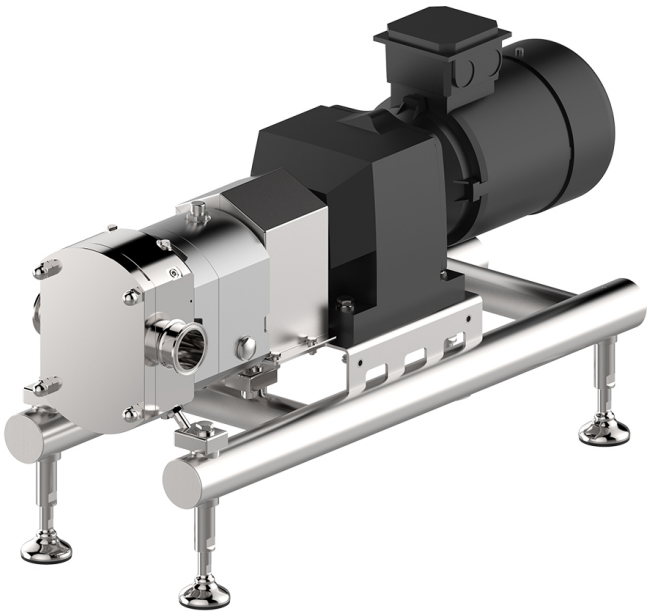
OPERATING INSTRACTIONS

Original instructions



GEA Hilge NOVALOBE 10-50

Hygienic Pumps

GEA Hilge Niederlassung der GEA Tuchenhagen GmbH
BA.280.YYY.001.GB
18.01.2024 / Revision: 6 /Language: English

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LEGAL NOTICE

These instructions are part of the technical documentation, which is part of the scope of delivery. They contain important information to ensure safe and proper transportation, mounting, commissioning, economic operation, maintenance, and repair of the pump. Following these instructions will help you avoid risks, reduce repair costs and downtime and increase the pump's reliability and service life.

These instructions are aimed at users of the pump and are intended in particular for the operator and its operating and maintenance personnel.

It is mandatory for the operator and its operating and maintenance personnel to read these instructions prior to transport, installation, commissioning, use, maintenance, repair, disassembly and disposal of the pump. The obligation to read these instructions applies also to persons responsible for carrying out activities in the phases of the life of the pump.

The operator is required to complement these instructions with information based on existing national regulations for occupational safety, health protection, and environmental protection.

In addition to these instructions and the mandatory regulations for accident prevention applicable in the country and place of use, the recognised technical rules for safe and proper work must be observed.

These instructions are part of the pump. The entire documentation consists of these instructions and any additional instructions provided. It must always be kept within reach at the pump’s location of use. When moving the pump to a different site and upon selling the pump, the entire documentation must be passed on as well.

These instructions were written to the best of our conscience. However, the manufacturer is not liable for any errors that may be contained in this document or for any resulting consequences.

The manufacturer reserves the right to make technical changes by further development of the pump described in these instructions.

Illustrations and drawings in these instructions are simplified representations. Due to enhancements and changes, it is possible that the illustrations do not exactly match the pump used by you. The technical data and dimensions are not binding. Claims cannot be derived from them.

The manufacturer assumes no liability for damages

- arising within the warranty period due to

- unintended operation and usage conditions,
- insufficient maintenance,
- improper operation,
- incorrect installation,
- incorrect or improper connection of electrical components.

- resulting or arising from unauthorised modifications or failure to follow the instructions,
- caused by use of accessories / spare parts that have not been supplied or recommended by the manufacturer.

SYMBOLS USED

Danger

Stands for an immediate danger which leads to heavy physical injuries or to the death.

Warning!

Stands for a possibly dangerous situation which leads to heavy physical injuries or to the death.

Caution!

Stands for a possibly dangerous situation which could lead to light physical injuries or to damages to property.

Hint!

Stands for an important tip whose attention is important for the designated use and function of the device.

Bullet points and numbered list characters

Bullet points are used to separate logical contents within a section:

- Bullet point 1

  Types of bullet point 1.

- Bullet point 2

  Types of bullet point 2.

Numbered list characters are used to separate enumerations within a descriptive text:

Descriptive text with consecutive numbering:

– Numbered list point 1

– Numbered list point 2

Handling instructions

Handling instructions require you to do something. Several consecutive steps result in a handling sequence that should be run in the specified order. The handling sequence can be divided into separate steps.

Handling sequence

1. Handling sequence step 1
   - step 1,
   - step 2,
   - step 3.
2. Handling sequence step 2

The subsequent handling sequence is the expected result:

→ Result of the handling sequence.

Individual handling steps

Individual handling steps are marked thus:

– Individual work steps

TABLE OF CONTENTS

1 General

1.1 Information about this document

Target group

These operating instructions are intended for:

- the operator/user of the pump,
- the maintenance and service personnel.

The instructions assume a general common technical understanding, which is necessary for the commissioning, maintenance and servicing of pump units.

Sections that are aimed only at special authorised personnel are indicated by a preceding note.

Text highlights

The following symbols and text formatting facilitate the reading of this document:

- Bullets and lists points
- Instructions.

Instructions that must be executed in a certain order are numbered according to the sequence.

For the marking of safety instructions, please refer to Section 2.3, Page 16.

Technical changes

Types, technical data and spare part numbers are subject to technical change.

We reserve the right to implement changes due to technical progress.

1.2 Manufacturer address

GEA Hilge
Niederlassung der GEA Tuchenhagen GmbH
Hilgestraße 37-47
55294 Bodenheim
Germany

Phone +49 6135 7016-0
Fax +49 6135 1737
hilge@gea.com
gea.com

1.3 Customer service

Phone +49 6135 7016 100 (Sales support)
Phone +49 6135 7016101 (Service)
spareparts.hilge@gea.com

1.4 EU Declaration of Conformity for Machines
in accordance with the EC Machinery Directive 2006/42/EC, Annex II 1. A

Manufacturer:	**GEA HILGE** **Niederlassung der GEA Tuchenhagen GmbH** **Hilgestrasse 37-47** **D 55294 Bodenheim Germany**

We declare under our sole responsibility that the machine

Designation:	Rotary piston pump
Model:	GEA Hilge NOVALOBE
Size:	10, 20, 30, 40, 50, 60

conforms with all the relevant provisions of this directive and the following directives:

Relevant EC directives:	2006/42/EC	EC Machinery Directive
Applicable harmonized standards, in particular:	EN 809:1998/A1+AC(D) EN ISO 12100:2010	
Remarks:	We also declare that the relevant technical documentation for this machine has been prepared in accordance with Annex VII, Part A, and agree to submit the documentation on justified request of national authorities on a data carrier.	

Person authorised for compilation and handover of technical documentation:

GEA HILGE
Niederlassung der GEA Tuchenhagen GmbH
Hilgestrasse 37-47
55294 Bodenheim Germany

Bodenheim, 12.12.2022

Karsten Becker
Managing Director

pp. Dr. Danijel Anciger
Head of product development

1.5 UKCA - Declaration of Conformity

We,

GEA HILGE
Niederlassung der GEA Tuchenhagen GmbH
Hilgestrasse 37-47
D 55294 Bodenheim Germany

hereby declare that the machine

Designation:	Centrifugal pump
Model:	GEA Hilge NOVALOBE
Size:	10, 20, 30, 40, 50, 60

complies with the following UK directives, provided that the conditions for commissioning are fulfille as specified in the technical documentation, in particular in the operating manual:

	Supply of Machinery (Safety) Regulations 2008, 2008 No. 1597
Applicable harmonized standards:	EN 809:1998+A1:2009+AC(D)
	EN ISO 12100:2010

Person authorised for compilation and handover of technical documentation:

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GEA Mechanical Equipment UK Ltd
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Old Wolverton Road, Old Wolverton, Milton Keynes
MK12 5PY, United Kingdom

Bodenheim, 12.12.2022

Karsten Becker
Managing Director

pp. Dr. Danijel Anciger
Manager Product Development

2 Safety

2.1 Intended use

⚠ Warning!

Non-intended use!

► Pump only media that are specified in the order. The pump has been specially designed for them.
► Operate the pump only on the electrical grid that was specified in the purchase order.

2.1.1 Pumped fluids

Use only clean or lightly polluted liquids as pumped fluids as long as they do not chemically or mechanically attack the pump materials or reduce their strength. If you want to pump liquids with higher viscosity than that of water, check for possible overload of the motor.

2.1.1.1 Abrasive media

Do not pump media with hard or abrasive components.

⚠ Caution!

Danger due to hard or abrasive parts in the pumping medium.

Damage to property.

► Ensure that no hard or abrasive components get into the pump

2.1.1.2 Maximum particle size in the pumping medium

Maximum particle size in the pumped medium (for example, pieces of fruit, meat or something similar)	
NOVALOBE	Particle size [mm] (soft, not abrasive)
10/ 0.06	12
20/ 0.12	16
30/ 0.33	23
40/ 0.65	29
50/ 1.29	35

2.1.2 Connections and piping

The pipe nominal diameters of the system should be equal to or greater than the pump nominal diameters DNE (suction side) or DNA (pressure side), and the fittings to the pump should match exactly the type standard of the fixed mating connection part on the pump. The suction line must be hermetically sealed and routed such that no air pockets can form. Avoid tight bends and valves directly in front of the pump. On the suction side, a straight settling section with a minimum length of 5 times the pipe diameter should be provided.

2.1.3 Switching frequency

Do not exceed a switching frequency of 15 switching operations per hour.

2.1.4 Types

All information and descriptions in these operating instructions on the use and handling of the pumps refer exclusively to the standard versions. Special designs and customised deviations as well as random external influences in the use and operation are not included in this provision.

2.2 Safety precautions in these operating instructions

Read the safety precautions!

These operating instructions contain basic precautions that must be observed during installation, operation and maintenance. They must therefore be read by the installer and relevant personnel or operator prior to installation and commissioning. The operating instructions must always be available at machine/ system site.

In addition to the general safety precautions listed in this chapter on safety, be sure to read also the other, special safety precautions included.

2.3 Explanation of the safety symbols used

⚠ Danger

Stands for an immediate danger which leads to heavy physical injuries or to the death.

► Description to avert the danger

⚠ Warning!

Stands for a possibly dangerous situation which leads to heavy physical injuries or to the death.

► Description to avert the dangerous situation.

⚠ Caution!

Stands for a possibly dangerous situation which could lead to light physical injuries or to damages to property.

► Description to avert the dangerous situation.

Notice

Stands for an important tip whose attention is important for the designated use and function of the product.

► Description of the necessary action for proper operation of the product.

2.4 Safety instructions for the company/operator

Follow the safety instructions contained in this operating manual, the relevant national accident prevention regulations as well as any internal working, operating, and safety provisions of the operating company.

⚠ Warning!

Hot or cold machine parts

Risk of burns.

► Secure hot or cold machine parts against contact!

⚠ Warning!

Rotating machine parts

Hazard of entrapment or entanglement.

► Do not remove contact protection for rotating machine parts (e.g. coupling)!

► Replace defective safety devices promptly!

⚠ Warning!

Hazardous materials

Contact with dangerous substances, e.g. by inhalation.

► Discharge the leakage of dangerous goods such that no danger to persons and the environment arises!
► Comply with legal provisions!
► Switch off the pump in the event of failure of the mechanical seal. Replace the mechanical seal before next use!

⚠ Warning!

Tripping and falling hazard

Danger due to electrical cables.

► Route the electrical supply line such that there is no risk of tripping (only for pumps on a chassis).

⚠ Danger

Live parts

Electric shock by touching live parts

► Use only technically flawless plugs and cables.

2.4.1 Dangers of non-compliance with safety information

Ignoring the safety instructions can result in bodily harm to persons as well as environmental harm and machine damage.

Failure to follow the safety instructions will result in the loss of any claims for damages.

Failure to follow the instructions may entail the following hazards, for example:

- Failure of important functions of the machine/system.
- Failure of prescribed methods for repair and maintenance
- Exposure of persons to electrical, mechanical, and chemical hazards.
- Environmental risks caused by leakage of hazardous substances.

2.4.2 Safety-conscious work behaviour

Follow the safety instructions contained in this operating manual, the relevant national accident prevention regulations as well as any internal working, operating, and safety provisions of the operating company.

2.5 Unauthorised modification and ordering of spare parts

Modification or alteration of the machine is only permitted with the written permission of the manufacturer.

Exclusive use of original spare parts and accessories authorised by the manufacturer ensures safety. The manufacturer will bear no liability for consequences arising from the use of unauthorised parts.

2.6 Staff qualifications and training

The staff for working on and with the pump must have the appropriate qualifications. Responsibilities, competencies and supervision of staff must be clearly defined by the operating company. If personnel do not have the necessary knowledge, they are to be trained and instructed. If necessary, this can be done by the product manufacturer/vendor on behalf of the operating company. The operating company must also ensure that the contents of the operating instructions are fully understood by the staff.

2.7 Safety equipment

Do not remove instructions from the pump.

Signs attached directly on the machine, such as an arrow to indicate the direction of rotation, must absolutely be observed and kept in fully legible condition. Damaged or illegible signs must be replaced.

3 Description

3.1 Pump overview

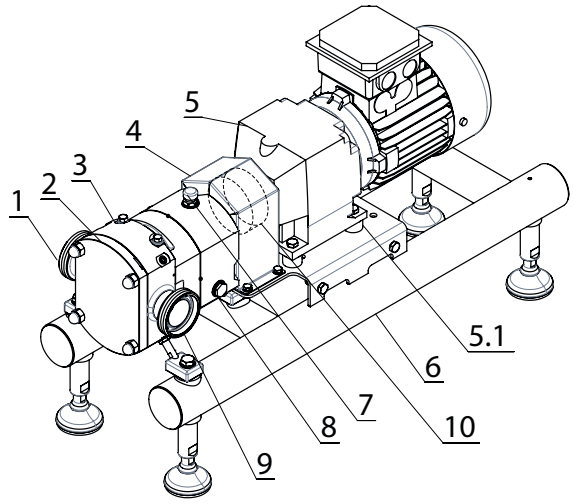

Fig.1: Schematic representation NOVALOBE, horizontal nozzle position

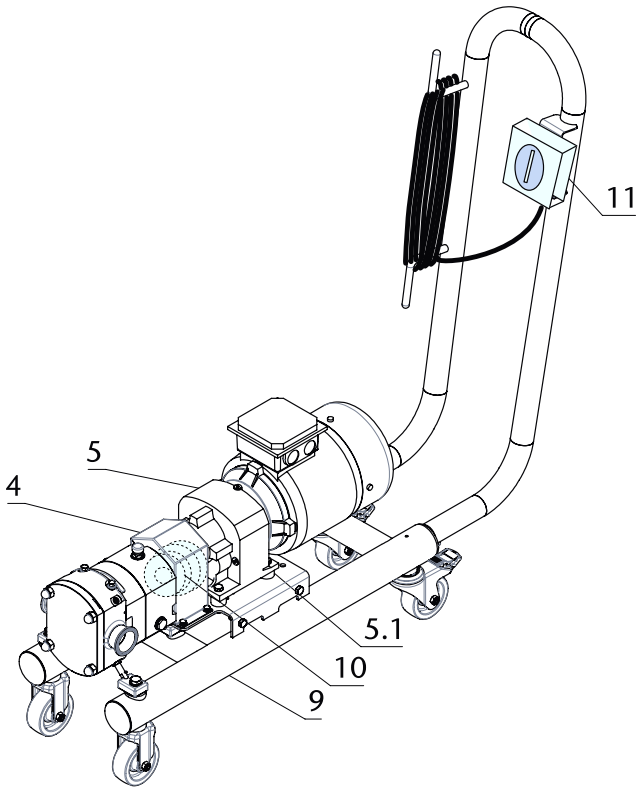

Fig.2: Schematic representation of NOVALOBE on trolley

Pump overview of NOVALOBE 10-50			
Item	**Description**	**Item**	**Description**
1	Suction/discharge port	6	Suction/discharge port
2	Flush port	7	Oil gauge glass
3	Gear	8	Oil inlet/outlet vent valve
4	Coupling guard	9	Base / trolley
5	Gear motor	10	Coupling
5.1	Subframe gear motor, depending on gear motor	11	Control unit

3.2 Description

Pumps of the NOVALOBE series are rotary piston positive displacement pumps. They have been specially developed for high-viscosity liquids as well as for the requirements of sterile process technology.

All parts in contact with the medium are designed according to the “Hygienic Design” guidelines and can drain automatically in vertical set-up without any other measures.

3.2.1 Standard version applications

NOVAlobe pumps are robust rotary piston pumps for pumping highly viscous liquids. In addition to the special hygiene requirements in sterile processes, the development focused on careful pumping of the medium. The NOVAlobe pump range offers reliable, efficient and hygienic operation in a wide range of demanding conditions. The pumps can be operated in both directions of rotation and are suitable, for example, for the following applications:

Food and beverage industry

- Dairies (fruit yoghurt, butter, soft cheese, etc.)
- Food production (sauces, dressing, baby food etc.)
- Soft drinks (syrup, juices etc.)
- Sweets (caramel, chocolate, etc.)
- Meat production (meat, animal fat, etc.)
- Brewery (yeast)

Pharmaceutical industry, biotechnology and cosmetics

- Vaccines
- Fermentation broth
- Blood plasma
- Shampoo, Lotions etc.

Other industrial applications

- Paper industry
- Textile industry
- Chemistry (oils, fats, etc.)

3.2.2 Hygienic design application areas

Due to the consistent hygienic design and the use of pore and porosity-free materials, the pump is ideally suited for use in food and beverage industry as well as in the pharmaceutical, biotechnology and cosmetic industry. For these application areas, automatic draining capability, for example by vertical position of the nozzles, and suitable pump connections is required, for example according to *EHEDG Position Paper: Easy cleanable Pipe couplings and Process connections*.

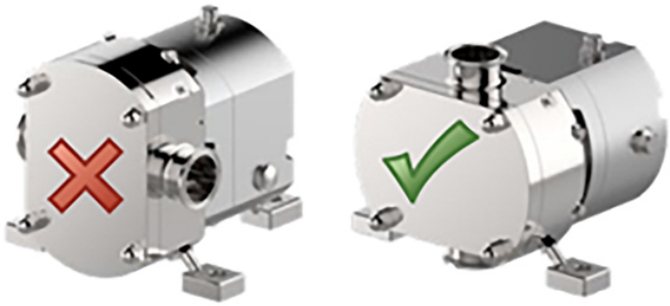

Fig.3: Set-up variants
left: horizontal set-up, no automatic draining | right: vertical set-up, automatic draining

3.3 Pump name

GEA Hilge pump name							
GEA Hilge NOVALOBE	**10**	**0.06**	**65-65**	**BW**	**2.2**	**4**	**312**
Pump name	Size	Displacement per revolution [l]	Nominal width	Rotor form BW: Bi-wing ML: Multi-lobe	Motor performance [kW]	Number of poles	Output speed Operating point

3.4 Nameplate

The nameplate contains the following information:

- Manufacturer name and address
- Product safety mark
- Pump type: pump denomination
- Ser.no: serial number
- Q: flow rate
- H: pressure
- P: Motor rating
- n: speed
- YOM: year of manufacture
- TAG No.:customer name

4 Transport and Storage

4.1 Special personnel qualification for transport and storage

Transports may only be carried out by qualified staff, who must observe the safety instructions.

4.2 Safety precautions for transport and storage

⚠ Warning!

Danger from packaging material with sharp edges!

► Wear gloves when removing the transport belts.

⚠ Warning!

Danger from tilting / toppling over of the pump!

► Before removing the transport protection observe the pump's centre of gravity.
► Secure the pump against unintentional tilting / falling over.

⚠ Warning!

Danger from unintentional rolling away!

► When transporting the pump with a pallet truck of a different industrial truck, secure the transported goods against unintentional rolling away.
► Secure the pump sufficiently against tipping over and falling down during transport.

⚠ Danger

Falling loads

Danger from falling loads.

► To transport the pump, use suitable load lifting equipment in proper condition with sufficient carrying capacity.
► Make sure that there are no persons present under suspended loads.
► Make sure that the pump is horizontally aligned when lifting.

⚠ Danger

Wrong attachment points!

► Attach the rope to suitable anchor points.
► Never fasten a rope to the pump housing or the suction/discharge port!
► For version with casing: Remove the stainless steel casing before transport.

⚠ Warning!

Danger due to the rotor of the rotary piston pump.

Squeezing or shearing.

► Never put fingers in the connections. The blades of the rotary piston pump can also rotate without a drive.

Storage of the pump

⚠ Caution!

Frost

Risk due to external conditions.

► In case of frost risk, drain the pump completely.

If the pump is not used immediately, proper storage conditions are as important for later operation as careful installation and proper maintenance.

Protect the pump from cold, moisture and dust, as well as against mechanical influences.

Qualified personnel is required for proper installation and maintenance.

4.3 Dimensions / weights

The weights may differ from the ones shown here depending on the version and accessories. Please contact the manufacturer for accurate information and quote the pump / order number.

These net weights are based on pumps:

- without gear motor
- without coupling
- without base frame
- with DIN 11851 threaded connection

NOVALOBE 10-50	
Size	**Weight [kg]**
NOVAlobe 10	10.9
NOVAlobe 20	21.9
NOVAlobe 30	48.7
NOVAlobe 40	93
NOVAlobe 50	157

4.4 Unpacking the pump

All of our pumps leave our warehouse properly packaged to avoid damage in transit.

Should you nevertheless find any damage after cautious unpacking and exact inspection of the shipment, immediately notify the carrier (railway, post, freight forwarder, shipping company). Make claims for damages. The transport risk passes to the customer once the shipment has left our warehouse.

4.5 Storage of the pump

Follow the following instructions for the storage of the pump:

- The maximum storage period is two years.
- In case of frost risk, drain the pump completely. Protect the pump from low temperatures.

- If the pump is not used immediately, proper storage conditions are as important for later operation as careful installation and proper maintenance.
- During storage, the pump should be turned by hand at least once a month. Parts such as shaft and bearings should change their position.
- After a longer storage period (more than 6 months), all elastomers (O-rings, shaft seals) must be checked for their elasticity. Brittle elastomers must be replaced.
- Protect the pump from cold, moisture and dust, as well as from mechanical influences.
- Qualified personnel is required for proper installation and maintenance.

4.6 Disposal of packaging material

The generation of waste should be avoided or minimized wherever possible. Surpluses and packaging materials not suitable for recycling should be disposed of through an approved waste disposal company. Packaging materials not suitable for recycling must always be disposed of in accordance with the requirements of environmental protection and waste disposal legislation as well as the requirements of the local authorities.

Packaging materials suitable for recycling should be reused or reprocessed.

5 Technical data

The operating safety of the delivered machine is only guaranteed if the machine is used as intended according to the sections of the operating instructions and the purchase order.

⚠ Warning!

Overload of the pump!

► Do not operate the pump above the maximum permissible operating data.
► Avoid even short-term pressure overloads (e.g. by pressure surges).

5.1 Serial number

The pump can be uniquely identified by the serial number. When ordering spare parts, always quote the serial number. The serial number is indicated on the nameplate.

5.2 Performance data

The pump was checked with water.

5.3 Noise emissions

The noise emissions caused by the pump are significantly influenced by their application. They are very dependent on the speed and/or the pumping medium. Therefore, no noise emissions can be specified. The loudest noise is caused by the fan on the gear motor. After a sound pressure level of 80 dB [A], suitable protective measures must be taken.

5.4 Maximum operating temperatures

⚠ Warning!

Danger by exceeding the maximum temperatures!

Bursting, spurting out of liquids due to overheating.

► Never exceed the specified operating temperatures.
► Operate the pump according to the ordering information. Read the maximum operating temperature in the order papers.

5.5 Maximum pressures

⚠ Warning!

Pressure overload of the pump!

► Operate the pump according to the ordering data.
► Never exceed the specified maximum operating pressure and differential pressure.

The pump’s maximum operating pressure pump depends on various factors:

- Pump type
- Type of connections

- Type of mechanical seal.
- Application (speed, viscosity, etc.)

Size	max. operating pressure
NOVALOBE 10-50	16 bar

Size	max. differential pressure
NOVALOBE 10-50	16 bar

5.6 Pressures and temperatures for heatable components

The table shows the permissible pressures and temperatures for NOVALOBE heatable components.

The unit fro the pressure *barg* is equal to the absolute pressure minus the atmospheric pressure.

Component	Parameter	NL 10	NL 20	NL 30	NL 40	NL 50
Back plate	Max. temp. [°C]	120	120	120	120	120
	Min. temp.[°C]	-20	-20	-20	-20	-20
	Max. pressure [barg]	4	4	4	4	4
Pump housing	Max. temp. [°C]	120	120	120	120	120
	Min. temp.[°C]	-20	-20	-20	-20	-20
	Max. pressure[]	4	4	4	4	4

5.7 Rotation speed for O-ring seals

The rotation speed of the O-ring seals is limited to ensure trouble-free operation. Please note the specified values.

Hint!

The maximum permissible speed depends on the nature of the pumped medium. The pump was designed by the manufacturer for a specific pumping task. The maximum speed can be obtained from the pump data sheet (order papers). Please contact the manufacturer if you have any questions.

Rotation speed [rpm]/O-ring seals						
Pump size	Single			Double		
	optimal	good	poor	optimal	good	poor
NOVAlobe 10	0 - 155	156 - 178	179 - 216	0 - 139	140 - 160	161 - 195
NOVAlobe 20	0 - 122	123 - 140	141 - 170	0 - 110	111 - 126	127 - 163
NOVAlobe 30	0 - 92	93 - 105	106 - 128	0 - 82	83 - 95	96 - 115
NOVAlobe 40	0 - 69	70 - 80	81 - 97	0 - 62	63 - 72	73 - 87
NOVAlobe 50	0 - 58	59 - 67	68 - 81	0 - 52	53 - 60	61 - 73

5.8 Gap dimensions

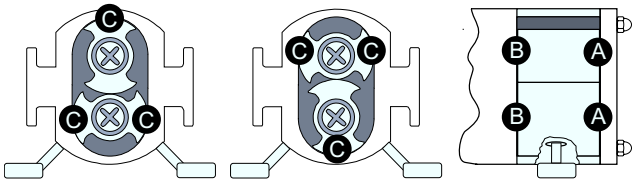

Fig.4: Measuring points of the gap dimensions for single and multi-leaf designs

Gap dimensions of NOVALOBE [mm]			
	Measuring points		
	Rotor/back plate	Rotor/pump housing inside	Rotor/pump casing outside
Pump size	A	B	C
10 / 0.06	0.10 - 0.12	0.07- 0.12	0.10- 0.20
20 / 0.12	0.15- 0.20	0.15- 0.20	0.15- 0.20
30 / 0.33	0.20- 0.25	0.22- 0.25	0.22- 0.28
40 / 0.65	0.25- 0.30	0.28- 0.33	0.28- 0.34
50 / 1.29	0.30- 0.33	0.35- 0.38	0.34- 0.40

If a particle filter is used on the suction side, the mesh width of the filter must not exceed 0.5 times the smallest gap dimension value of the respective pump size.

5.9 Position of oil sight glass, locking screws and bleed valve

The position of oil sight glass and locking screws depends on the fill quantity and the set up variant. The following figure shows the available screw-in position depending on the nozzle position.

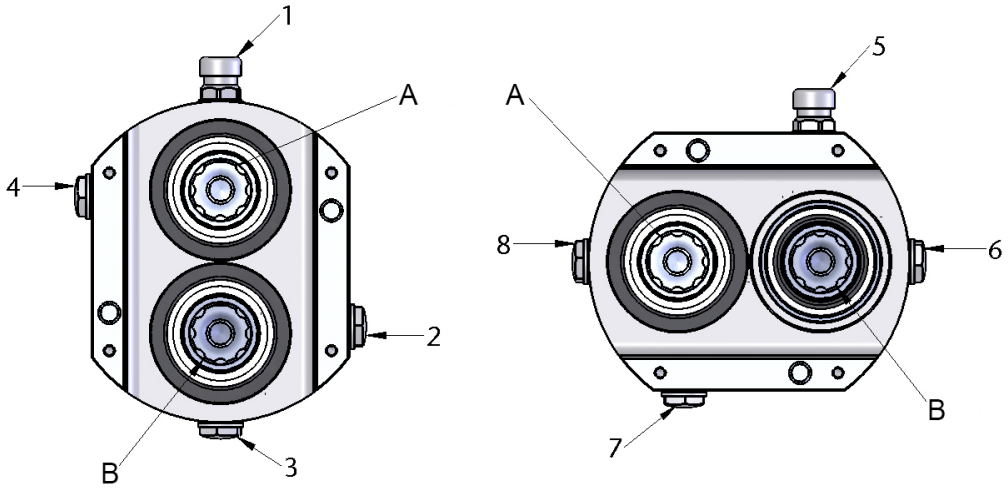

Fig.5: Possible positions of oil sight glass, locking screws and bleed valve
Left: horizontal nozzle position | right: vertical nozzle position
A: drive shaft
B: intermediate shaft

		Oil sight glass		Locking screw		Bleed valve
		low speed	high speed	low speed	high speed	
Nozzle	horizontal	Item 4	Item 2	Item 2 and 3	Item 3 and 4	Item 1
	vertical	Item 8	Item 8	Item 6 and 7	Item 6 and 7	Item 5

	Nozzle position		
	horizontal		vertical
	low speed [rpm]	high speed [rpm]	speed [rpm]
NOVAlobe 10	10 - 650	651 - 800	10 - 800
NOVAlobe 20	10 - 500	501 - 800	10 - 800
NOVAlobe 30	10 - 370	371 - 750	10 - 750
NOVAlobe 40	10 - 280	281 - 700	10 - 700
NOVAlobe 50	10 - 230	231 - 650	10 - 650

6 Assembly and installation

6.1 Safety precautions for setup, installation, and connection

⚠ Warning!

Mechanical overload!

► Do not use the pump and its connection port as support for the pipeline. (EN 809 5.2.1.2.3 and EN ISO 14847).
► Follow the general rules of mechanical engineering and plant construction and the regulations of the manufacturers of connecting elements (e.g. flanges). These regulations may include information on tightening torques, max. permissible angular misalignment, tools/equipment to use.
► Be sure to avoid any strain on the pump.
► After piping, check the alignment of the coupling (where applicable).

⚠ Caution!

Overload by foreign objects!

► Before installing the pump in the system, remove all plastic films and caps from the connectors.

⚠ Caution!

Dry running of the mechanical seal!

► The suction line must be hermetically sealed and laid such that no air pockets can form.
► Avoid tight bends and valves directly in front of the pump. They impair the incoming flow of the pump and the NPSH of the system.
► The pump is suited for gravity feed mode.
► The piping nominal diameters of the system should be equal to or greater than the DNE or DNA connections of the pump.
► Install the feed line with a slight slope to the pump.
► Install a shut-off valve in the inlet and outlet pipes near the pump
► Open the shut-off valve completely during operation.
► Do not use the shut-off valve for controlling.

⚠ Warning!

Overheating!

► Ensure adequate ventilation.
► Avoid sucking in the heated exhaust air also of adjacent units.
► Maintain minimum distances.

⚠ Caution!

Vibration!

► Ensure stable construction for mounting of the pump and piping. Insufficiently stiffened substructures may cause an overall structure capable of oscillating, which is excited to oscillate by hydraulic and/or motor forces during changing operating conditions in the system.

⚠ Caution!

Dry running of the mechanical seal!

► Connect the flushing lines such that supply for flushing is always ensured.
► The pressure in the flushing system (flushed single mechanical seal): Flushing pressure of 0.5 bar must not be exceeded.
► For sealing system (flushed double mechanical seal): Set pressure to 1.5 - 2 bar above discharge pressure, maximum permissible is 5 bar above discharge pressure.

⚠ Danger

Electric shock by touching live parts!

► Have the electrical connections be made by a licensed electrician.
► Follow the VDE as well as local regulations, in particular the safety regulations.
► Before connecting, switch off the power supply and secure it against unintentional reconnection

⚠ Danger

For motors with frequency inverter (tronic): Electric shock by touching live parts!

► Even if the power supply is switched off, touching electrical parts may cause an electric shock.
► Disconnect the power supply and wait at least four minutes before touching electrical components.

⚠ Warning!

Electric overload!

► Compare the voltage indicated on the motor plate with the operating voltage. The power supply properties must match the specifications on the nameplate.
► Install a motor protection switch.

⚠ Caution!

Voltage spikes in frequency converter operation!

► Use a motor suitable for frequency converter operation.
► Use a dU/dt filter to avoid voltage spikes or a motor with reinforced windings.

⚠ Caution!

Dry running of the mechanical seal when checking the direction of rotation.

► Fill and vent the pump before checking the direction of rotation.
► When using a flushing system ensure that the GLRD is flushed.
► Ensure that no objects in the pump block the rotors.
► Switch on the motor only briefly (1-2 seconds), check the direction of rotation and correct if necessary.

6.2 Special personnel qualification

The personnel used for setup, installation and connection must be adequately qualified for this work. See also Section 2.6, Page 18.

6.3 Setup, installation, and connection

6.3.1 Checking smooth running of the rotors

Before installation, check that the rotors are running smoothly.

Perform the following steps:

1. Remove the motor shroud (only for SUPER version).
2. Remove the coupling guard.
3. Carefully rotate the shaft of the coupling.

   The shaft must be rotatable without the rotors rubbing. If a rotor rubs against something, it has some damage that may have happened during transport of the pump.

   If the rotors rub: Contact the GEA Hilge service.

   If the rotors rotate freely:
4. Reattach the coupling guard.
5. Reattach the motor shroud (only for SUPER version).

   → The rotator has been checked for running smoothly.

6.3.2 Setting up and aligning the pump unit

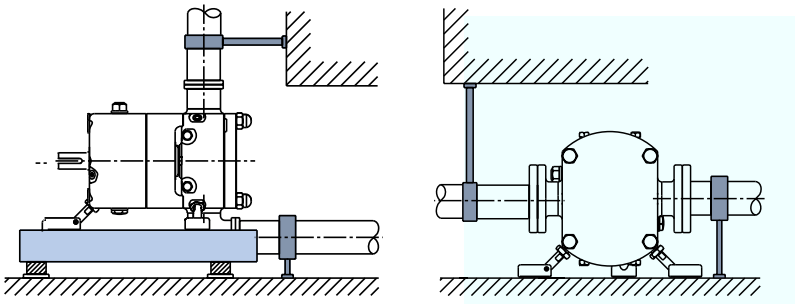

Fig.6: Support of the pipeline

Align the pump with the calotte feet on the base frame.

Aligning the pump:

1. Align the unit horizontally over the machined flat surfaces of the connecting pieces with a machine spirit level parallel to the motor axis.
2. After aligning the unit, tighten the fastening screws evenly in a crosswise sequence (where applicable).

6.3.3 Aligning the coupling

Careful alignment significantly increases the service life of the coupling as well as the shaft bearing and the seals.

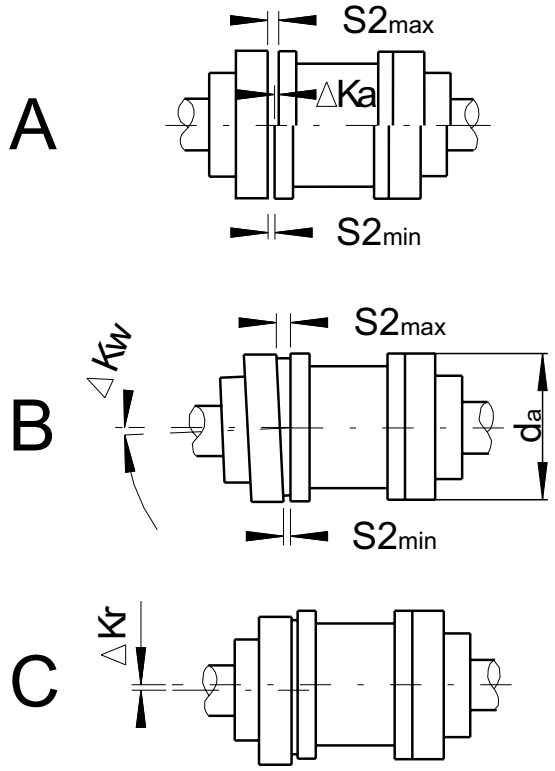

Fig.7: Relocation types (principle)
A - Axial displacement B | Angular displacement C | Radial displacement

To align the coupling carry out the following steps:

1. Disassemble the coupling protection.
2. Place a straight-edge at four opposite points (in steps of 90° degrees) across both clutch halves.
3. The straight-edge must have the same distance (light gap) everywhere.
4. Reinstall the coupling protection.

→ The coupling has been aligned.

6.3.3.1 Adjusting the coupling via the set-up

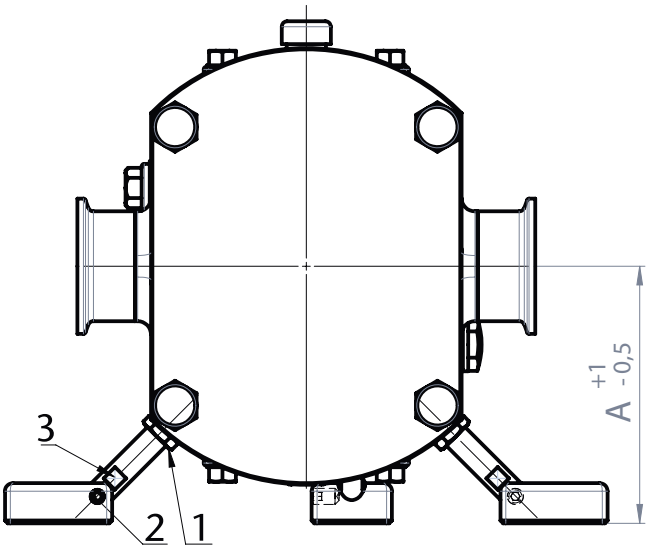

Fig.8: Alignment of the pump shaft to the drive shaft

The correct adjustment of the coupling is done by aligning the pump shaft to the drive shaft. Alignment is possible in the range from -0.5 mm to +1 mm.

For this, perform the following steps:

1. Loosen the connection of the feet to the base or to the trolley.
2. Loosen the hexagon nuts (1).
3. Loosen the grub screws (2).
4. Use the spanner flats (3) to adjust the height so that the correct alignment of the coupling is achieved. Adhere to permissible displacement values.
5. After aligning the coupling, retighten the hexagon nuts (1), the grub screws (2) and the connection of the feet to the base or trolley.

→ The coupling is aligned via the set-up.

6.3.3.2 Permissible displacement values for Flender couplings

Permissible displacement values for Flender B / BDS coupling

Axial offset type B											
Outer diameter of the coupling (da)		**58**	**68**	**80**	**95**	**110**	**125**	**140**	**160**	**180**	**200**	**225**
Size of type B		58	68	80	95	110	125	140	160	180	200	225
max. axial displacement [mm] (clearance)	$S2_{max}$	4	4	4	4	4	4	4	6	6	6	6
	$S2_{min}$	2	2	2	2	2	2	2	2	2	2	2

Axial offset type BDS											
Outer diameter of the coupling (da)		**66**	**76**	**88**	**103**	**118**	**135**	**152**	**172**	**194**	**218**	**245**
Size of type BDS		66	76	88	103	118	135	152	172	194	218	245
max. axial displacement [mm] (clearance)	$S2_{max}$	4	4	4	4	4	4	4	6	6	6	6
	$S2_{min}$	2	2	2	2	2	2	2	2	2	2	2

Permissible shaft offset values for radial offset ∆ Kr and difference of clearance (angle displacement) ∆ S2 [mm]												
Size of type B		**58**	**68**	**80**	**95**	**110**	**125**	**140**	**160**	**180**	**200**	**225**
Size of type BDS		**66**	**76**	**88**	**103**	**118**	**135**	**152**	**172**	**194**	**218**	**245**
Coupling speed [rpm]	250	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8
	500	0.3	0.3	0.3	0.35	0.35	0.4	0.4	0.5	0.5	0.55	0.55
	750	0.25	0.25	0.25	0.25	0.3	0.3	0.35	0.4	0.4	0.45	0.5
	1 000	0.2	0.2	0.2	0.25	0.25	0.25	0.3	0.35	0.35	0.4	0.4
	1 500	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3	0.3	0.3	0.35
	2 000	0.15	0.15	0.15	0.2	0.2	0.2	0.2	0.25	0.25	0.3	0.3
	3 000	0.15	0.15	0.15	0.15	0.15	0.15	0.2	0.2	0.2	0.2	0.25
	4 000	0.1	0.1	0.1	0.1	0.1	0.15	0.15	0.15	--	--	--

Torques and clearances for types B / BDS

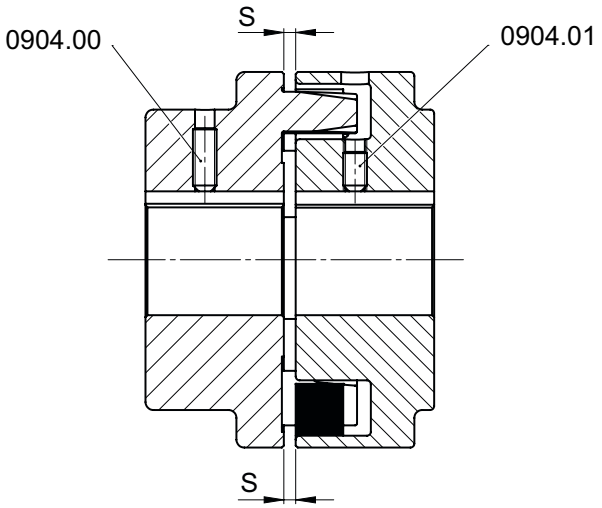

Fig.9: Coupling N-EUPEX, clearance S

Torques and clearances for types B / BDS											
Size of type B	**58**	**68**	**80**	**95**	**110**	**125**	**140**	**160**	**180**	**200**	**225**
Size of type BDS	**66**	**76**	**88**	**103**	**118**	**135**	**152**	**172**	**194**	**218**	**245**
Clearance S [mm]	3	3	3	3	3	3	3	4	4	4	4
Threaded pin DIN EN ISO 4029 (serrated cup point)	M5	M6	M6	M6	M6	M8	M8	M10	M12	M12	M12
Torque [Nm]	3	4	4	4	4	8	8	15	25	25	25

Tighten the threaded pins (0904.00 / 0904.01) with the torques stated in the table.

6.3.4 Installation in the piping system

Optimal suction

Install the pump with the suction nozzles as close as possible to the tank and the lowest position. This allows you to achieve optimal suction conditions and avoid cavitation of the pump.

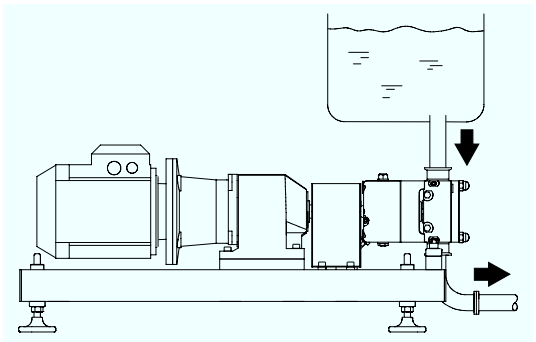

Fig.10: Installation in the piping system

Correct installation reduces the pressure losses on the suction side. This is particularly important for pumping high viscosity media.

6.3.4.1 Using the mechanical seal

For perfect operation, mechanical seals require a lubrication film in the sealing gap, which prevents contact between the two sliding surfaces. Usually this lubrication film is formed by the pumped product or by an externally supplied flushing/sealing fluid.

Due to the friction heat between the sliding faces, the lubrication film evaporates towards the atmosphere. This means there is a leak that is invisible in water, water-like or volatile liquids (e.g. alcohol). The amount of leakage for faultless operation is usually only a few ml/h; however, it may multiply depending on other influences.

Particularly in the running-in phase, mechanical seals, regardless of size, type or design, are subject to low leakage. In individual cases, it may be necessary to tolerate a low, visible leakage or to counteract it with suitable measures.

Dry run

The mechanical seal needs a lubrication film between the sliding surfaces for correct sealing.

If the lubrication film is missing or interrupted between the sliding surfaces, dry running occurs. The friction heat generated by the direct contact of the sliding surfaces leads to the destruction of the mechanical seal. Depending on the material pairing, this can take place within a few seconds.

6.3.4.2 Space requirements

Maintain the following minimum distances.

Pay attention to motor performance.

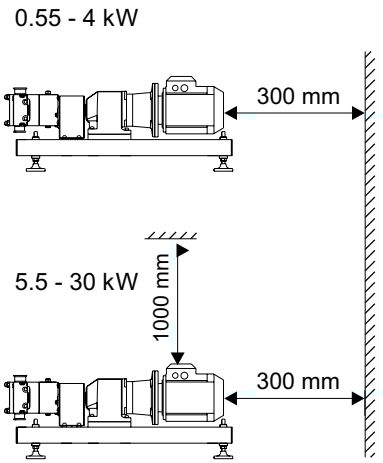

Fig.11: Minimum distances (schematic representation)

6.3.4.3 Noise and vibration damping

In NOVALOBE rotary piston pumps with base frame, the machine feet are equipped with dampening rubber.

Vibrations and noises are caused by the pulsating flow in the system and a vibration transmission through the base of the pump to the ground. Acoustic decoupling of the pump leads to a noise reduction.

The effect on the environment is subjective and depends largely on the correct installation and the nature of the rest of the remaining system.

Foundation

Vibration damping is best achieved if the pump is set up on a flat, solid concrete foundation.

As a guideline, the concrete foundation should be 1.5 times as heavy as the pump.

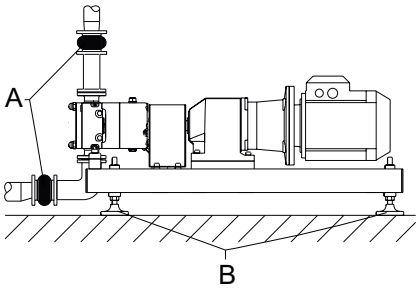

Fig.12: Foundation (schematic diagram)
A - compensators | B - solid base

6.3.5 Flush ports

6.3.5.1 Flushing fluid (optional)

Requirements of the flushing fluid

The flushing fluid has the task to lubricate and cool the product-side mechanical seal and the radial packing ring on the atmospheric side.

The flushing fluid must meet the following criteria:

- good flowability
- no impurities
- no solids
- no dissolved components
- adequate thermal conductivity
- no chemical or mechanical attacking of the pump materials, sealing materials, and elastomers.
- No contaminating of the pumped fluid
- Viscosity < 5 mPas
- Water hardness < 5° dH

Demineralised water meets these requirements to a large extent.

6.3.5.2 Flushing systems

Simple mechanical seal

The single mechanical seal is designed for hygienic applications and covers most common operating conditions in terms of operating pressure, temperature and speed.

The simple flushed mechanical seal is suitable for applications where media tend to crystallise or harden on contact with the atmosphere.

Double mechanical seal

The double mechanical seal can be operated with flushed pressure below the pump pressure. The seal is suitable for typical sterile applications where high temperatures are required.

For hazardous pumping medium, the flush pressure may be above the pump pressure. This creates the sealing liquid.

6.3.5.3 Connecting the flushing

Flushed mechanical seals are designed as lost flushing.

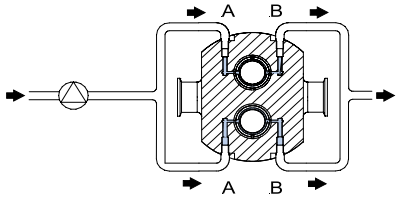

Fig.13: Flushing of the mechanical seals
A - Feed pipe, B - Return pipe

In this way, the flushing system is connected

1. Connect the feed pipe (A).
   - Flushing system (flushed single mechanical seal): Flushing pressure maximum 0.5 bar.
   - Flushing system (double mechanical seal): Pressure below the delivery pressure as flushing liquid. flushing pressure maximum 0.5 bar.
   - Sealing system (double mechanical seal): Pressure 1.5 - 2 bar above the delivery pressure as sealing liquid. Maximum permissible sealing pressure 5 bar above delivery pressure.
2. Close the return pipe (B).
3. Check the strength of the connections.
   → The flushing has been connected.

6.3.6 Electrical connection

⚠ Danger

Electric shock by touching live parts!

► Have the electrical connections be made by a licensed electrician.
► Observe local laws, standards and regulations - especially safety precautions.

6.3.6.1 Star connection

Star connection for high voltage.

Connect the pump according to the ordering information. The following figure shows the wiring diagram of the star connection.

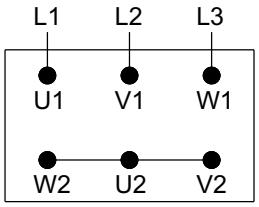

Fig.14: Star connection

6.3.6.2 Delta connection

Delta connection for low voltage.

Connect the pump according to the ordering information. The following figure shows the wiring diagram of the delta connection.

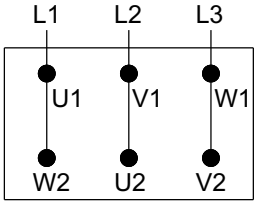

Fig.15: Delta connection

6.3.6.3 Frequency converter operation

All three-phase motors can be connected to a frequency converter. Frequency converter operation may subject the insulation of the motor to a higher load so that louder motor noise than in the normal case may occur due to eddy currents caused by voltage spikes.

Check the following operating conditions if the pump is operated using a frequency converter:

Operation with frequency converter	
Operating Conditions	**Measures**
Noise-sensitive applications	Install a dU/dt filter between the motor and frequency converter (reduces voltage spikes and thus noise).
Particularly noise-sensitive applications	Install sinusoidal filter.
Cable length	Use a cable which satisfies the conditions prescribed by the manufacturer of the frequency converter.
Supply voltage up to 500 V	Check that the motor is suitable for frequency converter operation.
Supply voltage between 500 V and 690 V	Install a dU/dt filter between the motor and the frequency converter (reduces voltage peaks and thus noise), or check whether the motor has a reinforced insulation.
Supply voltage 690 V and above	Install a dU/dt filter between the motor and the frequency converter and check whether the motor has a reinforced insulation.

Notice

Incorrect operation of the frequency converter!

► Follow the manufacturer's instructions to install and operate a frequency converter.

6.3.6.4 Checking the direction of rotation after connecting

Perform the following steps:

1. Re-install all safety devices.
2. Connect flushed mechanical seal for flushing or blocking medium (See Section 6.3.5.3, Page 38)
3. Check that hydraulic connections are firmly secured.
4. Open stop valves.
5. Fill the pump (system).
6. Note the direction-of-rotation arrow on the pump.
7. Switch on the motor briefly (1-2 seconds).
8. Compare the direction of rotation with the specified direction.
9. Correct the connection if necessary.

   → The direction of rotation has been checked, and corrected if necessary.

6.3.6.5 Earthing

⚠ Warning!

Electrical voltage by different potentials.

The occurrence of potential differences can cause damage to persons and property.

► Properly earth the pump and motor to achieve potential equalisation.

Earth the unit

Equipotential bonding for the motor and pump is performed via the protective conductor connection in the terminal box.

6.3.7 Operation Principle

Two precisely synchronised rotary pistons rotate in opposite directions. One in the clockwise direction the other in the counterclockwise direction. Due to the symmetrical shape of the rotors, the pump is suitable for operation in both directions.

Because the rotary pistons rotate in different directions, the increased volume between the rotary pistons creates a vacuum that draws the pumping medium into the pump.

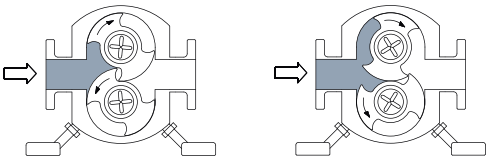

Fig.16: Procedure step 1

The pumping medium is enclosed between the rotary piston and pump housing and is conveyed to the outlet.

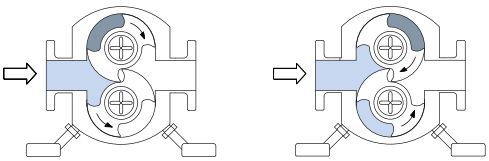

Fig.17: Procedure step 2

When the pumping medium has reached the outlet, the opposite rotary blade drives it out of the chamber. At this point, the volume in the chamber decreases so that the pressure on the outlet side is increased.

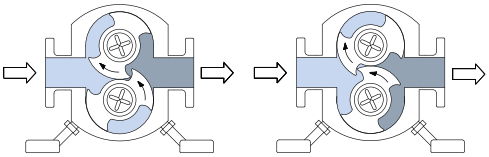

Fig.18: Procedure step 3

Hint!

When operating against a closed valve, the rotary piston pump steadily builds up more pressure. Since liquids are not compressible, there is a very rapid pressure build-up that destroys the pump. Take appropriate protective measures.

7 Commissioning

7.1 Special personnel qualification

The commissioning personnel must be suitably qualified for this work. See also Section 2.6, Page 18.

7.2 Safety instructions for commissioning

⚠ Warning!

Danger by conveying against a closed shut-off valve.

Rapid heating and sudden pressure increase.

► Never convey against a closed shut-off valve.
► Always keep the pressure-side shut-off valve open during operation.
► Do not exceed the permissible operating temperatures.

7.3 Commissioning / initial startup

7.3.1 Checking conditions of use

Compare the information in the following documents with the intended conditions of use of the pump:

- Order documents (order confirmation)
- Nameplate
- Operating instructions
- Test bench acceptance
- Make sure that the pump is operated only under the specified conditions of use. These conditions apply to pressure, temperature, fluid, etc.

7.3.2 Commissioning of the pump

Perform the following steps:

1. Check that all connections are firmly secured.
2. Make sure that all safety devices are installed.
3. Make sure that the electrical connections are correct.
4. Connect flushed mechanical seal for flushing or blocking medium. For details, see Section 6.3.5.3, Page 38.
5. Open stop valves in the system.
6. Fill the pump along with the system.
7. Vent the pump along with the system.
8. Fully open the suction-side stop valve.
9. Fully open the pressure-side stop valve.
10. Switch on the pump.
    → This completes the commissioning.

If there is no increase of delivery head after commissioning:

1. Switch off the pump.
2. Again vent the pump (system).
3. Repeat steps 7 to 10 and note section on *Disruptions and Assistance for Disposal* .

7.3.3 Functional testing of the mechanical seal

Perform the following steps:

1. Inspect the pump and check whether liquid exits at the mechanical seal.
   An intact mechanical seal operates virtually without any leakage.

If pumped fluid or flushing fluid exits:

1. Switch off the pump.
2. Replace the mechanical seal.
   Follow the installation instructions Section 10.2, Page 52.

7.4 Operation with control unit for pumps on trolley

Pumps on a trolley are equipped with a control unit for switching the pump on and off.

Depending on the equipment, an alternating sense of rotation can be set via the control unit.

For pumps supplied without a motor, the selection of the control panel switches must be chosen to match the amperage and voltage of the motor.

The switches must be connected according to the switch manufacturer's data sheets.

⚠ Caution!

Damage to property due to changing the sense of rotation too quickly

If the sense of rotation is changed before the rotors have come to a standstill, the pump may be overloaded.

► When changing the sense of rotation, first switch off the pump (switch position 0) and allow the rotors to come to a complete standstill.

8 Cleaning

To ensure the quality of sensitive fluids, pumps must be cleaned immediately after each use. Only in this way will adhesions and deposits be removed completely and contamination of the products be prevented. To achieve the best possible results, Hilge pumps are optimised with regard to gap and dead spaces, designed according to DIN EN 13951, and resistant to the cleaning agents referred to in the following chapter. Cleaning is carried out inside the system; no parts need to be removed or dismantled.

In general, a distinction is made between CIP and SIP. The procedures must comply with the state of the art and the EC directives. In any case, the operator must ensure that the target specifications are reached and applied as intended using the cleaning and sterilisation procedures, as well as the working temperatures and steps.

8.1 Special personnel qualification

The cleaning personnel must be suitably qualified for this work. See also Section 2.6, Page 18.

8.2 Safety instructions

⚠ Warning!

Damage caused by cleaning agents!

► Use only suitable cleaning agents.
► Observe the safety instructions in the product descriptions of the cleaning agents.
► Use always suitable personal protective equipment when handling cleaning agents.
► Be sure to avoid exceeding the permissible concentrations of cleaning agents.
► Reducing acids should not be used, because they cause pitting.

⚠ Warning!

Risk of burns!

► Do not touch the pump during cleaning. The surfaces may be very hot.

⚠ Warning!

Danger of scalding or burns.

► Do not touch the pump during steam sterilisation and the cooling phase. Surface temperatures may rise to over 100 °C.

⚠ Caution!

Dry running of the mechanical seal!

► Do not run the pump during steam sterilisation. Destruction of the mechanical seal!

⚠ Warning!

Pressure shock by evaporating liquid!

► Completely empty the system before steam sterilisation.

Notice

Disposal of cleaning agents

► Dispose of cleaning agents properly and in an environmentally friendly way.

8.3 Cleaning instructions

General conditions:

- The pump drains automatically when set up vertically.
- In the lines of the system, a flow speed of at least 1.5 m/s must be present during the cleaning process.
- For smaller pump sizes, such as NOVALOBE 10 to 30, the cleaning performance (flow rate and flow pressure) must be carried out by a separate booster pump. Like this the NOVALOBE can be overflowed to be able to clean other system parts with the required flow speed. The pump must run with the nominal speed available at the gear motor. The pressure boost is done via the pressure boost pump.

NOVALOBE pumps are intended to pump highly viscous media. Media with water-like viscosity, such as CIP cleaning medium, significantly reduce the output depending on the back pressure.

The table provides an overview of when system cleaning by NOVALOBE is possible even without pressure boost pump and bypass for which pump size. In order to achieve the flow speed of about 1.5 m/s in the system for the cleaning process, a separate pump design is required. Correct cleaning must be checked by the operator.

Minimum required speed for CIP cleaning for a flow speed of 1.5 m/s

Pump	Nominal width	Standard	Pipe dimensions	Minimum speed for CIP n theor. [rpm]
NL40	DN 65	DIN	70 x 2	474
		ISO	60.3 x 2	345
		ASME	63.75 x 1.65	395
NL50	DN 80	DIN	85 x 2	360
		ISO	76.1 x 2	285
		ASME	76.2 x 1.6	292

8.4 CIP

CIP stands for Cleaning in Place, the pump is completely rinsed with cleaning agents. The cleaning agent used must be suitable for the respective cleaning task.

The following table lists approved detergents and disinfectants and their permitted concentrations. Alternatively, information from DIN11483 Part 1 can be used.

Cleaning and disinfecting agents						
Cleaner type	**Chemical name**	**Max. concentration**	**Max. temperature**	**Permissible pH**	**Max. permissible Cl content in the preparation water**	**Max. permissible contact time**
		[%]	[°C] (°F)		[mg/l]	[h]
Alkaline	NaOH	2.5%	85 (185)[1]	13-14	150	3
Acid	H_2SO_4 H_3PO_4 HNO_3	2%[2,3]	60 (140)		150[2,3]	1
	$C_2H_4O_3$	0.0075%	90 (194)		150	0.5
	$C_2H_4O_3$	0.15%	20 (68)		150	2
	Iodophore	50 mg/l act. Iodine	30 (86)	>3	150	3

Cleaning agents that contain hydrochloric acid (HCl) or hydrofluoric acid (HF) must not be used. Consult the supplier for the use of special cleaning agents and procedures with respect to the materials. Thoroughly rinse the pump with water to remove any cleaning agents leaving no residues. The maximum permissible temperatures can be obtained from the technical data.

8.5 SIP

SIP stands for sterilisation in place, in which the pump is sterilised with superheated steam. For steam sterilization or sanitization, minimum temperatures of 121 ° C (250 ° F) must be applied to all wetted surfaces. The maximum permissible temperatures can be obtained from the section technical data.

The pump must not be in operation during steam sterilisation. The cooling period after the SIP process depends on pump size and external conditions. Check the pump temperature before switching it on again.

1 Dependent on the maximum permissible temperature of the pump
2 CrNi-steels
3 CrNiMo-steels

8.6 Manual exterior cleaning

Notice

Danger due to cleaning agents.

► Follow the manufacturer's instructions when using cleaning agents.
► Wear safety glasses and gloves.
► Dispose of cleaning agent properly.
► Do not use a high-pressure water jet to clean the pumps.

- Regular manual external cleaning of the pump unit facilitates proper operation.
- Always check the impermeability of the motor (terminal box, condensation water holes) before each cleaning.
- Clean the outside of the pump with a soft cloth or brush and use warm water if necessary.
- When using a cleaning agent, make sure that it does not attack the surface of the pump unit.
- Remove dust and debris that may clog the fan and cooling fins of the engine.
- Dry cleaning is preferable to wet cleaning.
- The cleaning intervals depend on the degree of contamination.

9 Maintenance / servicing

9.1 Safety instructions for maintenance and servicing

⚠ Warning!

Improper execution of work!

► Maintenance and inspection should be carried out by authorised and qualified personnel.

⚠ Warning!

Danger from tilting / toppling over of the pump!

► Before carrying out maintenance and repair work, secure pump against tilting / toppling over.

⚠ Warning!

Hot system and pump parts.

► Always allow the pump to cool before maintenance.

⚠ Warning!

Missing protection and safety devices.

► After completion of work: Reinstall all protective and safety devices and put into operation.

9.2 Special personnel qualification

The maintenance personnel must be suitably qualified for this work. See also Section 2.6, Page 18.

9.3 Pump maintenance

9.3.1 Daily maintenance

Check daily

- the oil level (gauge glass)
- the mechanical seals and O-rings for leaks
- the coupling for wear, misalignment or noise.

9.3.1.1 Replacement of O-rings

Notice

Hygiene risk, food safety

Worn out and not fully functional components may lead to the contamination of the pump.

► Pay close attention to the condition of the O-rings during regular inspections.

The O-rings must be replaced if any one of these characteristics are visible:

- The O-ring is deformed at one or more locations.
- The O-ring has cracks.
- The surface of the O-ring is porous and brittle.
- The O-ring has lost its elasticity.

9.3.2 Gear lubrication

9.3.2.1 Relubrication interval

Relubrication interval			
Oil temperature	**annually**	**semi-annually**	**quarterly**
< 50°C	x		
50 - 75°C		x	
> 75°C			x

9.3.2.2 Oil quantities

Fill the gearbox with the following quantities of oil:

Pump size	**Oil quantity [l]**	**Oil quantity [l]**	**Oil quantity [l]**
Nozzle	**horizontal up to 500 rpm**	**horizontal from 500 rpm**	**vertical**
NOVALOBE 10/0.06	0.70	0.03	0.05
NOVALOBE 20/0.12	0.16	0.05	0.10
NOVALOBE 30/0.33	0.45	0.13	0.34
NOVALOBE 40/0.65	0.80	0.20	0.48
NOVALOBE 50/1.29	1.50	0.60	1.00

9.3.2.3 Oil types

Lubrication of the gear unit is necessary for the following reasons:

- Lubricate bearings
- Reduce wear
- Reduce friction
- Cooling
- Corrosion protection

Use only the following lubricating oils or equivalent to lubricate the gear unit

Lubricating oils (examples):

Food category:

- Shell Cassida GL
- Mobil Food
- Dow Food

Industry

- Shell Omala

- Castrol Alphasyn
- Mobil SHC 600
- Mobil 600

Hint!

The type of oil used can be found in the order papers.

9.3.2.4 Information on the gear unit nameplate

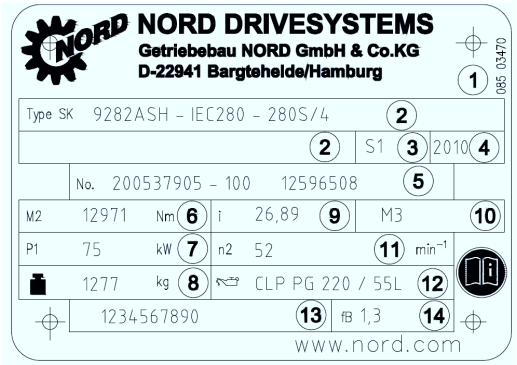

Fig.19: Nameplate (example)

Gear motor nameplate	
No.	**Designation**
1	Manufacturer
2	Gear unit type
3	Operating mode
4	Year of manufacture
5	Serial number
6	Rated torque of the gear output shaft
7	Drive power
8	Weight according to order execution
9	Total gear ratio
10	Installation position
11	Rated speed of the gear output shaft
12	Lubricant type, viscosity and quantity
13	Customer material number
14	Operating factor

9.4 Maintenance of the motor

Information on the motor nameplate

The information for relubrication intervals, grease types, grease quantity and, if necessary, further information can be found on the nameplate.

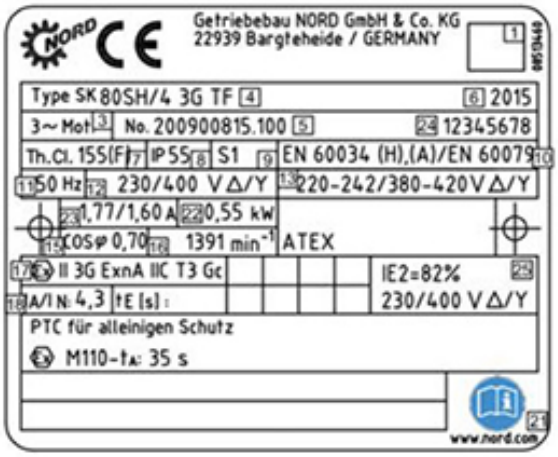

Fig.20: Motor nameplate

Nameplate designations	
1 - QR code	13 - Permissible voltage range
3 - Number of phases	15 - Power factor
4 - Type designation	16 - Speed
5 - Order number/motor number	17 - Explosion protection code
6 - Year of manufacture	18 - Locked rotor current/rated current
7 - Thermal class insulation system	21 - Follow the operating instructions
8 - IP protection	22 - Rated power (mechanical shaft power)
9 - Operating mode	23 - Rated current
10 - Standard specifications	24 - Individual serial number
11 - Rated frequency	25 - Efficiency
12 - Rated voltage	

10 Malfunctions / repairs

10.1 Special personnel qualification

The troubleshooting / repair personnel must be suitably qualified for this work.
See also Section 2.6, Page 18.

10.2 Safety instructions

⚠ Warning!

Improper execution of work!

► Repair work should be carried out by authorised and qualified personnel.

⚠ Danger

Electric shock by touching live parts!

► Always disconnect the pump from power before troubleshooting.

⚠ Danger

For motors with frequency converter (tronic): Electric shock by touching live parts!

► Even if the power supply is switched off, touching electrical parts may cause an electric shock.
► Disconnect the power supply and wait at least four minutes before touching electrical components.

⚠ Danger

Liquids squirting out under high pressure!

► Always depressurise the pump before troubleshooting.

⚠ Warning!

Hot system and pump parts!

► Always allow the pump to cool before troubleshooting.

⚠ Warning!

Inadvertent switch-on of the pump!

► Be sure to secure the pump against accidental switch-on.

⚠ Warning!

Contact with dangerous substances (e.g. by inhalation).

► Decontaminate a pump that delivers harmful media.

⚠ Warning!

Missing protection and safety devices!

► After completion of work: Reinstall all protective and safety devices and put into operation.

⚠ Caution!

Unsuitable tools!

► Make sure that all the parts can be mounted without damage.
► Use GEA Hilge assembly tools.

10.3 Malfunctions and remedies

Actions for troubleshooting

Malfunction	Cause	Remedy
Pump does not deliver or pump delivers with inadequate power.	1. Incorrect electrical connection (2 phases). 2. Incorrect direction of rotation. 3. Air in suction line or pump. 4. Back pressure too high. 5. Suction head too high, NPSH system (supply) too low. 6. Lines clogged or foreign objects in the rotor. 7. Air inclusion due to defective seal.	1. Check electrical connection, and correct if necessary. 2. Change phases of power supply (swap motor poles). 3. Vent and prime suction pipe or pump. 4. Reset operating point according to the data sheet. Check system for contamination. 5. Raise suction side liquid level, fully open the stop valve in the suction line. 6. Open pump and eliminate malfunctions. 7. Check and, if necessary, replace pipe seals, pump housing seals and shaft seals.
Motor protection switch turns off, motor is overloaded.	1. Pump is blocked due to clogging/sticking. 2. Pump is blocked by contacting due to strain on the pump body via the piping. (Check for damage.) 3. Pump runs beyond its rated operating point. 4. The fluid density or viscosity of the liquid is higher than stated in the order. 5. Motor protection switch is not set properly 6. Motor runs on 2 phases.	1. Open pump and eliminate malfunctions. 2. Install pump without strain, support piping by fixed points. 3. Adjust operating point according to data sheet. 4. If a lower power than specified is sufficient, reduce the flow rate on the pressure side: otherwise use a more powerful motor. 5. Check the setting, replace the motor protection switch if necessary. 6. Check electrical connection, replace defective fuse.
Pump causes too much noise. Pump runs unevenly and vibrates.	1. Suction head too high, NPSH system (supply) too low. 2. Air in suction line or pump.[1] 3. Back pressure is less than indicated. 4. Worn internal parts. 5. Pump is strained (start-up noise - check for damage.) 6. Bearings are damaged. 7. Bearings have too little, too much or inappropriate lubricant. 8. Motor fan defective. 9. Foreign material in the pump.	1. Raise suction side liquid level, fully open the stop valve in the suction line. 2. Vent and prime suction pipe or pump. 3. Adjust operating point according to data sheet. 4. Replace parts. 5. Install pump without strain, support piping by fixed points. 6. Replace bearings. 7. Add, reduce or replace lubricants. 8. Replace the fan motor. 9. Open and clean the pump (for self-priming pumps, install a screen if necessary).

Actions for troubleshooting		
Malfunction	**Cause**	**Remedy**
Leakage in the pump body, the connections, the mechanical seal.	1. Pump is strained (causing leaks at the pump body or at the connections).	1. Install pump without strain, support piping by fixed points.
	2. Housing seals and connection seals defective.	2. Replace housing seals and/or connection seals.
	3. Mechanical seal soiled or sticky.	3. Check and clean mechanical seal.
	4. Mechanical seal worn.	4. Replace the mechanical seal.
	5. Surface of shaft or shaft sleeve shrunk.	5. Replace shaft or shaft protection cover.
	6. Elastomer unsuitable for the pumped fluid.	6. Use suitable elastomer for pumped fluid and temperatures.
Impermissible temperature increases to pump, gear unit or motor	1. Air in suction line or pump. Suction head too high, NPSH system (supply) too low.	1. Vent and prime suction pipe or pump. Raise suction side liquid level, fully open the stop valve in the suction line.
	2. Bearings have too little, too much or inappropriate lubricant.	2. Add, reduce or replace lubricants.
	3. Motor protection switch is defective or not set properly.	3. Check the setting, replace the motor protection switch if necessary.
	4. Pressure valve closed.	4. Open pressure valve.

10.4 Repair

10.4.1 Repair order

Compliance with legal regulations on occupational safety requires all commercial companies to protect their workers and the people and the environment from harmful impacts when dealing with hazardous substances.

Follow local laws, regulations and guidelines.

Certificate of non-objection

The certificate of non-objection (Section 12.2, Page 74) attached to this document is part of the inspection/repair order. Nevertheless we reserve the right to reject the acceptance of this order for other reasons.

HILGE products and their parts are therefore inspected/repaired only if the certificate of non-objection completed properly and completely by authorised and qualified personnel is submitted.

Pumps that have been operated with radioactive substances are not accepted at all.

If, despite careful emptying and cleaning of the pump, safety precautions are required, the necessary information must be given.

10.4.2 NOVALOBE 10-50 parts overview

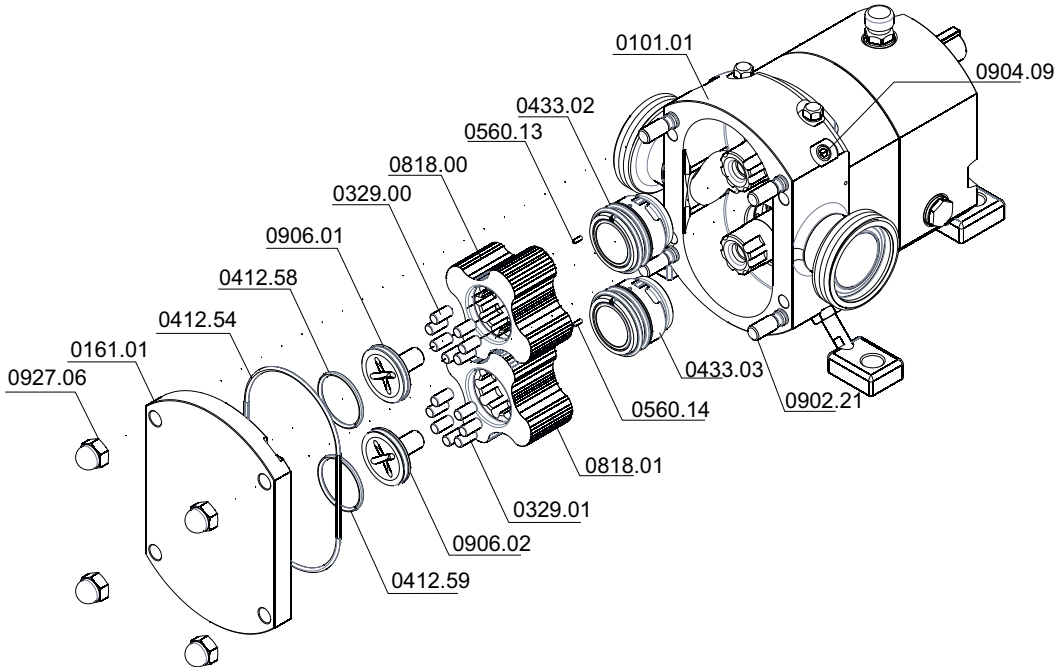

Fig.21

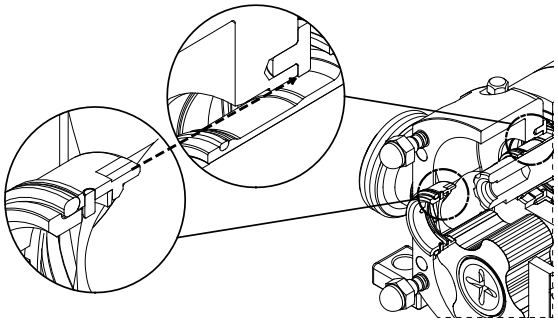

Fig.22: Mechanical seal torsion protection

NOVALOBE 10-50 parts list

Pcs.	Parts no.	Description	Pcs.	Parts no.	Description
1	0101.01	Pump housing	1	0560.13	Pin
1	0161.01	Back plate	1	0560.14	Pin
7	0329.00	Dowel pins	1	0818.00	Rotor
7	0329.01	Dowel pins	1	0818.01	Rotor
1	0412.54	O-ring	4	0902.21	Stud screw
1	0412.58	O-ring	2	0904.09	Grub screw
1	0412.59	O-ring	1	0906.01	Rotor bolt
1	0433.02	Mechanical seal	1	0906.02	Rotor bolt
1	0433.03	Mechanical seal	4	0927.06	Cap nut

10.4.3 Gear unit parts overview

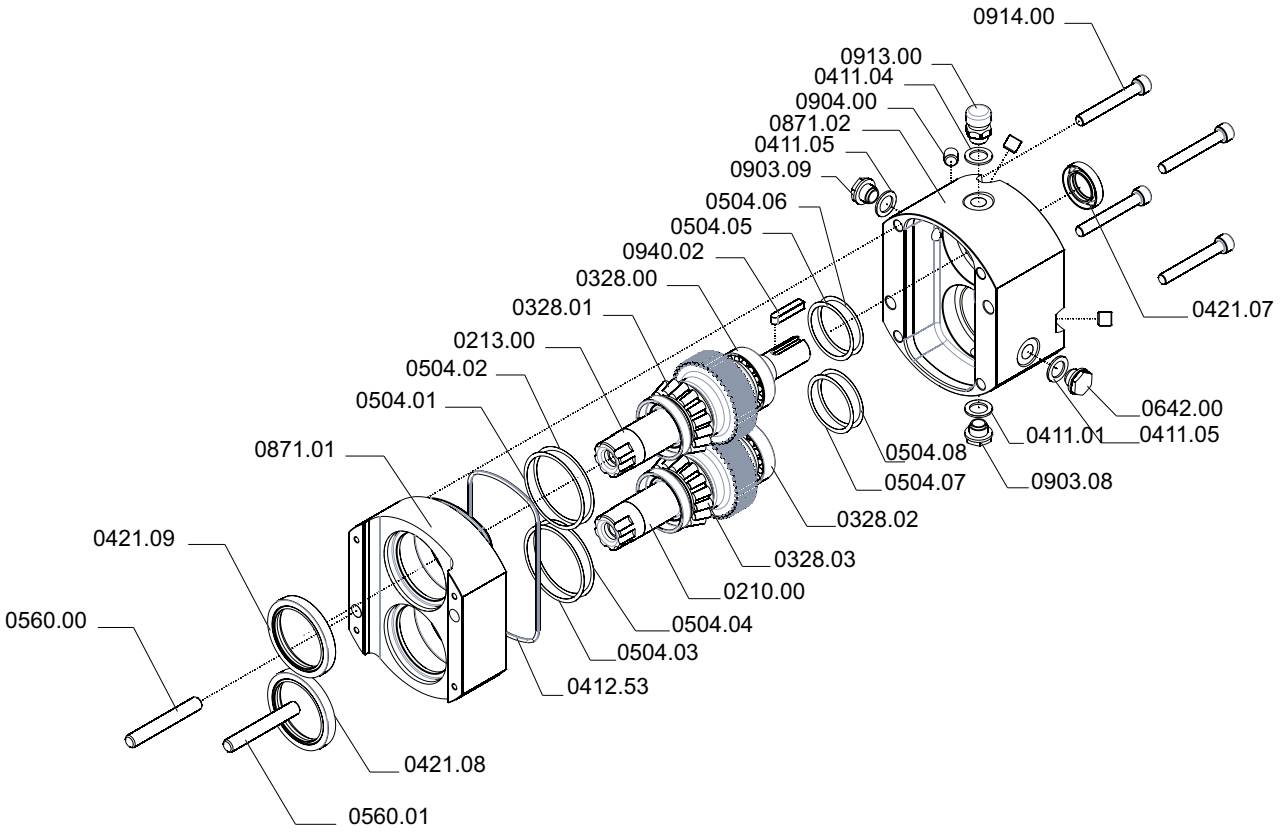

Fig.23: NOVALOBE gear unit parts overview

NOVALOBE gear unit parts list					
Pcs.	Parts no.	Description	Pcs.	Part no.	Description
1	0210.00	Output shaft	1	0504.04	Spacer ring/support disc
1	0213.00	Drive shaft	1	0504.05	Spacer ring/support disc
1	0328.00	Roller bearings	1	0504.06	Spacer ring/support disc
1	0328.01	Roller bearings	1	0504.07	Spacer ring/support disc
1	0328.02	Roller bearings	1	0504.08	Spacer ring/support disc
1	0328.03	Roller bearings	1	0560.00	Pin
1	0411.01	Seal ring	1	0560.01	Pin
1	0411.04	Seal ring	1	0642.00	Inspection ring
2	0411.05	Seal ring	1	0871.01	Gearbox
1	0412.53	O-ring	1	0871.02	Gearbox
1	0421.07	Radial shaft seal	1	0903.08	Locking screw
1	0421.08	Radial shaft seal	1	0903.09	Locking screw
1	0421.09	Radial shaft seal	4	0904.00	Set screw
1	0504.01	Spacer ring/support disc	1	0913.00	Vent screw
1	0504.02	Spacer ring/support disc	4	0914.00	Hex socket screw
1	0504.03	Spacer ring/support disc	1	0940.02	Key

10.4.4 Installation instructions

Notice

These instructions facilitate the installation and prevent damage to the pump.

► Always use round seals in original dimensions.
► Use no mineral oil greases for the wet section assembly.
► After removal, place wet parts on a clean, soft surface so that the polished surfaces do not scratch.
► Always replace mechanical seals completely.
► To tighten the rotor bolts 0906.01 / 02, use the original GEA-Hilge wrench and lock screw
► Check removed parts for damage and wear, and replace if necessary. Use only proper, clean parts for installation. Clean installation space and contact surfaces before installation.

Notice

Hygiene risk, food safety

Worn out and not fully functional components may lead to the contamination

► Use suitable cleaning agents to remove impurities in the area of the rotor mount, enclosed threads of rotor mount, O-rings, pump shaft and mechanical seal, e.g.:

1. Cleaning with warm water (approx. 40 °C/104 °F) and a commercially available dishwasher cleaner.
2. Rinse the cleaned parts with hot water (approx. 80 °C/176 °F) to thoroughly remove bacteria, germs and cleaning agent residues.

► Use a brush and / or other tools without damaging the surface. Plan contact-free cleaning in an ultrasonic bath to clean the mechanical seal.

Notice

Cleaning the rotor mount before assembly

Incorrect assembly of the rotors.

Adhesive remains of the rotor mount can reduce the required tightening torque during subsequent installation.

► If the threads of the rotor mount to secure the screws are sticky, remove adhesive remains from the threads of the impeller screws and the shaft.
► Clean the external threads with a wire brush.
► Clean the internal threads of the shafts with a round brush.

Selection round brush according to pump size		
Pump	Thread	Securing of impeller screws (0906)
NL10	M10	without
NL20	M12	without
NL30	M16	Loctite-TYP243 medium strength
NL40	M20	Loctite-TYP243 medium strength
NL50	M24	Loctite-TYP243 medium strength

10.4.5 Seal variants

A: single mechanical seal, B: single mechanical seal, flushed, C: double mechanical seal
D: single O-ring seal, E: double O-ring seal

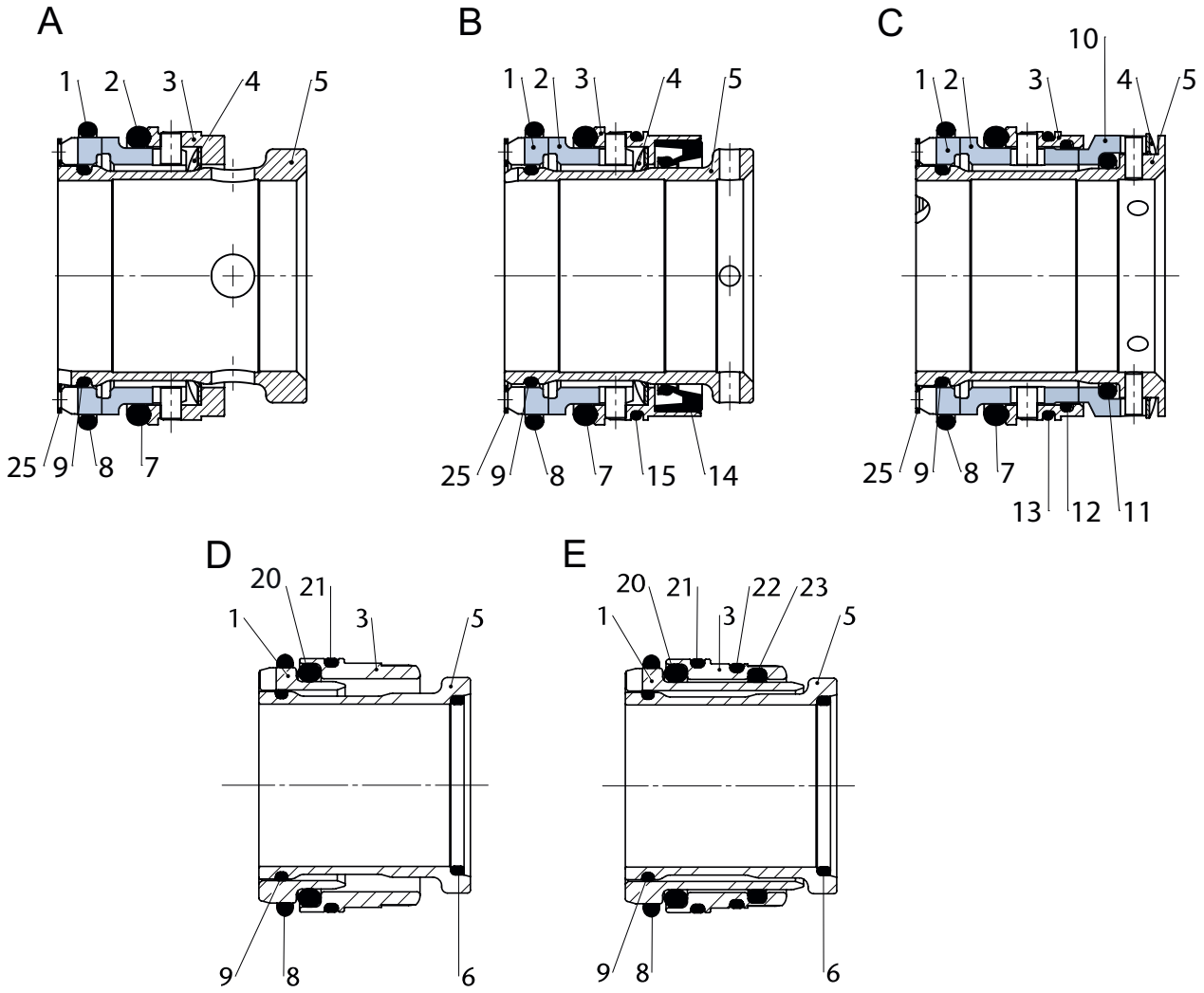

Fig.24: NOVALOBE mechanical seal variants

1 - slide ring (rotating)	8 -- O-ring	15 -- O-ring
2 - set ring	9 -- O-ring	20 - seal carrier for O-ring
3 - seal carrier (single mechanical seal)	10 - set ring (double mechanical seal)	21 -- O-ring
4 - corrugated spring	11 - seal carrier (double mechanical seal)	22 -- O-ring
5 - Shaft protection sleeve	12 - rotary ring outside (double mechanical seal)	23 -- O-ring
6 -- O-ring	13 -- O-ring	24 - torsion protection pin
7 -- O-ring	14 -- O-ring	25 - gasket

Parts may differ slightly from the illustrations shown here

10.4.6 Disassemble rotors and mechanical seals

Tools and equipment:

- Klüber paste UH1 96-402
- Puller for mechanical seals
- Lock screw (included with delivery)
- Socket wrench for rotor bolts

Contact for tool order: Section 1.3, Page 11.

Fig.25: Puller for mechanical seals

Fig.26: Lock screw

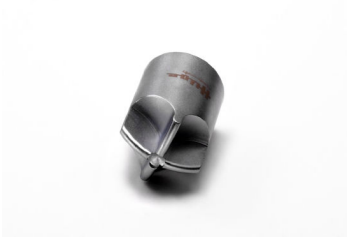

Fig.27: Socket wrench

Overview of the seal variants: Section 10.4.5, Page 58

Disassemble rotors and mechanical seals
Unscrew and remove the cap nuts (0927.06).

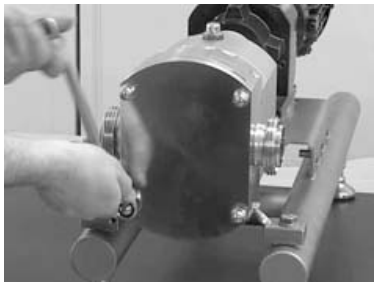

Fig.28: Cap nuts

Remove the back plate (0161.01) and the O-ring (0412.54).

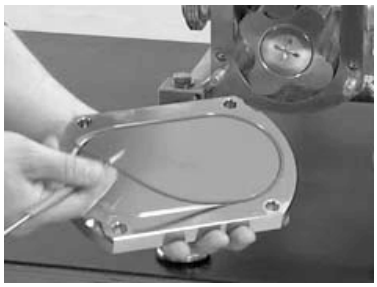

Fig.29: Back plate

Disassemble rotors and mechanical seals

Fix the rotors with the lock screw and remove the rotor bolts (0906.01/02) with the socket wrench.

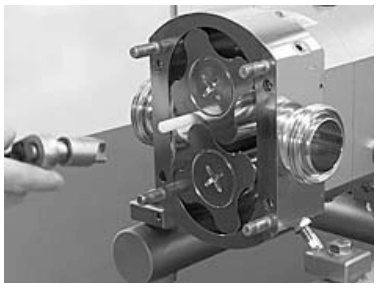

Fig.30: Use of lock screw and socket wrench

Remove the rotor bolts (0906.01/02) and the O-rings (0412.58/59).

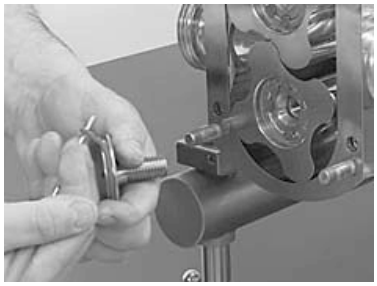

Fig.31: Rotor bolt

Disassemble the rotor units (0818.00 / 01).

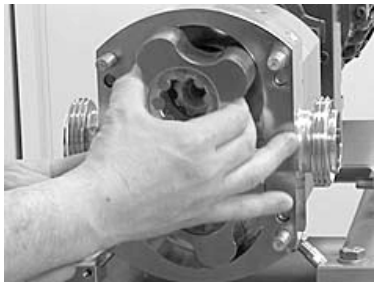

Fig.32: Rotor unit

Remove the rotary rings (item 1, type B) of the mechanical seals (0433.02/03).
For mechanical seals type A, B and C, remove the gasket (item 25).

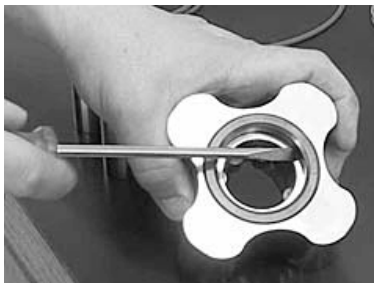

Fig.33: Mechanical seal

Disassemble rotors and mechanical seals

Remove the O-ring (item 8).

Fig.34: O-ring

Press the dowel pins (0329.00/01) out of the rotor units (0818.00/01).

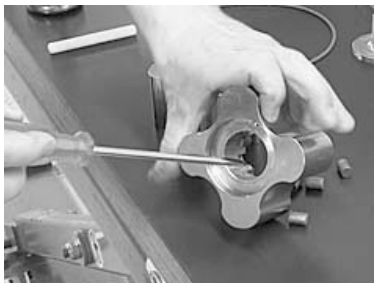

Fig.35: Dowel pins

Remove the O-ring (item 9).

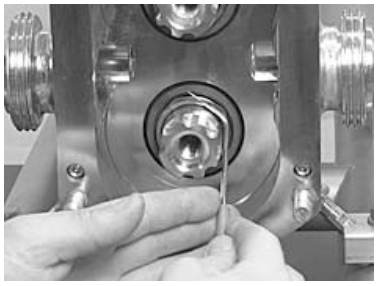

Fig.36: O-ring

Remove the mechanical seals (0433.02/03) with the puller.

Fig.37: Use of the puller

Disassemble rotors and mechanical seals

Remove the stationary ring (item 2, type A, B and C).

Fig.38: Stationary ring

Remove the O-ring (item 7, type A, B and C) from the stationary ring.

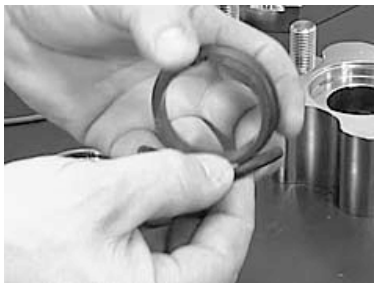

Fig.39: O-ring

Remove the seal carrier (item 3).

Fig.40: Radial packing ring

Remove the wave spring (item 4, type A, B and C).

Fig.41: Corrugated spring

Disassemble rotors and mechanical seals

Remove the O-ring (item 13, 15, 21, 22, type B to E) from the seal carrier.

Fig.42: O-ring, radial packing ring

Remove the O-ring (item 6, type D, E) from the shaft.

Fig.43: O-ring

→ The rotors and mechanical seals are now disassembled.

10.4.7 Install mechanical seals and rotors

Tools and equipment:

- Klüber paste UH1 96-402
- Klüber paste NH1 87-703 HYG
- Loctite 248 threadlocker (only for NL30, NL40, NL50)
- Mounting sleeve for seal carrier
- Lock screw, see Figure 26, Page 59
- socket wrench for rotor bolts, see Figure 27, Page 59

Hint!

Unless stated otherwise, the parts listed in these instructions are shown in and Section 10.4.2, Page 55.

Seal variants are shown in Section 10.4.5, Page 58.

Install mechanical seals and rotors

Insert the O-ring (item 6, type D and E) into the shaft protection sleeve (item 5).

Fig.44: O-ring, shaft protection sleeve

Grease the O-ring (item 6, type D and E) with Klüber paste NH1 87-703 HYG.

Fig.45: O-ring, shaft protection sleeve

Install mechanical seals and rotors

Push the O-ring (item 13, 15, 21, 22, type B to E) onto the seal carrier (item 3).

Fig.46: O-ring, seal carrier

Grease the O-ring (item 13, 15, 21, 22, type B to E) with Klüber paste NH1 87-703 HYG.

Fig.47: O-ring, seal carrier

Grease the seal carrier of the flushed mechanical seal (item 14, type B) with Klüber paste NH1 87-703 HYG.

Fig.48: Seal carrier of the flushed mechanical seal

Press the seal carrier of the flushed mechanical seal (item 3, type B) onto the shaft protection sleeve (item 5,).

Fig.49: Seal carrier, shaft protection sleeve

Install mechanical seals and rotors

Insert the wave spring (item 4, type A, B and C) in the mechanical seal.

Fig.50: Corrugated spring

Press the mechanical seals into the correct positions on the output shaft (0210.00) and drive shaft (0213.00).

Fig.51: Mechanical seal, drive shaft

Hint!

The grooves in the seal carrier must stand together at a 90° angle to the DNS/DND axis so that they engage in the torsion protection. For details, see Figure 22, Page 55.

Slide the seal carrier with the mounting sleeve onto the shaft as far as it will go.

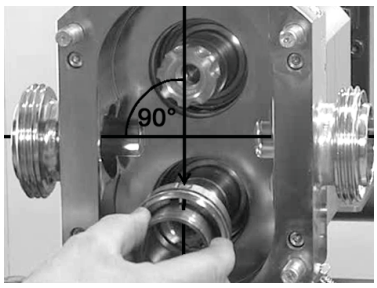

Fig.52: Position of the mechanical seals

Push the O-ring (item 7, type A and B) into the housing.

Fig.53: O-ring, drive shaft

Install mechanical seals and rotors

Install the stationary ring (item 10, type A and B) with the assembly sleeve in the correct position. Pin and groove of the anti-rotation must fit over each other.

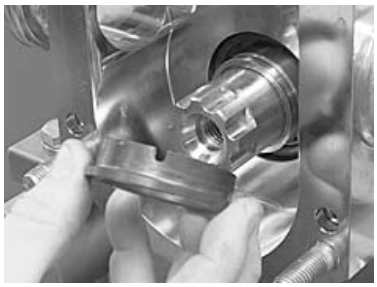

Fig.54: Set ring of the mechanical seal

Press the O-ring (item 9, type B) of the seal carrier into the correct position.

Fig.55: O-ring, seal carrier

Grease the inner surfaces of the rotors (0818.00 / 01) with Klüber paste UH1 96-402.
Insert the dowel pins (0329.00) into the rotors.

Fig.56: Rotor

Grease the O-ring of the rotary ring (item 8, type B) with Klüber paste NH1 87-703 HYG.
Insert the O-ring into the rotor.

Fig.57: O-ring, drive, sealing surfaces

Install mechanical seals and rotors

Insert the gasket (item 25, type A, B and C).
Press the rotary ring (item 1, type A, B, C) with the assembly sleeve into the correct position in the rotor. Pin and groove of the anti-rotation must fit over each other.

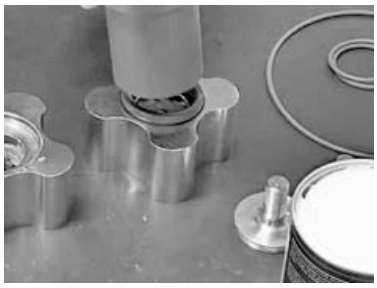

Fig.58: Mechanical seal

Grease the contact surfaces between the rotors and the output shafts (0210.00 / 0213.00) with Klüber paste UH1 96-402.

Fig.59: Output shafts

Slide the rotors onto the output shafts (0210.00) and (0213.00).

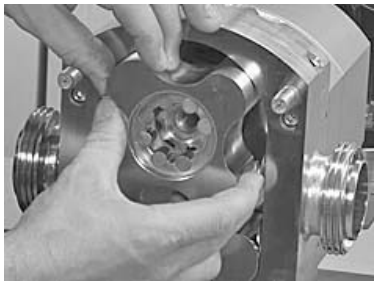

Fig.60: Rotor, output shaft

Grease the contact surfaces between the rotors (0818.00 / 01) and rotor screws (0906.01 / 02) with Klüber paste UH1 96-402.

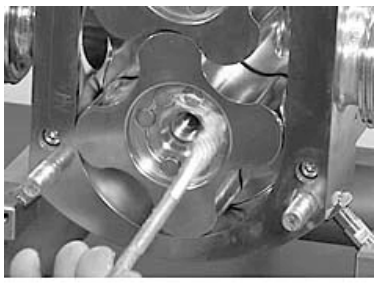

Fig.61: Contact surface rotor/rotor bolt

Install mechanical seals and rotors

Insert the O-rings (0412.58/59) into the rotor bolts (0906.01 / 02).

Fig.62: Rotor bolt, O-ring

Grease the threads of the rotors (0906.01 / 02) with Klüber paste UH1 96-402.

Screw the rotor bolts into the output shafts (0210.00) and (0213.00).

For NL30, 40 and NL50, the threads in the shafts must be cleaned from the old screw locking. Before reassembling, wet the thread of the rotor retainers with Loctite 248 screw locking.

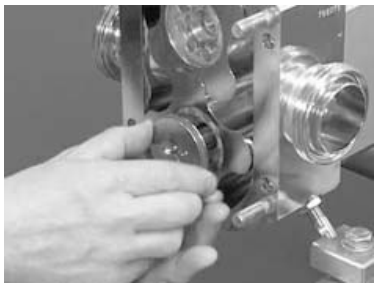

Fig.63: Rotor bolt

Tighten the rotor bolts (0906.01/02) with the socket wrench. Use the locking screw to fix the rotors.

Note torques in Section 10.4.7.1, Page 70.

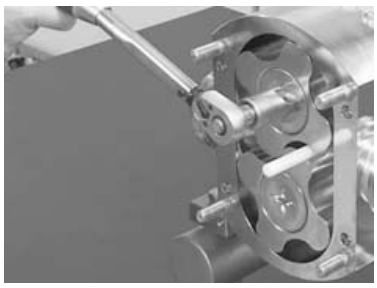

Fig.64: Rotor bolt, socket wrench

Insert the O-ring (0412.54) into the groove of the black plate (0161.01).

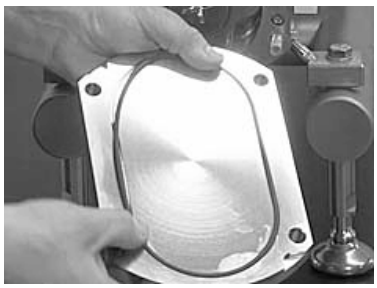

Fig.65: Back plate, O-ring

Install mechanical seals and rotors

Hint!

If the rotors or the pump housing are replaced, note the permissible gap dimensions in Section 5.8, Page 27. If the distances do not match the given values, contact GEA Hilge Service (Section 1.3, Page 11).

Fig.66: Back plate

Use the cap nuts (0161.01) to attach the pump housing (0927.06) to the back plate (0101.01).

Tighten the cap nuts (0927.06).
Note torques in Section 10.4.7.1, Page 70.

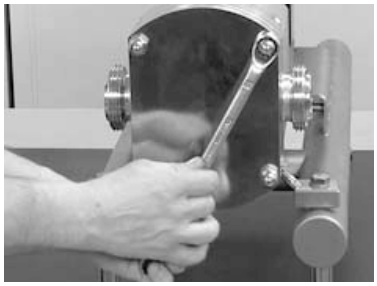

Fig.67: Back plate, cap nuts

→ The mechanical seals and the rotors are now mounted.

10.4.7.1 Torques for installation

Torques [Nm]		
Size	**Rotor bolt (0906.01/02)**	**Cap nuts (0927.06)**
NOVAlobe 10	12	7.7
NOVAlobe 20	30	15.3
NOVAlobe 30	45	26.7
NOVAlobe 40	90	66.5
NOVAlobe 50	110	130

11 Decommissioning

11.1 Special personnel qualification

The decommissioning personnel must be suitably qualified for this work. See also Section 2.6, Page 18.

11.2 Safety instructions

⚠ Warning!

Danger by conveying against a closed shut-off valve.

Rapid heating and sudden pressure increase.

► Never convey against a closed shut-off valve.
► Always keep the pressure-side shut-off valve open during operation.
► Do not exceed the permissible operating temperatures.

⚠ Caution!

Danger due to inadequate cleaning.

Sticking of the pump. Conveyed media that can become solid at standstill, for example processed cheese or chocolate, should not remain in the pump for a long time without operation. They can clog the mechanical seal and result in sudden and strong leakage when restarting.

► Clean the pump suitably after decommissioning. (See Chapter 8, Page 44

11.3 Temporary decommissioning

Perform the following steps:

1. Switch off the pump.
2. Close the pressure side shut-off valve.
3. Close the suction side shut-off valve.
4. Switch off flushing (where applicable)
5. Make sure that the pump is depressurised.
6. Depressurise the pressure from the shut-off system (where applicable).
   → The pump has been temporarily decommissioned.

11.4 Disposal

Discard the pump or parts thereof in an environment-friendly manner: Use the service of public or private disposal companies. If this is not possible, contact the next GEA Hilge company or service centre.

12 Appendix

12.1 Assembly instructions for pumps with free shaft end

These assembly instructions refer to pumps without motor and without base.

12.1.1 Special personnel qualification

The assembly personnel must be suitably qualified for this work. See also Section 2.6, Page 18.

12.1.2 Determination of the permissible operating data

- Pay attention to the details on the pump nameplate and datasheet.
- Select components for attachments to pumps that may be used in potentially explosive atmospheres to meet the requirements. Observe the ATEX marking on the pump.

12.1.3 Insalling the pump (at the customer)

12.1.3.1 Installing the gear motor

The rated speed of the selected gear motor may deviate +10% from the calculated pump speed.

To achieve the calculated pump speed, we recommend operating the gear motor on the frequency inverter.

Components for ATEX applications

If the pump is used in potentially explosive atmospheres, all devices and components must be suitable for this. Suitability is given when all equipment/ components have an ATEX declaration of conformity the markings of which match the ATEX marking on the pump.

12.1.3.2 Installing the coupling

Choose a sufficiently dimensioned coupling.

Components for ATEX applications

If the pump is used in potentially explosive atmospheres, all devices and components must be suitable for this. Suitability is given when all equipment/ components have an ATEX declaration of conformity the markings of which match the ATEX marking on the pump.

Observe the permissible layer thicknesses of the corrosion treatment for ATEX applications.

Assembly and base

Mount the pump and the gear motor on a joint base.

After assembly, align the pump shaft and the gear shaft with each other.

Alignment of the pump shaft to the gear motor shaft

Carry out the alignment of the coupling according to the assembly instructions of the selected coupling manufacturer.

The correct adjustment of the coupling is done by aligning the pump shaft to the drive shaft.

For details, see Section 6.3.3.1, Page 33.

Coupling guard

A coupling guard must be fitted in accordance with the Machine Directive 2006/42/EC*Chapter 1.4 Requirements for guards*.

Commissioning

Any machine may only be put into operation if it complies with the provisions of the Machine Directive (2006/42/EC).

The pump can be used as intended. The intended use is described in the order documents and in Section 2.1, Page 14 these operating instructions.

ATEX 2014/34/EU Guidelines

§ 55 Manufacturer/Installation

As long as the end user only uses a product and does not manufacture it, he is not a manufacturer according to the definition in the ATEX 2014/34/EU Directive.

The use of products also includes the integration of already ATEX-compliant products by the end user into his plant after a complete risk assessment, including occupational health and safety topics, interfaces and interactions with the existing system has been carried out in accordance with the Ordinance on Industrial Safety and Health (BetrSichV).

As a result, such an integration, which is unique and takes into account the known purpose and specific operating conditions of the installation, does not fall within the scope of ATEX 2014/34/EU Directive.

The integration of a pump, coupling, motor, the mounting plate by the end user into a system is considered an installation taking into account the pumped media and the operating conditions.

12.2 Certificate of non-objection

Certificate of non-objection

This section contains a certificate of non-objection. In the event of inspection or repair send the pump including this certificate to HILGE.

Certificate of non-objection

The following pump and its accessories, together with this certificate of non-objection, are herewith contracted out by the undersigned for inspection/repair:

Pump data

- Model:
- No.:
- Delivery date:

  Reason for inspection / repair contract

_____

_____

_____

_____

The pump (please mark with a cross)

___ was not used in liquids hazardous to health

___ was used for the following:

_____

Please state the last liquid pumped, if known:

_____

The pump was carefully drained and also cleaned inside and out before it was shipped/made available. (please mark with a cross).

___ No special safety measures are required in the course of further handling.

___ The following safety measures pertaining to flushing liquids, residual liquids, and disposal are required:

_____

_____

_____

_____

We confirm that the information given above is correct and complete and that shipment is in compliance with legal regulations.

Company (address): _____

Telephone: _____

Fax: _____

Email: _____

Name (incl. title) (please print): _____

Date: _____

Company stamp / signature:

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a better world

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GEA is a global technology company with multi-billion euro sales operations in more than 50 countries. Founded in 1881 the company is one of the largest providers of innovative equipment and process technology. GEA is listed in the STOXX® Europe 600 Index. In addition, the company is included in selected MSCI Global Sustainability Indexes.

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