

## Disc

The disc, which is inserted in the cover, contains the user manual(s) of the Bredel 265, Bredel 280 and Bredel 2100 hose pumps in the following languages:

English (UK)	Nederlands	Русский
English (US)	Polski	Svenska
Español	Português	Suomi
Français		

The disc also contains quick-reference instructions for the replacement of the pump hose. This replacement instruction is only for users that are familiar with the replacement procedures in the user manual.

## How to use the disc

- 1 Put the disc in the disc drive.
- 2 Close the disc drive.  
The disc will start automatically.
- 3 Wait until the various language versions appear on screen.
- 4 Select the required language (click 1x with the left mouse button).  
The PDF reader program will automatically start and the required user manual appears on screen.

## Shortcuts

In the left margin you will find the various chapters and paragraphs. These can be accessed directly by clicking on the required chapter or paragraph.

In the text you will find hyperlinks to chapters or paragraphs. These hyperlinks are linked with the required chapters or paragraphs. By clicking a shortcut the required chapter or paragraph appears on screen.

## System requirements

The program on the disc requires a PC with the following minimum system requirements:

- Disc drive

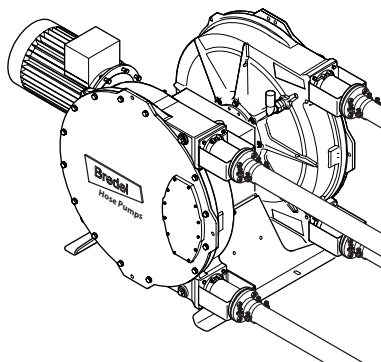
The following software must be installed on the PC:

- PDF reader program
- an Internet browser



# Hose pump series Bredel 265, Bredel 280 and Bredel 2100

## Manual



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**SAFETY FORM****NOTES**

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## **1 GENERAL**

### **1.1 How to use this manual**

This manual is intended as a reference book by means of which qualified users are able to install, commission and maintain the hose pumps mentioned on the front cover.

### **1.2 Original instructions**

The original instructions for this manual have been written in English. Other language versions of this manual are a translation of the original instructions.

### **1.3 Other supplied documentation**

Documentation of components such as motors, gearboxes and inverters is normally not included in this manual. However, if additional documentation is supplied, you must follow the instructions in this additional documentation.

### **1.4 Service and support**

For information with respect to specific adjustments, installation, maintenance or repair jobs which fall beyond the scope of this manual, contact your Bredel representative. Make sure you have the following data at hand:

- Serial number hose pump
- Article number pump hose
- Article number gearbox
- Article number electric motor
- Article number frequency controller

You will find these data on the identification plates or stickers of the pumphead, the pump hose, the gearbox and the electric motor. See § [4.1.1](#).



## 1.5 Environment and disposal of waste

**CAUTION**


Always observe the local rules and regulations with respect to processing (non reusable) parts of the hose pump.


Inquire within your local government about the possibilities for reuse or environment-friendly processing of packaging materials, (contaminated) lubricant and oil.


## 2 SAFETY

### 2.1 Symbols

In this manual the following symbols are used:

	<b>WARNING</b> Procedures which, if not carried out with the necessary care, may result in serious damage to the hose pump or in serious bodily harm.
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	<b>CAUTION</b> Procedures which, if not carried out with the necessary care, may result in serious damage to the hose pump, the surrounding area or the environment.
--	---

	Remarks, suggestions and advice.
---	----------------------------------

### 2.2 Intended use

The hose pump is exclusively designed for pumping suitable products. Every other or further use is not in conformance with the intended use.

The "Intended use" as laid down in EN 292-1 is "... the use for which the technical product is intended in accordance with the specifications of the manufacturer, inclusive of his indications in the sales brochure". In case of doubt it is the use which appears to be its intended use judging from the construction, execution and function of the product. Observing the instructions in the user's documentation also belongs to intended use.

Only use the pump in accordance with the intended use described above. The manufacturer cannot be held responsible for damage or harm resulting from misuse. If you want to change the application of your hose pump, contact your Bredel representative first.

### **2.3 Responsibility**

The manufacturer does not accept any responsibility for damage or harm caused by not (strictly) observing the safety regulations and instructions in this manual and the also supplied documentation, or by negligence during installation, use, maintenance and repair of the hose pumps mentioned on the front cover. Depending on the specific working conditions or accessories used, additional safety instructions can be required.

Immediately contact your Bredel representative, if you noticed a potential danger while using your hose pump.

**WARNING**

The user of the hose pump is always fully responsible for observing the local valid safety regulations and directives. Observe these safety regulations and directives when using the hose pump.

### **2.4 Qualification of the user**

The installation, use and maintenance of the hose pump should only be performed by well-trained and qualified users. Temporary staff and persons in training may use the hose pump only under the supervision and responsibility of trained and qualified users.

## **2.5 Regulations and instructions**

- Everyone who works with the hose pump must be aware of the contents of this manual and observe the instructions with great care.
- Never change the order of the actions to be carried out.
- Always store the manual and the manuals of the gearbox and the electric motor near the hose pump.

### **3 WARRANTY CONDITIONS**

The manufacturer offers a two-year warranty on all parts of the hose pump. This means that all parts will be repaired or replaced free of charge, with the exception of consumables such as pump hoses, hose clamps, ball bearings, wear rings, seals and rubber bushes, or parts which have been used wrongly, misused, whether or not they have been intentionally damaged. If genuine Watson-Marlow Bredel (hereafter called Bredel) parts are not used, any warranty claim is void.

Damaged parts which are covered by the applicable warranty conditions can be returned to the manufacturer. The parts must be accompanied by a fully filled in and signed safety form, as present in the back of this manual. The safety form must be applied to the outside of the shipping carton. Parts which have been contaminated or which have been corroded by chemicals or other substances which can pose a health risk must be cleaned before they are returned to the manufacturer. Furthermore, it should be indicated on the safety form which specific cleaning procedure has been followed, and that the equipment has been decontaminated. The safety form is required even if the parts have not been used.

Warranties purporting to be on behalf of Bredel B.V. made by any person, including representatives of Bredel B.V., its subsidiaries, or its distributors, which do not accord with the terms of this warranty shall not be binding upon Bredel B.V. unless expressly approved in writing by a Director or Manager of Bredel B.V.

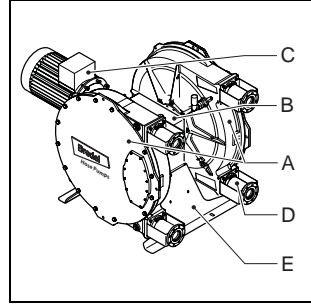
## 4 DESCRIPTION

### 4.1 Identification of the product

#### 4.1.1 Identification of the product

The hose pump can be identified based on the identification plates or stickers on:

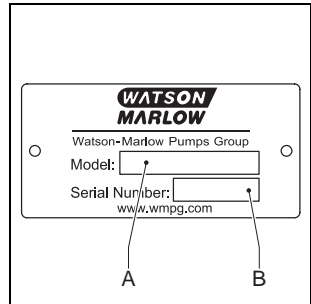
- A:** Pumphead
- B:** Gearbox
- C:** Electric motor
- D:** Pump hose
- E:** Frame



#### 4.1.2 Identification of the pump

The identification plate on the pump head contains the following data:

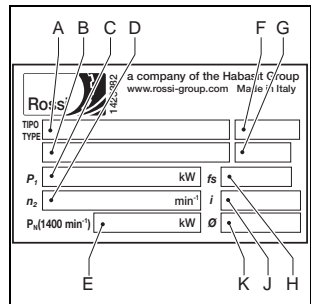
- A:** Pump model
- B:** Serial number



#### 4.1.3 Identification of the gearbox

The identification plate on the gearbox contains the following data:

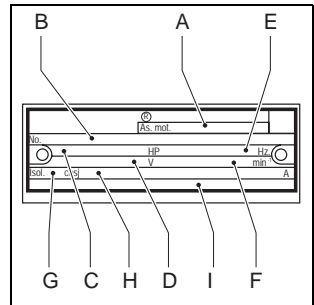
- A:** Type number
- B:** Batch number
- C:** Motor power
- D:** Gear motor output speed
- E:** Gear reducer nominal power
- F:** Two months and year of manufacture
- G:** Mounting position
- H:** Gear motor service factor
- J:** Transmission ratio
- K:** Diameter Flange - motor shaft



**4.1.4 Identification of the electric motor**

The identification plate on the electric motor contains the following data:

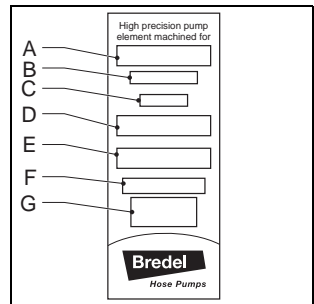
- A:** Serial number
- B:** Type number
- C:** Power
- D:** Voltage
- E:** Frequency
- F:** Pole no./Speed
- G:** Insulation class
- H:** Rise in temperature
- I:** Bredel article or order number



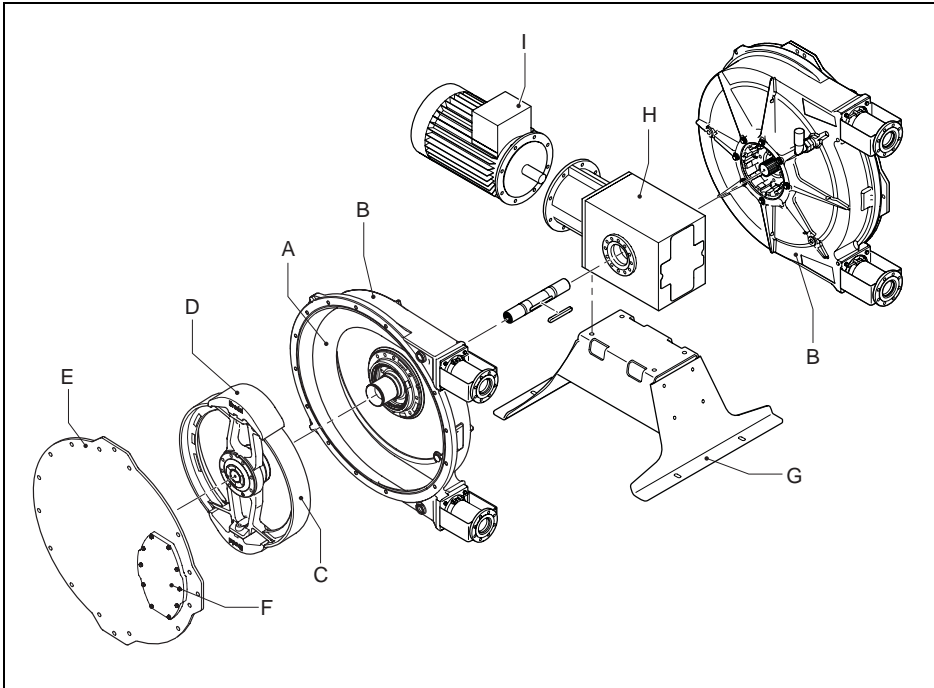
**4.1.5 Identification of the pump hose**

The identification sticker on the pump hose contains the following data:

- A:** Pump type
- B:** Reorder number
- C:** Internal diameter
- D:** Type of material of inner liner
- E:** Remarks, if applicable
- F:** Maximum permissible working pressure
- G:** Production code



## 4.2 Construction of the pump



- A:** Pump hose
- B:** Pump housing
- C:** Rotor
- D:** Pressing shoes
- E:** Cover
- F:** Inspection window
- G:** Frame
- H:** Gearbox
- I:** Electric motor

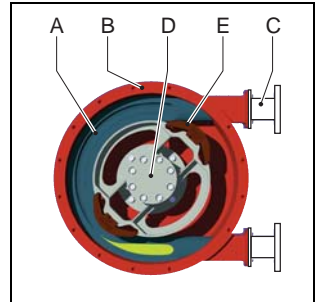
## 4.3 Operation of the pump

The heart of the pump head consists of a specially constructed pump hose (A) which lies contorted against the inside of the pump housing (B). Both ends of the hose are connected to the suction and discharge lines

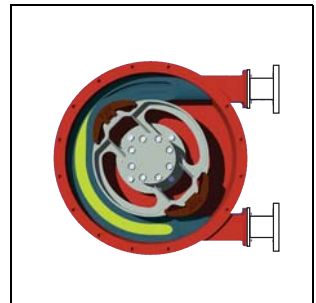


by means of a flange construction (C). A bearing-mounted rotor (D) with two facing pressing shoes (E) is in the center of the pump head.

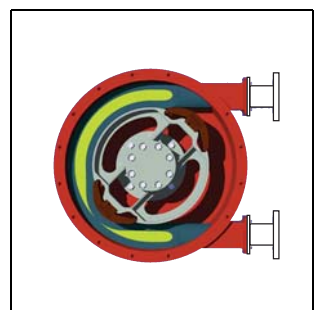
In phase 1 the lower pressing shoe compresses the pump hose by the rotational movement of the rotor, forcing the fluid through the hose. As soon as the pressing shoe has passed, the hose recovers to its original shape due to the mechanical properties of the material.



In phase 2 the product is drawn into the hose by the (continuous) turning motion of the rotor.



In phase 3, the second pressing shoe will subsequently compress the pump hose. Due to the continuous rotating movement of the rotor not only new product is sucked in, but also the already present product is pressed out by the pressing shoe. When the first pressing shoe runs from the pump hose, the second pressing shoe has already closed the pump hose and the product is prevented from flowing back. This method of liquid displacement is also known as the "positive displacement principle".

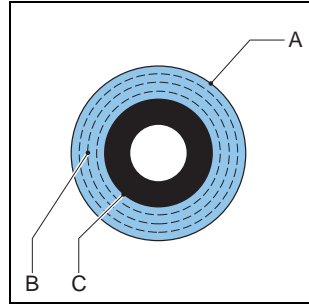


## 4.4 Pump hose

### 4.4.1 General

The pump hose is made of special rubbers, reinforced with nylon cords and is constructed as follows:

- A:** Outer extruded layer made of natural rubber
- B:** Four nylon reinforcement layers
- C:** Inner extruded liner



The pump hose liner material should be chemically resistant with the product to be pumped. Dependent on the specific requirements of your application a corresponding pump hose must be selected. For each pump model various hose types are available.

The material of the inner liner of the pump hose determines the hose type. Each hose type is marked by a unique color code.

Hose type	Material	Color code
NR	Natural rubber	Purple
NBR	Nitrile rubber	Yellow
EPDM	EPDM	Red
CSM	CSM	Blue

#### Natural Rubber\*

Always the first choice hose. A highly dynamic material, which has excellent abrasion resistance and mechanical strength, and is generally resistant to diluted acids and alcohols.

Max. liquid temperature 80 °C (175 °F).

Min. temperature -20 °C (-5 °F).

#### Nitrile rubber\*

A highly abrasion proof and wear resistant material that is generally resistant to oils, fats, alkaline, and detergents. Suitable for a wide range of food handling and meets FDA and 3A standards.

Max. liquid temperature 80 °C (175 °F).

Min. temperature -10 °C (15 °F).

**EPDM\***

Good chemical resistance especially to concentrated acids, ketones, and alcohols.

Max. liquid temperature 90 °C (195 °F).

Min. temperature -10 °C (15 °F).

Consult Bredel technical services for details on higher temperature operation, up to 90 °C (195 °F) with EPDM.

**CSM\***

Good chemical resistance for strong oxidizing products like concentrated acids and oxygen generating substances.

Max. liquid temperature 80 °C (175 °F).

Min. temperature -10 °C (15 °F)

Consult Bredel technical services for RPM limitations when using CSM.



\* Consult your Bredel representative for more detailed information about the chemical and temperature resistance of pump hoses.

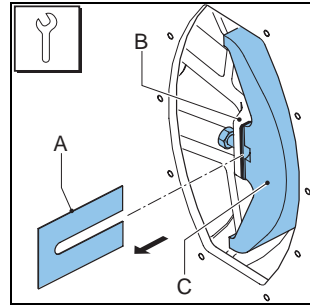
The Bredel pump hoses have been carefully machined, therefore there are minimum tolerances in wall thickness. This is very important to guarantee the correct compression of the pump hose, because:

- When the compression is too high, it creates a load on the pump and pump hose that is too high, which may result in a reduction of the life of the pump hose and bearings.
- When the compression is too low this will result in high velocity backflow (slip). Backflow results in a reduction of pump performance, hydraulic efficiency, and negatively impact the life of the pump hose.

#### 4.4.2 Hose compression force adjustment (shimming)

In order to achieve optimal life of the pump hose, the compression force of the pump hose can be adjusted by placing a number of shims under the pressing shoes. The shims (A) are fitted between the rotor (B) and the pressing shoe (C). The number of shims will vary for each discharge pressure situation.


The paragraph 8.8 describes how to select and install the shims.



#### 4.4.3 Lubrication and cooling

The pump head, in which the rotor and pump hose can be found, is filled with Bredel Genuine Hose Lubricant. This lubricant lubricates the movement between the hose and the pressing shoes and dissipates the generated heat via the pump housing and the cover.

The lubricant is food grade. See § 11.1.4 for the required quantity and NSF registration.

	Consult your Bredel representative for lubrication recommendations when operating the hose pump below 2 rpm.
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## 4.5 Gearbox

### 4.5.1 General

The hose pump types described in this manual use a bevel-helical gearbox. The gearbox is mainly used for high reduction ratios and low input speeds. This modular construction enables a wide range of reductions, torques and connection possibilities for the electric motor.

### **4.5.2 Maintenance**

For all information on maintenance and lubrications, see the manual of the gearbox.

Check the oil level regularly. If necessary, refill the oil level. Avoid mixing oils of different types. In case of doubt, change the oil completely. Also check that there are no metallic parts with unusual dimensions in the oil.

Special attention must be paid to very loaded output stages and with very low speeds (<1 rpm). In such cases, always use high viscosity oils with a good amount of Extreme Pressure (EP) additive.

Gearboxes, which are not particularly loaded and that have an intermittent operating cycle without considerable temperature ranges, can be lubricated with mineral oil.

When the gearboxes are heavily loaded and used in a continuous way, this can result in temperature increase. In this case, it is best to use polyalphaolefin synthetic lubricants (PAO). Use a synthetic lubricant when the ambient temperature is below -20 °C (-4 °F).

For special applications where high powers and speeds are involved, consult your Bredel representative.

### **4.6 Electric motor**

If the electric motor has been supplied, please consult the motor manual and nameplate for details on its specification. Most typically, AC squirrel cage induction motors drive the hose pumps.

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#### **4.7 Available options**

The following options are available for the hose pump:

- High (lubricant) level float switch
- Low (lubricant) level float switch
- Revolution counter
- Cover lifting device (CLD)
- Heavy duty bearings
- Epoxy pressing shoes
- Stainless steel 316 flanges, flange brackets, hose clamps, support and mounting articles
- Different flange standards (EN, ANSI, JIS)
- Vacuum assist facility

## **5      INSTALLATION**

### **5.1    Unpacking**

When unpacking, carefully follow the instructions as given on the packaging or on the hose pump. This also applies to the unpacking of the gearbox and the electric motor.

### **5.2    Inspection**

Check that your delivery is correct and check it for any transport damage. Also when replacing parts, check that the delivery of the replacement parts is correct and check them for any transport damage. See § 4.1.1. Report any damage immediately to your Bredel representative.

### **5.3    Installation conditions**

#### **5.3.1   Ambient conditions**

##### *Temperature*

Make sure that the hose pump is in an area where the ambient temperature during operation is not lower than -20 °C (-4 °F) and not higher than +45 °C (+113 °F).

The minimum start-up temperature for the gearbox is -10 °C (+15 °F). A heater is required for temperatures below -10 °C (+15 °F).

Note that some motors may not be suitable for this entire range of temperature. Consult your motor manufacturer's documentation for suitability of the motor in your ambient conditions.

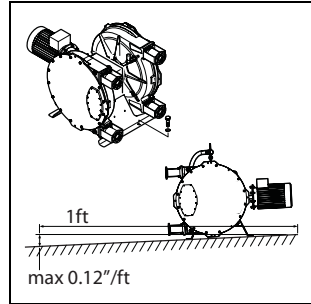
##### *Atmospheric humidity*

When the unit must be stored for a long period of time, especially in humid conditions, fill the gearbox completely with oil and protect the machined parts with rust inhibitors.

For extreme conditions, special precautions must be taken. Contact your local Bredel representative for additional information.

### 5.3.2 Set-up

- The pump materials and protective layers are suitable for indoor set-up and a protected outdoor set-up. Under certain conditions the pump is suitable for limited outdoor set-up or a salty or aggressive atmosphere. Consult your Bredel representative for more information.
- Position the pump on a horizontal surface. Use suitable anchor bolts to attach the pump to the floor surface.
- Make sure that there is sufficient room around the pump to carry out the necessary maintenance activities.
- Make sure that the room is sufficiently ventilated, so that the heat developed by the pump and drive can be discharged. Keep some distance between the ventilation cover of the electric motor and wall to enable the supply of necessary cooling air.
- A qualified electrician who is fully conversant with the appropriate regulations should connect the electric motor.
- Motor wiring: Follow the guidelines issued by the motor manufacturer. A current overload relay should be fitted to a contact breaker. Connect the motor in accordance with the manufacturer's instructions. When a thermal protection switch is fitted in the motor, the leads will be found in the motor terminal box. They should be connected to stop the pump if the switch changes state.
- A qualified electrician who is fully conversant with the appropriate regulations should connect liquid level switches and/or revolution counter.





### 5.3.3 Pipework

When determining and connecting suction and discharge lines consider the following points:

- The bore size of the suction and discharge lines must be larger than the bore size of the pump hose. For more information consult your Bredel representative.
- Limit the presence of sharp bends in the discharge line. Make sure that the radius of the bent discharge line is as large as possible (preferably  $R=4d$  to  $5d$ ). It is recommended to use Y-connections instead of T-connections.
- Keep the piping at a minimum equal to or greater than the bore size of the pump. Increase the bore size of the pipe work when the duty fluid has a high velocity or inertia. This will help keep friction and impulse losses to a minimum. Where critical velocities are a concern, consult your Bredel representative.
- For the flexible hoses select compatible materials and ensure the installation is suited for the design pressure of the system.
- Keep the delivery and suction lines as short and direct as possible.
- Prevent any possibilities of exceeding the maximum working pressure of the hose pump. See § 11.1.1. If necessary fit a pressure relief valve or shutdown switch. Consult your Bredel representative for detailed information.



#### CAUTION

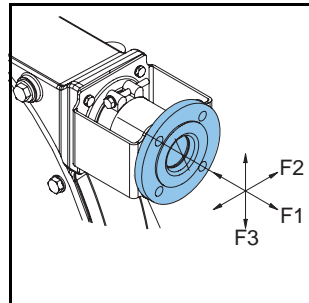
Consider the maximum permissible working pressure on the discharge side. Exceeding the maximum working pressure may lead to serious damage to the pump.

- Consult your Bredel representative for recommendations on mounting pulsation dampening devices. A pulsation dampener and/

or inlet pulse accumulator may be necessary if the relative density and pump speed is high and the line lengths are long.

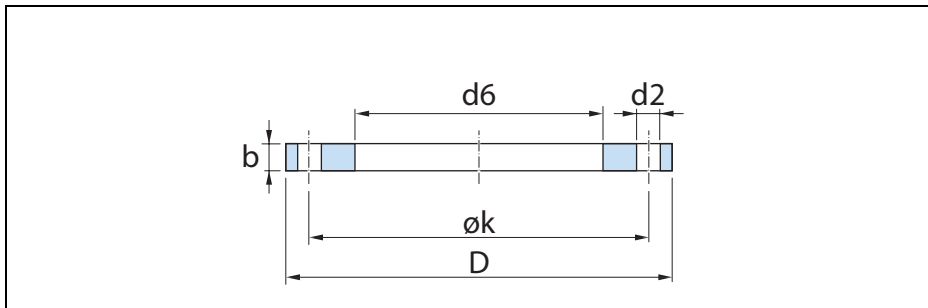
- The self-priming and positive displacement nature of peristaltic pumps means that valves are not required. If for whatever reason valves are fitted into the system, they must have a straight fluid path and cause minimum restriction to flow in the pumping circuit. Note that the presence of check valves directly in the process stream may increase pulsation and negatively impact hose life.
- For the ease of hose changing and some pulsation suppression, it is recommended to use a segment of flexible hose between the pump flange and hard piping of the suction and/or discharge line. A segment of three quarters (3/4) of the pump hose length for the flexible pipe work is recommended. Bredel also recommends installing an isolation valve and pipe-drain in the suction and discharge pipework to allow fluid isolation and drainage from the pump during maintenance. Following these recommendations will help minimize process fluid exposure to maintenance personnel.
- Make sure that the maximum forces on the flanges are not exceeded. The permissible loads are given in the following table.

Maximum permissible loads [lbf] on the pump flange			
Force	Bredel 265	Bredel 280	Bredel 2100
F1	315	450	450
F2	67	90	90
F3	157	225	225



### 5.3.4 Flange sizes of the pipework

The table below shows the flange sizes on the pumphead for external connection.



#### CAUTION

Apply a sufficiently large pipe diameter when joining both discharge lines or both suction lines.

Flange sizes							
Pump	EN-ANSI	D	d6	b	k	Number	d2
Bredel 265	EN1092-1 [mm]	185	81	20	145	4	18
	ANSI [inches]	7	2.94	7/8	5-1/2	4	3/4
Bredel 280	EN1092-1 [mm]	200	94	20	160	8	18
	ANSI [inches]	7-1/2	3.57	15/16	6	4	3/4
Bredel 2100	EN1092-1 [mm]	220	119	22	180	8	18
	ANSI [inches]	9	4.57	15/16	7-1/2	8	3/4

## 5.4 Lifting and moving the pump

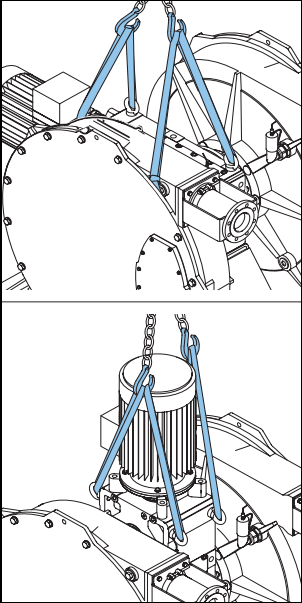
### 5.4.1 Lifting the complete unit

The pump can be delivered in several mounting positions. The gear motor unit can be placed in a vertical and horizontal position.

- Applicable for both configurations, use the through holes or tapped holes of the gear reducer casing when lifting and transporting the pump unit. Make sure that the load is properly balanced and provide hooks, lifting systems and cables suitable for the total mass of the pump unit. The illustrations show the proper way to lift the units.

	<p><b>CAUTION</b></p> <p>Do not use the eye bolts on the motor when lifting the pump unit.</p>
--	--

The maximum ratings are shown in the table below.



Maximum rating	Weight [kg]			Weight [lbs]		
	Bredel 265	Bredel 280	Bredel 2100	Bredel 265	Bredel 280	Bredel 2100
Pump with gearbox	1261	1948	2715	2774	4286	5972

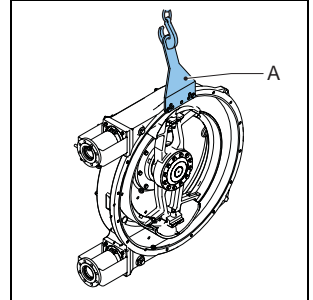
	<p><b>WARNING</b></p> <p>If the pump is to be lifted ensure that all standard lifting practices are adhered to and carried out by qualified personnel only.</p>
--	---

### 5.4.2 Lifting the pumphead

1. Lift the pumphead by using the lifting hole on the top of the pump cover, see §5.4.3.
2. During the (dis)assembly of the pumphead from the adaption ring, use the special-made lifting tool (A).



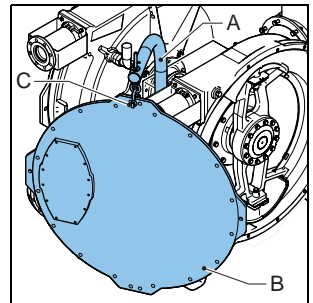
The lifting tool makes sure that the pumphead is positioned vertically in front of the adaption ring. This makes it easier to mount or dismount the pumphead. The lifting tool can be supplied by Bredel.



The working load limit (WLL) of the lifting tool is 1100 kg/2420 lbs. For weights of the pumphead, see §11.1.5.

### 5.4.3 Lifting the pump cover

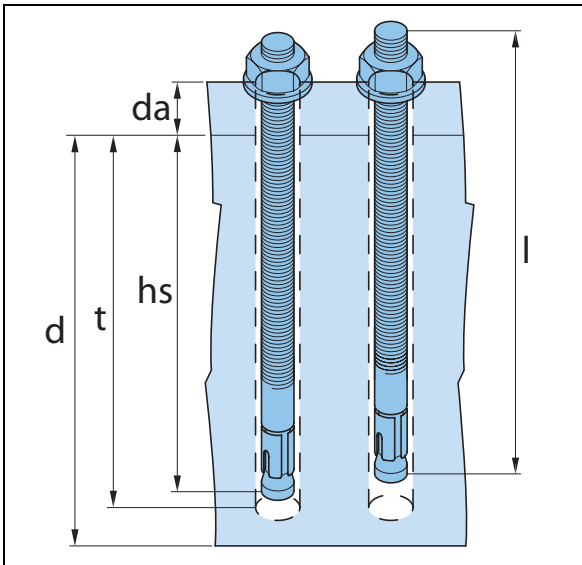
1. The cover (B) can be lifted by using the lifting hole (C) on the top of the pump cover. For weights of the pump cover, see §11.1.5. The cover can also be lifted by means of a cover lifting device (A), also called CLD. For mounting the cover lifting device, see §8.9.4 for the horizontal configuration and see §8.9.5 for the vertical configuration.



### 5.5 Placing the pump

Follow the next steps to make sure the anchor bolts are used properly.

1. Drill the holes.
2. Clean the bore holes.
3. Use a hammer to drive the anchor into the bore.
4. Tighten the bolt to the applicable moment setting ( $M_D$ ).



- $d_a$ : Min. material thickness
- $t$ : Min. drill depth
- $h_s$ : Min. hole depth
- $d$ : Foundation depth
- $l$ : Anchor bolt depth

		<b>Bredel 265</b>	<b>Bredel 280</b>	<b>Bredel 2100</b>
Flange dimensions	$d_a$ ["]	0.39	0.59	0.59
Flange hole dimensions	["]	0.70 x 1.18	0.87x1.77	0.87x1.77

		<b>Bredel 265</b>	<b>Bredel 280</b>	<b>Bredel 2100</b>
Bredel part no.		F550041	F550048	F550048
Bolt thread		M16	M20	M20
Bolt length	l ["]	5.71	5.71	5.71
Foundation height	d ["]	9.84	9.84	9.84
Drill diameter	Ø ["]	0.62	0.79	0.79
Min. drill depth	t ["]	4.33	4.33	4.33
Mounting depth	h <sub>s</sub> ["]	3.94	3.94	3.94
Torque setting	M <sub>D</sub> [lbf in]	445	885	885

**CAUTION**

Install the pump unit before drilling the holes. Then mark the positions of the bolt holes. Drill the bolt holes and install the installation bolts according to the table above.

Contact your local Bredel representative for additional information.

## **6 COMMISSIONING**

### **6.1 Preparations**

1. Check that the correct number of shims corresponds with your application. See § 11.1.7. For adjusting the compression force of the hose, see § 8.8.
2. Check that the lubricant level is above the minimum level line in the inspection window. If necessary add Bredel Genuine Hose Lubricant via the breather/vent plug. See also § 8.4.
3. Connect the electric motor in conformance with the locally applicable rules and regulations. See the manual of the electric motor. Ensure that the electrical installation work is carried out by qualified personnel.
4. Check the rotation of the rotor. The rotational direction of the rotor must match the configuration of suction and discharge piping.
5. Check that the breathers on the rear of the pump and on the gearbox are free from any obstruction.
6. Check to ensure the gearbox has been filled with the proper oil level.



## **6.2 Commissioning**

1. Connect the pipework.
2. Make sure that there are no obstructions such as closed valves.
3. Switch on the hose pump.
4. Check the rotation direction of the pump rotor.
5. Check the capacity of the hose pump. If the capacity differs from your specification, follow the instructions in chapter [11](#) or consult your Bredel representative.
6. Check the hose pump in accordance with points 1 to 4 of the maintenance table from § [8.2](#).

## 7 OPERATION

### 7.1 Temperature

The pump will heat up during normal operation. Heat is generated in the contact zone between the pressing shoe and the hose. The heat is removed by the lubricant and transported to the pump casing and cover. Under conditions of high pressure and running speed, casing and cover temperatures can reach values of over 65 °C (+149 °F).

Under these conditions a person should not be in direct contact with the pump surface to avoid injury by burning.

**WARNING**

Avoid contact with the casing and cover under conditions of high pressure and running speed.

**WARNING**


Do not touch the pump surface during operation. The pump can run very hot.

### 7.2 Power rating

The pump requires a certain amount of power for the specified operating condition(s). The gearbox and motor should be capable of handling these powers at the given revolution speeds.


**WARNING**

Overloading the motor can lead to serious motor damage. Do not exceed the maximum power rating of the motor.



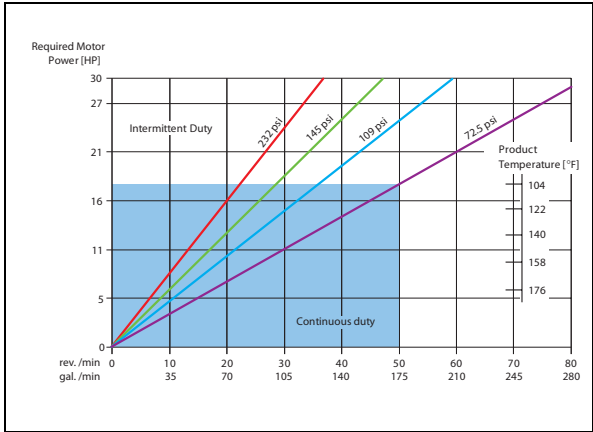
**WARNING**

Overloading the gearbox leads to increased tooth wear and shortened bearing life. This can lead to serious gearbox damage. Do not exceed the maximum power rating of the gearbox.

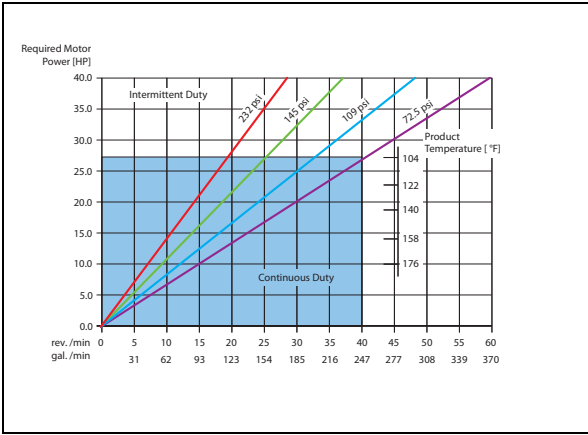


Check the rated powers of the motor and gearbox as indicated on the name plate and check these with the power ratings required for your operating condition.

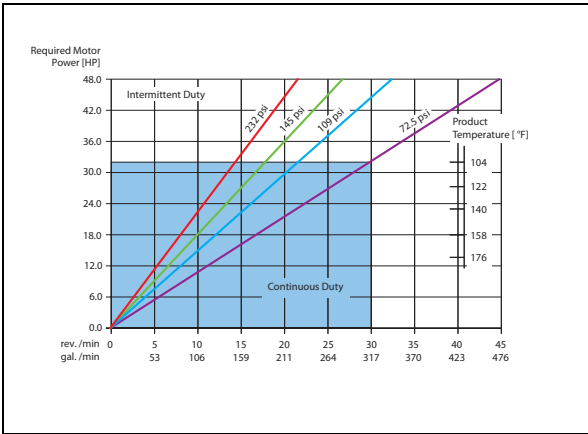
**7.2.1 Performance graph Bredel 265:**



### 7.2.2 Performance graph Bredel 280:



### 7.2.3 Performance graph Bredel 2100:



### 7.3 Dry running

Dry running is a running condition of the pump when no process flow (pumped product) is flowing through the pump. The Bredel peristaltic pumps are very suitable for dry running.

Dry running does impose an additional thermal load on the pump hose, because the internal heat associated with repetitive hose compression is normally removed by convection of the process fluid. So dry running increases the wear of the hose. The magnitude of the thermal load depends on the size and running speed of the pump as well as the amount of shims mounted on the rotor. To minimize the extra wear, it is advised to minimize the dry running periods.

**WARNING**

Do not apply dry running in combination with a flammable process fluid. In case of doubt, consult your Bredel representative.

### 7.4 Hose failure

The hose in a peristaltic pump has to withstand many load cycles of considerable magnitude. The repetitive stress cycles will deteriorate the hose and will eventually cause hose failure. The hose life strongly depends on the operating condition, process fluid and hose material. The end-user should be aware of this and accept the need for regular hose replacement.

A hose failure will result in direct contact between the pump lubricant and the pumped medium. In general, this will not cause a hazardous situation as the Bredel

Genuine Hose Lubricant is harmless (FDA approved), but it will result in additional downtime since the pump needs to be cleaned prior to new hose installation.

**WARNING**

Exceptions to this general rule are when the pumped product is either a strong oxidizer or a strong acid. These products should be avoided as they can cause unwanted chemical reactions with the Bredel Genuine Hose Lubricant and a hazardous situation may arise. In such cases an alternative lubricant should be used. Contact your Bredel representative for more details.

These consequences can be avoided by preventive hose replacement. The moment for preventive maintenance depends on the particular application and use of the hose. The end-user needs to find out the moment for preventive maintenance.

### 7.5 Fluid leakage

The Bredel pump series uses lubricated shoes to compress the hose. This means the pumphead must be filled with a sufficient amount of lubricant during operation. This lubricant is contained in the pump housing by the cover on the front side and by a dynamic seal on the back side. The gearbox is also filled with lubricant.

Seal damage can occur due to normal wear in time, but is seriously accelerated if the seal gets in contact with contaminated fluid (during hose failure). Thorough cleaning of the pump housing after a hose failure is strongly advised.

Both the pumphead and gearbox are directly coupled to each other. A special feature is included in the pumphead to enable early detection of seal damage of the pump or gearbox.

This feature is called the leakage zone. When a seal starts to show increased leakage, this can be detected at the back side of the pump. When drops of lubricant are visible, it indicates upcoming seal failure. To avoid consequential damage, the pump must be stopped and lubricant levels of the pumphead and gearbox must be checked. The damaged seal should be replaced.



Regularly inspect the pump on fluid leakage.



**WARNING**

Risk of injury from falling! Process fluid mixed with pump lubricant that is leaking from the pump can lead to slippery floors.

## 8 MAINTENANCE

### 8.1 General

**WARNING**

Make sure that during maintenance the power supply is disconnected.

**CAUTION**

Only use original Bredel parts when maintaining the hose pump. Bredel cannot guarantee a correct functioning pump and any consequential damage that occurs from the use of non-original Bredel components. See also chapters [2](#) and [3](#).

**CAUTION**

Check that your delivery of original parts is correct and check it for any transport damage. When in doubt, consult your Bredel representative

**WARNING**

Do not remove the pump cover if the power cable is connected to the motor. Do not connect the power cable to the motor if the pump cover is removed.



**WARNING**

If the cover is removed when the pump hose is still in the pumphead, the compression forces on the pump hose may cause deformation of the pump housing. The hose needs to be safely removed before the cover can be replaced.

Normally the compression forces are partially compensated by the cover.

The following steps must be taken:

- 1 Remove pump hose from the pump
- 2 Isolate the motor from the electrical supply.
- 3 Do not remove the cover if the pump hose is still in the pump.



Prior to installation, always check the condition of the supplied parts. Do not install damaged parts. In case of doubt, contact your Bredel representative.

## 8.2 Maintenance and periodic inspections

The following checklist shows the maintenance and periodic inspections that need to be carried out on the hose pump to guarantee an optimal safety, operation and life of the pump.



It is also necessary to carry out periodic inspection of the gearbox and the electric motor. Consult their separate manuals to guarantee an optimal safety, operation and life of the gearbox and the electric motor.

Point	Action	To be carried out	Remark
1	Check the lubricant level.	Before startup of the pump and on a scheduled interval during operation.	Make sure that the lubricant level is above the minimum level line in the inspection window. If necessary refill the lubricant. See also § 8.4.
2	Check the pumphead for any leakage of lubricant around the cover, the flanges and the rear of the pumphead.	Before startup of the pump and on a scheduled interval during operation.	See § 11.
3	Check the gearbox on any leakage.	Before startup of the pump and on a scheduled interval during operation.	In case of leakage consult your Bredel representative.
4	Check pump for deviating temperature or strange noises.	On a scheduled interval during operation.	See § 11.
5	Check pressing shoes for excessive damage.	When replacing the pump hose.	See § 8.6.
6	Internal cleaning of the pump hose.	Cleaning of the system or product change.	See § 8.3.
7	Replacing pump hose.	Preventive, this means after 75% of the hose life of the first hose.	See § 8.6.
8	Changing lubricant.	After every 2 <sup>nd</sup> hose change or after 5,000 service hours, whichever comes first or after hose rupture.	See § 8.4
9	Changing oil in gearbox.	Check the lubrication plate attached to the gear reducer.	Check the operating instructions of the gear reducer. An overall guide to the oil change interval is given in the table.
10	Replacing pump seal.	If necessary.	See § 8.7.3.

Point	Action	To be carried out	Remark
11	Replacing wear ring.	If necessary.	See § 8.7.3.
12	Replacing pressing shoes.	Wear on the running surface.	See § 8.7.2.
13	Replacing bearings.	If necessary.	See § 8.7.4.
14	Maintenance and periodic inspection of the gearbox and motor.	Before start-up of the pump and on a scheduled interval during operation.	Check the manuals of the gearbox and the motor.

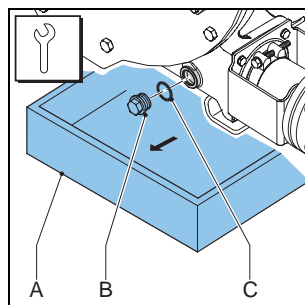
### 8.3 Cleaning the pump hose

Running the pump with clean water can clean the inside of the pump hose. If a cleaning fluid is added to the water, attention must be given to its compatibility with the hose liner material, and also the temperature at which the cleaning procedure will be performed. Sometimes a cleaning sponge can be very helpful.

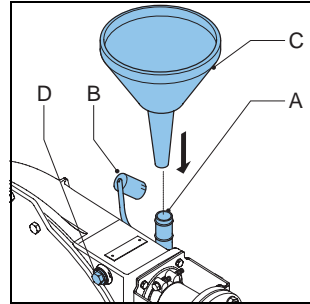
With many products, it is necessary to clean the pump hose immediately once the pump is stopped to avoid sedimentation and/or hardening of the product within the hose that can cause damage upon restart.

### 8.4 Changing lubricant

- Place a tray (A) under the drain plug in the bottom of the pump. Remove the drain plug (B). Catch the lubricant from the pump housing in the tray. Check that the sealing ring (C) is not damaged and replace it if necessary. Position the drain plug and tighten it firmly.



2. The pump housing can be filled with lubricant via the breather/vent (A) on the rear of the pump housing. For this purpose remove the breather cap (B) and position a funnel (C) in the breather. In order to facilitate the filling with lubricant the plug (D) on the front of the pump housing can be removed. Pour the lubricant in the pump housing via the funnel. Continue until the lubricant level has reached above the minimum level line.



<b>i</b>	For the required quantity of lubricant, see § 11.1.4.
----------	---

## 8.5 Changing oil in gearbox

1. Isolate the pump from the electrical supply.
2. Position a tray under the gearbox.
3. See the gearbox manual for procedure on oil change.

<b>i</b>	See the gearbox manual for service intervals and advised lubricants.
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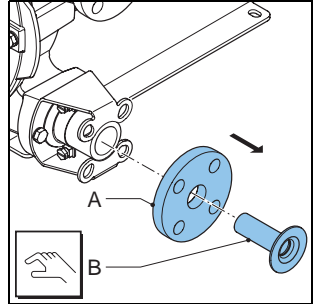
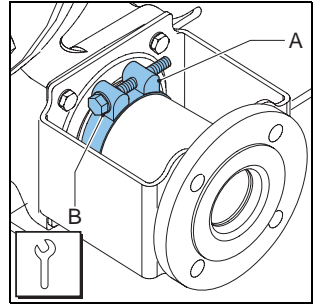
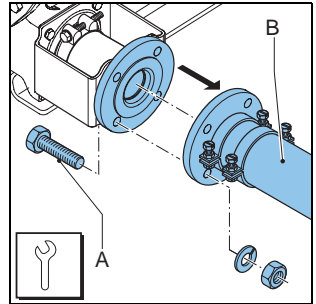
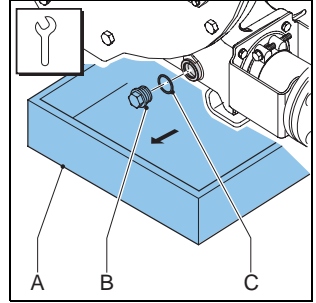
4. Switch on the electrical supply to the pump.

## 8.6 Replacing pump hose

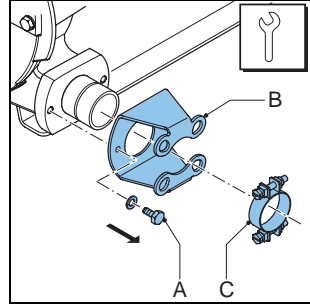
### 8.6.1 Removing pump hose

1. Isolate the pump from the electrical supply.
2. Close any shut-off valves in both the suction and discharge line to minimize product loss.

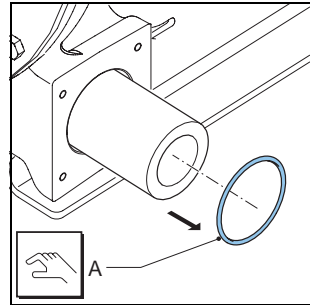
3. Place a tray (A) under the drain plug in the bottom of the pumphead. The tray must be large enough to contain the lubricant, possibly contaminated with product fluid, from the pumphead. Remove the drain plug (B). Catch the lubricant from the pump housing in the tray. Check that the breather vent mounted on the rear is not obscured. Check that the sealing ring (C) is not damaged and replace it if necessary. Position the drain plug and tighten it firmly.
4. Loosen the retaining bolts (A) of both the suction and discharge line (B). Disconnect the suction and discharge lines.
5. Loosen hose clamp (A) of both the inlet and outlet ports by loosening retaining bolt (B).
6. Pull the insert (B) from the hose and remove the flanges (A). Carry out this procedure both for the inlet and outlet ports.



7. Loosen the retaining bolts (A) of the flange bracket (B) and remove the bolts. Slide the flange bracket and the hose clip (C) off the hose. Carry out this procedure both for the inlet and outlet ports.



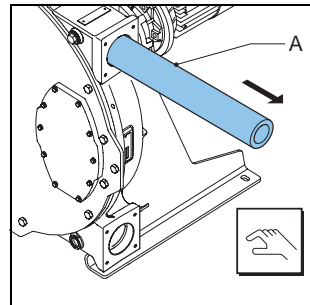
8. Slide off the sealing ring (A). Check that the sealing ring is not deformed or damaged and replace it if necessary. Carry out this procedure both for the inlet and outlet ports.



9. Connect the pump to the electrical supply.

	<p><b>WARNING</b> Removal of the hose is a powered process and requires rotation of the pump. Ensure body and tools are clear from moving parts prior to proceeding with hose removal.</p>
--	--

10. Power out the hose (A) from the pump chamber by jogging the motor.



	<p><b>WARNING</b> During jogging the motor:</p> <ul style="list-style-type: none"> <li>- Do not stand in front of the pump ports.</li> <li>- Do not try to guide the hose by hand.</li> </ul>
--	---

### 8.6.2 Cleaning the pump head

**WARNING**

Never remove the cover when the pump hose is in the pumphead. The compression forces on the pump hose are partially compensated by the cover. By removing the cover with the hose installed, subsequent damage can occur.

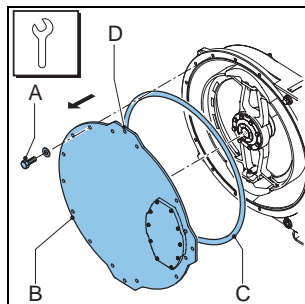
**WARNING**

The cover is heavy. For all weight and torque adjustment, please see the technical information section at the rear of this manual.

1. Isolate the pump from the electrical supply.
2. Use lifting hole (D) to move the cover. Remove the cover (B) by loosening the retaining bolts (A).


**WARNING**

Because of the heavy weight, use the Cover Lifting Device (refer to 8.9.4 and 8.9.5) or suitable equipment to move the cover.




3. Check the sealing ring (C) and replace it if necessary.
4. Rinse the pumphead with clean water and remove all residues. Make sure that no rinsing water remains in the pumphead.


5. Check the pressing shoes for wear or damage and replace them if necessary. See § 8.7.2. Also see the maintenance scheme in § 8.2.

	<p><b>CAUTION</b></p> <p>When the pressing shoes are worn the compression force of the hose decreases. If the compression force is too low, this results in a loss of capacity by the backflow of the liquid to be pumped. Backflow results in a reduction of the life of the pump hose.</p>
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6. Replace the cover and fasten the retaining bolts with the correct torque. See § 11.1.6.
7. Switch on the electrical supply to the pump.

### 8.6.3 Fitting the pump hose

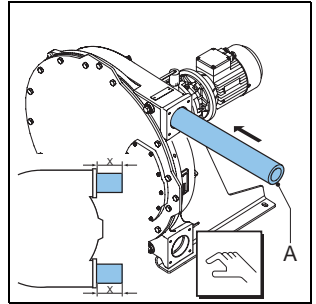
	<p><b>WARNING</b></p> <p>Fitting the pump hose is a powered process and requires pump rotation. Ensure the pump cover is properly fitted and that body and tools are clear from moving parts.</p>
--	---

	<p><b>WARNING</b></p> <p>For all weight and torque adjustment, please see the technical information section at the rear of this manual.</p>
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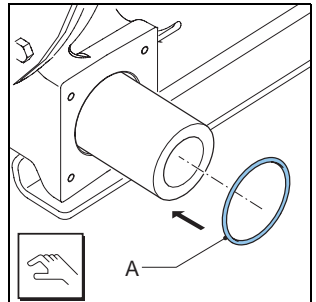
1. Clean the (new) pump hose on the outside and fully lubricate it with Bredel Genuine Hose Lubricant.
2. Turn on the pump and note the direction of the pump rotation.



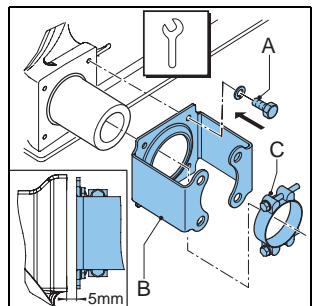
3. Fit the pump hose (A) via one of the ports – whichever is the suction based on rotation direction. Feed the hose into the port and allow the pressing shoe to draw the hose in the pump housing. The rotor will move the hose.
4. Stop the motor when the hose sticks out equally from both sides of the pump housing.



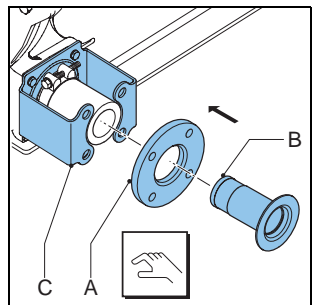
5. First fit the inlet port. Fit the sealing ring. Before mounting, check that the sealing ring (A) is not deformed or damaged and replace it if necessary.



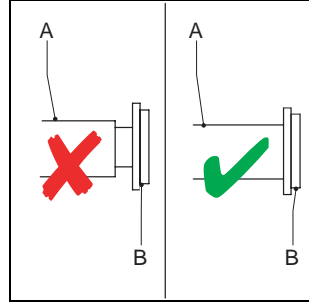
6. Before fitting check that the hose clamp is not damaged and replace it if necessary. Slide the flange bracket (B) and the hose clamp (C) over the hose together. Align the holes in the flange bracket with the ones at the front of the port. Position the four retaining bolts (A) and tighten them until they are approx. 5 mm (3/16") from the port, so that the gap between the flange bracket and the port remains.



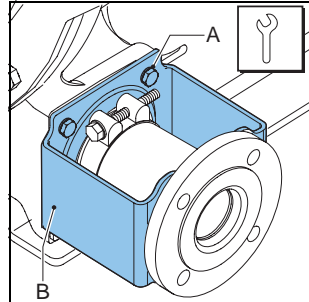
7. Slide insert (B) in the flange (A) and press the insert in the hose. If necessary lubricate the insert with Bredel Genuine Hose Lubricant in order to simplify mounting. Make sure that the holes in flange (A) are aligned with the holes in flange bracket (C). Check that the insert is in the correct place. If the insert is not positioned correctly the product to be pumped may leak or the lubricant may leak.



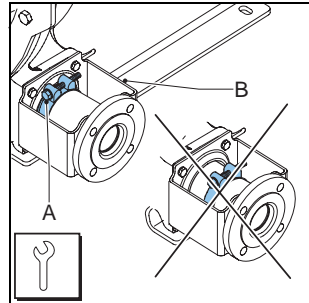
8. Turn the rotor in such a way that the hose (A) is pressed firmly against the flange surface (B).



9. Now fully tighten the retaining bolts (A) of the flange bracket (B). Make sure the bolts are tightened with the correct torque. See § 11.1.6.



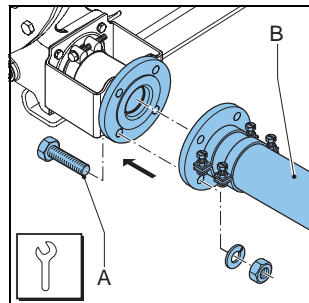
10. Position hose clamp (A) against O-ring chamber of the flange bracket (B) and fasten the retaining bolt. Make sure the bolts are tightened with the correct torque. See § 11.1.6.



11. Now fit the other port. For this port proceed in the same way as described above for the inlet port.

12. Fill the pump housing with Bredel Genuine Hose Lubricant. See § 8.4.

13. Fit the suction and discharge lines (B) and the retaining bolts (A). Tighten the retaining bolts with the correct torque. See § 11.1.6.



## 8.7 Exchanging replacement parts

### 8.7.1 General

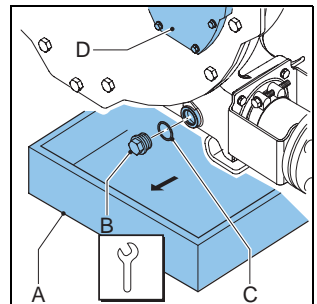
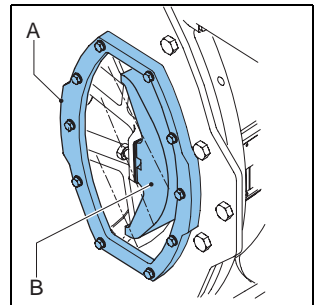


#### CAUTION

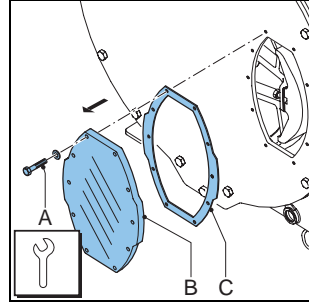
Items may be heavy. For all weight and torque adjustments for replacement procedures under this section, please see the technical information in chapter 11.

### 8.7.2 Replacing pressing shoes

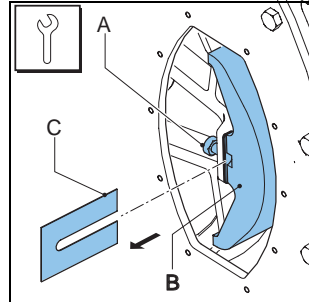
1. Jog the motor until the pressing shoe (B) is positioned in view of the inspection window (A).
2. Isolate the pump from the electrical supply.
3. Place a tray (A) under the drain plug (B) in the bottom of the pumphead. Remove the drain plug. Drain as much Bredel Genuine Hose Lubricant until the level has lowered just below the inspection window (D). Check that the sealing ring (C) is not damaged and replace it if necessary. Position the drain plug and tighten it firmly.



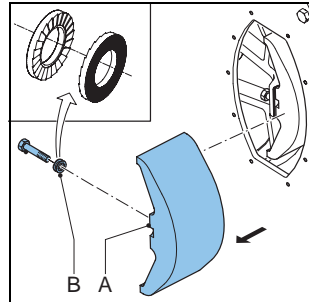
4. Loosen the retaining bolts (A) of the inspection window (B) and remove the bolts. Remove the inspection window. Care must be taken not to damage the gasket (C).



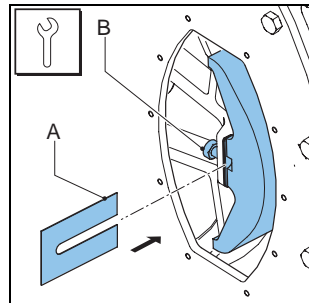
5. Loosen the retaining bolt(s) (A) of pressing shoe (B) a few turns. Remove the shims (C) if present. Loosen the retaining bolt(s) (A) of pressing shoe (B) completely and remove the pressing shoe.



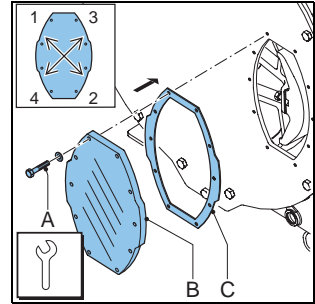
6. Position the (new) pressing shoe (A), check that the NordLock®-rings (B) have been positioned correctly and tighten the retaining bolt(s) a few turns.



7. Fit the removed shims (A) again. Tighten the retaining bolt(s) (B) with the correct torque. See § 11.1.6.

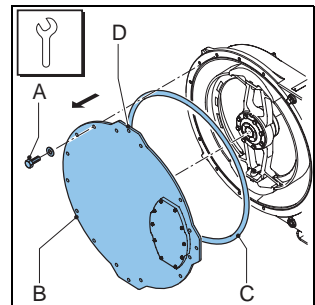


8. Refit the inspection window (B). Check the inspection window gasket (C) for damage and replace if necessary. Make sure that all bolts (A) are refitted and that they are tightened in the correct order, diagonally opposite each other.
9. Switch on the electrical supply.
10. Jog the motor until the second pressing shoe is positioned in front of the inspection window.
11. Isolate the pump from the electrical supply.
12. Repeat the procedure for removing and fitting this second pressing shoe by repeating steps 4 through 9.
13. Refill the lubricant. See § 8.4.



### 8.7.3 Replacing seal and wear ring

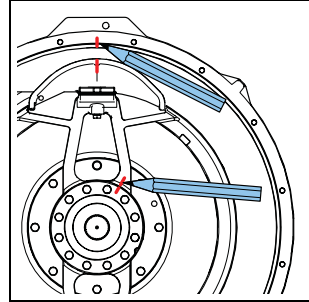
1. Remove the pump hose. See § 8.6.1.
2. Isolate the pump from the electrical supply.
3. Use lifting hole (D) to move the cover. Remove the cover (B) by loosening the retaining bolts (A). Check the sealing ring (C) of the pump cover for damage.




#### WARNING

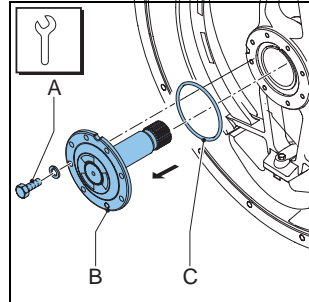
Because of the heavy weight, use the Cover Lifting Device (refer to 8.9.4 and 8.9.5) or suitable equipment to move the cover.

4. Mark the position of the drive shaft in relation to the rotor before removing the drive shaft. Also, mark the position of the rotor in relation to the pump house before removing the retaining bolts. This will ensure that the angle between the two rotors will be 90 degrees.

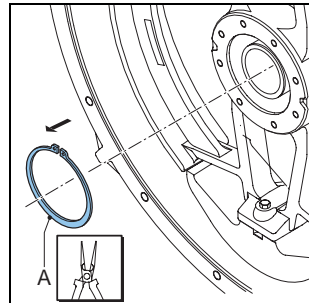


5. Remove the retaining bolts (A) of the drive shaft (B) and remove the drive shaft. Check the sealing ring (C) for damage.

	<p>If the drive shaft cannot be removed manually, use a screwdriver in the slots in the rotor provided for this purpose.</p>
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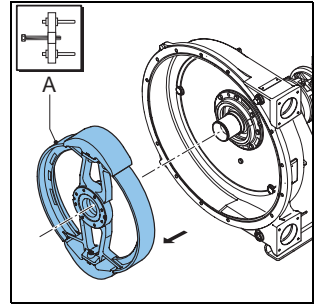
6. Remove the rotor retaining circlip (A), which locks the rotor on the hub. Use the correct tools to do this.



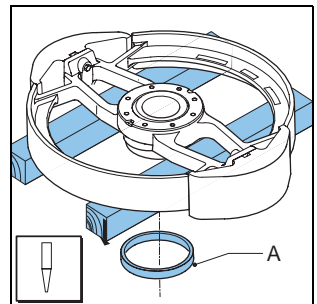
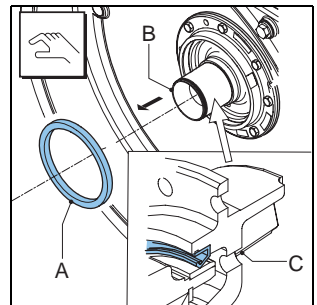
7. Fit the necessary lifting means before dismantling the rotor. Extract the rotor (A) from the hub. A suitable puller or similar extraction tool will be required during this stage of the disassembly.

**WARNING**

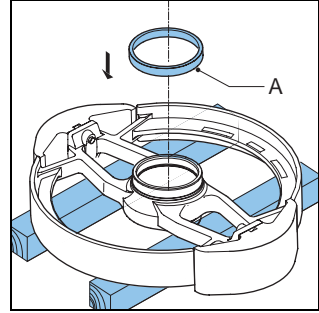
When removing the rotor a belt or similar lifting aid must carry the weight of the rotor. For the specific weight of the rotor, see § 11.1.5.



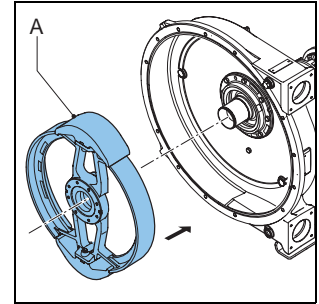
8. Remove the seal (A) from the hub (B). Clean and degrease the bore.
9. Fit a new seal using a wooden block and hammer. Carefully hit the seal crosswise and with equal strength in the bore until it touches the hub. The seal must be fitted in the correct orientation (C). Make sure that the open side points to the pump cover.
10. Support the rotor with wooden blocks at 90° to the spokes, with the ring (A) facing down. Position a suitable punch against the rear of the glued wear ring. Prevent damage to the wear ring seat or other parts.



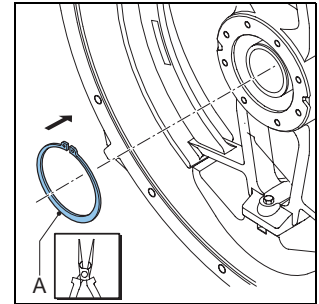
11. Turn the rotor over. Make sure that the seats of the new wear ring (A) and rotor are clean, dry and free of grease. Apply Loctite® type 641 or 603 both on the rotor and the wear ring. Position the new wear ring with the tapered edge facing up. Use a plastic hammer to fit the ring on the rotor until it touches the rotor completely.



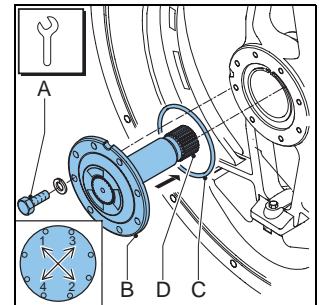
12. Check that the hub is clean and free of grease. Use the markings made in step 4 to fit the rotor (A) in the correct position. The bearings have been placed on the hub with a slight interference fit. Use a pressing tool to press the rotor on the hub.



13. Check rotor retaining circlip (A) for any signs of damage and replace if necessary. Refit the circlip. Use the correct tools for this purpose.



14. Heavily grease the spline (D) of the drive shaft (B) with a graphite-loaded grease. Ensure the mating faces of the drive shaft and rotor are clean, dry and free from lubricant. Check that the sealing ring (C) is not damaged and replace it if necessary. Fit the sealing ring in the groove of the shaft flange. Use the marks for the exact position to fit the drive shaft. Turn the rotor until



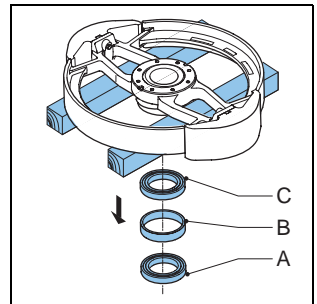
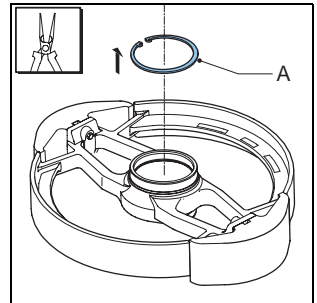


the bolt holes in the drive shaft correspond with the threaded holes in the rotor. Mount the retaining bolts (A) of the drive shaft. Tighten the bolts finger-tight. Tighten them diagonally opposite to each other to the specified torque limits. See § 11.1.6.

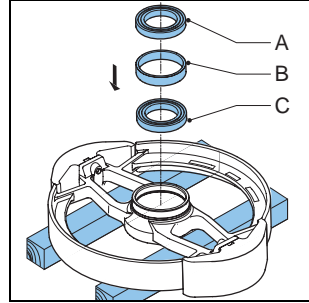
15. Replace the cover and fasten the retaining bolts with the correct torque. See § 11.1.6.
16. Switch on the electrical supply to the pump.
17. Fit the (new) pump hose. See § 8.6.3.

#### 8.7.4 Replacing bearings

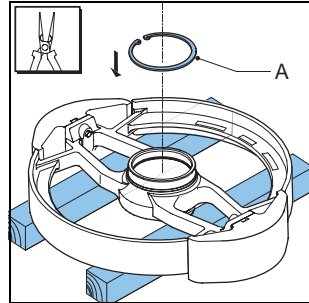
1. Dismount the pump hose, the cover and rotor by following steps 1 through 7 from § 8.7.3.
2. Lay the rotor on a flat surface with the wear ring face up. Remove retaining circlip (A) with the correct tools.
3. Turn the rotor over. Remove using the correct pressing tools, first the first bearing (A), the spacer ring (B) and the second bearing (C) from the rotor. Check the spacer ring for damage. Retain the spacer ring (B).



4. Turn the rotor over. Check that the hub is clean and dry. Press using the pressing tool the first bearing (C) in its place. Position the spacer ring (B). Subsequently press the second bearing (A) in its place.



5. Refit the retaining circlip (A) in the rotor. Use the correct tools for this purpose.
6. Fit the rotor, the cover and pump hose by following steps 11 through 16 from § 8.7.3.



### 8.8 Adjusting hose compression force (shimming)

Fitting and removing shims is a simple action which can be carried out via the inspection window on the front of the pump housing. The pump hose or the pump cover does not need to be removed. In order to determine the correct number of shims for your specific application see § 11.1.7.



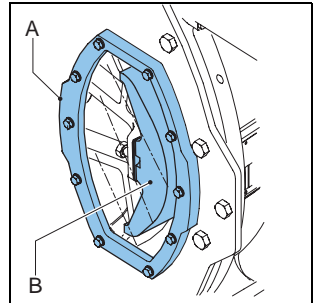
**CAUTION**

Too many shims, this means a too high compression force on the pump hose, create a too high load on the pump head and pump hose, which results in a reduction of the life of the pump hose and bearings.

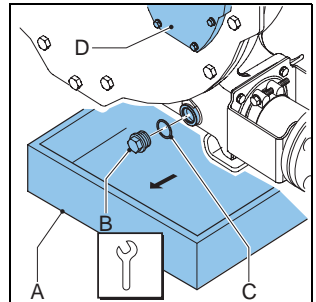
**CAUTION**

Too few shims, this means a too low compression force on the pump hose, create a loss of yield and slip or backflow. Backflow results in a reduction of the life of the pump hose.

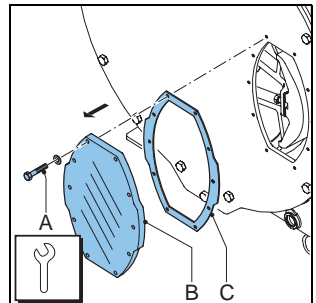
1. Jog the motor until the pressing shoe (B) is positioned in view of the inspection window (A).
2. Isolate the pump from the electrical supply.



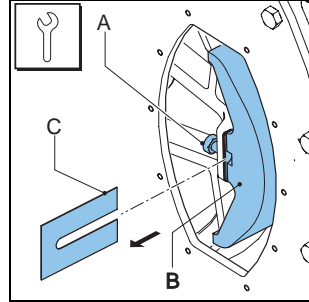
3. Place a tray (A) under the drain plug (B) in the bottom of the pump head. Remove the drain plug. Drain as much Bredel Genuine Hose Lubricant until the level has lowered just below the inspection window (D). Check that the sealing ring (C) is not damaged and replace it if necessary. Position the drain plug and tighten it firmly.



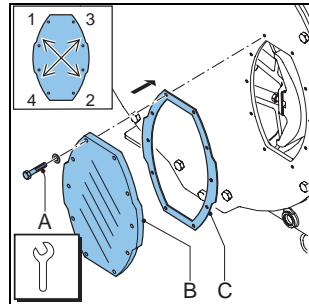
4. Loosen the retaining bolts (A) of the inspection window (B) and remove the bolts. Remove the inspection window. When doing this prevent the gasket (C) from damaging.



5. Loosen the retaining bolt(s) (A) of pressing shoe (B) a few turns. Fit the shims (C) or remove them, until the correct number of shims is present. See § 11.1.7. Tighten the retaining bolt(s) of the pressing shoe with the correct torque. See § 11.1.6.



6. Check the inspection window gasket for damage and replace if necessary. Refit the inspection window (B). Make sure that all bolts (A) are refitted and that they are tightened in the correct order, diagonally opposite each other, to the specified torque limits. See § 11.1.7.

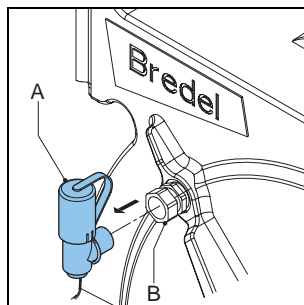


7. Switch on the electrical supply.
8. Jog the motor until the second pressing shoe is positioned in front of the inspection window.
9. Isolate the pump from the electrical supply.
10. Repeat the procedure for this pressing shoe by repeating steps 4, 5, 6 and 7.
11. Refill the lubricant via the breather. See § 8.4.

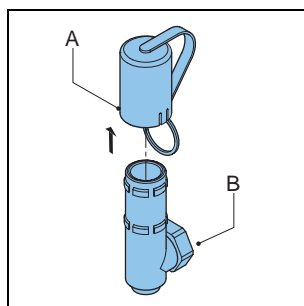
## 8.9 Fitting options

### 8.9.1 Fitting a high-level float switch

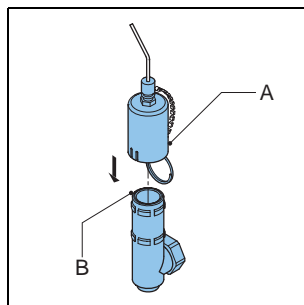
1. Dismount the standard breather (A) on the rear of the pump, by dismounting it from crimp connector (B).



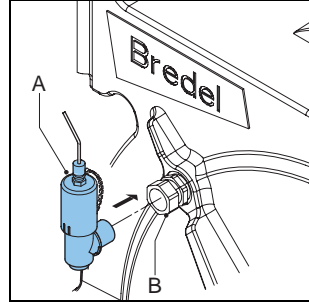
2. Slide the standard breather cap (A) from breather (B).



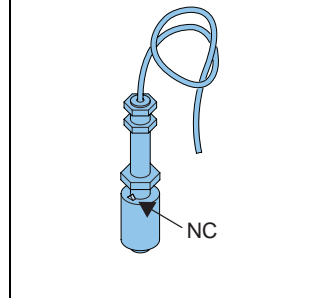
3. Replace the standard breather cap with the breather cap with high level float switch (A) and slide it over breather (B).



4. Fit the breather (A) on the rear of the pump, by mounting it to crimp connector (B).



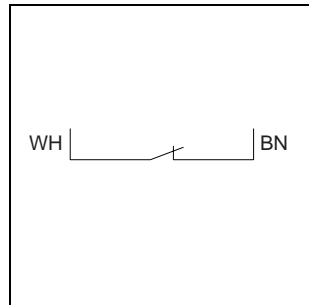
5. Connect the high-level float switch to the electrical supply. Bear in mind that the electrical contact of the float switch is normally closed (NC). When the lubricant level is (too) high the contact will open.



6. The floater has to be connected to the auxiliary power circuit via the 2-meter (6.5-feet) long PVC cable (2 x 0.34 mm<sup>2</sup>, 2 x 22 AWG).

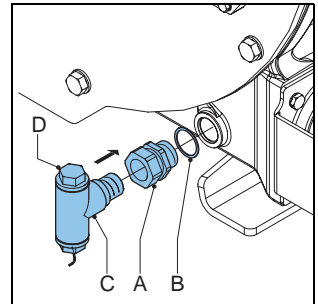
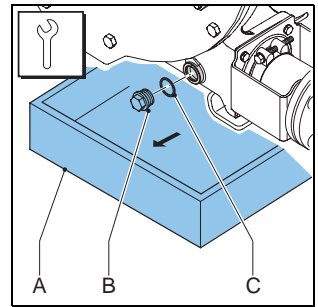
<b>Specifications*</b>	
Voltage	Max. 230 V AC/DC
Current	Max. 2 A
Power	Max. 40 VA

\* For use in non-explosive atmospheres



**8.9.2 Fitting a low level float switch**

1. If the pump is filled with lubricant this must be removed first. Place a clean tray (A) under the drain plug in the bottom of the pump. Remove the drain plug (B). Catch the lubricant from the pump housing in the tray. Check the sealing ring (C) for damage.
  
2. Fit the crimp connector (A) together with the sealing ring (B) to the pump housing. Fit the low-level float switch (C) to the crimp connector (A).
  
3. Connect the low-level float switch to the electrical supply. Bear in mind that the electrical contact of the float switch is normally closed (NC). When the lubricant level is (too) low the contact will open.



**Specifications**

Voltage:	Max. 230 V AC/DC
Current:	Max. 2 A
Power:	Max. 40 VA




Where the floater is constructed to stop the equipment, operating has to be arranged so that the stop function locks-out, preventing the equipment from being re-started without re-setting. Check if the floater is mounted with the NC sign at the top.

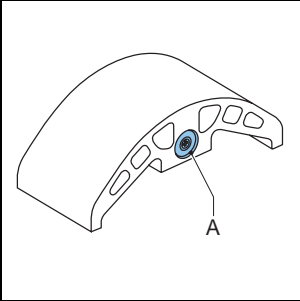
4. Refill the pump housing to the proper level with Bredel Genuine Hose Lubricant.

5. Breathe the float switch by carefully opening plug (D) until lubricant escapes. Subsequently close the plug again.
6. See step 6 of § 8.9.1.

**8.9.3 Fitting revolution counter**

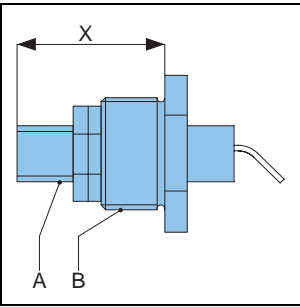
1. Remove one of the pressing shoes of the rotor by following steps 1 through 5 of § 8.7.2.
2. Replace pressing shoe by the special pressing shoe with a magnet (A) by following the steps 6 through 8 of § 8.7.2.

	Make sure that the pressing shoe is placed in such a way that the magnet (A) is at the backside and facing the pump housing.
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3. Fit the inductive sensor (A) in plug (B) and adjust it to dimension "X" as indicated in the table below. Use sealant Loctite 572 or similar to prevent leakage.

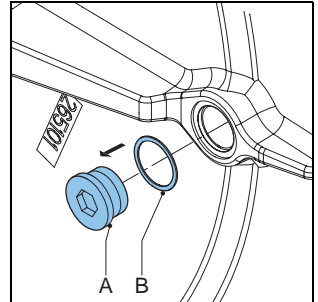
Pump type	Dimension "X" [inch]
Bredel 265	1.26 +0 /-0.04
Bredel 280	1.77 +0 /-0.04
Bredel 2100	1.77 +0 /-0.04



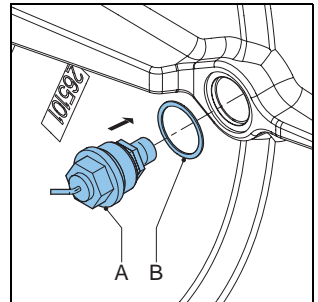
4. Tighten the adjusting nuts.



- Remove a plug (A) and the sealing ring (B) on the back side of the pump housing. Check that the sealing ring (B) is not damaged and replace it if necessary.



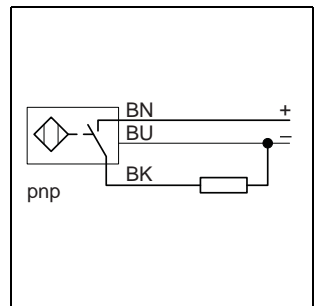
- Fit the plug with the inductive sensor (A) together with sealing ring (B) on the pump housing.



- Refill the pump housing to the proper level with Bredel lubricant.

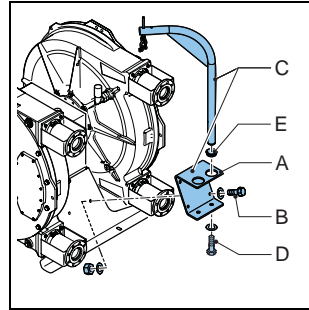
- Connect the sensor electrically via the 2-meter (6.5-foot) long PVC cable (3 x 0.34mm<sup>2</sup>, 3 x 22 AWG). See the connection scheme below.


Specifications	
Voltage	10 ... 30 V DC
Current	Max. 150 mA



**8.9.4 Installing the cover lifting device (CLD) on a horizontal configuration**

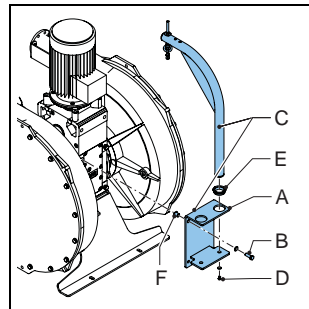
1. Define the position.  
The cover lifting device (CLD) must be mounted on the frame on the opposite position of the motor side. See the illustration.
2. Fit the bracket.  
Fit the bracket (A) with the supplied fasteners (B) on the frame of the unit.  
The torque on the bolts should be 210 Nm (1858.7 lbs in.).
3. Insert the lifting pole.  
The lifting pole (C) is fastened on the bottom side of the pole (D) with a bolt (D). Furthermore, the lifting pole is supported by a ring (E), which is placed in the hole of the bracket.



	<p><b>WARNING</b></p> <p>Do not exceed the maximum allowed lifting weight of 200 kg/ 440 lbs during the lifting of the cover. This is also indicated on the CLD.</p>
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**8.9.5 Installing the cover lifting device (CLD) on a vertical configuration**


1. Define the position  
The cover lifting device (CLD) must be mounted with the help of a female threaded bush on the gear reducer. This can be done on both sides of the gear reducer. See the illustration.
2. Fit the bracket  
Fit the bracket (A) with the supplied fasteners (B) and female threaded bush (F) on the gear reducer.  
The bush should be placed in the spacing of the gear reducer used for attaching the gear reducer to a frame or support.



The torque on the bolts should be as given in the table below.

Bolt size	Torque
M16	210 Nm (1860 lbf in.)
M20	400 Nm (3540 lbf in.)

3. Insert the lifting pole.  
The lifting pole (C) is fastened on the bottom side of the bracket with a bolt (D). Furthermore, the lifting pole is supported by a ring (E), which is placed in the hole of the bracket.

	<p><b>WARNING</b></p> <p>Do not exceed the maximum allowed lifting weight of 200 kg/ 440 lbs during the lifting of the cover. This is also indicated on the CLD.</p>
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## **9 STORAGE**

### **9.1 Hose pump**

- Store the hose pump or pump parts in a dry area. Make sure that the hose pump or pump parts are not exposed to temperatures lower than  $-40\text{ }^{\circ}\text{C}$  ( $-104\text{ }^{\circ}\text{F}$ ) or higher than  $+70\text{ }^{\circ}\text{C}$  ( $158\text{ }^{\circ}\text{F}$ ).
- Cover the openings of the inlet and outlet ports.
- Prevent corrosion of untreated parts. For this purpose use the correct protection or packaging means.
- After a long period of standstill or storage (i.e. pump is idle for a period of longer than one continuous month), the static load on the pump hose may cause permanent deformation, which will reduce the life of the pump hose and may cause difficulty in starting.

To prevent deformation of the hose, pump motor should be jogged on a monthly basis to allow repositioning of the shoe on the hose.

If motor jogging is not possible and long term shutdown is expected, remove a pressing shoe and turn the rotor so far that the second pressing shoe is in front of the inspection window. In this way there is no load put on the pump hose. When startup is again expected, replace the pressing shoes, the proper number of shims, and the lubricant.

### **9.2 Pump hose**

- Store the pump hose in a cool and dark room. After two years the hose material will age, which will reduce the life of the hose.

**9.3 Electric motor and gearbox**

- When the unit must be stored for a long period of time, especially in humid conditions, fill the gearbox completely with oil and protect the machined parts with rust inhibitors.
- For further requirements regarding storage of the electric motor and the gearbox, see the supplied documentation of the electric motor and gearbox.

## 10 TROUBLESHOOTING

**WARNING**

Disconnect and lock the power supply to the pump drive before any work is carried out.

Wait two minutes to make sure that the capacitors have discharged. This is necessary when the motor is fitted with a Variable Frequency Drive (VFD) and has single phase power supply.

If the hose pump does not function (correctly), consult the following checklist to see if you can remedy the error yourself. If this is not the case, contact your Bredel representative.

Problem	Possible cause	Correction
Failure to operate.	No voltage.	Check that the supply power switch is on.
		Check the electrical supply is available at the pump.
	Stalled rotor.	Check if the pump is stalled by incorrect fitting of the hose.
		Check the VFD settings, if applicable.
	Lubricant level monitoring system has been activated.	Check that the lubricant level monitoring system has stalled the pump. Check the functioning of the lubricant level monitoring system, or check the lubricant level.

Problem	Possible cause	Correction
<b>High pump temperature.</b>	Non standard hose lubricant used.	Consult the Bredel representative for the correct lubricant.
	Low lubricant level.	Add Bredel Genuine Hose Lubricant. For the required amount of lubricant see § 11.1.4.
	Product temperature too high.	Consult the Bredel representative about the maximum temperature range of the product.
	Internal friction on the hose caused by blocked or poor suction characteristics.	Check pipework/valves for blockages. Ensure that the suction pipework is as short as possible and that the diameter is large enough.
	Over-shimming of the pump rotor shoes.	Consult the diagram. See § 11.1.7. Remove excess shims.
	High pump speed.	Reduce pump speed to a minimum. Consult with your Bredel pump representative for advice on optimum pump speeds.

Problem	Possible cause	Correction
<b>Low capacity / pressure.</b>	Shut-off valve in the suction line (partly) closed.	Fully open the shut-off valve.
	Under shimming of the pressing shoes.	Consult the diagram in § 11.1.7. Fit the correct number of shims.
	Hose rupture or badly worn hose.	Replace hose. See § 8.6.
	(Partial) blockage of the suction line or too little product on the suction side.	Ensure that the suction line is clear of blockages and that sufficient product is available.
	Connections and hose clamps not correctly mounted, which makes the pump suck air.	Tighten connections and hose clamps.
	The filling degree of the pump hose is too low, because the speed is too high in relation to the viscosity of the product to be pumped and the inlet pressure. The suction line can be too long or too narrow or a combination of these factors.	Consult your Bredel representative for a recommendation.



<b>Problem</b>	<b>Possible cause</b>	<b>Correction</b>
<b>Vibration of the pump and pipe-work.</b>	Suction and discharge lines are not secured correctly.	Check and secure pipework.
	High pump speed with long suction and discharge lines or high relative density or a combination of these factors.	Reduce pump speed. Reduce the line lengths on both suction and discharge where possible. Consult your Bredel representative for a recommendation.
	Too narrow diameter of suction and/or discharge line.	Increase the diameter of the suction/discharge lines.
	Rotors are not correctly aligned.	Align the rotors in relation to each other at an angle of 90 degrees.
<b>Broken front cover bolts.</b>	Pump cover (dis)mounted with the hose in the pump.	Never (dis)mount the pump cover when the hose is still in the pump.
<b>Short hose life.</b>	Chemical attack of the hose.	Check the compatibility of the hose material with the product to be pumped. Consult your Bredel representative for correct hose selection.
	High pump speed.	Reduce pump speed.
	High discharge pressures.	Maximum working pressure 1600 kPa (230 psi). Check that the discharge line is not blocked, the shut-off valves are fully opened and the pressure relief valve functions properly (if present in the discharge line).
	High product temperature.	Consult your Bredel representative for correct hose selection.
	High pulsations.	Restructure the discharge and inlet conditions.

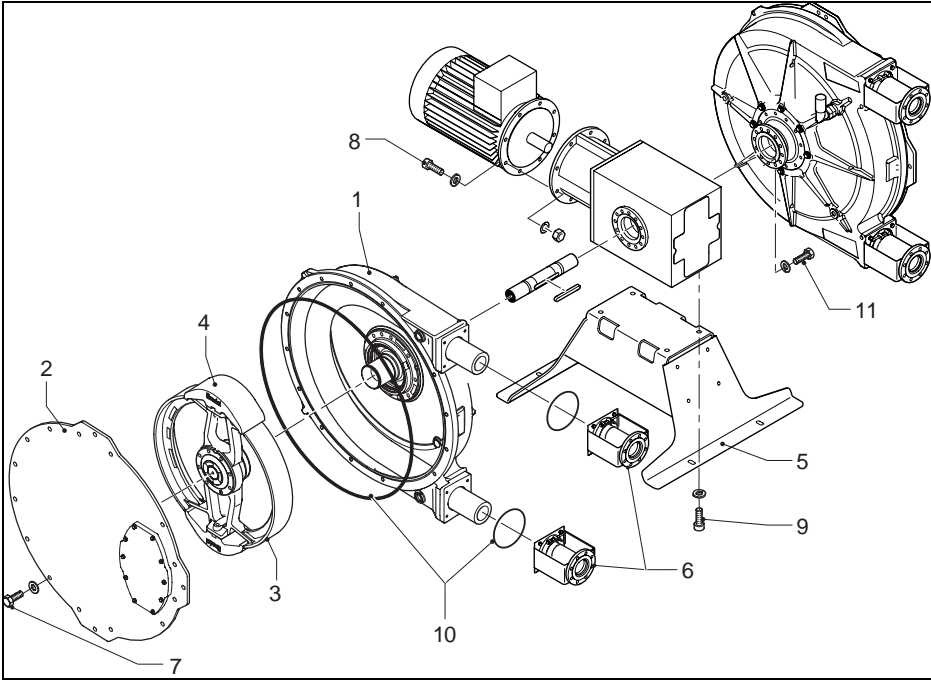
Problem	Possible cause	Correction
<b>Hose pulled into the pump.</b>	Insufficient or no hose lubricant in the pumphead.	Add extra lubricant. See § 8.4.
	Incorrect lubricant: no Bredel Genuine Hose Lubricant in the pumphead.	Consult the Bredel representative for the correct lubricant.
	Extremely high inlet pressure - larger than 300 kPa (43.5 psi).	Reduce the inlet pressure.
<b>Lubricant leakage at flange bracket.</b>	Hose blocked by an incompressible object in the hose. The hose cannot be compressed and will be pulled into the pump housing.	Remove hose, check for blockages and replace if necessary.
	Bolts of flange bracket loose.	Tighten to the specified torque settings. See § 11.1.6.
	Bolts of hose clamps loose.	Tighten to the specified torque settings. See § 11.1.6.
<b>Leakage from the rear of the pump housing "Buffer zone".</b>	Damaged wear or sealing ring.	Replace wear or sealing ring.
<b>Motor functions, but rotor does not.</b>	Broken undercut on the pump shaft.	Follow installation procedure supplied with replacement shaft. Check process conditions to prevent recurrence of overload.

**11 SPECIFICATIONS****11.1 Pumphead****11.1.1 Performance**

Description	Bredel 265	Bredel 280	Bredel 2100
Max. capacity, continuous [GPM]	176.0	246.6	317.0
Max. capacity, intermittent [GPM]*	283.4	344.3	475.5
Capacity per revolution [gal/rev]	3.6	6.2	10.6
Max. permissible working pressure [psi]	232		
Permissible ambient temperature [°F]	-4 to +113		
Permissible product temperature [°F]	+15 to +176		
Sound level on 1 m [dB(A)]	70		

\* Intermittent duty: Let the pump stand still to cool down for at least 1 hour after 2 hours of operation.

**11.1.2 Materials**



Pos	Description	Material
1	Pump housing	Cast-iron
2	Cover	Commercial grade mild steel 37
3	Pump rotor	Cast-iron
4	Pressing shoes	Aluminium (Epoxy optional)
5	Frame	Mild steel, galvanised*
6	Hose flange brackets	Mild steel, galvanised*
7	Cover fixings	Mild steel, galvanised*
8	Motor fixings	Mild steel, galvanised*
9	Mounting material of frame	Mild steel, galvanised*
10	Seals and glands	Neoprene or Nitrile
11	Pumphead fixings	Mild steel, galvanised*

\* available in Stainless Steel upon request

**11.1.3 Surface treatment**


- After surface preparation, one layer of two-component acrylate is used for surface protection. Standard color is RAL 3011, however other colors are optional. Contact your Bredel representative for details on surface treatment.
- All galvanized parts, exclusive of mounting articles, have been provided with an electrolytic zinc layer of 15 - 20 microns (0.6 - 0.8 mil).

**11.1.4 Lubricant table pump**

	<b>Bredel 265</b>	<b>Bredel 280</b>	<b>Bredel 2100</b>
Lubricant	Bredel*	Bredel*	Bredel*
Required quantity per pumphead [US gal]	5.3	10.6	15.8

\* Bredel Genuine Hose Lubricant is registered at NSF: NSF Registration No 123204; Category Code H1. See also: [www.NSF.org/USDA](http://www.NSF.org/USDA).

The relative density of Bredel Genuine Hose Lubricant is 1.245.

	Should you require additional information with respect to the safety data sheet, consult your Bredel representative.
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**11.1.5 Weights**

For additional information on weights of gearbox or motor, see the supplied manuals.

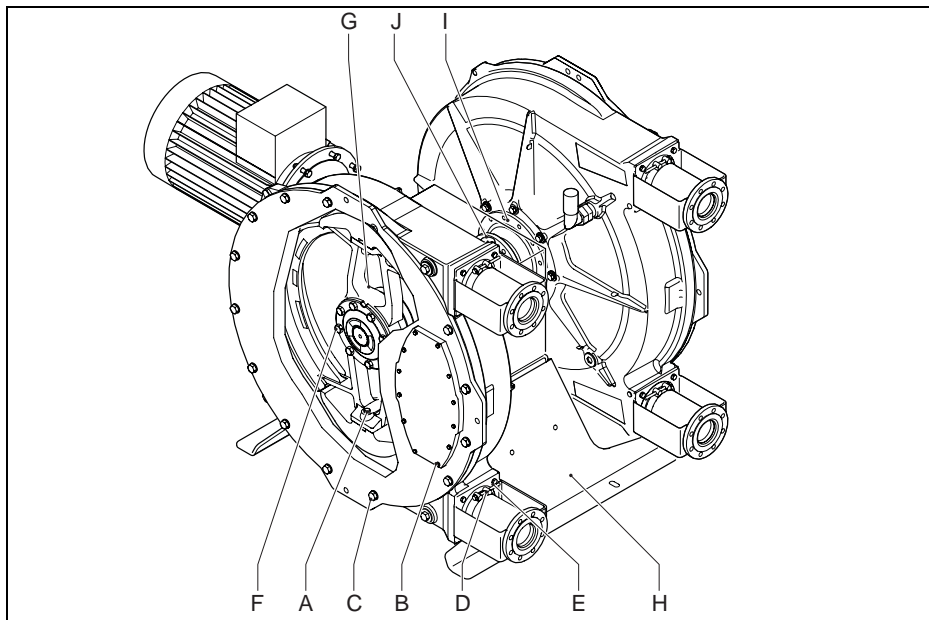
Description	Weight [lbs]		
	Bredel 265	Bredel 280	Bredel 2100
Pump with gearbox *	2780	4295	5985
Pumphead complete **	795	1270	2019
Pumphead assembly ***	537	794	1235
Rotor	88	170	260
Pressing shoe	7.1	12.3	22.5
Pump cover	138	235	430
Drive shaft	17.0	36.6	43.0
Hub	40.3	77.4	117.5
Hose	25.4	46.3	68.3
Frame (maximum size)	210	284	317

\* Maximum net weight of the hose pump with the gearbox and electric motor.

\*\* Weight of a completely mounted pumphead, hose, lubricant included.

\*\*\* Pumphead without cover, hose, lubricant, flanges, flange brackets, hose clamps, inserts and drive shaft.

**11.1.6 Torque figures**



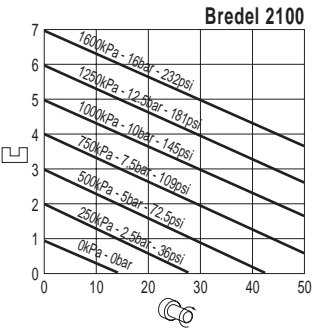
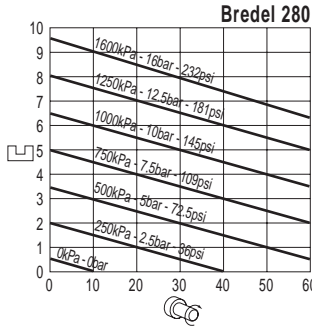
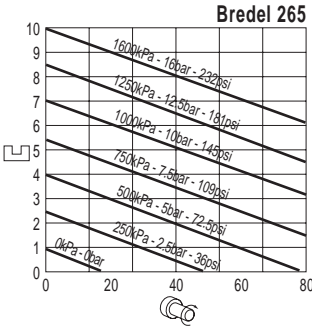
Pos	Description	Bredel 265		Bredel 280		Bredel 2100	
		Torque [lbf in]	Bolt size*	Torque [lbf in]	Bolt size*	Torque [lbf in]	Bolt size*
A	Pressing shoe bolt(s)	750	M12x70	1840	M16x90	1840	M16x100
B	Inspection window	71	M8x35	71	M8x35	71	M8x45
C	Cover	1860	M16x35	1860	M16x35	3540	M20x55
D	Hose clamp**	354	M10	354	M10	354	M10
E	Flange bracket	440	M10x25	750	M12x25	750	M12x30
F	Drive shaft	750	M12x35	1860	M16x45	1860	M16x45
G	Hub	750	M12x35	1860	M16x55	1860	M16x55
H	Frame	3540	M20x70	3540	M20x70	3540	M20x70
		-	-	6200	M24x80	6200	M24x80
I	Adaption flange	750	M12x40	750	M12x35	1200	M14x40
		-	-	750	M12x40	-	-
J	Adaption flange	1860	M16	1860	M16	1860	M16
		-	-	3540	M20	3540	M20

- \* All bolts are class 8.8.
- \*\* Due to creeping of the hose material, the hose clamp force initially reduces in time. If leakage starts, re-tighten the hose clamp to the specified torque level. The listed torque values apply to a new and properly greased hose clamp. See also § 8.6.3 point 10 for extra instructions and hose clamp installation.

**11.1.7 Shims specifications**

How to use the diagrams:

- 1 Find the pump speed in [rpm] on the horizontal axis.
  - 2 Go straight up and meet the proper discharge-pressure line.
  - 3 At that point, go straight to the left and read the number of shims on the vertical axis.
- When the product temperatures are above 60 °C (+140 °F) always use one shim less than indicated in the diagrams.
  - Always round up the number of shims.
  - Each diagram gives the number of shims per pressing shoe.
  - Shim both pressing shoes identically.



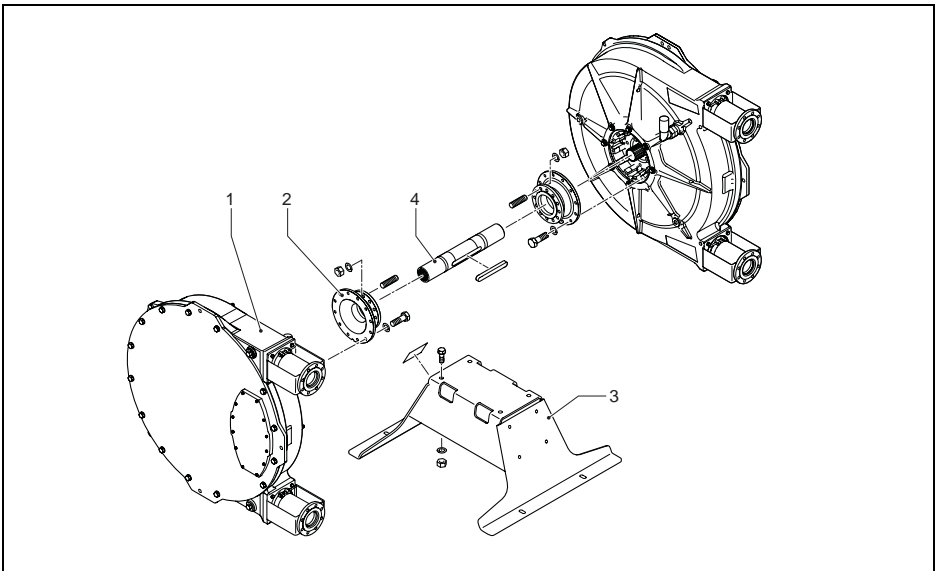


## 11.2 Lubricant for gearbox

Please check the documentation that is supplied with the gearbox for specified lubricants. Please be aware that the type of lubricant depends on running conditions and ambient conditions. Special features might be required to keep the gearbox temperatures within limits. Please check the gearbox manual. In case of doubt, consult your Bredel representative.

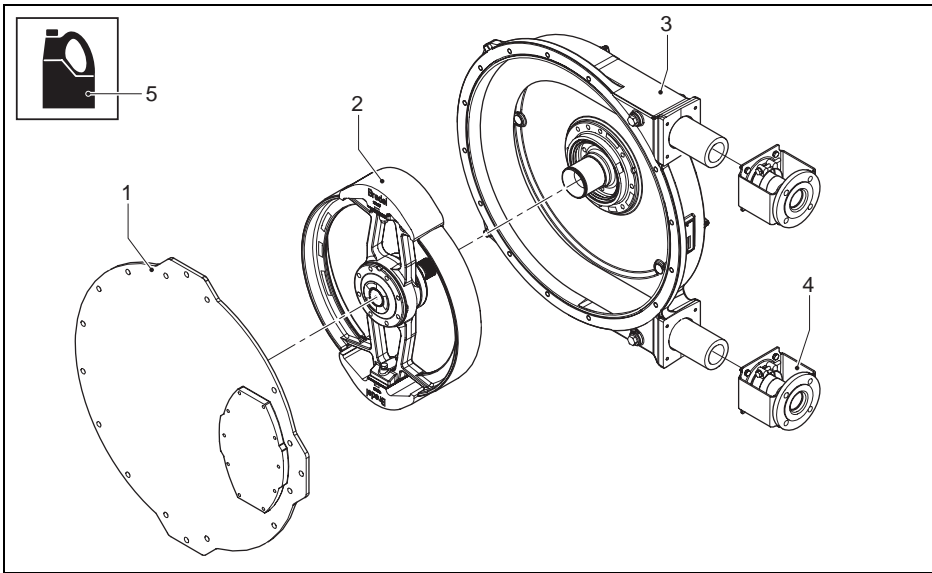
## 11.3 Parts list

### 11.3.1 Overview complete unit



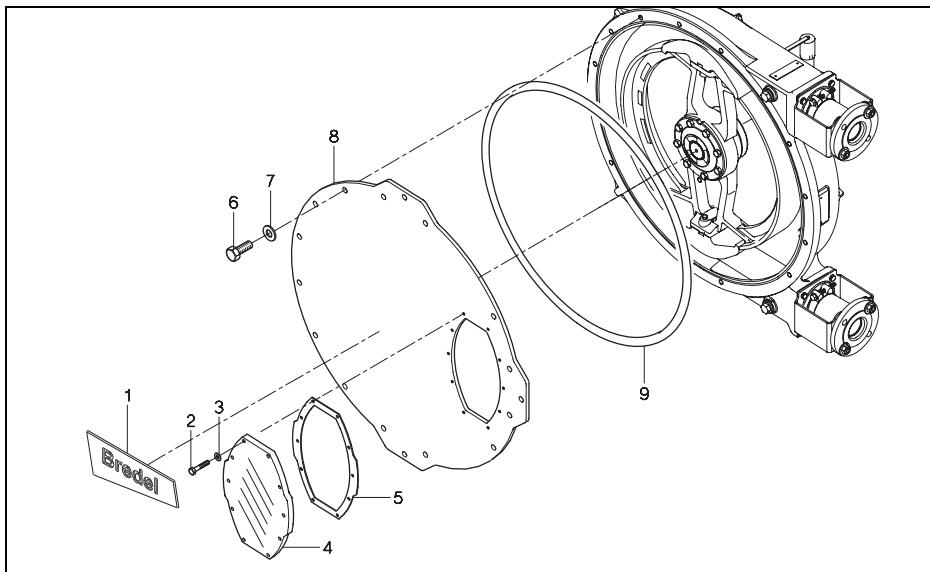
Pos.	Description
1	Pump head assembly. See § 11.3.2.
2	Adaption assembly. See § 11.3.8.
3	Frame assembly. See § 11.3.9.
4	Shaft assembly. See § 11.3.10.

**11.3.2 Overview pump head**



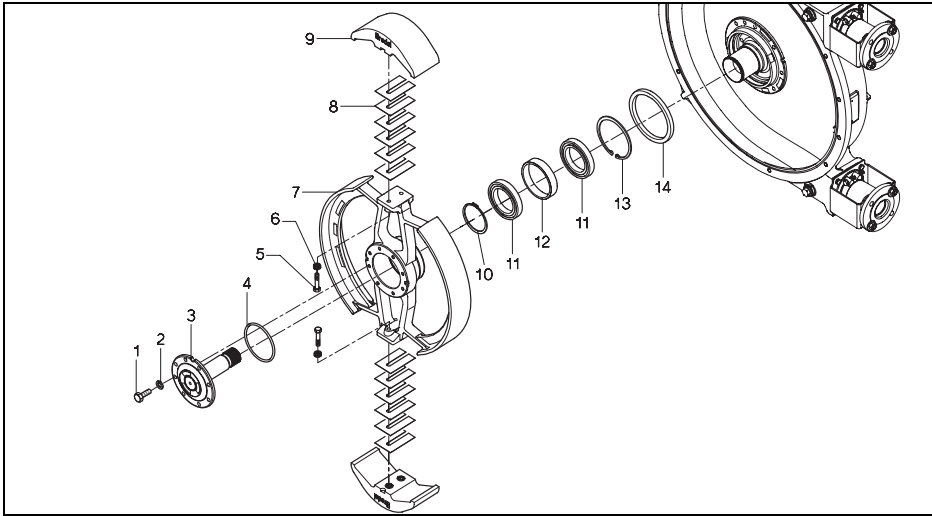
Pos.	Description
1	Cover assembly. See § 11.3.3.
2	Rotor assembly. See § 11.3.4.
3	Pump housing assembly. See § 11.3.5.
4	Flange assembly. See § 11.3.6.
5	Lubricants. See § 11.3.7.

**11.3.3 Cover assembly**



Pos.	Qty.	Description	Product codes for parts of pump type		
			Bredel 265	Bredel 280	Bredel 2100
1	1	Sticker	29265238	29280238	29200238
2	8	Bolt, hex. head	F101038	F101038	F101040
3	8	Washer, plain	F322012	F322012	F322012
4	1	Inspection window	265155	280155	200155
5	1	Gasket	265156	280156	200156
6	14	Bolt, hex. head	F111182	F111182	F111218
7	14	Washer, plain	F322017	F322017	F322019
8	1	Pump cover	265102	280102	200102
9	1	Quad ring	265123	280123	200123

**11.3.4 Rotor assembly**

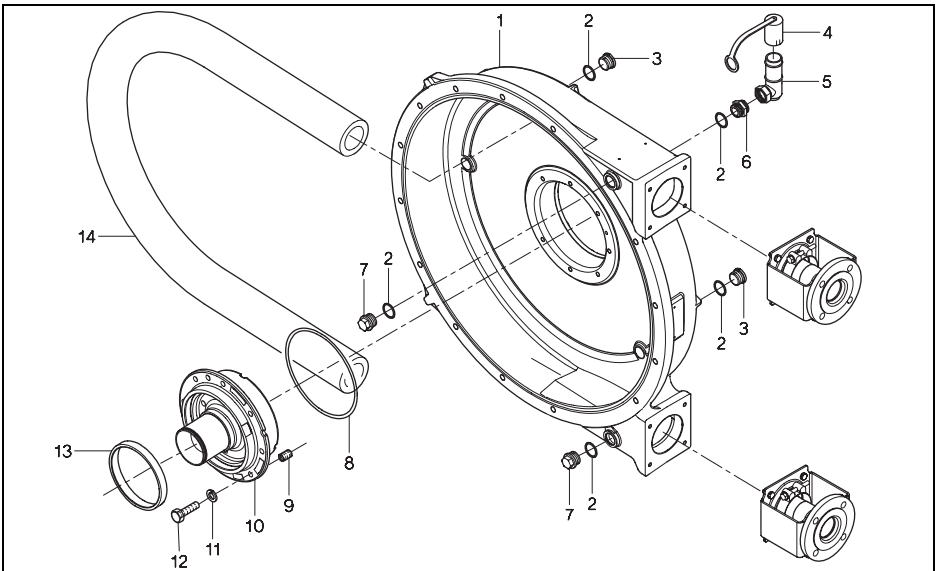


Pos.	Qty.	Description	Product codes for parts of pump type		
			Bredel 265	Bredel 280	Bredel 2100
1	8*	Bolt, hex. head	F111132	F111184	F111184
2	8*	Washer, spring Lock	F336013	F336015	F336015
3	1	Drive shaft	265104	280104	200104
4	1	O-ring	S122541	S122611	S122611
5	4	Bolt, hex. head	F101085	F101131	F101132
6	4	NordLock® ring	F349007	F349009	F349009
7	1	Rotor	265103	280103	200103
8	20**	Shim	265107	280107	200107
9	2	Pressing shoe: aluminium	265110	280110	200110
	2	Epoxy, with stainless steel insert	265109A	280109A	200109A
10	1	Retaining ring	F343071	F343075	F343075
11	2	Bearing	B142060	B142460	B142460
12	1	Spacer outside	29151201	29180201	29181201
13	1	Retaining ring	F344087	F344093	F344093
14	1	Wear ring	29180202	29240202	29240202

\* Pos. 1 and 2: Bredel 265 and Bredel 280: 8 pieces; Bredel 2100: 12 pieces.

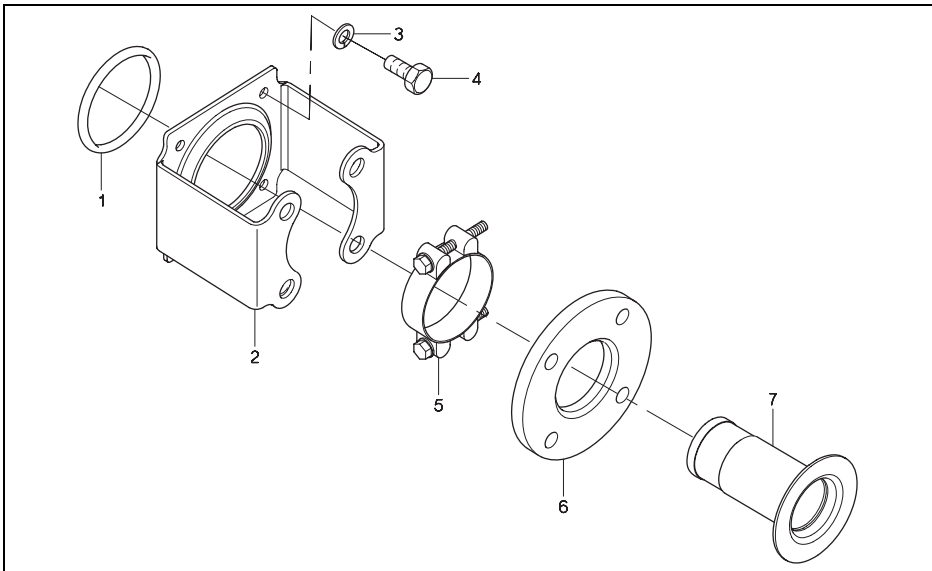
\*\* Pos. 8: Bredel 265, Bredel 280: 20 pieces, and Bredel 2100: 14 pieces

**11.3.5 Pump housing assembly**



Pos.	Qty.	Description	Product codes for parts of pump type		
			Bredel 265	Bredel 280	Bredel 2100
1	1	Pump housing	265101	280101	200101
2	4	Packing ring	29040257	29056244	29056244
3	2	Plug, int. hex. hd	F901006	F901008	F901008
4	1	Breather cap	29065223	29089223	29089223
5	1	Breather	29110146	29125146	29125146
6	1	Coupling, straight	F602006	F602008	F602008
7	2	Plug, ext. hex. hd.	F911006	F911008	F911008
8	1	O-ring	S122711	S122771	S122801
9	1	Dowel pin	F416082	F416121	F416121
10	1	Hub	265203	280203	200203
11	8	Washer, spring Lock	F336013	F336015	F336015
12	8	Bolt, hex. head	F115132	F115186	F115186
13	1	Seal	S213611	S214811	S214811
14	1	NR	065020	080020	100020
	1	NBR	065040	080040	100040
	1	EPDM	065075	080075	100075
	1	CSM	065070	080070	100070

**11.3.6 Flange assembly**

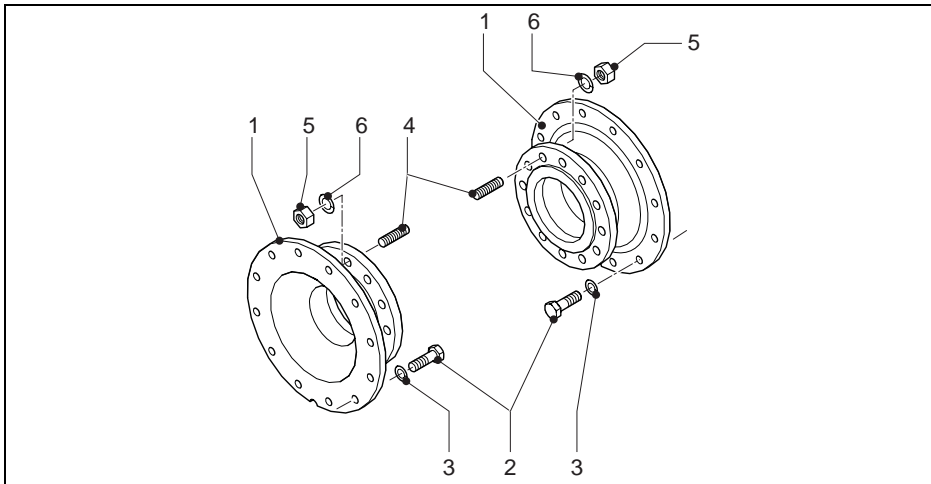


Pos.	Qty.	Description	Product codes for parts of pump type		
			Bredel 265	Bredel 280	Bredel 2100
1	2	O-ring	S112431	S112501	S115571
2	2	Flange bracket, EN Steel	265197	280197	200197
	2	Flange bracket, EN SS	265197E	280197E	200197E
	2	Flange bracket, ANSI Steel	265197	280197A	200197
	2	Flange bracket, ANSI SS	265197E	280197F	200197E
3	8	Washer, spring lock	F336012	F336013	F336013
4	8	Bolt, hex. head	F111096	F111128	F111130
5	2	Hose clamp	C101048	C101051	C101054
6	2	Flange, EN Steel	065198	080198	100198
	2	Flange, EN SS	265199	280199	200199
	2	Flange, ANSI Steel	065198A	080198A	100198A
	2	Flange, ANSI SS	265199A	280199A	200199A
7	2	Insert, AISI 316	265186	280186	200186
	2	Insert, PP	265189	280189	200189
	2	Insert, PVC	265187	280187	200187
	2	Insert, PVDF	265190	280190	200190

**11.3.7 Lubricants per pumphead**

<b>Pos.</b>	<b>Qty.</b>	<b>Description</b>	<b>Product codes</b>
1	-	1 gallon Bredel Genuine Hose Lubricant	911143
	-	5 gallons Bredel Genuine Hose Lubricant	912143
	-	55 gallons Bredel Genuine Hose Lubricant	913143

**11.3.8 Adaption assembly**

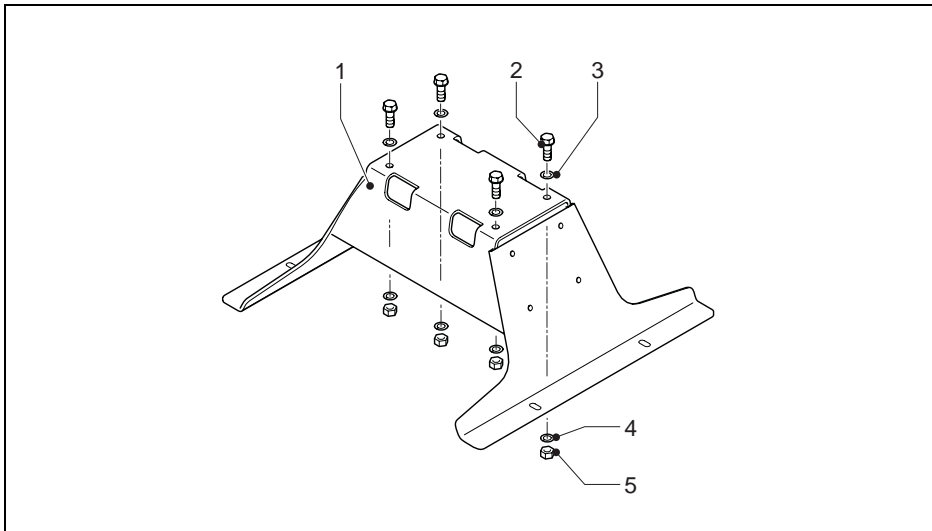


Pos.	Description	Product codes for parts of pump type					
		Bredel 265		Bredel 280		Bredel 280	
		Qty.	Code	Qty.	Code	Qty.	Code
1	Adaption flange 160V	2	29300465	-	-	-	-
	Adaption flange 160H	2	29300365	-	-	-	-
	Adaption flange 180V	2	29350465	2	29350480	-	-
	Adaption flange 180H	2	29350365	2	29350380	-	-
	Adaption flange 200V	-	-	-	-	2	29400480
	Adaption flange 200H	-	-	-	-	2	29400380
	Adaption flange 225V	-	-	-	-	-	-
	Adaption flange 225H	-	-	-	-	-	-
2	Bolt, hex. (socket) head	20	F201106	20	F111132	20	F201106
3	Spring washer	20	F332007	20	F336013	20	F332007
4	Stud bolt	16	F521057	16	F521057	4	F521059
		-	-	-	-	12	F521070
5	Hex. nut	16	F301010	16	F301010	4	F301010
		-	-	-	-	12	F301012
6	Spring washer	16	F336015	16	F336015	4	F336015
		-	-	-	-	12	F336017



Pos.	Description	Product codes for parts of pump type					
		Bredel 2100		Bredel 2100		Bredel 2100	
		Qty.	Code	Qty.	Code	Qty.	Code
1	Adaption flange 160V	-	-	-	-	-	-
	Adaption flange 160H	-	-	-	-	-	-
	Adaption flange 180V	2	29355300	-	-	-	-
	Adaption flange 180H	2	29355300	-	-	-	-
	Adaption flange 200V	-	-	2	29400300	-	-
	Adaption flange 200H	-	-	2	29400300	-	-
	Adaption flange 225V	-	-	-	-	2	29450300
	Adaption flange 225H	-	-	-	-	2	29450300
2	Bolt, hex. (socket) head	24	F111164	24	F111164	24	F201124
3	Spring washer	24	F336014	24	F336014	24	F332008
4	Stud bolt	16	F521059	4	F521059	16	F521070
		-	-	12	F521070	-	-
5	Hex. nut	16	F301010	4	F301010	16	F301012
		-	-	12	F301012	-	-
6	Spring washer	16	F336015	4	F336015	16	F336017
		-	-	12	F336017	-	-

11.3.9 Frame assembly

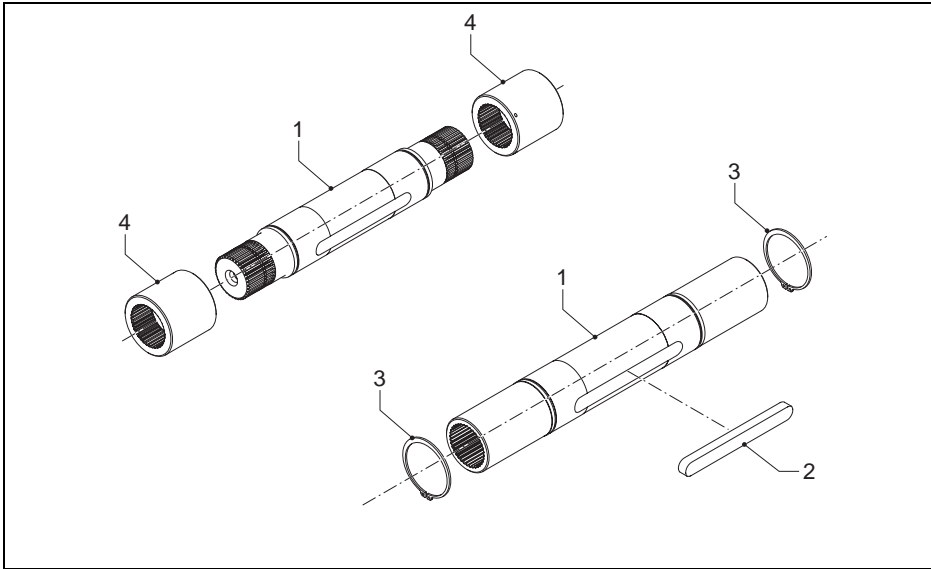


Pos.	Description	Product codes for parts of pump type							
		Bredel 265 Steel Galv.		Bredel 265 AISI 316		Bredel 280 Steel Galv.		Bredel 280 Steel Galv.	
		Qty.	Code	Qty.	Code	Qty.	Code	Qty.	Code
1	Frame 160V	1	29345765	1	29345766	-	-	-	-
	Frame 160H	1	29345665	1	29345666	-	-	-	-
	Frame 180V	1	29345765	1	29345766	1	29440780	-	-
	Frame 180H	1	29345665	1	29345666	1	29440680	-	-
	Frame 200V	-	-	-	-	-	-	1	29395780
	Frame 200H	-	-	-	-	-	-	1	29395680
	Frame 225V	-	-	-	-	-	-	-	-
	Frame 225H	-	-	-	-	-	-	-	-
2	Bolt, hex. head	4	F111221	4	F504173	4	F111221	4	F111247
3	Plain washer	4	F322017	4	F523018	4	F322017	4	F322021
4	Spring washer	4	F336017	4	F532015	4	F336017	4	F336019
5	Hex. nut	4	F301012	4	F516018	4	F301012	4	F301014

Pos.	Description	Product codes for parts of pump type					
		Bredel 280 AISI 316		Bredel 280 AISI 316		Bredel 2100 Steel Galv.	
		Qty.	Code	Qty.	Code	Qty.	Code
1	Frame 160V	-	-	-	-	-	-
	Frame 160H	-	-	-	-	-	-
	Frame 180V	1	29440781	-	-	1	29540700
	Frame 180H	1	29440681	-	-	1	29540600
	Frame 200V	-	-	1	29395781	-	-
	Frame 200H	-	-	1	29395681	-	-
	Frame 225V	-	-	-	-	-	-
	Frame 225H	-	-	-	-	-	-
2	Bolt, hex. head	4	F504173	4	F504197	4	F111221
3	Plain washer	4	F523018	4	F523020	4	F322017
4	Spring washer	4	F532015	4	F532017	4	F336017
5	Hex. nut	4	F516018	4	F516020	4	F301012

Pos.	Description	Product codes for parts of pump type					
		Bredel 2100 AISI 316		Bredel 2100 Steel Galv.		Bredel 2100 AISI 316	
		Qty.	Code	Qty.	Code	Qty.	Code
1	Frame 160V	-	-	-	-	-	-
	Frame 160H	-	-	-	-	-	-
	Frame 180V	1	29540701	-	-	-	-
	Frame 180H	1	29540601	-	-	-	-
	Frame 200V	-	-	1	29495700	1	29495701
	Frame 200H	-	-	1	29495600	1	29495601
	Frame 225V	-	-	1	29495700	1	29495701
	Frame 225H	-	-	1	29495600	1	29495601
2	Bolt, hex. head	4	F504173	4	F111247	4	F504197
3	Plain washer	4	F523018	4	F322021	4	F523020
4	Spring washer	4	F532015	4	F336019	4	F532017
5	Hex. nut	4	F516018	4	F301014	4	F516020

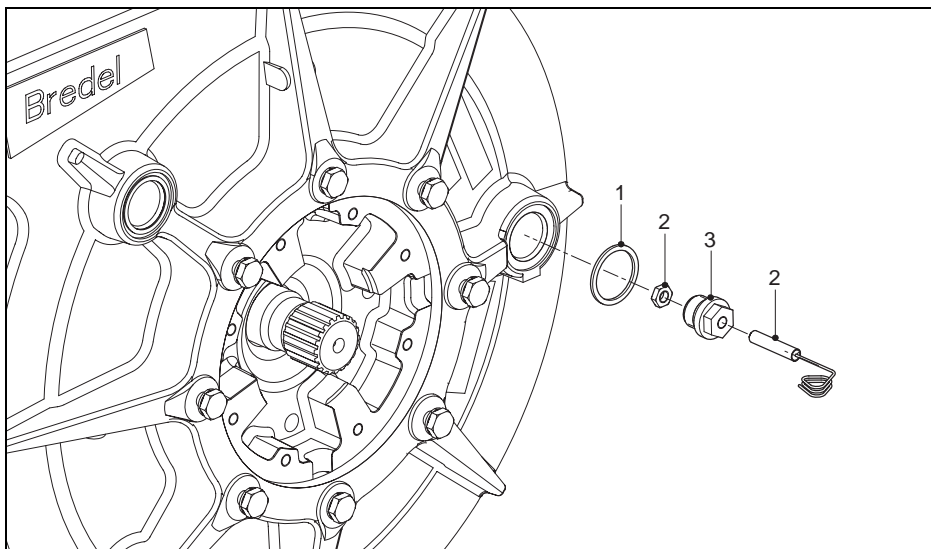
**11.3.10 Shaft assembly**



Pos.	Description	Product codes for parts of pump type							
		Bredel 265		Bredel 265		Bredel 280		Bredel 280	
		Qty.	Code	Qty.	Code	Qty.	Code	Qty.	Code
1	Shaft 160V/H	1	29475565	-	-	-	-	-	-
	Shaft 180V/H	-	-	1	29485565	1	29490580	-	-
	Shaft 200V/H	-	-	-	-	-	-	1	29650580
	Shaft 225V/H	-	-	-	-	-	-	-	-
2	Parallel key	1	F436908	1	F436909	1	F436909	1	F436906
3	Retaining ring	2	F343061	2	F343066	2	F343066	2	F343071
4	Spline sleeve	-	-	-	-	-	-	-	-

Pos.	Description	Product codes for parts of pump type					
		Bredel 2100		Bredel 2100		Bredel 2100	
		Qty.	Code	Qty.	Code	Qty.	Code
1	Shaft 160V/H	-	-	-	-	-	-
	Shaft 180V/H	1	29525500	-	-	-	-
	Shaft 200V/H	-	-	1	29650500	-	-
	Shaft 225V/H	-	-	-	-	1	29600500
2	Parallel key	1	F436909	1	F436906	1	F436906
3	Retaining ring	2	F343066	2	F343071	2	F343073
4	Spline sleeve	2	29110500	-	-	-	-

### 11.3.11 Revolution counter assembly



Pos.	Qty.	Description	Product codes for parts of pump type		
			Bredel 265	Bredel 280	Bredel 2100
1	1	Gasket	29040257	29056244	29056244
2	1	Revolution counter	29040462	29040462	29040462
3	1	Adapter	29039460	29055460	29055460

**SAFETY FORM**

**Product Use and Decontamination Declaration**

In compliance with the **Health and Safety Regulations**, the user is required to declare those substances that have been in contact with the item(s) you are returning to Watson-Marlow Bredel B.V. or any of its subsidiaries or distributors. Failure to do so will cause delays in servicing the item or in issuing a response. Therefore, **please complete this form** to make sure we have the information before receipt of the item(s) being returned. A completed copy must be attached to **the outside of the packaging** containing the item(s). You, the user, are responsible for cleaning and decontaminating the item(s) before returning them.

Please complete a separate Decontamination Certificate for each item returned. **RG/KBR no**.....

1 Company .....

Address .....

Postal code .....

Telephone..... Fax number .....

2 Product .....

2.1 Serial Number .....

2.2 Has the Product been used?  
 YES  NO   
 If yes, please complete all the following paragraphs.  
 If no, please complete paragraph 5 only

3.4 Cleaning fluid to be used if residue of chemical is found during servicing;  
 a) .....  
 b) .....  
 c) .....  
 d) .....

3 Details of substances pumped

3.1 Chemical Names  
 a) .....  
 b) .....  
 c) .....  
 d) .....

4 I hereby confirm that the only substances(s) that the equipment specified has pumped or come into contact with are those named, that the information given is correct, and the carrier has been informed if the consignment is of a hazardous nature.

3.2 Precautions to be taken in handling these substances:  
 a) .....  
 b) .....  
 c) .....  
 d) .....

5 Signed .....  
 Name .....  
 Position .....  
 Date .....

3.3 Action to be taken in the event of human contact:  
 a) .....  
 b) .....  
 c) .....  
 d) .....

**Note:**  
**To assist us in our servicing please describe any fault condition you have witnessed.**

.....  
 .....  
 .....



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