

Operating and Maintenance Instructions



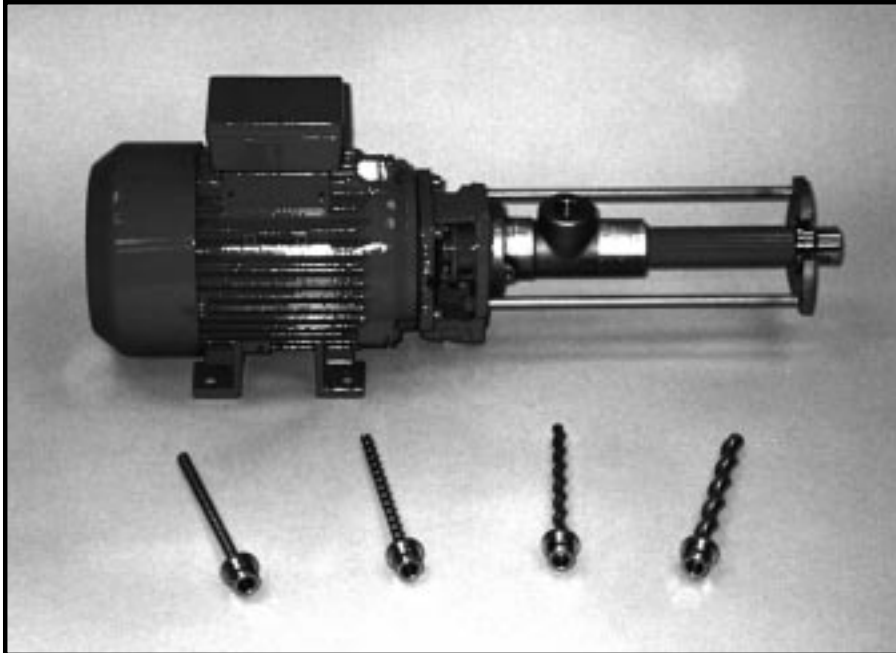
NEMO®-Pump

Model Number

Sales Order/Job Number

Machine Number

Date of issue



Important Note

These operating instructions are designed to familiarize the user with the machine and its designated use.

The Instruction Manual

- Contains important information on how to operate the machine safely, properly and efficiently. Observing these instructions help to avoid danger, to reduce repair costs and downtimes and to increase the reliability and life of the machine;
- Must always be available wherever the machine is in use.

- Must be read and applied by any **person in charge** of carrying out work with and on the machine, such as:

Operation including setting up, troubleshooting in the course of work, evacuation of production waste, care and disposal of fuels and consumables

Maintenance (servicing, inspection, repair) and/or

Transport; shall be completed by the end user and authorized personnel with

the national requirements in force for the prevention of accidents and the environmental protection.

In addition to the operating instructions and to the mandatory rules and regulations for accident prevention and environmental protection in the country and place of use of the machine, the generally recognized technical rules for safe and proper working must also be observed.

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1 Safety Precautions

These operating instructions contain essential information which should be observed during installation, operation and maintenance. These operating instructions should be read and understood by the engineer, as well as other responsible operators before assembly and operation. Operating instructions should always be readily available wherever the machine is being used.

The general safety rules detailed under "Safety Precautions", plus the safety precautions set by the end user, must be followed.

1.1 Symbols Relating to Safety Precautions in the Operating Instructions

Personal injury, damage to machines or contamination of the environment can result if the safety precautions contained in this document are not strictly enforced. Following are signs commonly used to signify areas of danger:



Safety Sign
Danger to General Public



Safety Sign
Electrical Hazard



Danger from Possible Injury by Machinery



Danger from Suspended Loads



Damage to Machinery

Warning or indication plates attached to the pump which show the correct direction of rotation (or fluid connections) must always be kept in readable condition.

1.2 Qualifications and Training of Personnel

All personnel responsible for service, maintenance, inspection, installation and operation must have the appropriate training. Responsibility and supervision of personnel must be strictly enforced by the end user. If training of personnel is required, it can be provided by the manufacturer/representative. Furthermore, it is the responsibility of the end user to ensure that personnel fully understands the operating instructions.

1.3 Non-Observance of Safety Precautions

Non-observance of the safety rules can result in personal injury, damage to machines or contamination of the environment. Non-observance can void product warranty.

Non-observance can also result in the following:

- ◆ Premature failure of components or machine/equipment malfunction.
- ◆ Danger to personnel from electrical, mechanical or chemical hazards.
- ◆ Danger to the environment from leakage of dangerous materials.

1.4 Safe Operation

The safety precautions outlined in these operating instructions, the existing national regulations on accident prevention and the end user's own operating and safety regulations **must be observed**.

1.5 Safety Precautions

- ◆ Hot or cold machine components must be insulated or shielded.
- ◆ Guards covering moving parts (i.e. shafts, couplings) must not be removed while machines are in operation.
- ◆ Leakage of dangerous materials (i.e. explosives, toxins or hot materials) from the shaft sealing area should be properly contained.
- ◆ In order to prevent electrical hazards, applicable local and/or federal regulations must be adhered to.

1.6 Safety Precautions for Maintenance, Inspection and Installation Work

The end user must ensure that all maintenance, inspection and installation work is performed by authorized and qualified personnel who understand the operating instructions and are properly trained.

Work on a pump/machine should only be performed when it is disconnected from its power source, pressure has been relieved, and the complete unit has returned to room temperature. It is imperative that these procedures are adhered to before attempting work on the machine.

Pumps or units which transfer dangerous substances must be decontaminated.

Immediately following maintenance work, all safety and protection equipment must be re-installed and safety trips must be tested.

Refer to Section 5.0, "Start-up," before restarting machine/pump.

1.7 Unauthorized Use of Spare Parts and/or Modifications to the Pump

Modifications to the machines and/or its components are permitted only with the manufacturer's consent. Original spare parts and accessories authorized by the manufacturer ensure safety. The use of other components revokes any warranty and liability for consequences which may result.

1.8 Improper Application

Machinery is only guaranteed safe for the use specified.

This machinery was manufactured in accordance to the specifications and the conditions specified by the end user. The machine should not be operated in any way that exceeds design capacities.

1.9 Specific Points for the Use of NEMO® Pumps

NEMO® Pumps should only be used for the application for which they were sold.

If you wish to change the pumping medium, you should check with either the supplier or manufacturer to ensure that the pump will be suitable for the new medium. This is especially important with aggressive, poisonous or otherwise dangerous media.

Criteria for the selection of a pump includes:

1. Compatibility between the medium to be pumped and the materials of all wetted pump parts.
2. Compatibility between elastomeric components and mechanical seal faces.
3. The pressure and temperature rating of the pump.

NEMO® Pumps are of positive displacement progressing cavity design, and have the potential to generate very high pressure.

1 SAFETY PRECAUTIONS

A blockage or closure of a valve in the discharge line can cause a pressure rise **higher than the installation can withstand**. A substantial pressure increase can result in the bursting of pipes and/or damage to other components of pump or drive systems. Extreme caution must be used, especially when dangerous media is present.

Appropriate safety equipment must be installed (i.e.: an emergency stop button, a pressure relief valve or rupture disc).

During maintenance and repair work on the pump, please note the following:

1. No one other than those involved with maintenance and repair should have access to power supply.
2. When dismantling the pump, follow the instructions for handling the medium (e.g.: protective clothing, no smoking, etc.)
3. Before putting the pump back into operation, ensure that all guards and other safety devices (e.g.: drive belt and coupling protection) are properly re-installed.

Always keep safety in mind during operation, maintenance and installation of equipment. Please adhere to applicable federal and local rules and regulations.

1.10 Notes on Inspection and Repair

It is the responsibility and obligation of all commercial businesses to enforce safety in the workplace, regulations governing dangerous materials, accident prevention and environmental protection at all times.

People along with the environment must be protected from adverse effects caused by contact with dangerous materials.

The procedures for proper handling, containment and/or disposal of all hazardous materials, including wastewater, must be strictly enforced.

Important:

A Material Safety Data Sheet must accompany any machine/part and a Safety Conformity Certificate must be completed prior to inspection or repair. Please make a duplicate copy and leave the original in the Operation and Maintenance manual.

Where special safety precautions are necessary, in addition to careful emptying and cleaning of the machinery, the necessary information must be given.

Inspection or repair of machinery containing radioactive medium will only be performed by authorized personnel under protection and supervision of the owner.

The Safety Conformity Certificate is part of the inspection/repair service. We reserve the right to refuse acceptance of this order/service for other reasons.

Safety Conformity Certificate

This completed Safety Conformity Certificate and a Material Safety Data Sheet must accompany the machine and its accessories when returned to the manufacturer for repair/inspection services.

Pump Model Number _____

Job Number _____

Date of Manufacture _____ Equipment Return Authorization # _____

Machine Number _____

Was carefully emptied and cleaned, both inside and out, in preparation for shipment. Yes No

Precautions with regard to health and the environment are to be observed. Yes No

This machine came into contact with media hazardous to health and the environment. Yes No

The following additional precautions are necessary with regard to the handling of media and the disposal of waste: _____

We confirm the above information is accurate and complete, and shipment will be in accordance with legal requirements:

Company

Telephone No.: _____
Fax No.: _____

Address

Name _____

Date: _____

Position: _____

Company Stamp/Signature

2 Description

The Nemo® Pump is a positive displacement, progressing cavity-type pump.

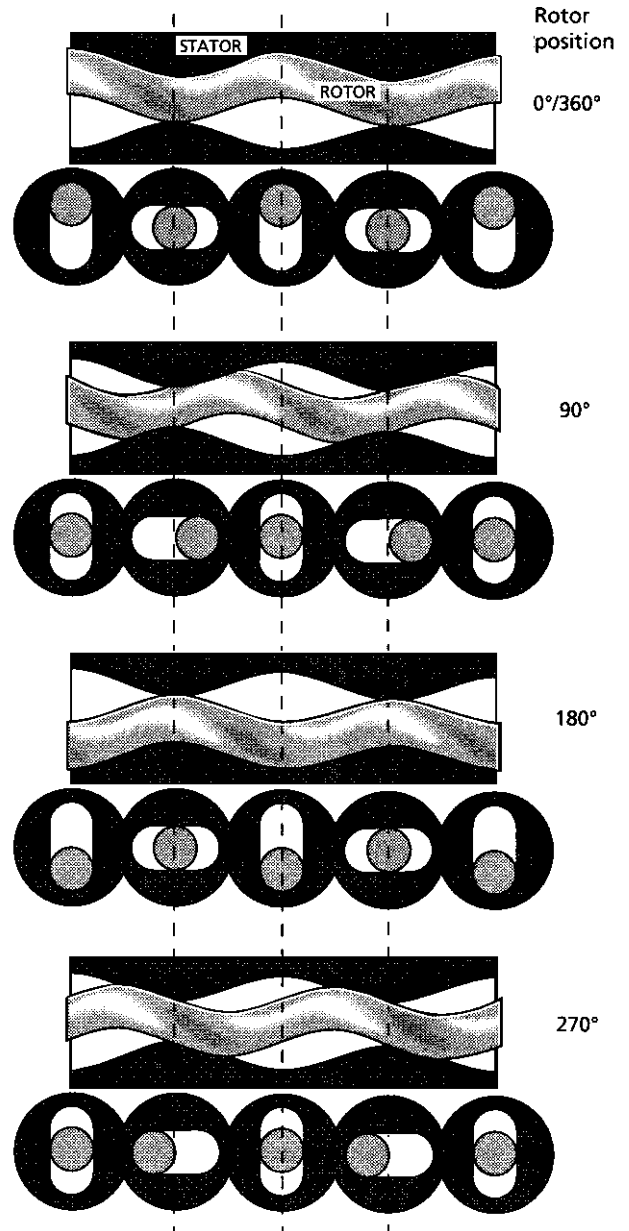
The main components of the pump (which was invented by Professor Rene' Moineau) are: a rotating part, called the rotor; and a stationary part, called the stator.

The rotor has a single helix shape and is normally made of a metallic material. The stator is formed as a double-helix with twice the pitch of the rotor and is normally an elastomer. The interference (compression) fit between the rotor and stator creates a series of sealed chambers called cavities. When the rotor turns inside the stator, the medium moves continuously from the inlet to the outlet of the cavities.

The NEMO® Pump principle utilizes many positive characteristics of other pump types:

- ◆ Like centrifugal pumps, NEMO® Pumps have no suction or pressure valves, but do have a stable flow rate in proportion to the number of revolutions.
- ◆ Like piston pumps, NEMO® Pumps have a suction lift up to 28'. Vacuum capacity is 24-25'.
- ◆ Like membrane and peristaltic pumps, NEMO® Pumps can transport all types of media including inhomogeneous, gaseous and abrasive media; as well as those that are not of a liquid consistency, or contain solids and/or fibrous material.
- ◆ Like gear pumps and screw pumps, NEMO® Pumps are capable of handling high-viscosity media.

- ◆ Like piston, membrane, gear or screw pumps, NEMO® Pumps can be used for metering applications.



Length and cross-sections of the rotor and stator during a rotation.

2.2 General Data

Noise Emissions:

The maximum noise emission level permitted at a workplace is 85 dB (A).

The noise level was measured in accordance with OSHA CFR 1910.95 to assure that the pump does not exceed 85 dB (A).

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

In order to maintain a noise emission level of ≤ 85 dB (A), the pump must be securely mounted and not allowed to cavitate.

3 Packaging, Transportation, Storage

3.1 Packaging and Transportation

NEMO® Pumps are shipped on skid-mounted wood-framed cardboard enclosures, unless the customer specifies otherwise.

The packages are labeled with any special handling instructions.

Upon receipt, inspect the pump for any transportation damage.

Claims for damages should be reported to the **freight carrier immediately.**

Uncrated horizontal pumps should be lifted using the bolt holes of the frame or the lifting lugs attached to the baseplate.

Vertical pumps should be lifted by using the bolt-down holes, or lifting lugs attached to the mounting plate.



Use caution when lifting top-heavy pumps. The center of gravity may be above the points where the lifting gear is attached. If this is the case, secure additionally to **prevent tipping over!**

Vertical pumps should be stored horizontally **only**, unless they are secured vertically. **This will prevent hazards of tipping!**



Avoid suspending the complete pump unit by the eye bolts of the motor or gear box. These eye bolts should be used for lifting the motor and/or the gear box only.

As when operating any type of equipment, exercise caution and adhere to all applicable instructions, rules and regulations.

Due to the variety of possible pump designs and applications, only general instructions can be given here. These should be adequate for experienced assembly or transportation personnel.

When in doubt, contact the supplier for more detailed information.

When moving the pump or unit on wheels, strictly adhere to the following:

- ◆ Lock out the motor drive to protect against unintended start-up.
- ◆ Move the pump unit carefully and slowly, especially where the ground is uneven.
Hazards of tipping!
- ◆ The pump should be stored in a stable position with wheels or rollers locked or otherwise secured.
- ◆ Be careful not to allow flexible piping to bend or become kinked. Obstruction of flow will cause excessive discharge pressure.
- ◆ Where necessary, secure the pump unit with additional support blocks.

3.2 Storage

Pumps are packaged for transportation and short-term storage. In cases of prolonged storage, the pumps should be protected as follows until installation:

- ◆ **Stator:**
When stored for a long period, the elastomer along the contact line between the rotor and stator may become temporarily distorted (compression-set). This will increase the required starting torque. For this reason, the stator should be removed and stored in a cool, dry place in an air-tight package and protected from light.
- ◆ **Shaft Sealing by packing gland:**
Remove the packing gland and protect the exposed shaft surface with protective grease or oil.
- ◆ **Pump parts in stainless steel:** No protection necessary.
- ◆ **Other non-protected pump parts:** Protect with grease or oil.
- ◆ **Drives:** Observe the instructions of the drive supplier.

Store Room

The environment in which rubber products are being kept must be cool, dry, free of dust and well ventilated, and must not be stored in the open.

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.

Recommended relative humidity is < 65%.

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

Rubber products should be kept in a sealed package.

As ozone is very aggressive and harmful there should be no store room used which houses equipment likely to produce ozone, i.e. 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 the store room.

◆ **Rotor**

Support with wooden blocks and protect against damage from mechanical impact. For tool steel rotors (material number 1.2436): coat the surfaces with protective grease to avoid rusting.

◆ **Shaft Sealing by packing gland**

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

◆ **Pump parts in stainless steel**

No grease coating necessary.

◆ **Other, non-coated pump parts**

Protect with grease or oil.

◆ **Drives**

Observe instructions of the drive supplier.

4 Installation

If the NEMO® Pump was stored and the rotor grease protected:
Remove the grease before installing the stator.

Clean the rotor thoroughly in order to avoid contamination of the stator and the pumping medium.

Verify all hardware has been properly installed and fastened.

4.1 Direction of Rotation

The direction of rotation of the pump is given on the name plate.

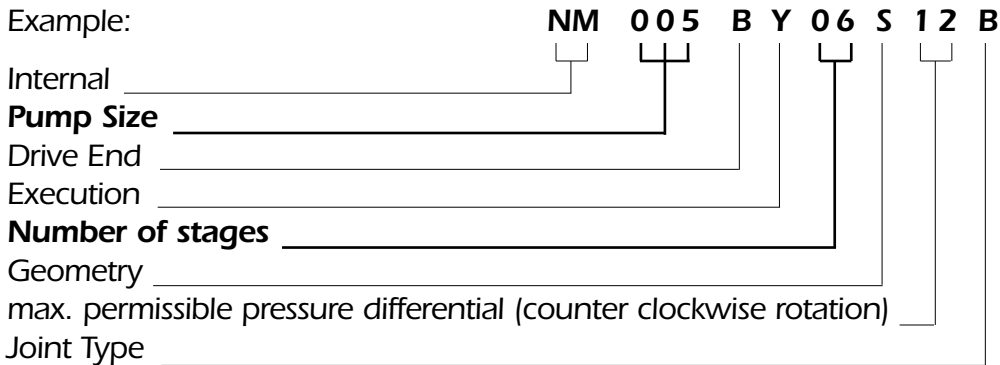
4.2 Pressure

Maximum permissible pressure inside the pump housing (A) is 6 bar.

The maximum permissible pressure inside the end flange (B) is 12 bar.

Type key

Example:

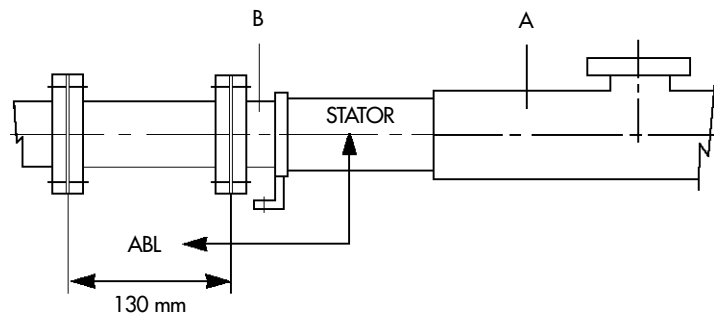


4.3 Shaft Sealing

- ◆ 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**. For more details see Section 7.4!

4.4 Piping System

- ◆ Arrange suction and discharge pipes so that when the pump is not running, the medium is still present. Sufficient media should remain inside in order to lubricate the pump during restart.
- ◆ Clean the pipe work and rinse thoroughly before installing the pump.
- ◆ The installation of a removable distance piece with a length of 130 mm between the end flange (B) and the pipe work is recommended for stator removal.



5 Start-up

NEMO® Progressing Cavity Pumps must be operated with the following precautions:



Never run the pump dry!

Even a few rotations in dry condition will damage the stator.



If the rotor was protected with grease for long-term storage:

Thoroughly clean the rotor to prevent damage caused by interaction of the grease, stator material and medium.

- ◆ Before initial start-up, regardless of rotation, make sure the pump housing and suction piping are filled with medium. If medium is high in viscosity, it may be necessary to prime the pump with a compatible liquid. Priming of the pump is necessary to lubricate the stator.



NEMO® Pumps are positive displacement progressing cavity pumps and have the potential to generate very high pressure capable of bursting vessels or pipes.



Excessive pressure can overload the drive train (shaft, connecting rod, joints, rotor) or exceed pressure limitations of the housings and their connections, resulting in damage or breakage. Refer to Section 4.4 of this manual for housing pressure limitations.

Never run the pump with an inlet or outlet valve closed.

- ◆ Open valves and vents before starting the pump!
- ◆ Turn pump motor on and off briefly to check direction of rotation.

6 Temporary Shutdown



- ◆ Following the temporary shutdown, the pump should be emptied and rinsed when:
 - the pump is installed in a location inside or outside where the medium has the potential to freeze.
 - the medium has a tendency to solidify or harden.
 - the medium tends to build up or become tacky on the shaft sealing area.

- ◆ **Stator:**

When stored for an extended period, the elastomer along the contact line between the rotor and stator may become temporarily distorted (compression-set).

This will increase the required starting torque. For this reason, the stator should be removed and stored in a cool, dry place in an airtight package and protected from light.

- ◆ **Rotor:**

Support with wooden blocks and cover to protect from mechanical damage, after the stator has been removed.

Rotors made with Tool Steel (Material number 1.2436)
Should be protected against corrosion with protective grease.



Prior to installation, thoroughly clean rotor to prevent damage caused by interaction of the grease, stator material and medium.

- ◆ **Stand-by Pump:**

A stand-by pump is sometimes installed to eliminate downtime. Stand-by pumps should be operated occasionally to keep properly conditioned for use.

7 Maintenance

7.1 Pumps in General



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

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



7.2 Lubrication

The NEMO® Pump does not require frequent lubrication.

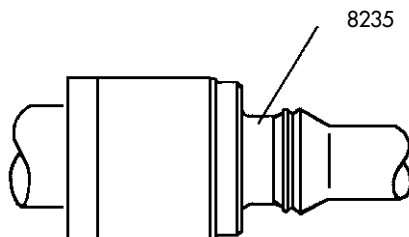
- ◆ Maintenance and lubrication of the drive should be carried out according to the drive manufacturers instructions.

7.3 Lubricating the Pin Joints with SM-Pin Joint Seals

◆ It is advisable to change the oil and check the seals of the pin joints:

- when replacing worn joint parts
- when disassembling the pump for any reason

Joint basic size series NM	Quantity of oil per joint in cm ³
NM 003-011	1
NM 015	1.5
NM 021	2
NM 031	5
NM 038	15
NM 045	22
NM 053	36
NM 063	78
NM 076	165
NM 090	205
NM 105	450



Lubricating Oil:

Industrial Application	Designation DIN 51502	Permitted Product	
General Industry	<table border="1"><tr><td>CLP 460</td></tr></table>	CLP 460	"SHELL" Omala 460
	CLP 460		
with SM-pin joint seal (8235) of EPDM <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>CLP PG</td></tr><tr><td>320</td></tr></table>	CLP PG	320	prescribed: KLUBERSYNTH GH 6-320
CLP PG			
320			

7.4 Shaft Sealing through Single Mechanical Seal

- ◆ The seal specification of a NEMO® Pump is noted on the order acknowledgement.
- ◆ Pumps fitted with direction dependent seals should **never** be run in the opposite direction of the rotation arrow.
- ◆ If excessive leaks occur the spring tension and the seal surfaces should be checked, replace the seal, if necessary.

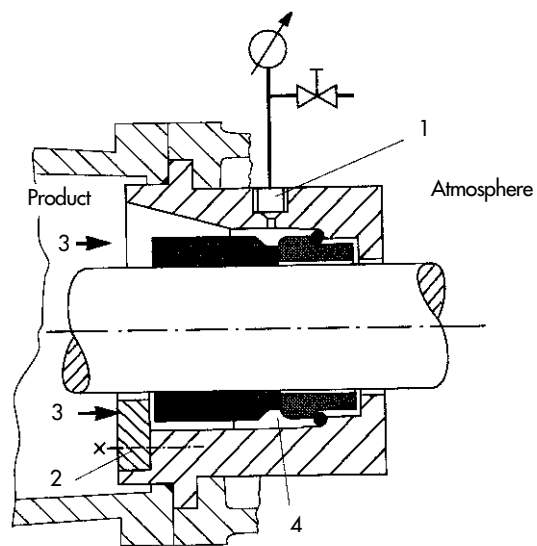
Single mechanical seals usually work without any additional equipment. Their application range can be increased by operating them with a flushing or cooling system.

Flushing

Medium containing high solids should be flushed as follows:

A clear rinse (1) is fed in near the area of the sliding surface. An additional throttle seal (2) can be built in. This keeps the contaminated medium (3) away from the seals (4) if:

- sufficient flush (1) is added
- the pressure of the flush (1) is greater than the pressure of the medium (3).



8 Trouble-Shooting

8.1 Trouble-Shooting Guide

The following chart lists possible problems and corresponding solutions:

8.2 Determining the Kind of Problem and the Possible Cause

- The column describing a possible problem shows one or more boxes marked with a cross.

- On the corresponding lines, you will find the possible reasons/causes and some hints how to handle the problem. Thus, the actual cause of the problem can be narrowed down and eventually detected.

- ◆ The table helps to identify the problem and offers a possible solution. For more complicated problems, consult the manufacturer.

Possible Problem										TROUBLE-SHOOTING GUIDE		
Pump will not start	No suction capability	Discharge output low	Discharge pressure low	Discharge output fluctuates	Pump is noisy	Pump jammed	Drive overloaded	Stator service life too short	Rotor service life too short	Shaft seal leaks	A good service life can be expected if the pump is used in accordance with your specified application and maintained in accordance with this manual. If operating problems arise, use this chart as a guide in locating the problem.	See Next Page for Corrective Action.
POSSIBLE CAUSE												
X							X				Pump or stator is new, too much static friction.	1
X		X	X				X				Power supply incorrect; drive not properly wired.	2
		X					X	X	X		Discharge pressure too high.	3
X						X	X				Foreign matter or debris in pump.	4
X						X	X	X	X		Temperature of pumped liquid too high; stator swells.	5
X						X	X	X			Stator swells due to chemical attack, unsuitable elastomer.	6
X						X	X	X			Liquid contains too many solids, causing blockages.	7
X						X	X	X	X	X	Liquid settles and hardens at pump shut-down.	8
		X	X	X							Air in suction piping.	9
	X	X	X	X							Suction pipe leaks.	10
	X	X	X	X							Shaft sealing leaks.	11
		X	X								Pump speed too low.	12
	X	X	X								Undersized rotor; operating temperature not reached.	13
		X	X	X	X			X	X		Discharge too high or suction head too low (cavitation).	14
		X	X		X	X	X	X	X		Pump running dry.	15
	X	X	X		X						Stator worn out.	16
	X	X	X		X			X	X		Stator material brittle.	17
	X	X	X		X			X			Rotor worn out.	18
					X						Joints worn.	19
					X						Pump and drive out of alignment.	20
					X						Elastomer in coupling worn out.	21
					X					X	Pump bearings worn.	22
							X				Pump speed too high.	23
							X				Viscosity too high.	24
							X				Specific gravity too high.	25
							X			X	Stuffing box not properly tightened.	26
										X	Incorrect packing.	27
										X	Wrong direction of rotation.	28
	X									X	Stationary or rotating face of mechanical seal worn.	29
										X	O-Rings in mechanical seal worn or damaged.	30



8 TROUBLE-SHOOTING

CORRECTIVE ACTION

1	Fill pump and turn by hand. If necessary, use glycerine to lubricate stator.
2	Check motor nameplate data. Test voltage, phase and frequency.
3	Measure actual discharge pressure and compare to your specification.
4	Remove debris and correct any damage.
5	If liquid temperature cannot be reduced, use an undersized rotor.
6	Check specified application, If necessary, change stator material.
7	Increase liquid-to-solids ratio.
8	Clean pump and rinse out after each use.
9	Increase NPSHA; eliminate leaks (see No. 10).
10	Check seals; tighten piping connections.
11	Packing: tighten stuffing box or replace packing. Mech. seal: replace rings or seals; remove deposits.
12	If drive is variable speed, increase speed at pump.
13	Heat pump (stator) to operating temperature.
14	Reduce suction losses; lower liquid temperature; install pump at lower elevation.
15	Fill pump; provide dry run protection; relocate suction piping.
16	Replace stator.
17	Replace stator, check specified application; change stator material of construction if necessary.
18	Replace rotor; determine cause; change rotor material of construction if necessary.
19	Replace necessary parts; seal and refit carefully.
20	Re-align pump and drive.
21	Replace coupling elastomer; re-align.
22	Replace bearings, lubricate and seal. For high temperature, check bearing tolerances and lubrication.
23	If drive is variable, set at lower speed.
24	Measure viscosity and compare to specified viscosity.
25	Measure specific gravity and compare to specified specific gravity.
26	Service stuffing box; replace worn shafts.
27	Change packing material.
28	Reverse polarity of drive motor.
29	Rework or replace seal faces.
30	Replace o-rings; check specified application. Change o-ring material of construction if necessary.



9 Removal and Assembly of End Flange, 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.
- ◆ Remove the hex nuts (2030) with spring washers (2025).
- ◆ Take off the retaining plate (2555).
- ◆ Remove the end flange (2005) from the stator (3005).
- ◆ Remove the stator (3005).
- ◆ Remove the pump housing (2010) from drive stool (0085) or bearing housing (0005).

Reassemble in reverse order.

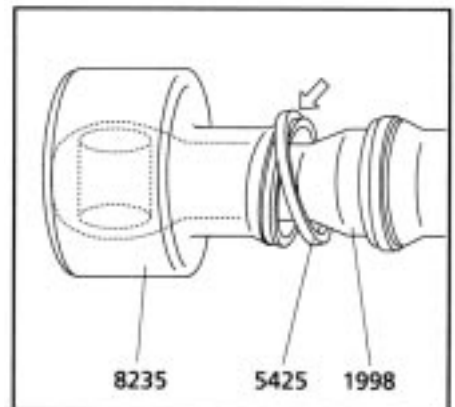
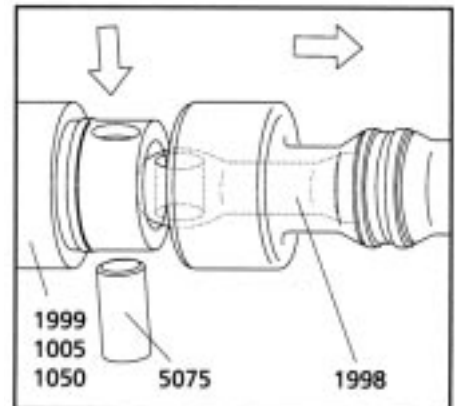
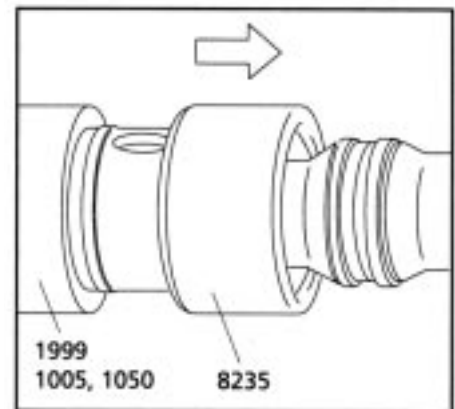
- ◆ Installing the stator (3005) will be easier when using glycerine as a lubricant.
- ◆ Ensure during refitting that gasket (8110) is in perfect condition and will seat properly.

10 Disassembly and Assembly of the Rotating Parts with Pin Joints with SM-Pin Joint Seal

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

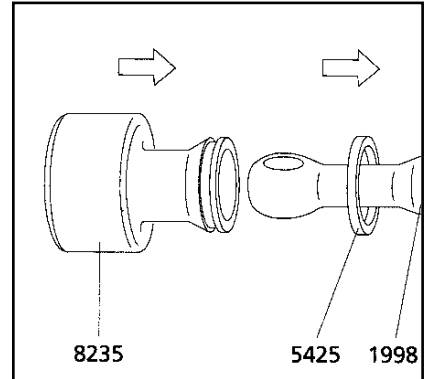
Disassembly:

- ◆ Push the SM-pin joint seal (8235) away from the rotor (1999), drive shaft (1005) or connecting shaft (1050) exposing the pin (5075).
- ◆ Press the pin (5075) out of the rotor (1999), connecting shaft (1050) or drive shaft (1005). Remove the coupling rod (1998) from the rotor (1999), connecting shaft (1050) or drive shaft (1005).
- ◆ 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).

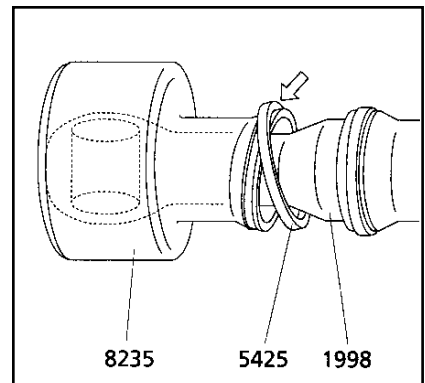


Assembly:

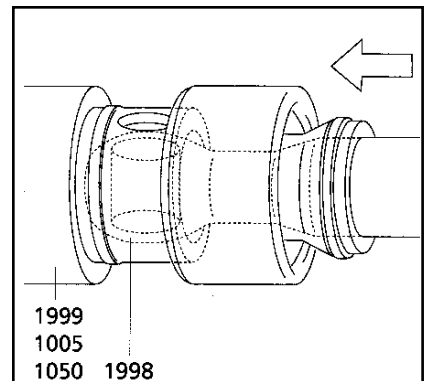
- ◆ Slip the clamp ring (5425) and the SM-pin joint seal (8235) on over the head of the coupling rod (1998).



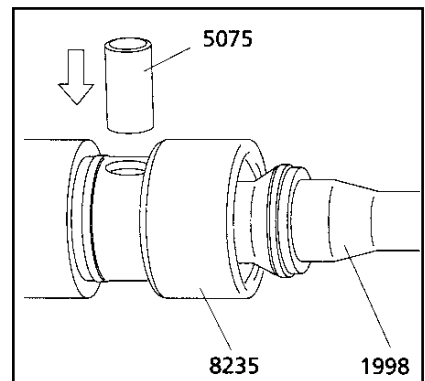
- ◆ Push the SM-pin joint seal (8235) towards the narrow section on the head of coupling rod (1998) and place the clamp ring (5425) back into the groove of the SM-pin joint seal (8235). Then move the SM-pin joint seal (8235) up to the coupling rod (1998) shoulder.



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



- ◆ Join the rotor (1999), drive shaft (1005) or connecting 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).



Assemble the second pin joint in the same manner.

11 Removal and Installation of the Connecting Shaft with Shaft Seal

Removal:

- ◆ Remove pin (1055).
- ◆ If the shaft seal housing (W) is connected tightly to the drive stool (0085), then pull off the connecting shaft (1050) from the drive shaft.
If the shaft seal housing (W) is a separate part, then remove it from the drive stool (0085) together with the connecting shaft (1050).
- ◆ If a mechanical seal is installed, see description
"Removal and Installation of Mechanical Seal" after Page 12.0.

Installation:

- ◆ Apply grease into the bore of the connecting shaft (1050) to avoid rust.
- ◆ If the shaft seal housing (W) is connected tightly to the drive stool (0085), then insert connecting shaft (1050) into the shaft seal housing (W) and push connecting shaft (1050) on to the drive shaft.
If the shaft seal housing (W) is a separate part, then place it into the drive stool (0085) together with the connecting shaft (1050) and push connecting shaft (1050) on to the drive shaft.
- ◆ If a mechanical seal is installed, see description
"Removal and Installation of Mechanical Seal" after Page 12.0.
- ◆ Apply some grease or oil, into the pin (1055) and insert.

12 Removal and Installation of the Mechanical Seal



Cleanliness must be observed for removal and installation.
Please avoid any damage to the sealing surfaces and gaskets.
The sealing unit is dismantled **on** the shaft.

- ◆ 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!

Re-install in reverse order.

- ◆ 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 matter between the seal faces.

- ◆ Important: Ensure that the sealing faces are correctly installed (see Manufacturer's catalog).

14 Recommended Spare Parts

(Pump with pin joints with SM-seal)

In general, we have all spare parts subject to wear in stock. Our subsidiaries and exclusive representatives also hold a certain stock. We recommend to keep an amount of spare parts, corresponding to the pump, in stock on site as follows:

Pieces		Position Number	Designation
Large Set	Small Set		
1	1	3005	stator
1	–	1998	coupling rod
2	–	5075	pin
2	–	8235	SM-seal
1	–	1999	rotor
2	–	5425	clamp ring

To ensure that you receive the part quickly, please provide the following information with your order. Also, please specify the model number of your pump.

Either: 1. a. Part number per the parts drawing
b. Job number (see pump nameplate)

or: 2. a. Part number per the parts drawing
b. Pump machine number. The machine number is stamped on both the pump nameplate and the bearing housing (0005) or drive stool (0085).

or: 3. Identification number of part (Note: The I.D. Number is a six digit number which describes the part, pump size, and materials of construction).

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