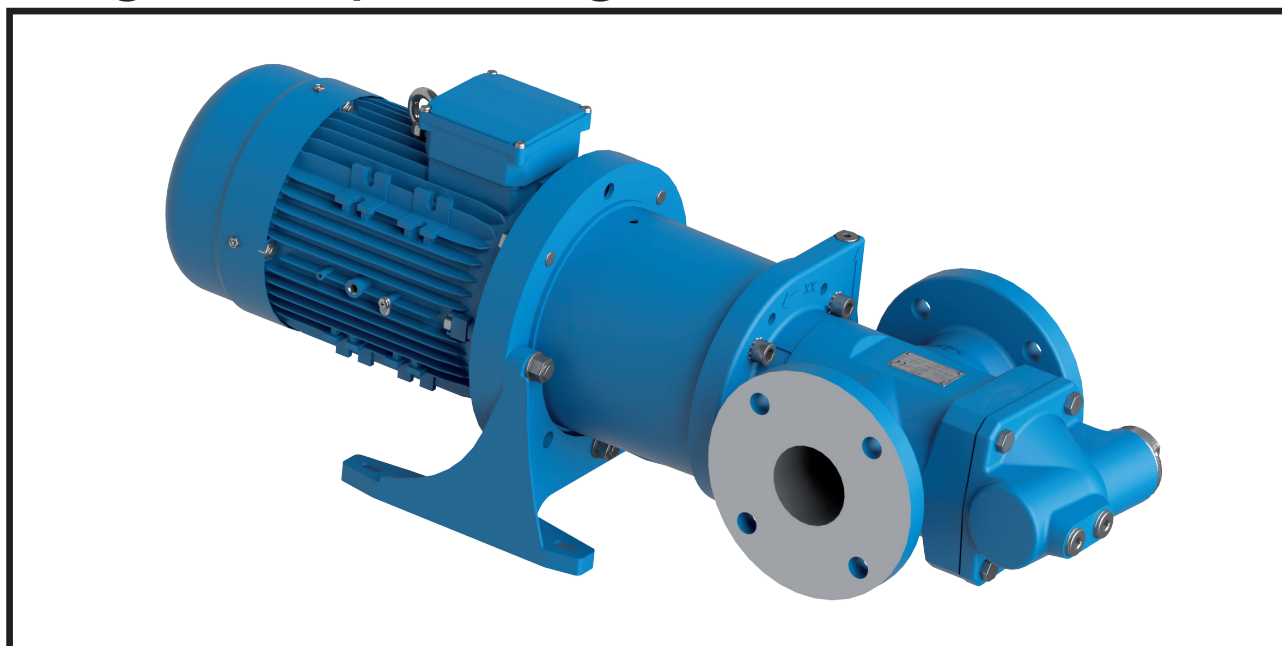


# Screw pumps OptiLine ACG8

## Original Operating Manual



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Before commencing any work, read this instruction carefully! Failure to comply with these instructions may cause damage and personal injury!

# Introduction

## Other applicable documents

Document	Purpose
ATEX additional instructions	Operation in explosion-hazard areas
Order data sheet	Technical specifications, conditions of operation
Technical description	Technical specifications, operating limits
Supplier documentation	Technical documentation for parts supplied by subcontractors, e.g. drive system, coupling or auxiliary operating system.
Spare parts list	Ordering spare parts
Declaration of conformity	Conformity with standards, Content of the declaration of conformity

# Safety

### ATTENTION

The manufacturer accepts no liability for damages caused by disregarding any of the documentation.

## Intended use

- Only use the pump to pump the agreed pumped liquids (→ order data sheet).
- Adhere to the operating limits.
- Avoid dry running:
  - Make sure the pump is only operated with, and never without, pumped liquid.
- Avoid cavitation:
  - Open the pressure-side fitting completely.
- Avoid damage to the motor:
  - Do not switch on the motor more than the maximum permissible number of times per hour (→ manufacturer's specifications).
- Consult the manufacturer about any other use of the pump.
- Pumps delivered without a motor must be assembled into a pump unit according to the provisions of EC Machine Directive 2006/42/EC.

## Prevention of obvious misuse (examples)

- Note the operating limits of the pump with regard to temperature, pressure, viscosity, flow rate and motor speed (→ order data sheet).
- When using auxiliary systems, ensure there is a continuous supply of the appropriate operating medium.
- Do not operate the pump while the pressure-side fitting is closed.
- Only select the setup type according to this operating manual. For example, the following are not allowed:
  - Hanging pumps in the pipe
  - Overhead installation
  - Installation in the immediate vicinity of extreme heat or cold sources

## General safety instructions

### ATTENTION

Observe the following regulations before carrying out any work.

## Product safety

The pump has been constructed according to the latest technology and recognized technical safety rules. Nevertheless, operation of the pump can still put the life and health of the user or third parties at risk or damage the pump or other property.

- Only operate the pump if it is in perfect technical condition and only use it as intended, remaining aware of safety and risks, and adhere to the instructions in this manual.
- Keep this manual and all other applicable documents complete, legible and accessible to personnel at all times.

- Refrain from any procedures and actions that would pose a risk to personnel or third parties.
- In the event of any safety-relevant malfunctions, shut down the pump immediately and have the malfunction corrected by the personnel responsible.
- In addition to the entire documentation for the product, comply with statutory or other safety and accident-prevention regulations and the applicable standards and guidelines in the country where the system is operated.

## Obligations of the operating company

### Safety-conscious operation

- Ensure that the following safety aspects are observed and monitored:
  - Intended use
  - Statutory or other safety and accident-prevention regulations
  - Safety regulations governing the handling of hazardous substances
  - Applicable standards and guidelines in the country where the pump is operated
- Make personal protective equipment available.

### Qualified personnel

- Make sure all personnel tasked with work on the pump have read and understood this manual and all other applicable documents, especially the safety, maintenance and repair information, before they start any work.
- Organize responsibilities, areas of competence and the supervision of personnel.
- Ensure that all work is carried out by specialist technicians only:
  - Fitting, repair and maintenance work
  - Work on the electrical system
- Make sure that trainee personnel only work on the pump under the supervision of specialist technicians.
- Persons who have an implanted pacemaker:
  - Must stay away from the pump with magnetic coupling and parts of the magnetic coupling
  - May not work on or with any of the magnetic parts

### Safety equipment

- Provide the following safety equipment and verify its functionality:
  - For hot, cold and moving parts: on-site safety guards for the pump
  - For possible electrostatic charges: provide the necessary grounding
  - If there is no pressure relief valve in the pump: Provide an appropriate safety valve on the pressure side between the pump and the first shut-off device

### Warranty

- Obtain the manufacturer's approval prior to carrying out any modifications, repairs or alterations during the warranty period.
- Only use genuine parts or parts that have been approved by the manufacturer.

### Drive system

For pumps delivered without a drive system, comply with the following requirements for the drive system:

- When using three-phase asynchronous motors, observe IEC 60034-30-1.
- Power of the drive according to EN ISO 5199 is recommended (EN ISO 5199 also applicable for drives of screw pumps).
- Use coupling guard with the following requirements:
  - Fastening elements must be connected to the pump unit in undetachable design (cannot get lost).
  - Safety distances against the reaching of hazardous areas according to EN ISO 13857 must be complied with.

## Obligations of the operating company

- All directions given on the pump must be followed (and kept legible), e.g. the arrow indicating the sense of rotation and the markings for fluid connections.
- Pump, coupling guard and components:
  - Do not step on them or use as a climbing aid
  - Do not use them to support boards, ramps or beams
  - Do not use them as a fixing point for winches or supports
  - Do not use them for storing paper or similar materials
  - Do not use hot pump or motor components as a heating point
  - Do not de-ice using gas burners or similar tools
- Do not remove the safety guards for hot, cold or moving parts during operation.
- Use personal protective equipment whenever necessary.
- Only carry out work on the pump while it is not running.
- Isolate the motor from its supply voltage and secure it against being switched back on again when carrying out any fitting or maintenance work.
- Reinstall the safety equipment on the pump as required by regulations after any work on the pump.
- With an implanted pacemaker:
  - Stay at least 1 meter away from the pump with magnetic coupling or parts of the magnetic coupling.
  - Do not work with or on the magnetic parts.

# Specific hazards

## Explosion-hazard area

- (→ ATEX additional instructions).

## Hazardous pumped liquids

- Observe the safety regulations for handling hazardous substances (e.g. hot, flammable, poisonous or potentially harmful) when handling hazardous pumped liquids.
- Use personal protective equipment when carrying out any work on the pump.
- Noise level:
  - Check individual pump series noise level in respective Product Description

## Magnetic field

The magnetic field of the magnetic coupling can destroy products that are sensitive to magnets.


These include:

- Pacemakers
- Plastic identity cards with magnetic strips
- Credit and check cards
- Electric, electronic and precision mechanical devices (such as mechanical and digital clocks, pocket calculators, hard disks)

# Installation

**For pumps in explosion-hazard areas  
(→ ATEX additional instructions).**

Design limitations and technical data for each pump are found in the Product description. Installation of IMO AB low pressure pumps does not require special skills. However, these instructions presume that the work is carried out by experienced fitters!


**11**  Failure to comply with these instructions may cause damage and personal injury

## Transport and storage

Always protect the pump against ingress of water and other impurities. Store the pump in a clean, dry and warm environment. The pump is delivered with the internals oiled and with protective covers over the pipe connections and drain openings. These covers should remain in place for as long as possible during the mounting and installation procedure but must be removed before start up.

## Lifting of pump


Lifting of the complete pump unit with the lifting device attached to the motor, should be avoided as the motor's lifting provisions may not be able to carry the combined weight of the pump and motor.


**12**  All pumps should be lifted with straps securely attached to the pump or pump unit, so that the center of gravity is located between the straps in order to avoid tipping of the pump.

## Strainer

The pump has to be protected from foreign matters such as weld slag, pipe scale, etc., that could enter the pump via the suction line. If the cleanliness of the system cannot be guaranteed, a strainer must be installed in the inlet pipe near the pump. For practical reasons a suction strainer with 0.8-2.0 mm mesh openings is recommended.

The size of the strainer should be selected so that it is large enough to allow adequate pressure at the pump inlet. The pressure drop across the strainer should preferably not exceed 0.1 bar at max. flow rate and normal operating viscosity. A vacuum gauge between the strainer and the pump inlet is recommended to indicate when the strainer needs cleaning.

**13**  All work carried out on the pump has to be performed in such a manner that risks for personal injury are observed.

**14**  Lifting a complete pump unit, using slings or hooks attached to the pump or connecting frame may be dangerous since the centre of gravity of the pump unit may be higher than the points of attachment.

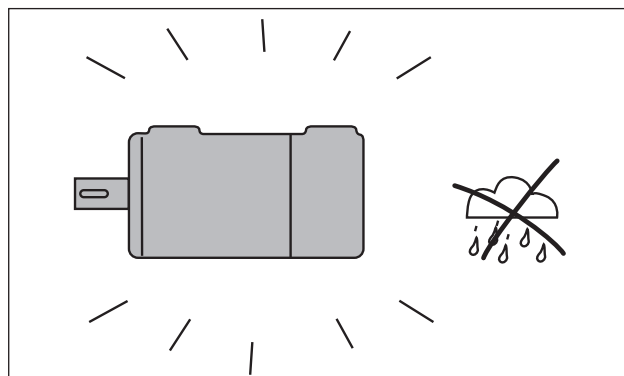


Fig 1. Keep dry and clean

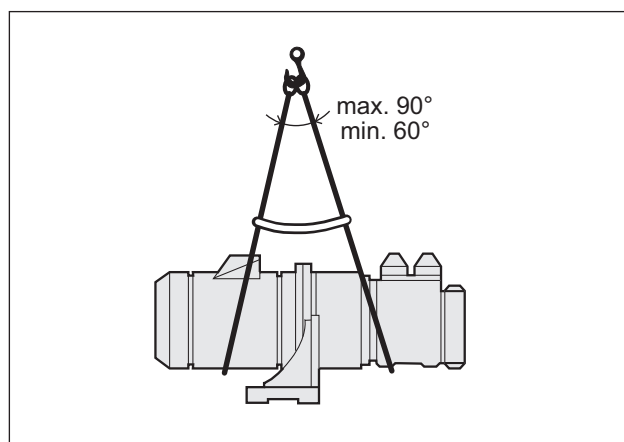


Fig 2. Lifting the pump

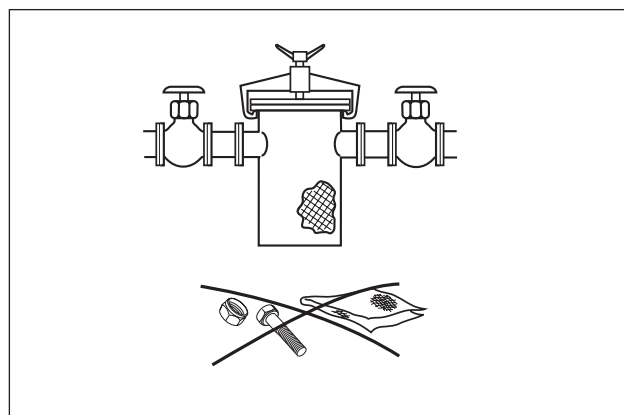


Fig. 3 Strainer

## Pipe connections

The pipe work shall be installed and supported so that no pipe stresses are transferred to the pump body. The pipe forces and torque transferred to the pump shall be in accordance with ISO 14847. The pipe work should be tight in order to avoid leakage and infiltration of foreign particles and/or air. Shut off valves should be installed in both suction and discharge pipes, so that the pump can be hydraulically isolated.

## Suction line

The suction pipe should be designed so that the total pressure drop, measured at the pump inlet flange, does not exceed the suction capability of the pump. Make a proper calculation of the suction line including components such as valves, strainer, pipe bends etc. Generally, the pressure drop in the suction line should be as low as possible, which is achieved if the suction pipe is short, straight and has a suitable diameter. The velocity in the suction line should be kept in the range 0.5 - 1.2 m/s. For L.O. circulating systems, we recommend to keep it as low as possible. The suction line must be equipped with a port that allows filling the pump before start.

## Discharge line

The discharge line should be dimensioned to keep the velocity in the range 1 - 3 m/s.

## Deaeration

In installations with negative suction head, where the pump might be started against a pressurized system, a deaeration pipe with an orifice (2-3 mm is recommended) has to be installed. The deaeration pipe should be connected to the outlet pipe's highest point. This must also be installed when the pump is used as a stand-by pump.

## Liquid trap

In some mounting arrangements the pump may not retain the liquid at stand still. In such installations the suction pipe should be arranged so it forms a liquid trap together with the pump, keeping the pump half filled with liquid.

15



When handling liquids that may harm skin use gloves and/or protective clothing

16



When handling liquids which may involve fire hazards appropriate precautions to avoid danger are to be taken.

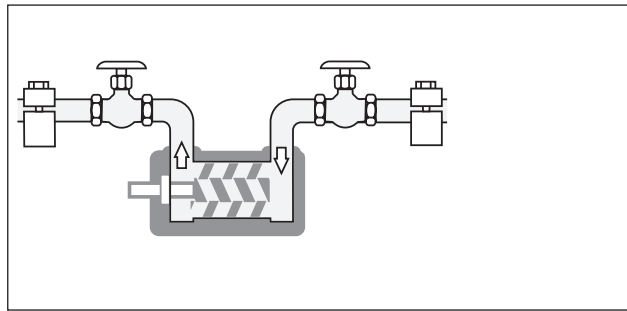


Fig. 4 Pipe connections

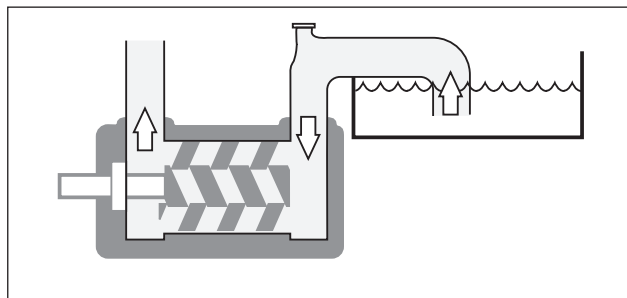


Fig. 5 Suction Line

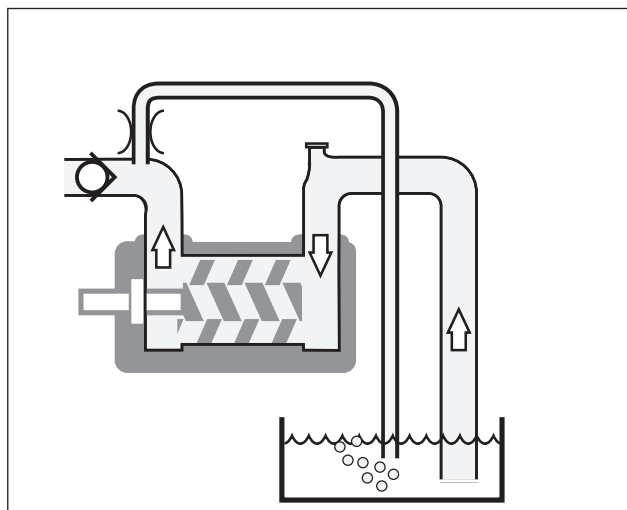


Fig. 6 Deaeration

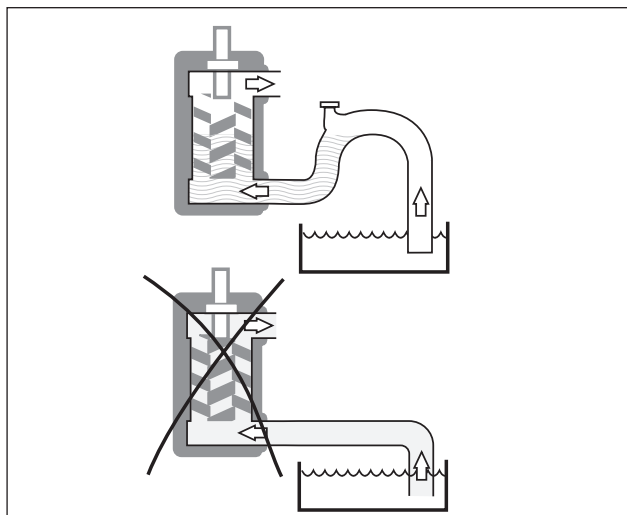


Fig. 7 Liquid trap

## Gauges

Gauges for monitoring the pump's working conditions are recommended. These gauges should be placed readable as close to the pumps in- and outlet flanges as possible. On the ACG Optiline standard pumps there are gauge connections for both in- and outlet.

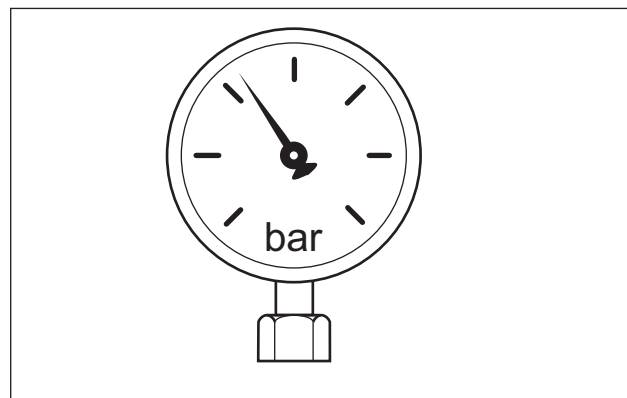


Fig. 8 Gauges

## Pressure relief valve

All systems with screw pumps must be equipped with a pressure relief valve installed immediately adjacent to the pump. In the standard versions of IMO ACG Optiline pumps, this pressure relief valve is an integral part of the pump to protect the system against excess pressure. When liquid is circulated through the valve it heats up in proportion to the set pressure level and the percentage of by-passed liquid. 100% bypass can only be tolerated for less than about 3 minutes, 50 %by-pass generally for unlimited periods of time. If more than 50% recirculation is anticipated, a value specific to each application should be determined by closely monitoring the pump body temperature. If the pump is operating in line with a separate pressure control valve (see fig. 9), the setting of the relief valve should be high enough so as not to interfere with the control valve. Likewise, if two pumps are operating in parallel, the setting should be such that interference between the two valves is avoided.

Also remember that a total bypass by the pumps internal relief valve will cut off the cooling flow to the pumps magnetic coupling and cause an overheating with destroyed magnets as a result quite fast.

17



Oil leakage may make the floor slippery and cause personal injury.

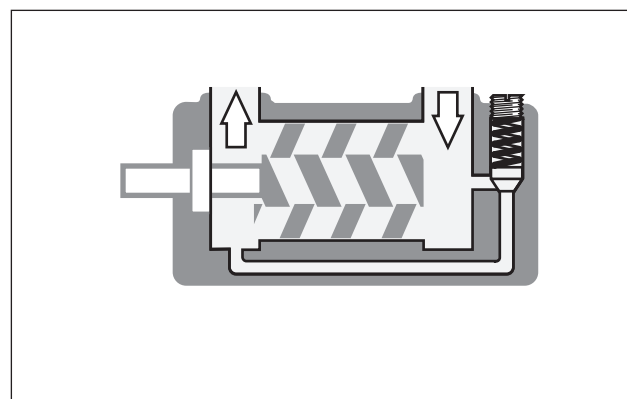


Fig. 9 Pressure Relief Valve

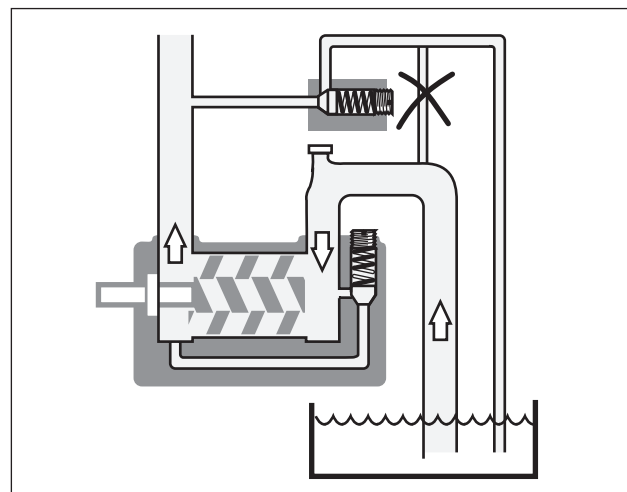


Fig. 10 External control with pressure relief valve



# Startup


**For pumps in explosion-hazard areas  
(→ ATEX additional instructions).**

## Pressure testing and flushing

The system must be flushed and pressure tested before connecting the pump. If corrosive liquid, such as water is used, the system must be thoroughly drained, dried and protected against corrosion after having been flushed.

## Before starting:

After installation and whenever it can be assumed that the pump has been emptied, the pump must be thoroughly filled with liquid. See fig 11.

- 18  Make sure the prime mover is locked out and can not be started accidentally.

## Direction of rotation

When the pump is ready to be started, switch the motor briefly on and off and check that the drive motor rotates in the correct direction as indicated by the rotation arrow. The arrow is placed on the side of the front cover 5010 as well as on riveted steel plates on the connecting frame 003.

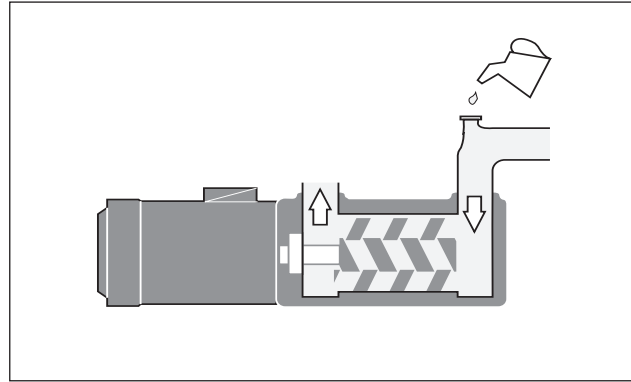



Fig. 11 Filling the pump

- 19  Don't mix up with arrow for inlet and outlet!

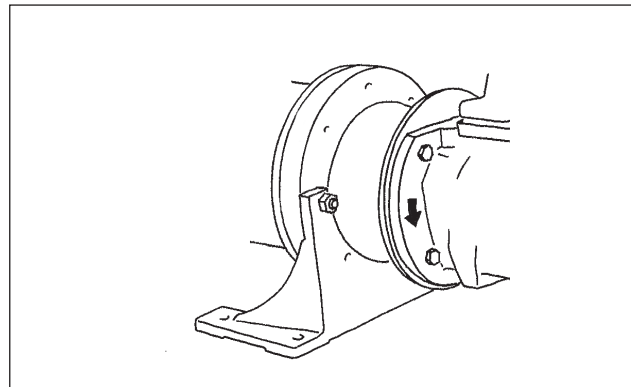


Fig. 12 Direction of rotation

## Differential pressure

Differential pressures below 1 bar is strictly forbidden as the magnetic coupling under these conditions may lose its cooling flow and cause an overheating of the magnetic coupling with a risk of a potential fire as a result. We do strongly recommend magnetic coupled pumps to be equipped with a differential pressure monitoring device that stops the pump automatically if the differential pressure for some reason should drop to below 1 bar.

## Air in the pumped fluid

It is forbidden to use the ACG Optiline pump with fluids that contain more than 0,2% of air due to the risk of ignition during an eventual overheating of the pump.

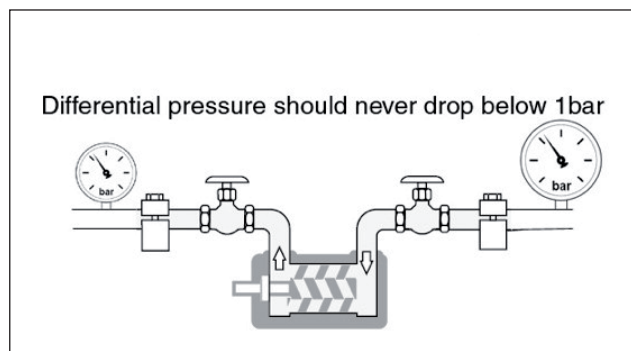




Fig. 13 Differential Pressure



# Trouble shooting

Problem	Cause	What to do
<b>Wrong direction of rotation</b>	<ul style="list-style-type: none"> <li>- Electric cables to motor wrongly connected.</li> </ul>	<p>Reverse the terminal connection on electric motor.</p> <div> 20  <p>Connecting and disconnecting of electric cables must be done only by personnel authorized to do such work.</p> </div>
<b>The pump cannot be primed</b>	<ul style="list-style-type: none"> <li>- Wrong direction of rotation.</li> <li>- Suction line is not open or pressure drop in the suction line is too high.</li> <li>- Major air leakage into the suction line.</li> <li>- The pump cannot evacuate the air through the discharge line due to excessive counter pressure.</li> </ul>	<p>See above.</p> <p>Check all components in suction line. The inlet condition should be checked with a vacuum gauge at the pump inlet. Check the suction line.</p> <p>See the chapter on Deaeration (see page 22).</p>
<b>No flow</b>	<ul style="list-style-type: none"> <li>- The pump is not primed.</li> <li>- The pressure relief valve is set below the counter pressure.</li> </ul>	<p>See above.</p> <p>Readjust the pressure relief valve to a value above counter pressure.</p>
<b>Flow too low</b>	<ul style="list-style-type: none"> <li>- The pressure relief valve is set too low (Discharge pressure also low).</li> <li>- Something is restricting the flow in the suction line. (This would usually cause noise).</li> <li>- The pumped liquid contains a significant amount of compressible gas, such as free air. (This would usually cause noise).</li> </ul>	<p>Readjust the pressure relief valve</p> <p>Check all components in the suction line (strainers, valves etc.).</p> <p>See the chapter on Noise and Vibration. ( Page 11).</p>
<b>Pressure too low</b>	<ul style="list-style-type: none"> <li>- The pressure relief valve is set too low.</li> <li>- Counter pressure in the discharge line is too low due to a major leakage.</li> <li>- The valve piston is stuck in open position.</li> <li>- Something is restricting the flow in the suction line. (This would usually cause noise).</li> <li>- The pumped liquid contains a significant amount of compressible gas, such as free air. (This would usually cause noise).</li> <li>- A too small pump has been chosen.</li> </ul>	<p>Readjust the pressure relief valve.</p> <p>Check the components in the discharge line inclusive the recipients.</p> <p>Check the valve. See Maintenance and Service instruction for respective pump. Check all components in the suction line (strainers, valves etc.).</p> <p>See the chapter on Noise and Vibration. (Page 11).</p> <p>Contact your IMO AB representative.</p>

<b>Pressure too high</b>	<ul style="list-style-type: none"> <li>- The pressure relief valve is set too high.</li> <li>- The oil is too cold (or has higher viscosity than anticipated).</li> <li>- Counter pressure in the discharge line is too high.</li> </ul>	<p>Readjust the pressure relief valve.</p> <p>Reduce the pressure setting until operational temperature has been reached.</p> <p>Check the discharge line.</p>
<b>Drive motor difficult to start or tends to stop by tripping the motor overload relay</b>	<ul style="list-style-type: none"> <li>- Counter pressure too high.</li> <li>- Liquid too cold.</li> <li>- Motor is undersized for the prevailing conditions.</li> <li>- Electrical power supply faulty.</li> <li>- Motor overload relay set too low or is faulty.</li> <li>- Incorrect setting of Y/D starter.</li> </ul>	<p>See above: Pressure too high.</p> <p>Readjust the pressure relief valve to a lower value. Thus the power consumption for the pumping is relieved and overloading due to the high viscosity may be avoided. When the liquid has reached normal temperature and thus flows easily, the relief valve is reset to normal pressure.</p> <p>Check the motor.</p> <p>Check the motor and motor connection.</p> <p>Readjust or replace the relay.</p> <p>Readjust the setting of the starting sequence. The time before the motor overload relay is tripped should not exceed 10-15 seconds.</p>
<b>Noise and vibration</b>  <div data-bbox="129 1093 456 1267"> <div>21</div>  <p>Monitor the pump function and shut down if any sign of malfunction is noticed</p> </div>	<ul style="list-style-type: none"> <li>- The flow to the pump is insufficient.</li> <li>- Insufficient support of pipe work.</li> <li>- Bad alignment</li> <li>- Air leakage into the suction line.</li> <li>- Free air in the liquid or gas cavitation.</li> <li>- Faulty electrical supply.</li> </ul>	<p>See chapter: The flow is too low.</p> <p>Check for pipe vibrations in the pump connections. Check that the pipes are sufficiently clamped.</p> <p>Check alignment, see page 4.</p> <p>Check the suction line for air leakage.</p> <p>For pumps with Tuning: Contact your IMO representative or IMO service department.</p> <p>Check all three phases of the supply.</p>

# Maintenance and Service

For pumps in explosion-hazard areas (→ ATEX additional instructions).

## Introduction

A screw pump from IMO is a quality product that is designed for a long problem free operation in tough environments. As all other mechanical products they do however requires a certain grade of maintenance and service in order to guarantee a faultless and economic favourable operation.

A recommendation is to go through the pump each 5 year in order to replace wear details such as ball bearings and certain gaskets and o-rings. A relatively small review of a screw pump from IMO means that the pump in most of the cases will be in a condition “as new” and therefore give the operator another long and problem free operation.

### Identification of safety instructions

Non compliance of safety instructions identified by the following symbol could affect safety for persons



Safety instructions where electrical safety is involved are identified by:



Safety instructions which shall be considered for reasons of safe operation of the pump or pump unit and/or protection of the pump or pump unit itself are marked by the sign:



## List of components

Valid for all ACG Optiline Generation 8 pumps with sizes 045, 052, 060 & 070 and leads K, N & D  
With version codes NHBP, NJBP, NKBP, NLBP & NMBP.

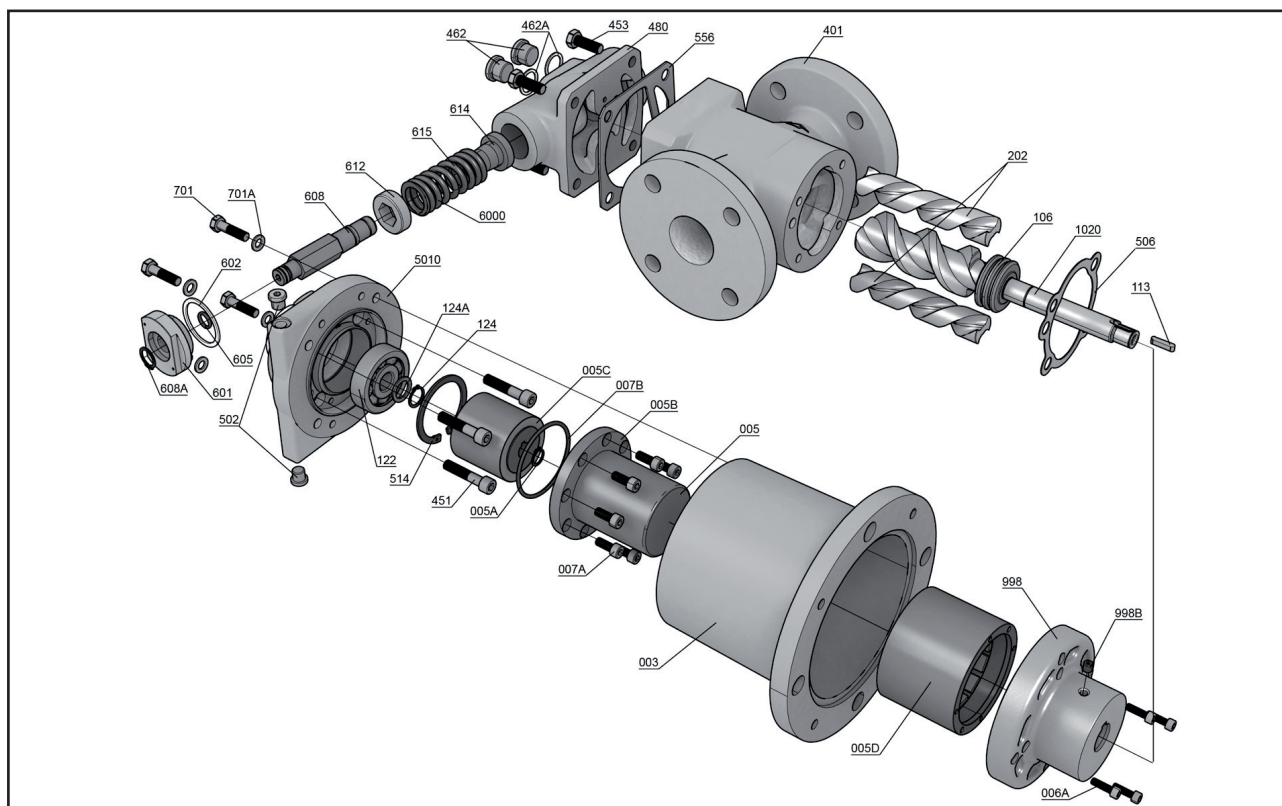
Pos No	Designation	Qty	Included components in Spare part sets					Explanations:
			G012	G054	G057	G070	G098	
002	Motor	1						G012:Rotor set
003	Connecting frame	1						G054:G012+G057 + pos. no 122
004	Angle bracket	1						G057:Joint kit
005	Magnetic coupling complete	1					x	G070:Valve element
005A	Retaining ring	1		x	x		x	G098:Magnetic coupling
005B	Sealing can	1					x	
005C	Inner magnetic rotor	1					x	
005D	Outer magnetic rotor	1					x	
006A	Screw	4						
007A	Screw	6/8						
007B	O-ring	1		x	x		x	
1020	Power rotor	1	x	x				
113	Shaft key	1	x	x				
122	Ball bearing	1		x				
124	Retaining ring	1		x	x			
124A	Support ring	1		x	x			
202	Idler rotor	2	x	x				
401	Pump body	1						
451	Screw	4/6						
453	Screw	4						
462	Plug	2						
462A	Sealing washer	2		x	x			
480	Valve housing	1						
5010	Front cover	1						
502	Plug	2						
506	Gasket	1		x	x			
514	Retaining ring	1		x	x			
556	Gasket	1		x	x			
601	Valve cover	1				x		
602	Sealing washer	1		x	x	x		
605	O-ring	1		x	x	x		
608	Valve spindle	1				x		
608A	Retaining ring	1				x		
612	Regulating nut	1				x		
614	Valve piston	1				x		
615	Valve spring	1				x		
701	Screw	4						
701A	Washer	4						
702	Screw	4						
702A	Washer	4						
703	Screw	3						
703B	Nut	3						
998	Drive hub	1						
998B	Screw	1						

## Exploded view



Before commencing any work, read this instruction carefully! Failure to comply with these instructions may cause damage and personal injury!

For more information about the pumps identification code, technical data and performance we refer to the ACG Product description.



## Recommended Spare Parts Kits and tool kits

Every shutdown for service of a plant is costly. The time for repair should therefore be limited to a minimum which can be accomplished by keeping a spare pump. The changed pump can later be repaired at a suitable place and can then be used as a spare pump. For maintenance the following spare parts kits and tools are recommended:

## Ordering Code

Item	Spare Parts sets	Part numbers for pump size			
		045	052	060	070
G012	Rotor set D-lead				901193023
	N-lead	901193015	901193017	901193019	901193021
	K-lead	901193016	901193018	901193020	901193022
G054	Major kit = G012+G057 + pos.no.122	-	-	-	-
	Joint kit	901193031	901193032	901193033	901193034
G070	Valve element	901190990	901190990	901190984	901190984
G098	Magnetic coupling	H	901193035	-	-
		J	901193036	901193036	-
		K	901193037	901193037	901193040
		L	901193038	901193038	901193041
		M	901193039	901193039	901193042
122	Ball bearing	901192855	901192855	901192827	901192827
480	Valve housing	901191022	901191025	901191028	901191031

Kit	Contents	To be used for
G057	Gaskets, o-rings etc.	Dismantling of the pump
G012	Rotorset	Repair after major breakdown or great wear
122	Ball bearing	Repair after major breakdown or great wear
901193128	Guide pins pump size 045	For dismantling and assembly of the pump
901193129	Guide pins pump size 052	For dismantling and assembly of the pump
901193130	Guide pins pump size 060	For dismantling and assembly of the pump
901193131	Guide pins pump size 070	For dismantling and assembly of the pump

## Service intervals

The intervals for inspection and replacement of wear parts vary greatly with the properties of the pumped liquid and can only be determined by experience. All internal parts of the ACG Optiline pump are lubricated by the pumped liquid. Pumping liquid which contain abrasive materials, or liquid that is corrosive, will significantly reduce service life and call for shorter service intervals. Wear in the pump will normally show as:

- Vibration
- Noise
- Loss of capacity
- Reduction in flow/pressure
- Loss of the magnetic power

We recommend planned inspections and/or overhaul at regular intervals, not exceeding 5 years. It is recommended to always have the spares included in joint spare part kit G057 together with the ball bearing 122 available for a planned inspection.

## Inspection of rotors

To reach the idler rotors in a quicker way than described in the dismantling section, loosen the rear cover (480) with the valve. Screw out the idler rotors backwards. Internal clearances in the pump, which are vital for its proper function, may have been affected by wear. Acceptable wear can be determined only by experience of the actual application. As a rule of thumb the following max clearance values may apply: Between rotor and bores: 0.2 mm, Between rotor flanks: 0.4 mm For light duties (low pressure, medium viscosity) even bigger clearances may be acceptable but for low viscosity/ high pressure duties the limit will be lower. Also watch if there are major scratches on these parts.

## Inspection of the magnetic coupling

The magnetic coupling with all its components is considered to be maintenance free if operated and mounted according to our instructions.

The lifetime of the magnets is well within the lifetime of the pump and exchange of the magnets is only necessary if a major breakdown has occurred as a result of for example excessive amounts of dirt or particles in the pumped fluid.

## Common aspects whit magnetic couplings

Permanent magnetic couplings generate a strong magnetic field. The installation must be carried out only by trained staff that has the understanding of how a magnetic coupling acts and all the safety precautions related to it. All installation instructions must be strictly followed. Modifications or changes to the magnetic coupling or its components are not to be allowed under any circumstances. IMO does NOT take any responsibilities for damages caused by improper use or damages related to this.

Magnetic data carriers such as bank cards, floppy disks etc may become unreadable and should always be kept separated from the magnetic field.

## DANGER

Installations and maintenance must always take place during complete shutdown in an un-pressurised condition. The drive unit must be secured against inadvertent switching on by means of blocking the electrical supply to the electric motor in order to avoid serious injuries due to rotating parts.

2



ATTENTION! In areas where permanent magnetic couplings are handled or stored with open access, persons with heart **PACEMAKERS** should keep a distance of 3 meters. For permanent magnetic couplings assembled within a pump a safety distance of 3 meter is sufficient.



## Precautions prior to starting maintenance on the pump

3



If the pumps operating temperature exceeds 60°C, let the pump cool off before any service, maintenance or dismantling work is commenced to avoid burn injury

4



All work carried out on the pump has to be performed in such a manner that risks for personal injury are observed!

5



When handling liquids that may harm skin, use gloves and/or protecting clothing!

6



When handling liquids which may involve fire hazard appropriate precautions to avoid danger are to be taken.

7



In case of failure for system with elevated pressure, fluid jets may cause injury and/ or damage.

8



Oil leakage may make the floor slippery and cause personal injury.

9



Before any maintenance work, ensure that the driver is deenergized and the pump hydraulically isolated.

10

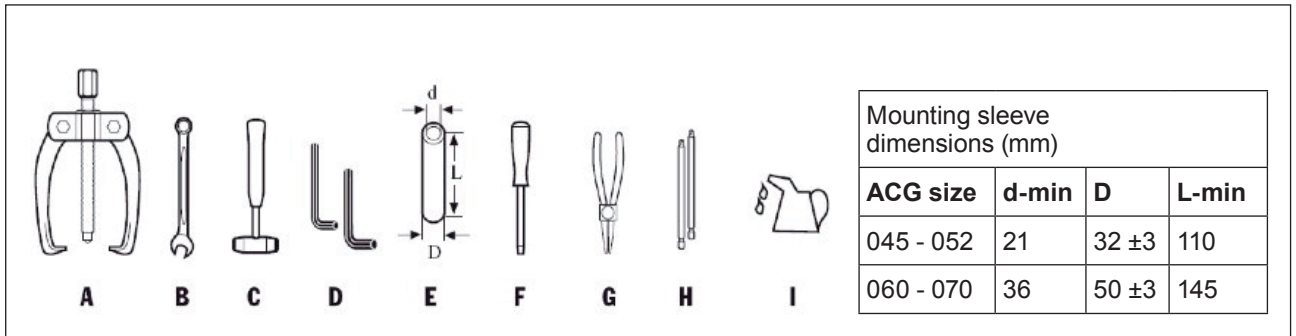


Connecting and disconnecting of electrical cables must be done only by personnel authorized to do such work.



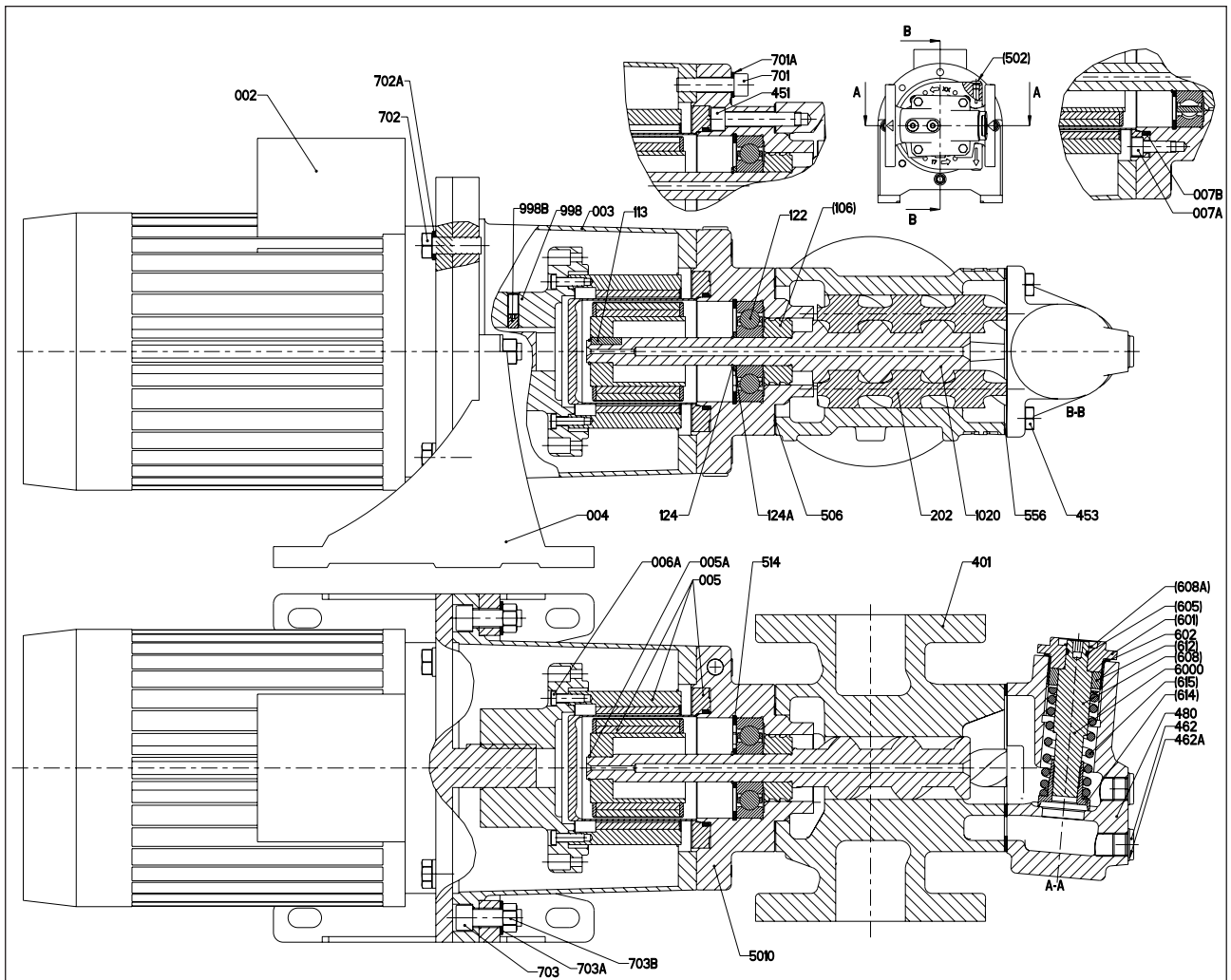
# Dismantling and reassembling the pump

## List of tools necessary for dismantling and reassembly



- A = Puller  
 B = Spanner various sizes  
 C = Plastic mallet  
 D = Allen keys various sizes  
 E = Mounting Sleeve for ball bearing (sizes - see table)  
 F = Screw driver  
 G = Circlip pliers  
 H = Guide Pins (for ordering code, see table page 5)  
 I = Oil can

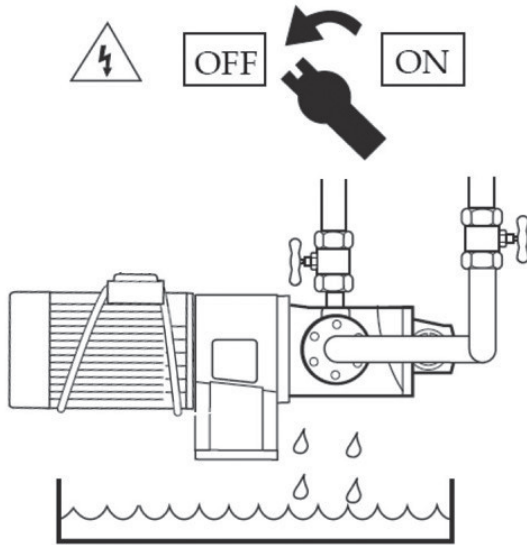
## Sectional View





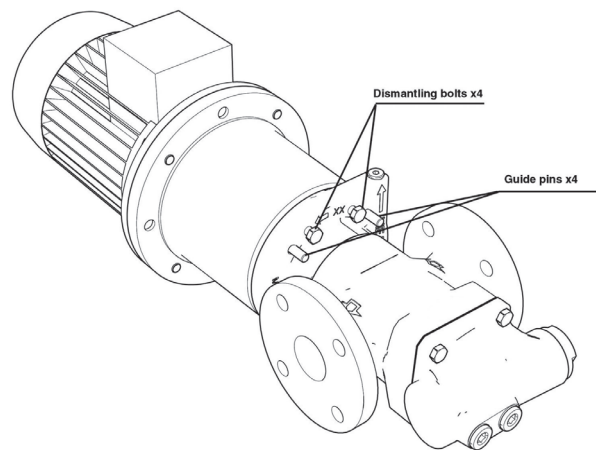
# Dismantling

**A.**



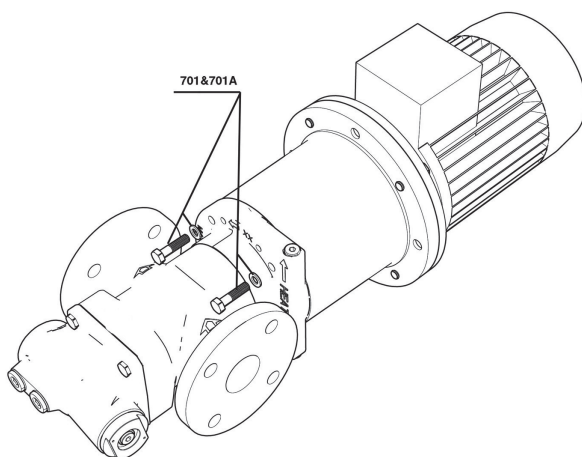
- Turn the electricity OFF.
- Close the valves.
- Disconnect the electric motor.
- For horizontal installation drain the pump by loosen screws 453 3-4 turns and loosen valve housing 480.

**C.**



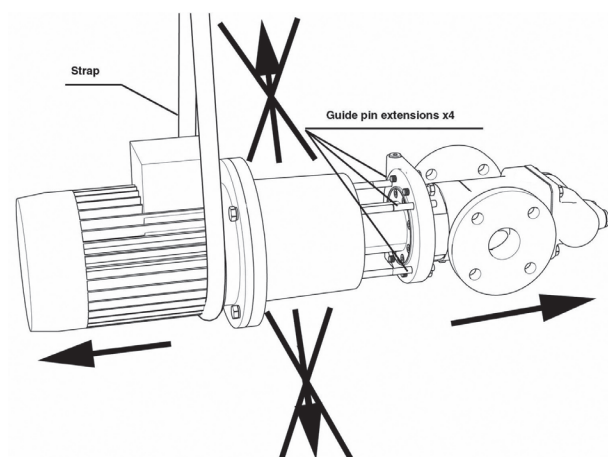
- Mount the first half of the 4 guide pins which comes in two parts through the pumps front cover into the connecting frame.
- Attach the dismantling bolts and slowly start to tight them until the pump is separated from the electrical motor.
- Continue to tight the bolts while making sure that the pump and the electric motor with its connecting frame is in a straight line with each other.

**B.**



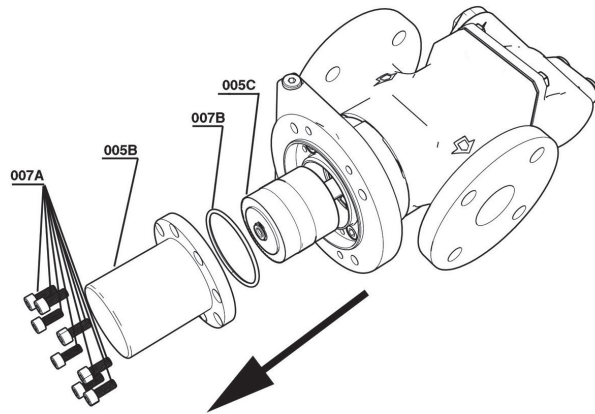
- Remove the 4 bolts 701 and the washers 701A

**D.**



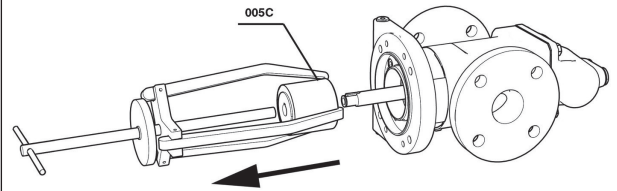
- Mount the extension guide pins when it is possible and continue to separate the pump from the electrical motor in an straight line in order to avoid damages on the magnets.
- The use of a strap or similar devices on the electrical motor in order to stabilize and secure the package from the magnetic force is recommended.

## E.



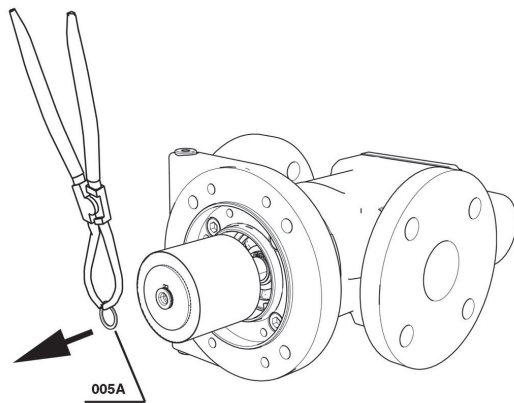
- Unscrew the bolts 007A
- Pull out the sealing can 005B with its o-ring 007B

## G.



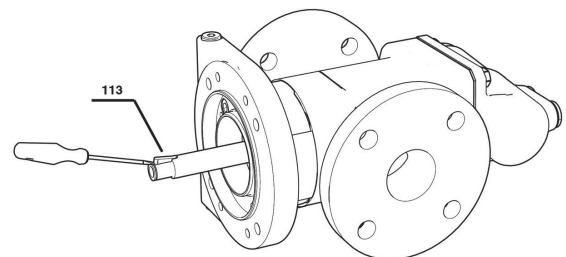
- Remove the inner magnetic rotor with a suitable three arm puller

## F.



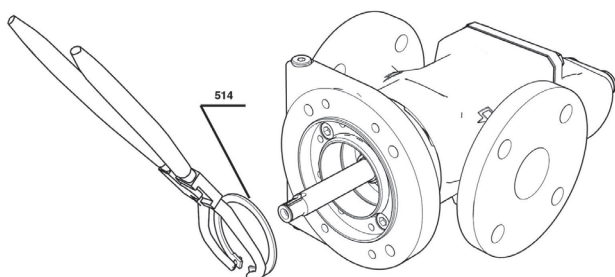
- Remove the circlip 005A with a suitable plier.

## H.



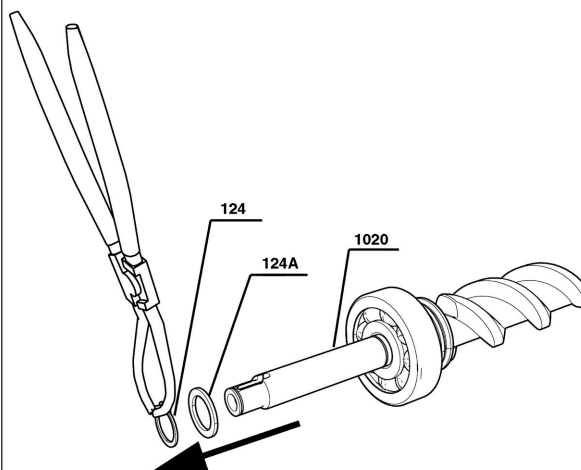
- Remove the key 113 from the pump shaft.

**I.**



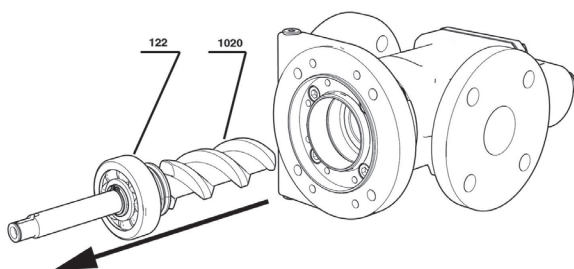
- Remove the circlip 514 from the front cove with a suitable plier.

**K.**



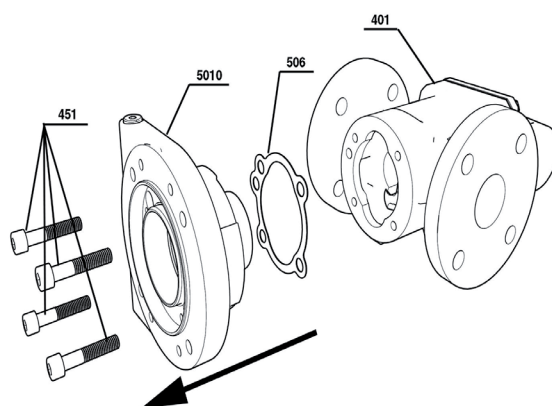
- Remove the circlip 124 with a suitable plier from the power rotor 1020.
- Remove the support washer 124A.

**J.**



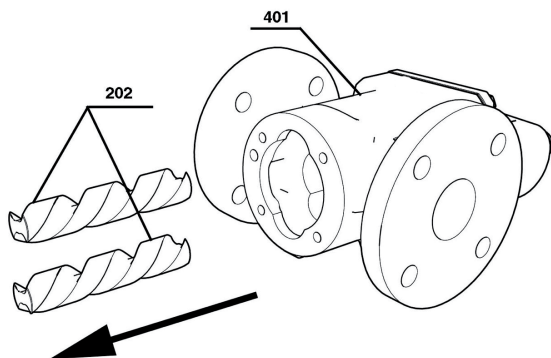
- Pull out the power rotor 1020 with its ball bearing 122 by hand force from the pump body.

**L.**



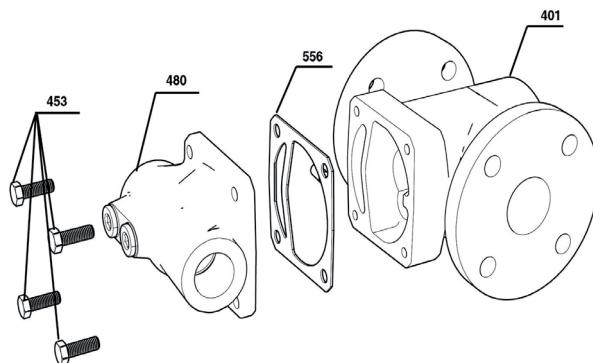
- Unscrew the bolts 451 from the front cover 5010
- Separate the front cover 5010 with its gasket 506 from the pump house 401.

# M.



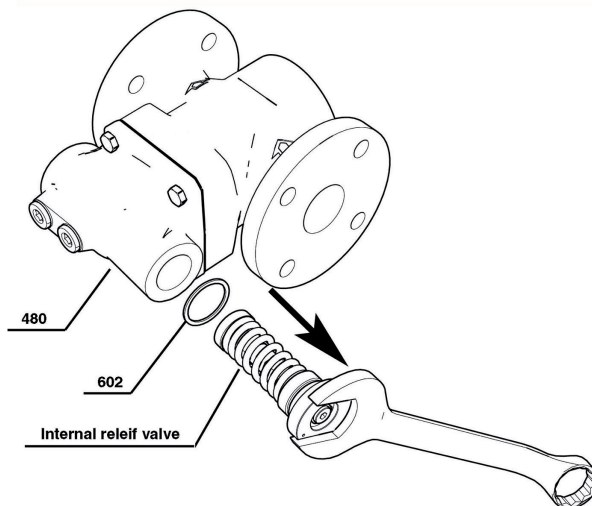
- Pull out the idlers 202 from the pump body 401 by hand force.

# O.



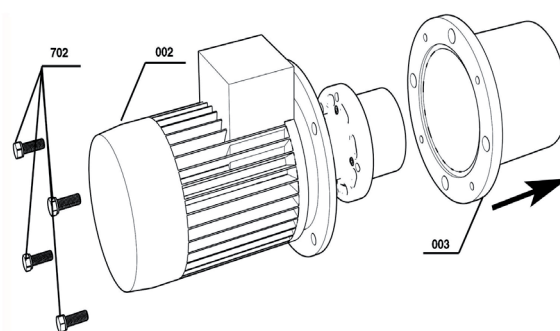
- Unscrew the 4 bolts 453 with a suitable spanner and remove the rear cover 480 with its gasket 556 from the pump body 401

# N.



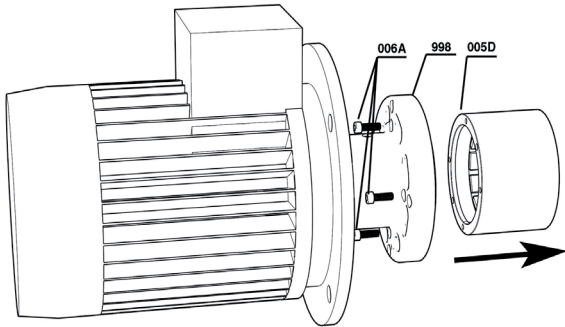
- Unscrew the complete internal relief valve by means of a suitable open spanner and pull it out from the rear cover 480 together with its seal ring 602.

# P.



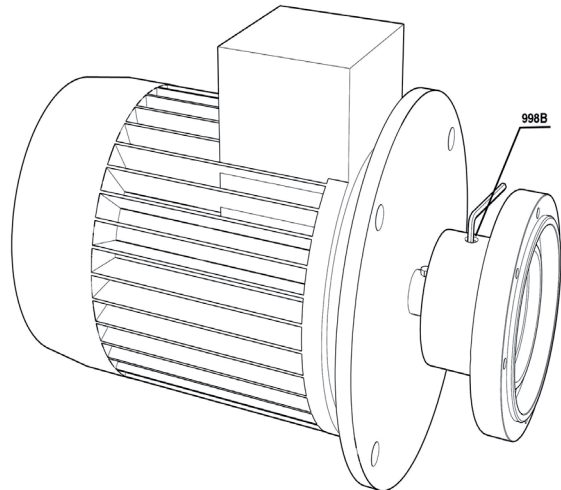
- Unscrew the 4 bolts 702 with a suitable spanner and separate the connecting frame 003 from the electrical motor 002

**Q.**



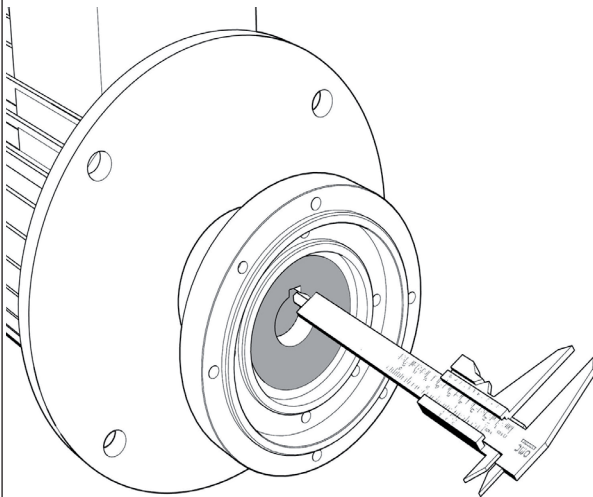
- Unscrew the bolts 006A with a suitable allen key and remove the outer magnet from the coupling 998

**S.**



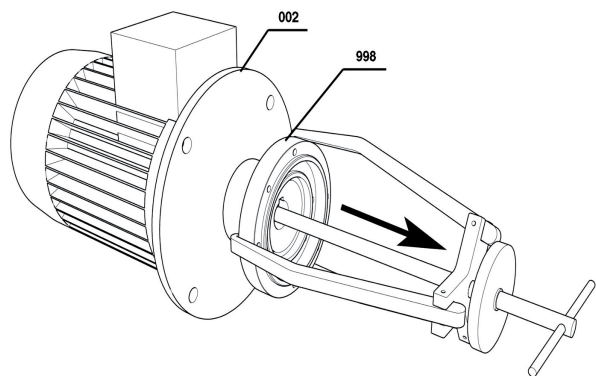
- Unscrew the locking bolt 998B from the coupling 998.

**R.**



- Measure the distance on the shaft coupling and note the value so that it can be used during the assembly later on.

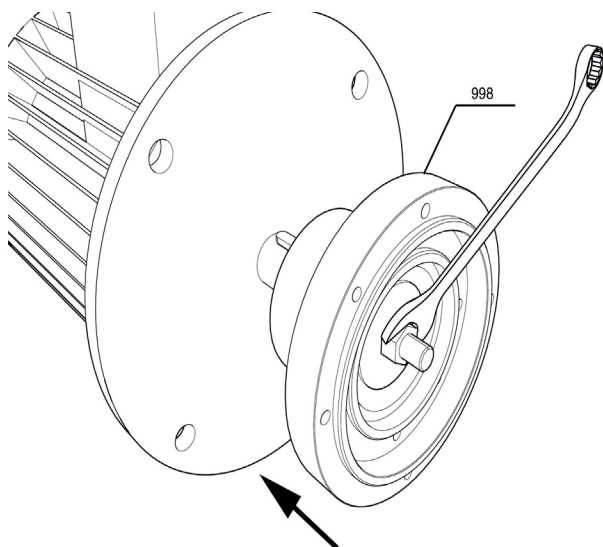
**S.**



- Use a three arm legged puller and remove the coupling 998 from the electrical motor.

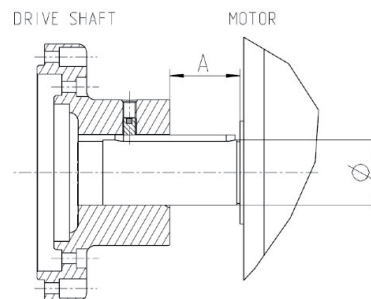
# Reassembly

## A.



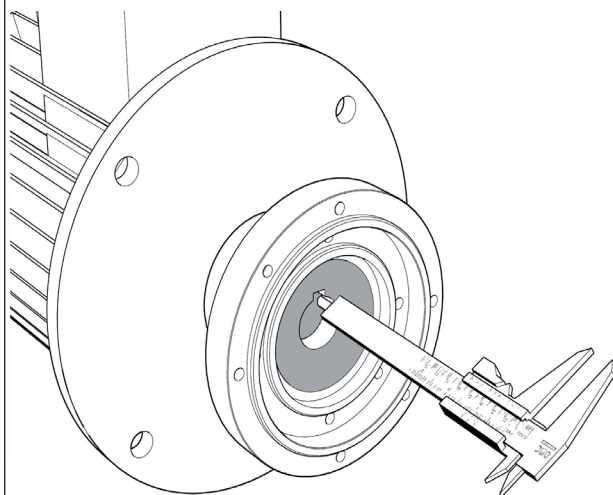
- Mount the coupling half 998 onto the drive shaft of the electrical motor by means of a big washer and a threaded pin and a nut that is tightened in order to press the coupling half onto the shaft.  
NOTE: Do not use a hammer as this can Damage the shaft!

## C.



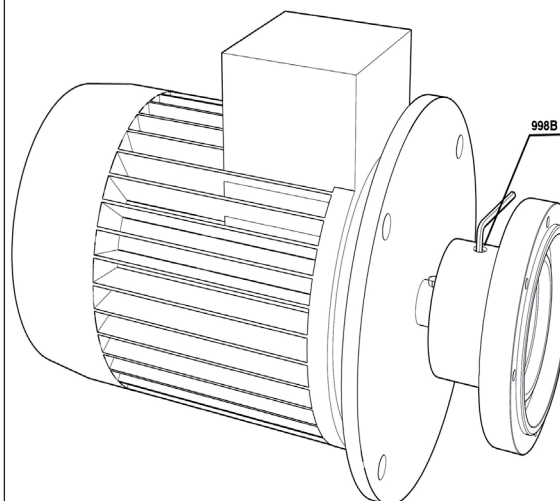
Pump size	Motor		Drive shaft		Magnetic coupling Art.no.				
	IEC-no.	Shaft (mm)	Designation	Art.no.	DST75-10 192856	DST75-20 192857	DST75-30 192858	DST75-40 192859	DST75-60 192860
Mounting distance A $\pm 0.2$ (mm)									
045/052	100	28	DST75-110/26	192815	20	20	20	20	0
	112	28							
	132	38	DST75-110/36	192816	41	41	41	41	21
	160	42	DST75-110/42	192817	73	73	73	73	53
060					DST110-22 192843	DST110-50 192844	DST110-80 192845		
	132	38	DST75-110/36	192816	21	21	21		
	160	42	DST75-110/42	192817	53	53	53		
	180	48	DST75-110/48	192818	53	53	53		
070					DST135-85 192889	DST135-135 192890	DST135-180 192891		
	132	38	DST135/38	192896	0	0	0		
	160	42	DST135/42	192897					
	180	48	DST135/48	192898	46	46	46		
	200	55	DST135/55	192899	0	0	0		
	225	55	DST135/55	192899	29	29	29		
	225	60	DST135/60	192900	75	75	75		

## B.



- Measure the distance in order to get the same as before the coupling was removed.

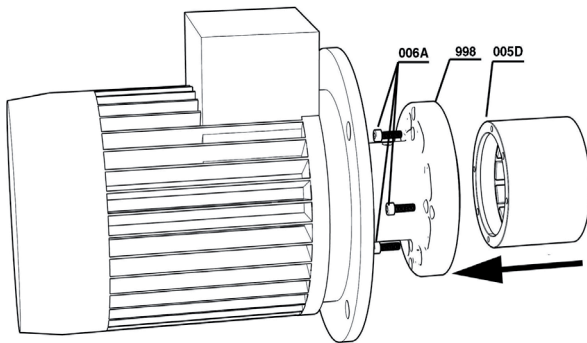
## D.



- Tight the looking bolt 998B with a suitable hexagon key according to the tightening torque table on page 27.
- Lock the bolt with sealant Loctite as per the tightening torque table.

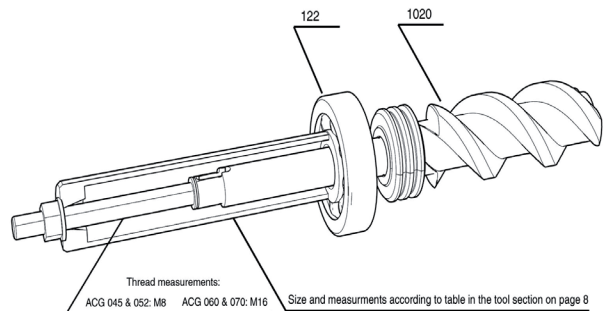


# E.



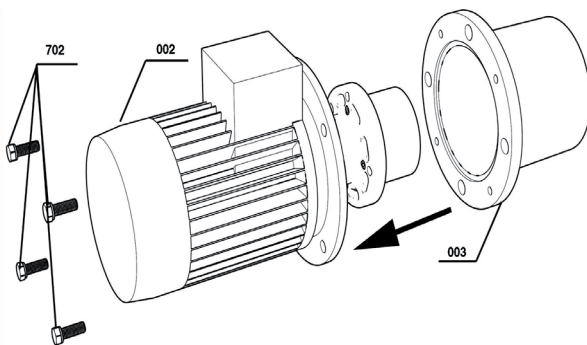
- Attach the outer magnet rotor 005D to the coupling half 998 and tight the screws 006A according to the tightening torque table on page 27.
- Lock the screws 006A with sealant Loctite as per the tightening torque table.

# G.



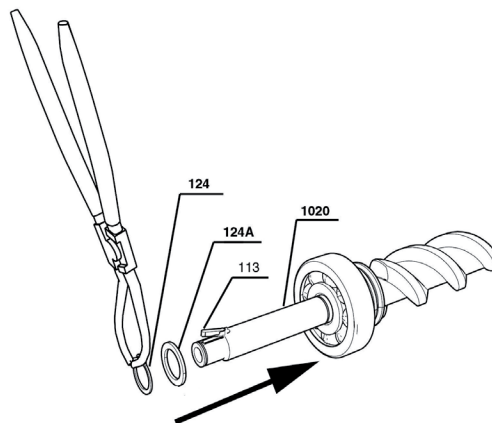
- Mount the ball bearing 122 on the power rotor 1020 with the mounting tool described on page 8, use a threaded pin together with a nut and a washer and press down the ball bearing on the shaft carefully. Note: in order to make the ball bearing to slide on easier it is recommended to grease the shaft surface.

# F.



- Attach the connecting frame 003 to the electrical motor 002 by means of tightening the bolts 702 according to the tightening torque table on page 27.

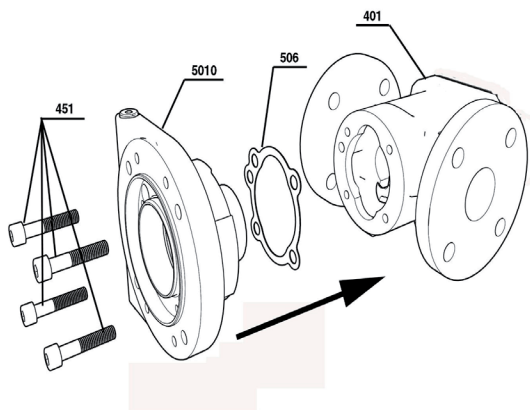
# H.



- Mount the washer 124A and slide on the circlip 124 with a suitable plier on the power rotor 1020.
- Mount the key 113 on the power rotor 1020.

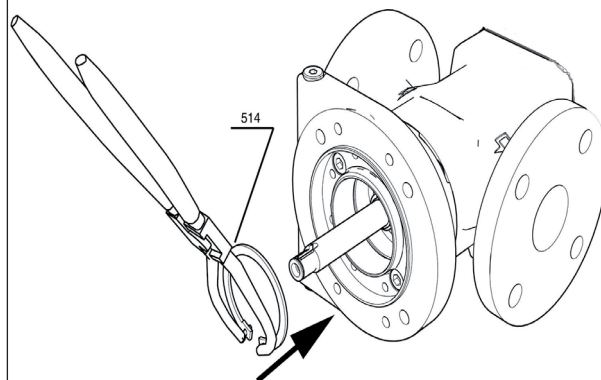


# I.



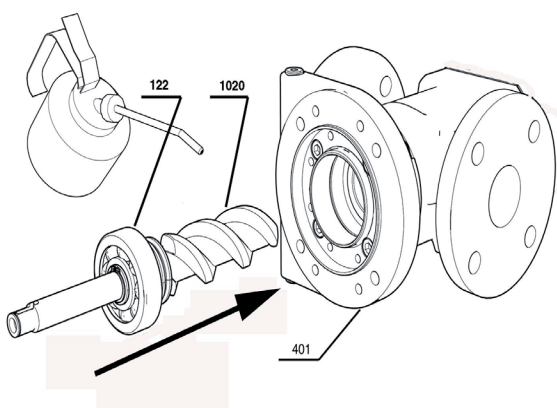
- Mount the front cover 5010 with its gasket 506 onto the pump body 401 with the bolts 451
- The bolts 451 are to be tightened according to the tightening torque table on page 27.

# K.



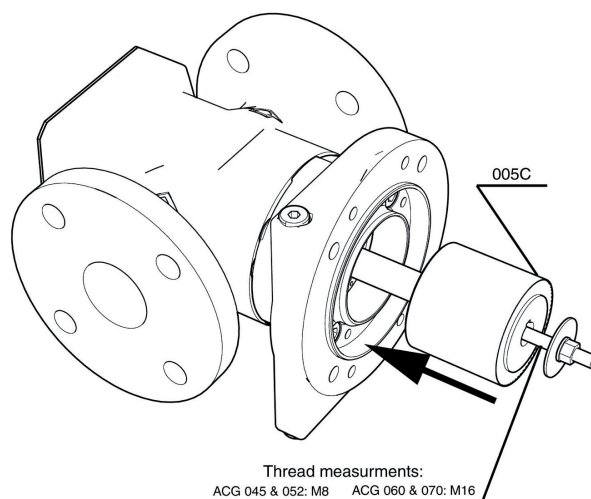
- Attach the Circlip 514 with a suitable plier into the front cover.

# J.



- Carefully slide the power rotor 1020 with its ball bearing 122 into the pump body 401 with hand force. Note: do not forget to lubricate the rotor prior to the mounting.

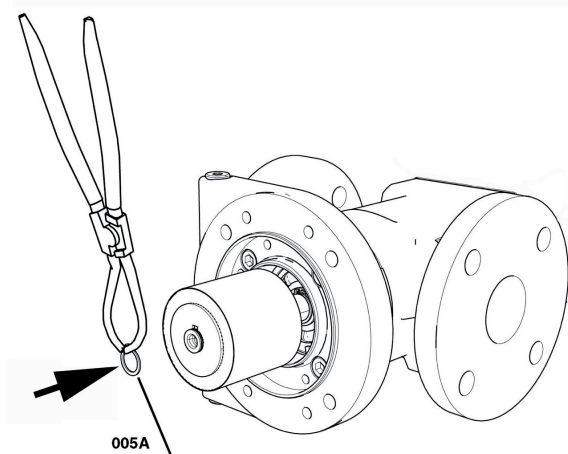
# L.



- Press the inner magnetic rotor onto the rotor shaft by means of a threaded pin and a nut/washer, push it into its final position by means of a suitable socket.

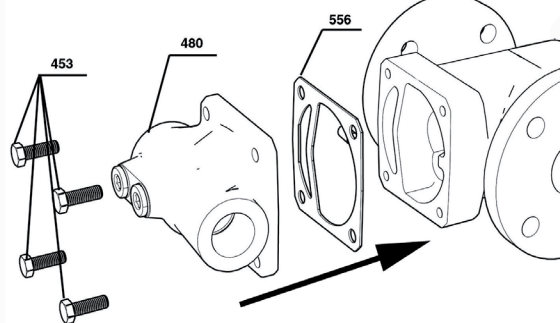
**NOTE: DO NOT USE A HAMMER AS THIS CAN DAMAGE THE PARTS!**

# M.



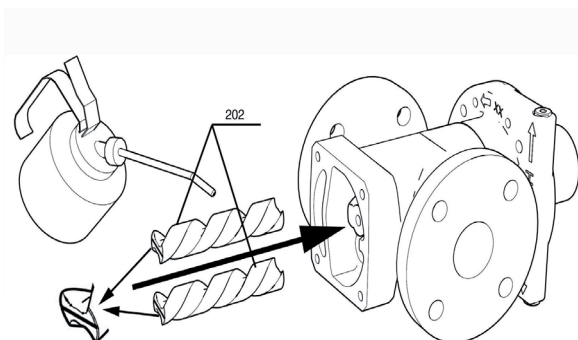
- Mount the circlip 005A with a suitable plier.

# O.



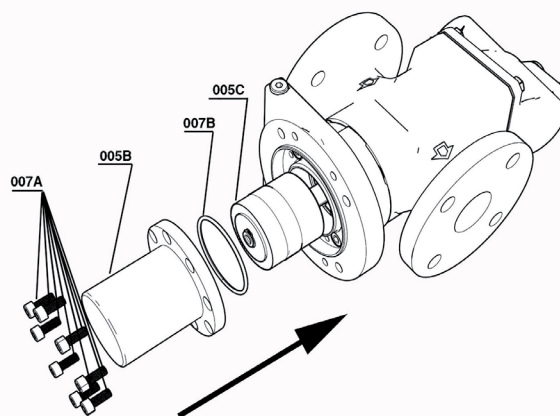
- Mount the rear cover 480 with its gasket 556 onto the pump body and tight the bolts 453 according to the tightening torque table on page 27.

# N.



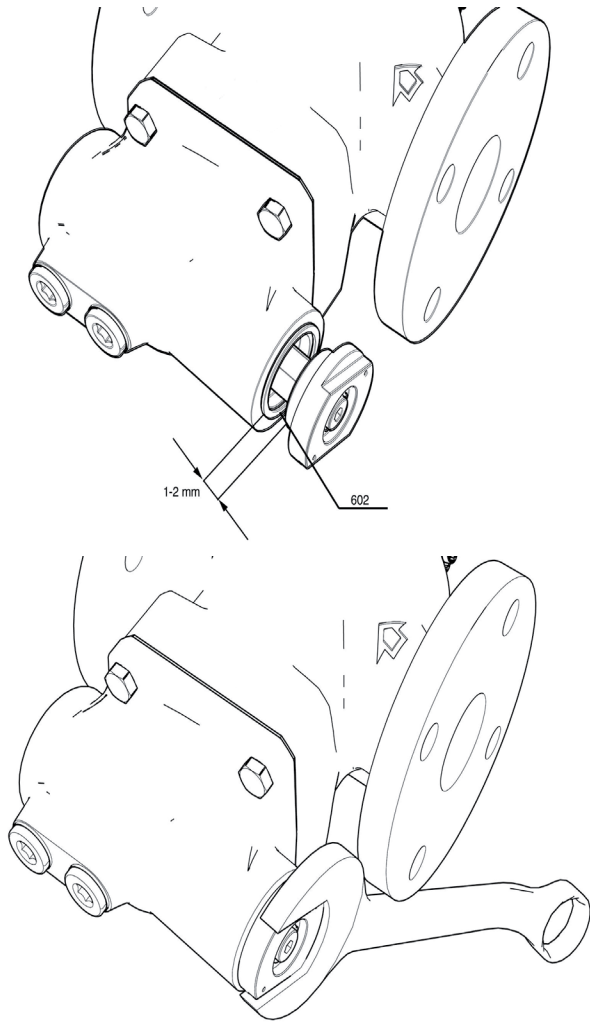
- Carefully slide the lubricated idlers into the pump body
- Make sure that the lubrication slots are pointing backwards

# P.



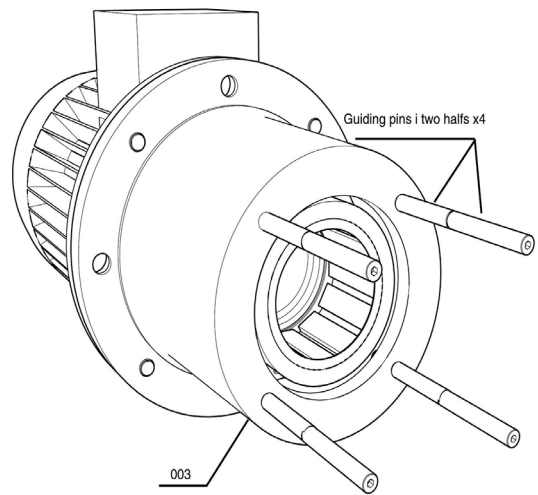
- Mount the sealing can 005B with its o-ring 007B onto the pump and tight the bolts 007A according to the tightening torque table on page 27.

# Q.



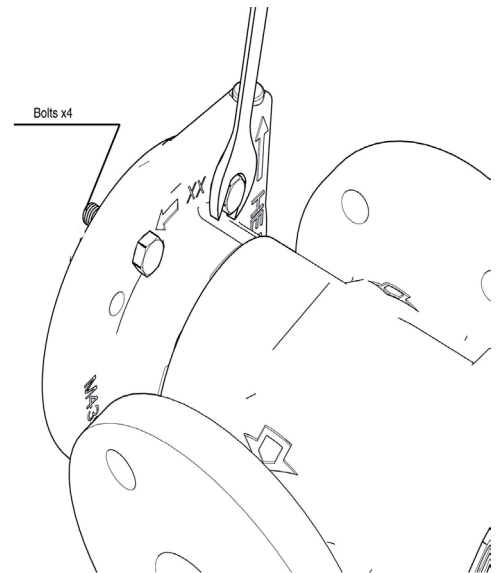
- Mount the pumps internal relief valve into the back cover by means of letting the inner threaded ring be mounted first with a distance to the outer one of 1-2 mm
- Do not forget to include the seal ring 602
- Tight the nut accordingly with a suitable spanner.

# R.



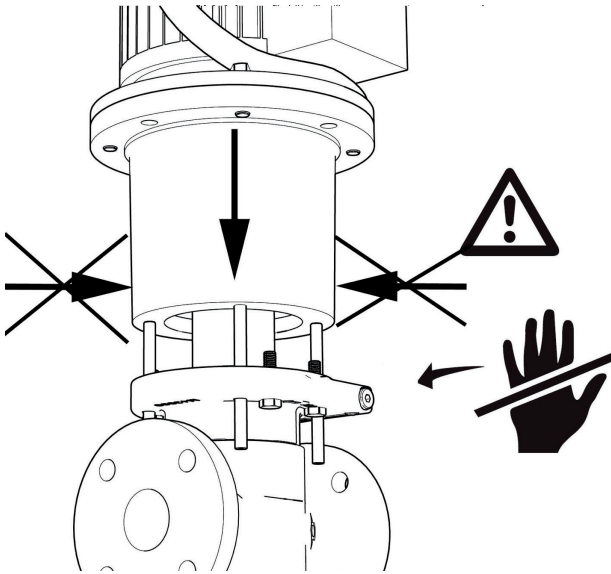
- Mount the guiding pins into the connecting frame 003.

# S.



- Attach 4 bolts in the pumps front cover in order to avoid a to rapid mounting due the magnetic forces that will take place when the pump package is joined.

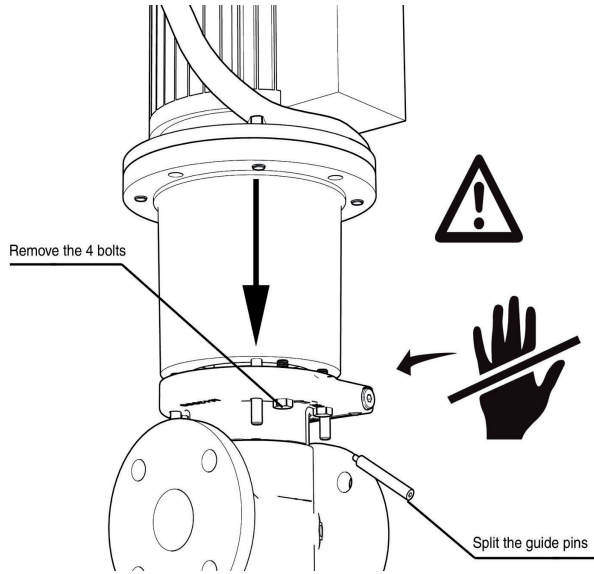
T.



- Slowly lower the electric motor with the connecting frame towards the pump until the stop bolts touches the frame.
- Avoid side forces that could damage the magnets as it is crucial that the package is connected in a straight line

NOTE: The magnetic forces are very high at this point and can easily cause severe injuries DO NOT EVER PUT YOUR FINGERS OR HANDS BETWEEN THE CONNECTING FRAME AND THE PUMP AS AN ACCIDENTAL SLIP DOWNWARDS EASILY CAN CRUSH A HAND OR EVEN CUT A FINGER.

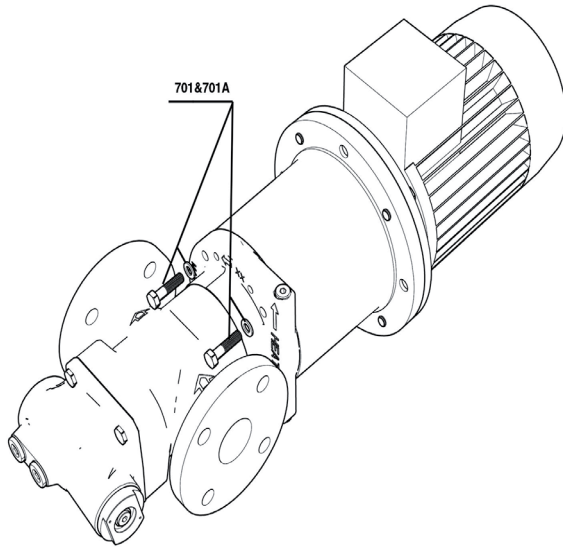
U.



- Unscrew the stopping bolts and allow the pump to completely join with the electrical motor/connecting frame
- Avoid side forces that could damage the magnets as it is crucial that the package is connected in a straight line

NOTE: The magnetic forces are very high at this point and can easily cause severe injuries DO NOT EVER PUT YOUR FINGERS OR HANDS BETWEEN THE CONNECTING FRAME AND THE PUMP AS AN ACCIDENTAL SLIP DOWNWARDS EASILY CAN CRUSH A HAND OR EVEN CUT A FINGER.

V.



- Tight the bolts 701 with its washers 701A with a suitable spanner according to the torque tightening table on this page.

**Tightening torque (Nm)**

Pos.No	Size	045	052	060	070
006A		10	10	10	10
007A		20	20	20	20
451		47	47	81	81
453		47	47	81	81
462		74	74	74	74
502		47	47	47	47
301		13	20	47	47
701		13	20	47	47
702/IEC 100-132		30	30	30	30
702/IEC 160-225		74	74	74	74
703B/IEC 100-132		81	81	81	81
703B/IEC 160-225		197	197	197	197
998B		15	15	15	15

006A and 998B - Fastened with sealant Loctite 222 or similar

Adress:

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Sweden