp tools! Special care must be taken to prevent heavy strokes,vibrations or impact by a hammer.

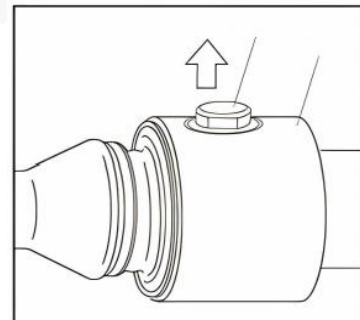
For removal of the rotor(1999)and coupling rod(1998)the pin joints should be dismantled as follows:

- Place the dismantled unit-consisting of drive stool (0085) with drive(A)and connecting shaft(1050), coupling rod(1998)and rotor(1999) -on the work- bench with a wooden block supporting the rotor(1999).



Basicjoint size for big pump

- Unscrew the wear sleeves(5440)from the head of rotor(1999)or connecting shaft(1050)



Basicjoint size for basic pump

- Push circlip(5065)out of its groove and slip off Over the head of rotor (1999 or connecting shaft(1050).

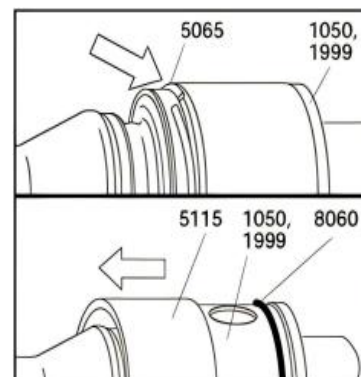
Pumps fitted with a ceramic rotor(1999):

Carefully turn safety sleeve(5115)with a squeeze belt wrench,and remove.

The following method should **not** be employed for pumps fitted with a **ceramic** rotor.

Pumps fitted with a metallic rotor (1999):

If necessary hit the edge of sleeve(5115)at an angle with the help of a wooden block and a plastic hammer.Taking care not to damage the O-rings(8060)!



- Press the pin(5075)out of the head of rotor(1999) or connecting shaft(1050).If necessary use a hammer and a thin cylindrical pin.

Drain the oil into a receptacle.

Caution for pumps with ceramic rotors!

Where a pin (5075)may not come out easily,the metallic head of rotor(1999)should be supported on wooden blocks.Then the pin(5075)can be driven out with the help of a pin punch.This should be done with care,holding the ceramic rotor with your hands.

Please dispose of this oil in the proper manner.

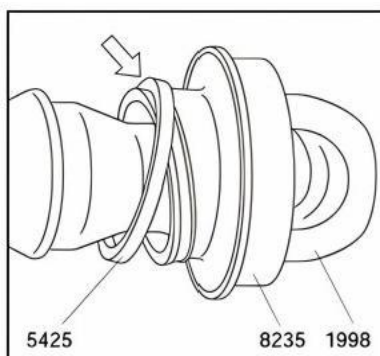
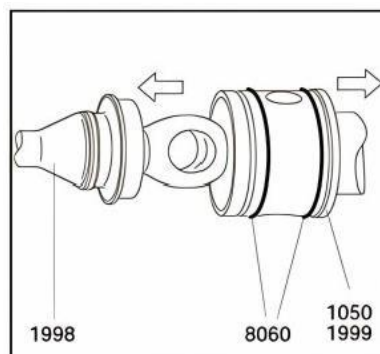
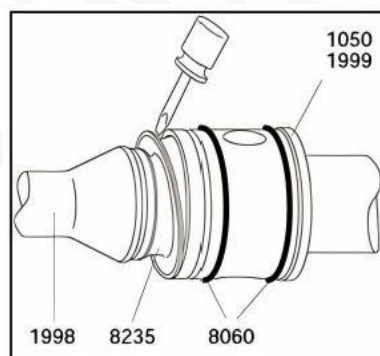
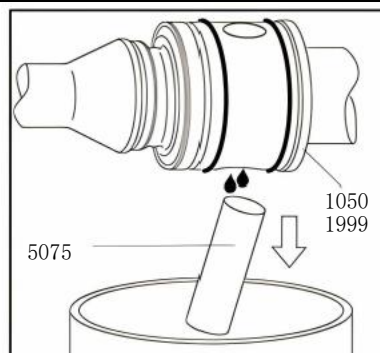


- Using a screwdriver,carefully lever the SM-pin joint seal(8235) out of the head of rotor(1999) or connecting shaft(1050).

Taking care not to damage the SM-pin joint seal (8235)!

- Pull apart the rotor (1999)/ coupling rod(1998) / connecting shaft (1050) assembly. Remove the O- rings (8060).

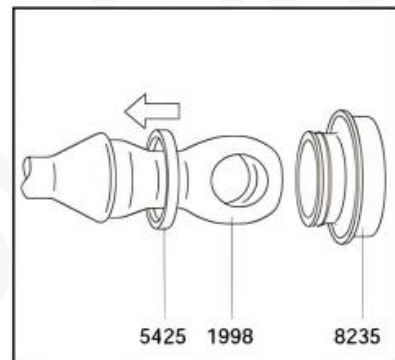
- Push the SM-pin joint seal (8235) towards the head of coupling rod (1998). In the narrow coupling rod section press the clamp ring (5425) out of the groove of the seal. Then slip the SM-pin joint seal (8235) and clamp ring (5425) off over the head of the coupling rod (1998).



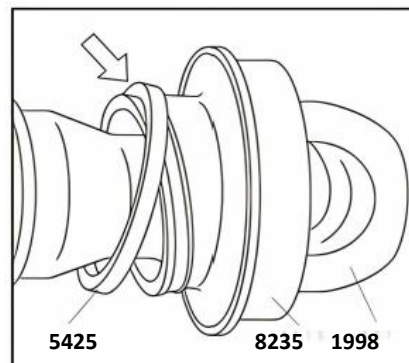
7.2 Fitting the Rotor and Coupling Rod

For fitting the rotor(1999)with coupling rod (1998), the two pinjoints should be assembled as follows:

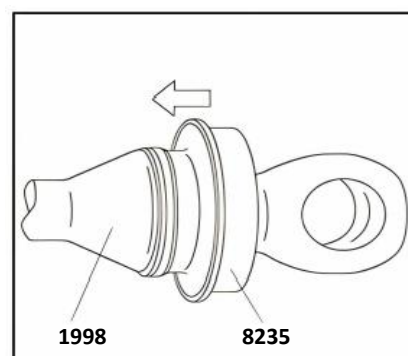
- Slip the clamp ring(5425) over the head of coupling rod(1998).



- Push the SM-pin joint seal(8235)over the head of coupling rod (1998)towards its narrow section, there squeezing the clamp ring(5425)into the groove of the SM-pin joint seal(8235).

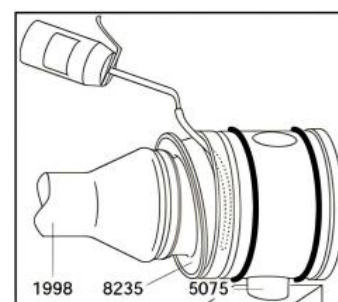
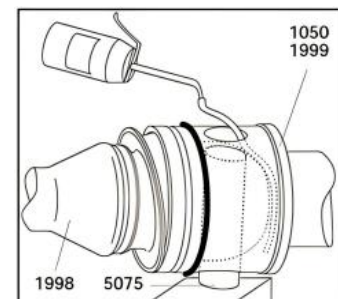
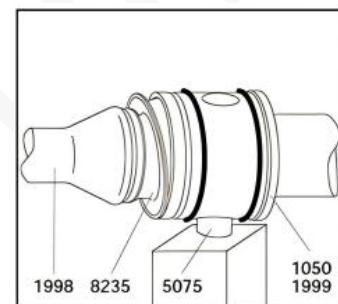
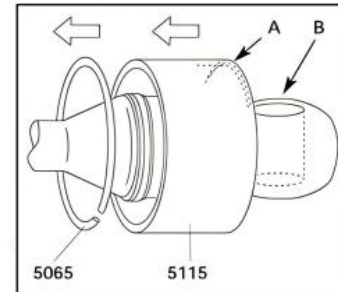


- Push the SM-pinjoint seal (8235)with the correctly placed clamp ring (5425)up to the shoulder of couplin rod (1998).



Basic joint size for basic pump

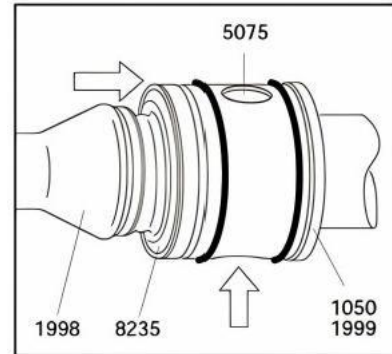
- Slip the circlip(5065)on to the coupling rod (1998). Slide the sleeve(5115)on to coupling rod(1998)so the inside diameter of chamfering(A)is being placed towards the coupling rod (1998) extension. Chamfering(A)will later on ease the installation over the O-rings(8060). Orient the head of coupling rod (1998)until it is in vertical position for the bore(B)for the pin(5075).
- Slide the coupling rod(1998)with SM-pin joint seal (8235)into the bore of rotor(1999)or connecting shaft(1050)and insert the pin(5075)from below and push up to the upper edge of coupling rod(1998). Support the pin(5075)against dropping out. Slide the SM-pin joint seal(8235)into the rotor (1999)or connecting shaft(1050)only from below, and in a slightly slanted position.
- For lubrication,use an oil can which should be fitted with a thin plastic hose having an outside diameter of not more than 4 mm. Insert this hose into the upper oil port opening in the rotor(1999)or connecting shaft(1050).Then slide the hose end past the coupling rod (1998) allthe way down to the bottom section of the rotor head(1999)or connecting shaft(1050). Slowly fill with lubricating oil up to the filling port.
- Pull the hose out. Then insert the hose end through the small gap on the topside of SM-pin joint seal(8235)and guide it down to the bottom of the hollow space between coupling rod(1998)and SM-pin joint seal(8235). Slowly fill with lubricating oil up to the gap.



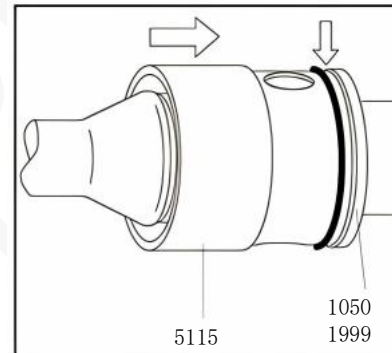
■ Pull the hose out.

Push the pin(5075)entirely into the bore of head of rotor(1999)or connecting shaft(1050)and retain in place.

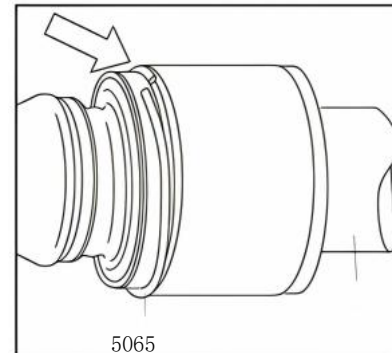
Only now, press the SM-pin joint seal (8235) into the bore of head of rotor (1999) or connecting shaft (1050) and push up to the shoulder. In doing so the SM-pin joint seal (8235) should be slightly bulbous around the outer surface. Wipe off overflow oil. Use this oil for lubricating the Orings (8060).



■ Slip the sleeve(5110) or (5115), with its chamfering (A) forward, on to the head of rotor (1999) or connecting shaft (1050) and push up to the shoulder.



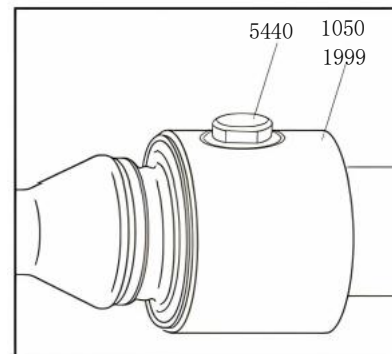
■ Place the circlip(5065)into its groove on the rotor head (1999)or connecting shaft (1050) and carefully snap in place all around.



■ **Basic joint size for big pump**

Slide the coupling rod (1998) into the bore of the head of rotor (1999) and connecting shaft (1050) and insert the pins(5075).

Insert the SM-pin joint seal(8235) into the head of rotor (1999) and connecting shaft(1050). Only then screw in one wear sleeve (5440) with O- ring (8060) into the head of rotor (1999) and connecting shaft (1050) and turn upside down.

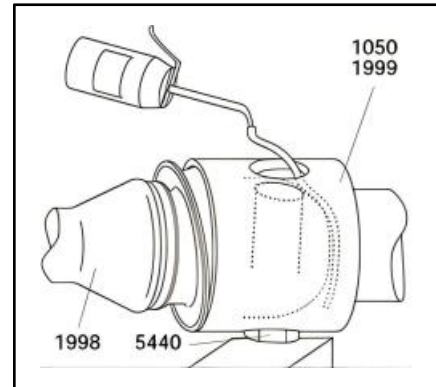


- For lubrication, use an oil can which should be fitted with a thin plastic hose having an outside diameter of not more than 4mm.

Insert this hose into the upper oil port opening in the rotor (1999) or connecting shaft(1050). Then slide the hose end (2000) past the coupling rod (1998) all the way down to the bottom section of the rotor head (1999) or connecting shaft (1050).

(2001)

Slowly fill with lubricating oil up to the filling port.

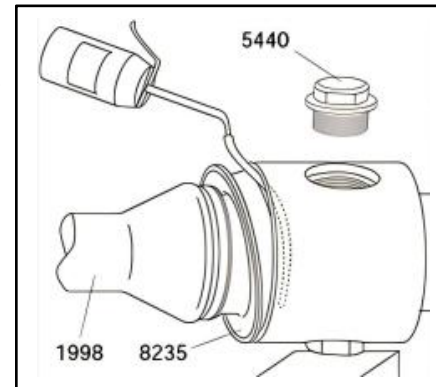


- Pull the hose out.

Then insert the hose end through the small gap on the top side of SM-pin joint seal (8235) and guide it down to the bottom of the hollow space between coupling rod (1998) and SM-pin joint seal (8235).

Slowly fill with lubricating oil up to the gap.

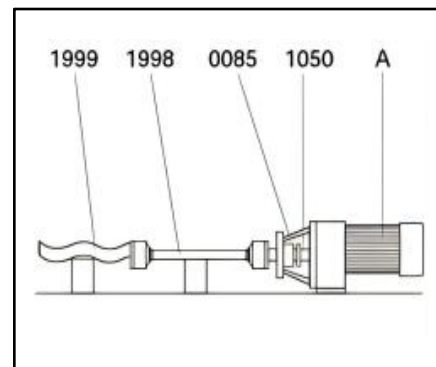
- Screw in the second wear sleeve(5440) with O-ring (8060) into the head of rotor (1999) and connecting shaft (1050).



- **Basic joint size:**

Drive connecting shaft(1050),coupling rod(1998) and rotor(1999) are nowjoined by means of the two pin joints.

Pump housing(2010), stator(3005) and end stud (2005) may now be fitted.

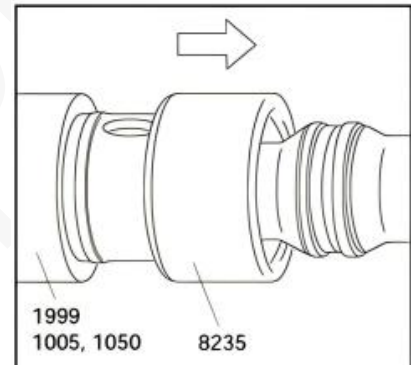


7.3 Dismantling and Assembly of the Rotating Parts with Pin Joints with SM-Pin Joint Seal (joint basic size for small pump)

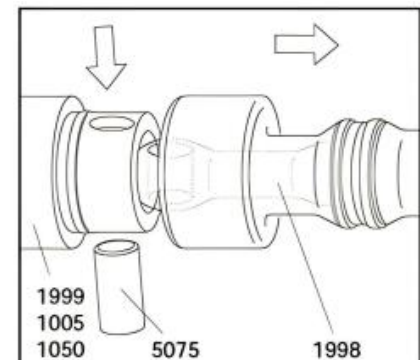
For removal and refitting of the rotor(1999)and coupling rod(1998) the pin joints should be dismantled and re-assembled as follows:

Dismantling:

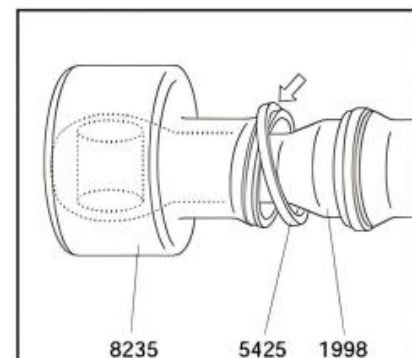
■ Push the SM-pin joint seal(8235)away from the rotor (1999), drive shaft(1005)or connecting shaft (1050) so the bore for the pin(5075) comes free.



■ Press the pin(5075)out of the rotor(1999) connecting shaft (1050)or drive shaft (1005). Then withdraw the coupling rod (1998)from the bore of rotor(1999), connecting shaft (1050) or drive shaft (1005).

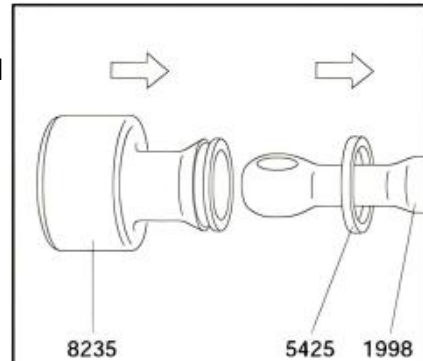


■ Push the SM-pinjoint seal (8235)towards the head of coupling rod (1998).In the narrow coupling rod section press the clamp ring(5425)out of the groove of the seal.Then slip the SM-pin joint seal (8235)and clamp ring(5425)off over the head of the coupling rod (1998).

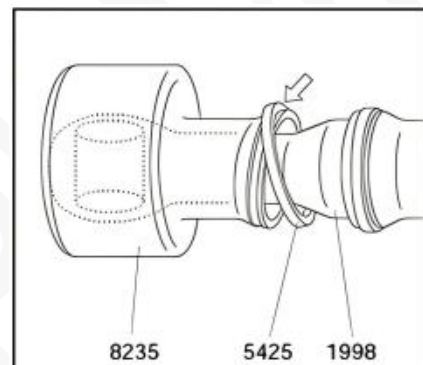


Re-Assembly:

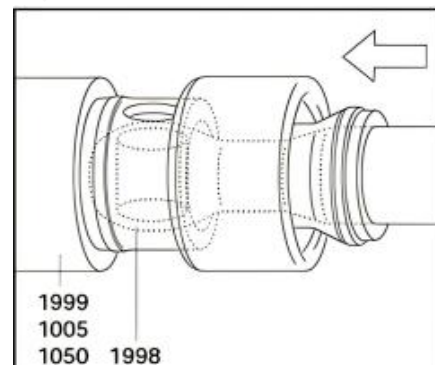
■ Slip the clamp ring(5425) and the SM-pin joint seal (8235)on over the head of the coupling rod(1998).



■ Push the SM-pin joint seal(8235)towards the narrow section on the head of coupling rod(1998) and place the clamp ring (5425) back into the groove of the SM-pin joint seal(8235). Then move the SM-pin joint seal(8235)up to the coupling rod (1998) shoulder.



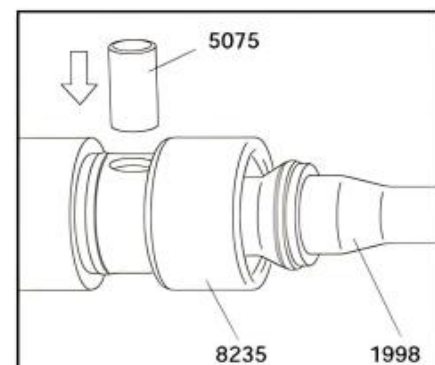
■ Place the head of coupling rod (1998) into the bore of the rotor (1999), drive shaft (1005) or connecting shaft(1050).



■ Join the rotor (1999),drive shaft (1005) or con-necting shaft(1050)and coupling rod(1998) by the pin (5075).

Then push the SM-pin joint seal (8235) up to the shoulder of the rotor(1999),drive shaft (1005)or connecting shaft(1050).

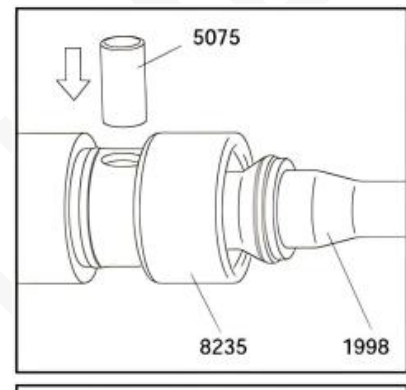
Re-assemble the second pin joint in the same manner.



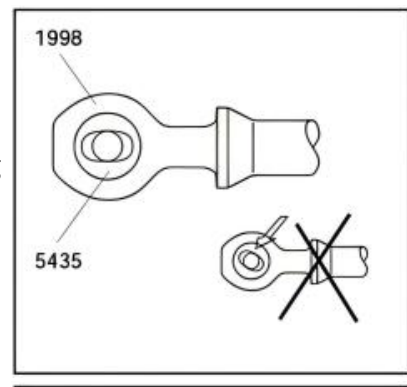
7.4 Replacing the Wear Sleeves of Adapter, Rotor and Coupling Rod

■ The wear sleeves(5435,5440)have a very tight fit.
A press should be used to remove or refit them.

It may be possible though to drive the damaged sleeves out with a suitable mandrel. A rigid vice however is needed at the least for pressing new sleeves (5435, 5440) in again.



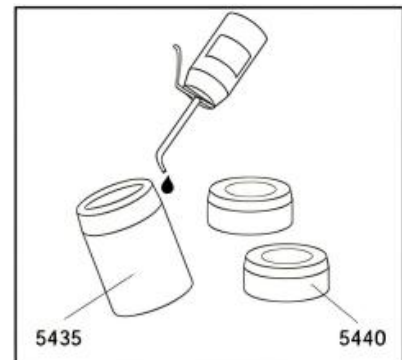
■ Orient the wear sleeves(5435)so that their oval bore agrees with the longitudinal axis of the coupling rod (1998).



■ Generously oil the wear sleeves(5435,5440).

■ Every wear sleeve(5435,5440)has got one smaller outer diameter on one end for better insertion into the bores of the coupling rod.

■ Ensure the sleeves are placed in the correct orientation to the coupling rod(1998).



	8 DISMANTLING AND ASSEMBLY OF THE CONNECTING SHAFT	PAGE 8.0
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8 Removal and Fitting of the Connecting Shaft with Shaft Seal

Removal:

- Push the circlip (1035) in the direction to the mechanical seal.
- Remove pin (1030).
- Remove the shaft seal housing (7005) and mechanical seal (7010) together with connecting shaft (1050) and set ring (1035) from drive stool (0085) and the drive shaft.
The thread of cylindrical head screw (1040) can be used as forcing screw.

Fitting:

- Apply grease into the bore of the connecting shaft (1050) to avoid rust.
- Assemble the shaft seal housing (7005) and mechanical seal (7010) together with connecting shaft (1050) and set ring (1035) with drive stool (0085) and push connecting shaft (1050) on to the drive shaft.
At this please observe the installation direction of set ring (1035).
- Connect the connecting shaft (1050) and the drive shaft by pin (1030).
Push set ring (1035) on pin (1030).

Removal and Fitting of the Mechanical Seal

Utmost cleanliness must be observed for all removal and fitting activities.

Please avoid any damage to the sealing surfaces and gaskets.

■ Remove all visible connecting screws and pull apart the seal housing on the shaft. The seal housing can be made up of several parts, depending on the seal construction. Compare the attached Sectional Drawing W.

■ Carefully remove the housing parts from the shaft together with the seal counter face parts, one after the other.

■ Carefully push the seal counter face parts out of the housing parts.

Special care must be taken when fitting double PTFE-coated gaskets: the joint of the outer coating must point away from the seal assembly direction, otherwise the coating may open or be pulled off.

Refitting is a simple reversal of the above procedure.

■ To reduce frictional forces during seal assembly, apply some glycerine to the shaft and the seal housing in the area of the gaskets.

Ensure that the distribution of pressure is uniform when inserting the pressure sensitive counter rings.

When inserting larger rings, use a suitable mandrel.

Do not allow any foreign bodies to get between the sliding surfaces.

Important: Exactly keep to the seal installation dimensions and ensure that the sealing faces are correctly pressed together.

10 Trouble-Shooting and Remedying

10.1 Trouble Chart

The chart overleaf lists possible problems

- the type
- the likely reason /cause
- the remedy.

- A problem may have various causes:Several boxes in the vertical column are marked with a cross.
- A reason/cause may result in various problems: Several boxes in the horizontal column are marked with a cross.

10.2 How do you trace the kind of problem to find the possible cause?

- The column describing a possible problem shows one or several boxes marked with a cross.
- On the corresponding lines you will find the possible reasons/cause and some hints how to handle the problem. Thus the actual cause of the problem can be narrowed down and eventually detected.
- If you find further cross-marked boxes on one of the lines and should there appear corresponding problems as well, then the likely cause of the problem has been detected.
- The table helps in finding the root of the problem and will give you the remedy if it is straight forward.For more complicated problems the manufacturer has to be consulted.

Possible Problems										Possible Causes
The pump is no longer starting	The pump is no longer sucking	The pumped medium is too little	The pressure is too low	The pumped medium is unstable	The pump is running loudly	The pump is stuck	The drive is overloaded	The stator life time is too short	The rotor life time is too short	
X							X			In new pumps or stators:the static friction is too great.
X		X	X				X			The pump electrical equipment is not compatible with the electrical supply.
		X					X	X	X	The pressure is too high.
x						X	X			There are foreign bodies in the pump.
X						X	X	X	X	The temperature of the liquid medium is too high,the stator is too ductile.
X						X	X	X		The stator has swollen,the elastomer is not compatible with the medium.
X						X	X	X		The solids content of the medium is too high and leads to blockages.
X						X	X	X	X	The liquid medium sediments or hardens when left to stand.
		X	X	X						There is air in the suction pipe.
	X	X	X	X						The suction pipe is leaking.
	X	X	X	X						The shaft seal is leaking.
		X	X							The rpm is too low.
	X	X	X							With reduced diameter rotors:operating temperature has not been reached.
		X	X	X	X			X	X	The suction is too great or pressure too low(cavitation).
		X	X		X	X	X	X		The pump is running dry.
	X	X	X		X					The stator is worn out,or temperature of liquid is too low.
	X	X	X		X			X	X	The stator material is brittle.
	X	X	X		X			X		The rotor is worn out.
					X					The joints are worn out.
					X					The pump and drive are not axially aligned.
					X					The elastic element of the coupling is worn out.
					X				X	The roller bearings are destroyed.
							X			The rpm is too high.
							X			The viscosity is too high.
							X			The specific weight of the medium is too high.
							X		X	The stuffing box is incorrectly tightened.
									X	The packing is not suited to the liquid medium.
	X								X	Mechanical seal :rotation is incorrect.
									X	Mechanical seal:mechanical seal and mating ring have failed.
									X	Mechanical seal:elastomers damaged,swollen or brittle.

	10 TROUBLE-SHOOTING AND REMEDYING	PAGE 10.0
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Remedy
Fill the pump up, then pump through manually using a suitable appliance; if necessary use glycerine as lubricant in the stator.
Check order information. Examine electrical installation (possibly 2 phase operation).
Measure the pressure with a manometer and check against order details. Reduce the pressure or change the drive.
Remove foreign bodies and eliminate possible damage.
If the liquid medium temperature cannot be lowered, use a reduced diameter rotor.
Check whether the liquid medium agrees with the order requirements. Possibly change stator material..
Increase the liquid part of the medium.
Clean the pump and rinse through after each run.
Increase the suction liquid level, prevent turbulence and air bubbles at the inlet.
Check seals and tighten pipe connections.
Stuffing box: tighten or renew. Mechanical seal: renew seals, eliminate solid deposits.
In the case of adjustable drives :increase the rpm. If necessary change the drive.
Warm up the pump(stator) to operating temperature first of all.
Decrease suction resistance, lower the temperature of the liquid medium, install the pump at a lower location.
Fill up the pump, provide for dry running protection, move the pipes.
Replace with a new stator or ensure correct liquid temperature.
Fit a new stator. Check the liquid medium agrees with order details; if necessary change the stator material.
Change rotor, establish the cause. Wear and tear, corrosion, cavitation; if necessary change to a different material or coating.
Replace relevant parts, carefully reseal and lubricate.
Re-align the unit.
Use a new connection and re-align the pump.
Replace roller bearings, lubricate, reseal. At higher temperatures observe the lubricant and the bearings.
In the case of adjustable drives: lower the rpm.
Measure the viscosity and compare with order details. If necessary adjust viscosity or change the drive.
Measure specific weight and compare with order details. If necessary adjust specific weight or change the drive.
Service stuffing box according to page 7.4, if necessary renew worn shaft.
Replace fitted packing with another packing type.
Change electrical connection.
Replace relevant rings with new ones.
Replace elastomers. Check whether the liquid medium agrees with order details, if necessary change material.

	11 PACKAGING,TRANSPORTATION,STORAGE	PAGE 11.0
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11 Packaging,Transportation,Storage

11.1 Packaging and Transportation

Screw pumps are shipped in railroad containers or crates unless the customer specifies otherwise.

The packings are labelled and symbols give the handling instructions .

On receipt check for any transport damages.

Transport damages should be reported to the transporter immediately. The pumps should be transported as closely as possible to the location of installation and only there should they be uncrated.

Uncrated horizontal pumps should be lifted by using a shackle which can be attached to the baseplate.The bolt holes of the frame or the lifting lugs attached to the baseplate could be used as shown on the installation drawing.

Vertical pumps should be lifted by using the bolt down holes, lifting lugs or shackles attached to the baseplate.This is shown on the installation drawing. For most applications,the drive is mounted on top of the pump.



Be careful when lifting top heavy pumps.The centre of gravity may be above the points where the lifting gear is attached to.If the case,secure additionally against tipping over!

Vertical pumps should not be deposited unless they are secured vertically.

Hazards of tipping! Deposit only in horizontal position!



It is essential to avoid that the total pump unit be suspended with eye bolts of the motor or gear box.These eye bolts should be used for lifting the motor and/or the gear box **only**.

Because of the variety of possible pump designs and applications,only general instructions can be given here.These should be good enough for experienced assemblymen or transportation experts.

When in doubt,please ask for detailed information on the pump unit concerned.

When moving the pump or unit on **wheels** strictly attend to the following:

- Pad lock the motor drive and secure against unintended starting up.
- Move the pump unit carefully and slowly, especially where the ground is uneven.
Hazards of tipping!
- Ensure a stable position of the pump or unit at the operating/storage place and secure it by actuating all clamping devices on all the wheels or rollers against voluntary moving away.
- Where fitted loosely, carefully watch the pipe bends when pumping. Power of repulsion!
- Where necessary, secure the pump unit additionally with support blocks.

Storage

The pumps are preserved for transport unless specified otherwise. In cases of longer storage the pumps should be handled as follows until installation:

■ Stator:

If the pump is not to be used immediately, then the elastomer along the contact line between rotor and stator may become permanently distorted (compression-set). This will increase the break away torque. Therefore, the stator should be removed and kept separately in a clean, cool and dry environment.

Note: stator has a storage for a period of up to six months.

General

Most of the rubber products may change their physical properties under unfavourable conditions or if treated improperly, which will result in a shorter lifetime.

Or they may become useless through excessive hardening, aging, regenerating or permanent deformation, also because of blistering, cracking or other damages appearing on the surfaces.

The changes may occur under the influence of oxygen, ozone, heat, light, humidity, solvents or because of storing the products under tension.

If stored and treated properly, the rubber products will keep their properties, even over a long period of time (some years), almost unchanged.

This does, however, not apply to uncured rubber compounds.

Store room

The environment in which rubber products are being kept must be cool, dry, free of dust and rather airy, and they must not be stored in the open, not even in a weather sheltered space.

Rubber products should be kept in surroundings not having less than minus 10°C and not more than plus 15°C.

Store rooms should not be damp, and it must be ensured that there will be no condensation.

Most favourable is an environment offering a relative humidity under 65%.

Rubber products must be protected against light, particularly direct sunlight or artificial light when having a high UV portion.

They should furthermore be kept away from ventilation, especially draught, by wrapping them up.

As ozone is very aggressive and harmful there should be no store room used which houses equipment likely to produce ozone, e.g. electric motors or other equipment which might bring about sparks or other electrical discharges.

There must be no solvents, oil, grease, lubricants or any chemicals kept in a store room.

■ Rotor

Please support with wooden blocks and cover up against harm from mechanical impact.

For rotors of RCC (material number 1.2436):

coat the surfaces with protective grease to avoid rusting.

■ Shaft Sealing by packing gland

Remove the gland and coat the exposed shaft surface with grease.

■ Pump parts in stainless steel

No grease coating necessary.

■ Other, non-coated pump parts Protect with grease.**■ Drives**

Please observe the drive supplier's instructions.

	12 RECOMMENDED STOCK OF WEAR PARTS	PAGE 12.0
12 Recommended Spare Parts In general, we have all spare parts in stock. Our subsidiaries and exclusive representatives also hold a certain stock. For special cases and when short waiting periods are not acceptable, we recommend to keep an amount of spare parts, corresponding to the pump, in stock on site (please see table below). -Rotor -Stator -Elastomer parts as O-rings and sleeves -joint parts -shaft seals. To avoid mistakes in delivery, please identify the parts by their position number shown in the spare parts list or on the sectional drawing.		

This notice must be kept nearby the machine for reference!



SHARP PUMP

ATTENTION

1. Clean the pipe work and rinse thoroughly before the installation of the pump. When connecting the pipe work to the pump, please ensure no external stress to the pump flanges.
2. Before the first start up, fill the pump housing with medium. If high viscous mediums, fill with liquid.
3. All inlet and outlet valves must be fully open before start up.
4. Check the direction of Rotation is the same as stated on the pumps nameplate before start up by briefly switching on the pump motor.
5. Never allow the pump to run dry without any medium. A few rotations in a dry condition will damage the stator.
6. With gland packing a small leakage should be permitted through the stuffing box for lubrication.
7. The pump must only be used for the design duties as specified on the order confirmation. If change the medium or duties, please contact the manufacture.
8. Never run the pump in overload. Corresponding safety equipment must be installed in the pipe work.
9. The pump should be regularly rinsed or cleaned according to the medium, after stoppage to prevent any build up of the medium leading to blockage.
10. If the actual medium temperature is not the same as specified in the order confirmation, the performance of the pump will be influenced or may not be used.
11. Standby pumps, which are idle for long periods, should be operated from time to time to prevent the plasticity distortion of the stator.

The pump should not be installed or operated without first reading the operation & maintenance manual; This should also be done prior to any maintenance. For more complicated problems the manufacture should be contacted.

JIANGSU SHARP PUMP CO.,LTD

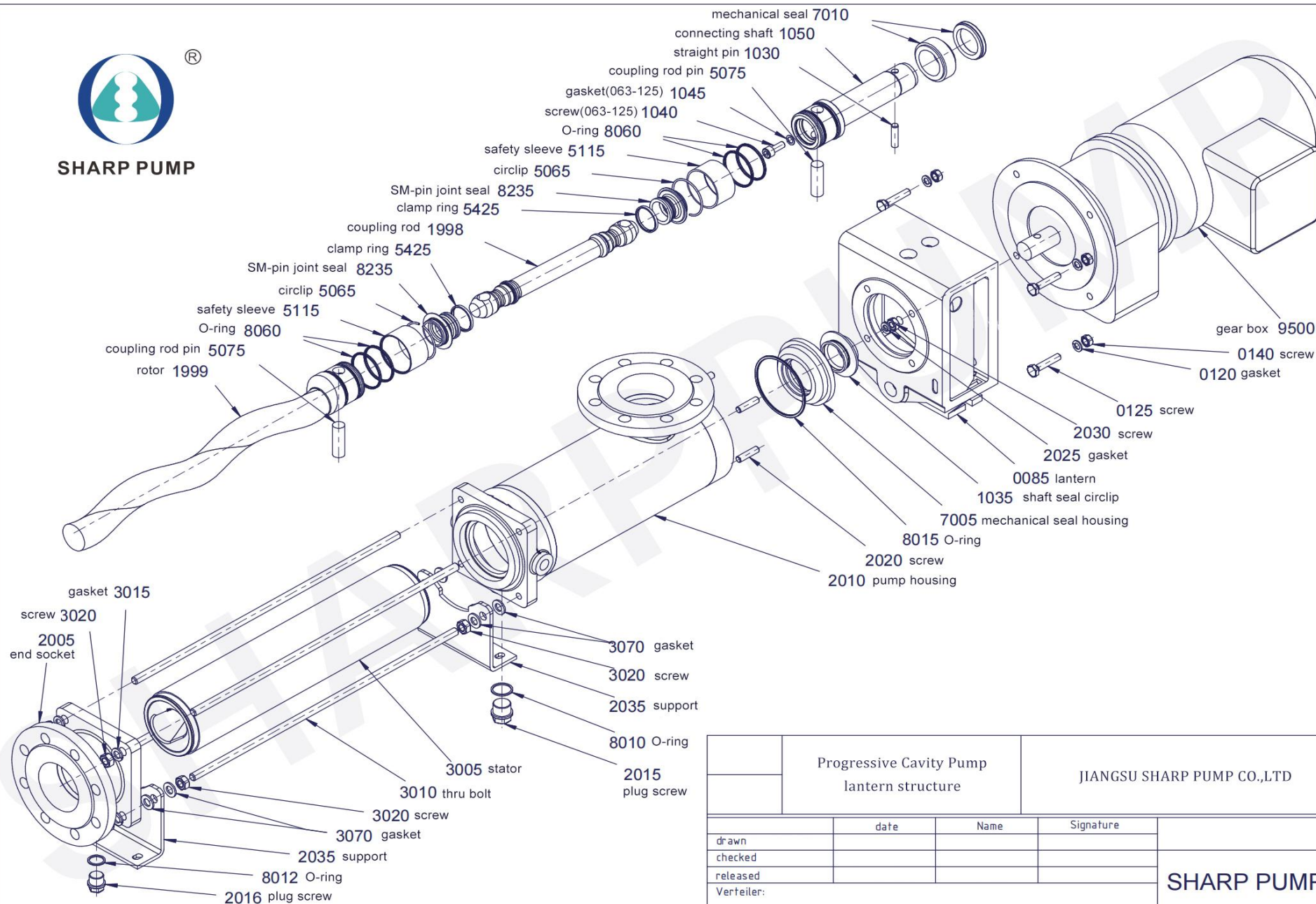
TEL: +86-523-84231792

	14 SECTIONAL DRAWINGS	PAGE 14.0
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14 Sectional Drawings



SHARP PUMP



		Progressive Cavity Pump lantern structure		JIANGSU SHARP PUMP CO.,LTD	
		date	Name	Signature	SHARP PUMP
drawn					
checked					
released					
Verfeiler:					