Bredel

Hose Pumps

BREDEL PUMP SERIES

Installation, Operating and Maintenance Manual

CIP

40 50

Hose Pump Series
Bredel CIP 40, Bredel CIP 50

Manual

Original Instructions

CONTENTS

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 Bredel CIP 40 and Bredel CIP 50.

1.2 Other supplied documentation

Documentation of components such as the gearbox, the motor and the actuator is not included in this manual. However, if additional documentation is supplied, you must follow the instructions in this additional documentation.

1.3 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

You will find these data on the identification plates or stickers of the pumphead and the pump hose (refer to section 4.1.1).

1.4 Used products and the environment

	**ENVIRONMENT** Enquire with your local government about the possibilities for reuse or environment friendly processing of packaging materials, (contaminated) lubricant and oil. Always observe the local rules and regulations with respect to processing (non reusable) parts of the hose pump.

2 SAFETY

2.1 Symbols

In this manual the following symbols are used:

	**WARNING** Procedures which, if not carried out with the necessary care, may result in serious damage to the hose pump or in serious bodily harm.

	**CAUTION** 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. (1)
The manufacturer cannot be held responsible for damage or harm resulting from this. The hose pump is designed in conformance with the valid standards and directives.
Only use the pump in conformance with the intended use described above. If you want to change the application of your hose pump, contact your Bredel representative first.

1. 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.

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 is only reserved for well trained and qualified users. Temporary staff and persons in training may only use the hose pump under the supervision and responsibility of well trained and qualified users.

2.5 Regulations and instructions

- Everyone who will work with the hose pump must know the content 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 near the hose pump.

3 WARRANTY CONDITIONS

The manufacturer offers a 2 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, and seals, or parts which have been used wrongly, misused, and whether or not they have been intentionally damaged. If no original Watson-Marlow Bredel parts are used, every claim to warranty becomes 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 it should be indicated that the equipment has been decontaminated. The safety form is required at all items, even if the parts have not been used.

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

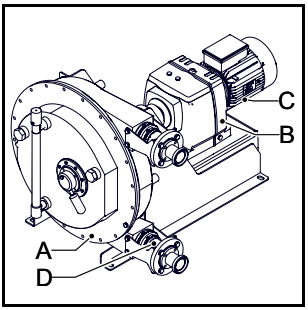
4 DESCRIPTION

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:

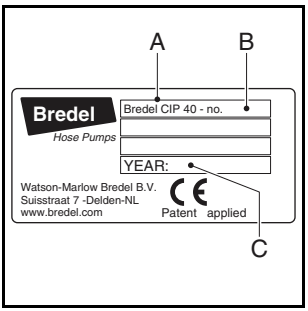
A: Pumphead
B: Gearbox
C: Electric motor
D: Pump hose



4.1.2 Identification of the pump

The identification plate on the pumphead contains the following data:

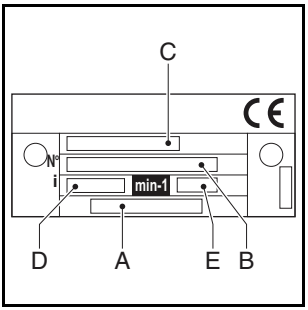
A: Pump type
B: Serial number
C: Year of manufacture



4.1.3 Identification of the gearbox

If applicable: the identification plate on the gearbox contains (depending on the brand) the following data:

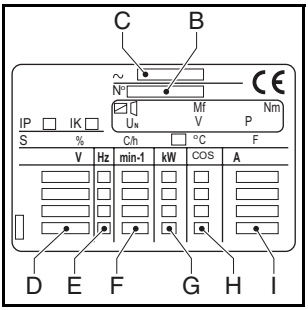
A: Article number
B: Serial number
C: Type number
D: Reduction ratio
E: Revolutions per minute



4.1.4 Identification of the electric motor

If applicable: the identification plate on the electric motor contains (depending on the brand) the following data:

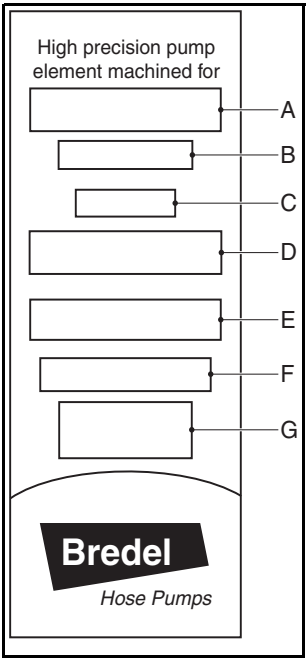
A: Type number
B: Serial number
C: Article number
D: Mains
E: Frequency
F: Speed
G: Power
H: Power factor
I: Current



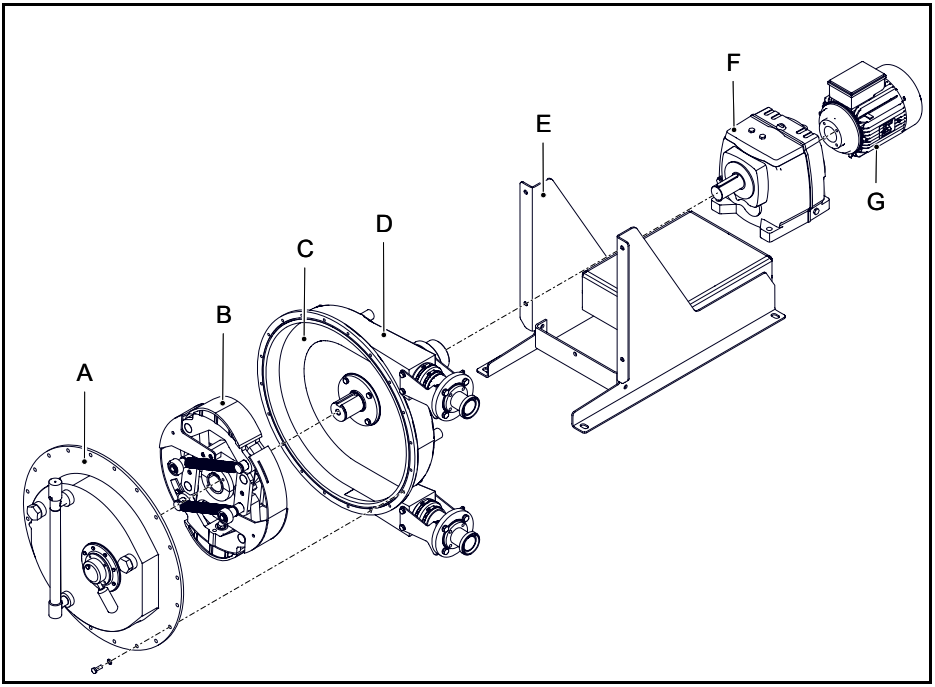
4.1.5 Identification of the pump hose

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

A: Pump type
B: Part code
C: Internal diameter
D: Type of material of inner layer
E: Remarks, if applicable
F: Maximum permissible working pressure
G: Production code



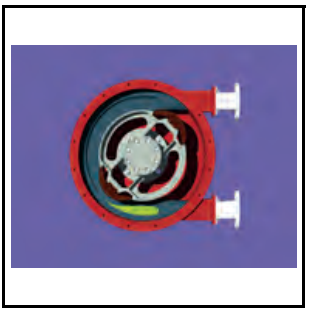
4.2 Construction of the pump



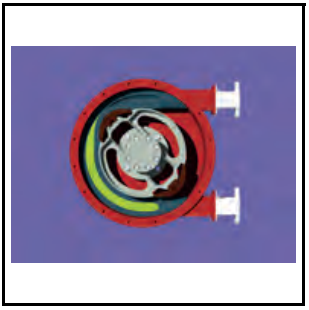
A: Cover
B: Rotor
C: Pump hose
D: Pump housing
E: Support
F: Gearbox
G: Electric motor

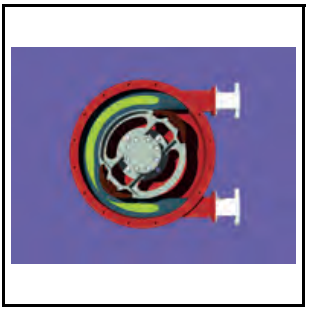
4.3 Operation of a hose pump

The heart of the pumphead consists of a specially constructed pump hose which lies contorted against the inside of the pump housing. Both ends of the hose are connected to the suction and discharge lines by means of a flange construction. A bearing-mounted rotor with two facing pressing shoes is in the center of the pumphead.



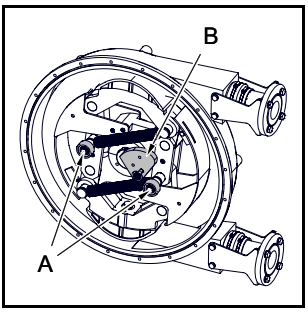
In phase 1 the lower pressing shoe compressed the pump hose by the rotational movement of the rotor, forcing the fluid through the hose. As soon as the pressing shoe has passed, the hose recovers to its original shape due to the mechanical properties of the material.
In phase 2 the product is drawn into 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".



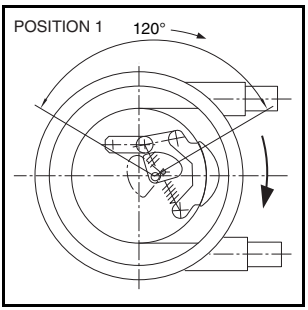


4.4 Description of Bredel hose pump with special rotor construction for CIP cleaning

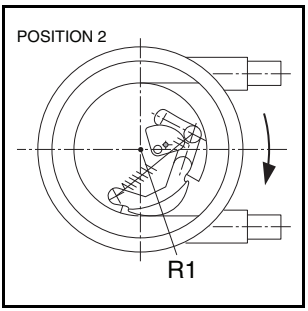
The pump has a special rotor that contains 2 standard pressing shoes. These pressing shoes can be adjusted by shims, same as with standard pumps. Every pressing shoe is, at one side, connected to the rotor by a pivot-arm Construction. In the centre of this pivot-arm is a roller (A).



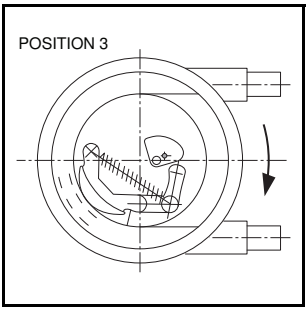
Attached to the inside of the special pump cover is a shaft with a cam (B), that can be moved manually or by an actuator (electrically or pneumatically) that is mounted at the outside of the pump cover.
When the cam (B) is in neutral position, it does not touch the roller (A) of the pivot-arm inside the pump. When the cam (B) is turned over about 120° (position 1), the roller (A) will follow the cam (B), thus pushing the pivot-arm outwards (position 2).



Resulting from this movement, the pressing shoe is retracted from the pump hose. Once retracted the shoe rests on the hose (position 3). Now the pump hose is and remains fully opened. The pump can be stopped and the hose can be flushed/cleaned. When the retracted shoe is leaving the compression area (in between the ports) the attached spring will force it back into normal position.

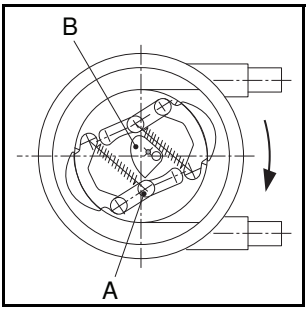


With rotation in CIP mode the pressing shoes are retracted one at a time during one full rotation in the pumping direction.
The pump is not intended to keep running in CIP mode.



⚠	**Caution** Stop the pump after one revolution when the pump is in CIP mode. Continuous rotation may cause excessive wear and damage of the cam mechanism.

When the cleaning procedure is finished, first the cam (B) has to be repositioned to neutral. After the cam is in this position, the pump can be started in normal direction of rotation. The springs will pull the pressing shoe back to the normal (pumping) position.



⚠	**Caution** Do not start the pump before the cam is in neutral position; Do not reverse rotation when actuator (cam) is in active position, this will seriously damage the cam mechanism. When the actuator (cam) is in neutral position, the pump can be reversed as normal.

Additional remarks:

- The construction of the rotor and cam mechanism depends on the rotation direction of the pump. Refer to section 7.9.
- After initial assembly, the pump cover cannot be mounted in another position.
- To avoid wear to all vital parts, we recommend following speed limits:
  Bredel CIP 40 : 60 rpm
  Bredel CIP 50 : 50 rpm

4.5 Application information & cleaning

Possible fields of application:

- Food industry
- Pharmaceutical industry
- Paint industry
- Others

For **FOOD INDUSTRY** applications (dairies, breweries, etc.) the pumps preferably can be supplied with nitrile (F-NBR) food grade hoses or Bioprene hoses, and stainless steel sanitary connectors.

	Carefully read the additional user information supplied with the food hoses.

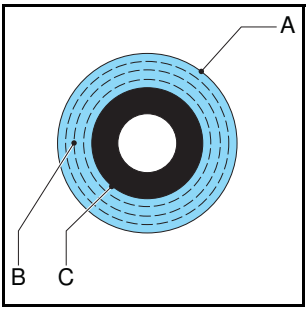
Cleaning of the F-NBR pump hose can be done by using aqueous ALKALINE solutions, such as CAUSTIC SODA or SODIUM CHLORIDE (max. concentration 20%).
In case of cleaning with saturated steam (SIP) use one of the following combinations of temperature and duration of cleaning.

- 120 °C. (248 °F) : maximum 30 minutes
- 100 °C. (212 °F) : maximum 60 minutes
- 80 °C. (176 °F) : unlimited

It is recommended to flush (cool) the pump hose with cold water after high temperature cleaning, unless the pump is going back to normal duty again.
For **OTHER INDUSTRIES** the pumps can be supplied with other hose types like NR (natural rubber) or EPDM rubber hoses and with standard flange + Insert connections.
Flanges can be galvanized steel or stainless steel to EN, ASA or JIS.
Inserts available in stainless steel, PVC, PP and PVDF.
Cleaning to be done by using liquids that do not attack the used pump hose material. In case of doubt contact your Bredel representative.

4.6 Pump hose

4.6.1 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: 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	Colour code
NR	Natural rubber	Purple
NBR	Nitrile rubber	Yellow
F-NBR	Nitrile rubber	Yellow
EPDM	EPDM	Red
CSM	CSM	Blue
Bioprene	Bioprene	Light green

	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, with minimum tolerances in wall thickness. To ensure the correct compression of the pump hose, because:

- When the compression is too high it creates an excessive load on the pump and pump element, resulting in reduced hose life and bearing life.
- When the compression is too low, this will result in loss of capacity due to backflow. Backflow results in a reduction of hose life.

4.6.2 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 are fitted between the rotor and the pressing shoe. The number of shims will vary depending on the operating speed and pressure. Refer to section 11.1.8.

Caution
Always apply the advised amount of shimming for optimum hose performance. Shim both shoes identically.

4.6.3 Lubrication and cooling

The pumphead is filled with a special lubricant. The lubricant lubricates the movement between the hose and the pressing shoes and transfers the generated heat from the hose to the pump housing and the cover.
The Bredel CIP pump needs to be filled with twice as much lubricant compared to a standard pump of this size. The lubricant is food grade. The user is responsible to ensure chemical compatibility with the fluid to be pumped (refer to section 11.1.4).

4.6.4 Gearbox

The hose pump types described in this manual use various types of gearbox units. The gearboxes are fitted with a foot rest.

4.6.5 Electric motor

The hose pump type described in this manual use various types of motors. If the pump is to be used in potentially explosive atmospheres, please contact your Bredel representative, as these type of pumps are not in compliance with ATEX by default.

4.6.6 Available options

The following options are available for the hose pump:

- High (lubricant) level float switch.
- Low (lubricant) level float switch.
- Epoxy pressing shoes.
- Stainless steel 316 flanges, flange brackets, hose clamps, supporting parts and fasteners.

The following options are available for CIP control:

- Pneumatic actuator with solenoid 5/2 control valve
- Electric actuator
- Manual actuator

5 INSTALLATION

5.1 Unpacking

When unpacking carefully follow the instructions as given on the packaging or on the hose pump. Dispose of the package material through the appropriate channels.

5.2 Inspections

Check that your delivery is correct and check it for any transport damage, refer to section 4.1. Report any damage immediately to your Bredel representative.

5.3 Installation conditions

5.3.1 Ambient conditions

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).

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.
- Make sure that the floor surface is horizontal and has a maximum slope of 10 mm per meter. 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, for convection of the heat generated by the pump and drive. Keep some distance between the ventilation cover of the electric motor and wall to enable cooling.

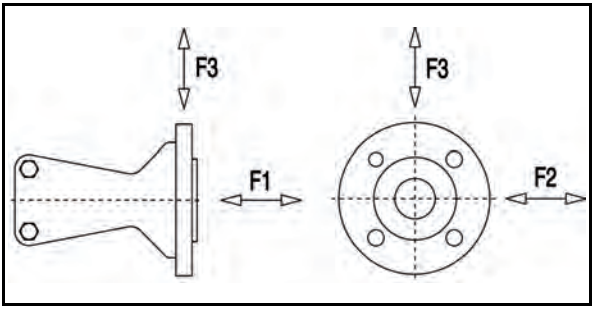
5.3.3 Pipework

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

- The bore size of the suction line must be larger than the bore size of the pump hose. The bore size of the discharge line must be minimal or larger than the bore size of the pump hose. For more information consult your Bredel representative.
- Avoid sharp bends and make the radiuses of the bends are as large as possible. It is recommended to use Y-connections instead of T-connections.
- It is recommended to use a minimum of three quarter (3/4) of the hose length as flexible hose in the suction or discharge line. This way connection lines do not have to be removed when changing a pump hose.
- Keep the delivery and suction lines as short and direct as possible.
- Do not exceed the maximum working pressure of the hose pump, refer to section 11.1.1. If necessary fit a pressure release valve.

Caution
Consider the maximum permissible working pressure on the discharge side. Exceeding the maximum working pressure can cause to serious damage to the pump.

- Make sure that the maximum forces on the flanges are not exceeded. The maximum flange loads are given in the table below:



Force	Bredel CIP 40	Bredel CIP 50
F1 [N]	1000	1400
F2 [N]	200	300
F3 [N]	500	700

5.3.4 Pulsating flow

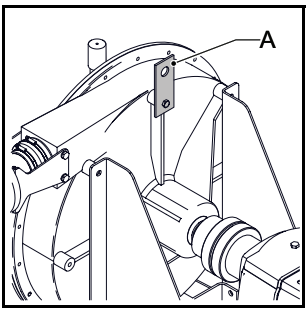
Hose pumps have a pulsating flow that can result in vibrations of pump and flow lines under the following circumstances:

- suction and discharge lines are not fixed correctly
- high pump speed in combination with long suction and discharge lines and/or high density of the product
- diameter of suction and/or discharge line too small

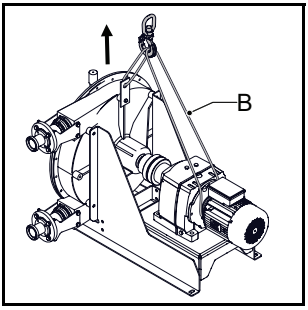
In case of unacceptable pulsations, dampeners for suction and/or discharge line can be supplied. Please consult your Bredel representative for information on Inlet Pulsation Accumulators (IPA) or Pulsation Dampeners (PD). These accumulators and dampeners are not suitable for food applications.

5.4 Lifting and moving the pump

For lifting and moving the pumphead, use the lifting lug (A). This lifting lug is fitted on the rear of the pumphead. The complete hose pump, i.e. pumphead, gearbox and electric motor, must be lifted using the lifting lug (A) plus additional support on gearbox and motor using suitable straps or slings (B).



For the weights of the pump, refer to section 11.1.6.



⚠	**Warning** If the pump is to be lifted ensure that all standard lifting practices are adhered to and carried out by qualified personnel only. Never lift the complete pump unit by only using the lifting lug.

6 COMMISSIONING

6.1 Preparations

- Connect the electric motor in conformance with the locally applicable rules and regulations. Have the electrical installation work carried out by qualified personnel.
- The pump casing is filled with a Bredel Genuine Hose Lubricant. If necessary refill lubricant via the breather/vent plug (refer to section 7.3).
- Set the actuator switch in the pumping position.
- In case of pneumatic actuator check if the actuator response is good (refer to section 8.6.3).
- Check the rotation of the rotor.
- Check that the number of shims corresponds with your application, refer to section 11.1.8.
- For adjusting the compression force of the hose, refer to section 7.8.
- Make sure that there are no obstructions such as closed valves.

6.2 Start-up

- Switch on the hose pump.
- Check the rotation of the rotor.
- Check the capacity of the hose pump. If the capacity differs from your specification, follow the instructions in chapter 10 or consult your Bredel representative.
- Check the hose pump in accordance with points 1 to 4 of the maintenance table from section 7.1.

7 GENERAL MAINTENANCE

Warning
Only use original Bredel parts when maintaining the hose pump. Otherwise Bredel cannot guarantee correct functioning of the pump, also see: “Safety” and “Warranties”.

7.1 Maintenance and periodic inspections

In the table below is indicated which maintenance and periodic inspections need to be carried out on the hose pump to guarantee an optimal safety, operation and life of the pump.

Point	Action	To be carried out	Remark
1	Check the lubricant level.	Before start up of the pump and on a scheduled interval during operation.	Make sure that the pump casing is filled to half way level with a genuine Bredel hose lubricant. If necessary refill the lubricant (refer to section 7.3).
2	Check the pumphead for any leakage of lubricant around the cover and the flanges.	Before start up of the pump and on a scheduled interval during operation.	Refer to chapter 10
3	Check pump for deviating temperature or strange noises.	On a scheduled interval during operation.	Refer to chapter 10
4	Check pressing shoes for excessive damage.	When replacing the pump hose.	Refer to section 7.5
5	Internal cleaning of the pump hose.	Cleaning of the system or product change.	Refer to section 7.2
6	Replacing pump hose.	Preventive, this means after 75% of the hose life of the first hose.	Refer to section 7.5

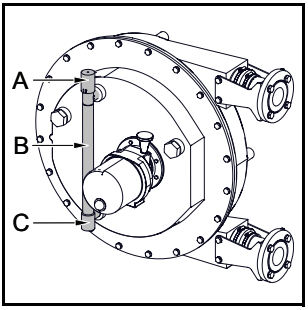
Point	Action	To be carried out	Remark
7	Changing lubricant.	After every 2nd hose change or after 5,000 service hours, whichever comes first or after hose rupture.	Refer to section 7.3
8	Replacing pump seal.	If necessary.	Refer to section 7.7.2
9	Replacing pressing shoes.	When there is visible wear on the running surface.	Refer to section 7.7.1
10	Replacing bearings.	If necessary.	Refer to section 7.7.2

7.2 Cleaning pump hose

With a lot of products it is necessary to have the pump hose cleaned immediately after pumping to avoid hardening of the product inside. The inside of the pump hose can be easily cleaned by rinsing the pump with clean water. If a cleaning fluid is added to the water, it must be checked that the hose liner material is resistant to that. Also note that the pump hose can resist the cleaning temperature. Special cleaning balls are also available; please consult your Bredel representative.

7.3 Changing lubricant

1. Place a tray under the drain plug (C).
2. Remove the drain plug (C) and collect the lubricant in the tray.
3. Install the drain plug.
4. Remove the breather cap (A) and position a funnel in the breather.
5. Pour lubricant in the funnel until the lubricant level is half way the inspection tube (B).
6. Install the breather cap (A).



7.4 Changing oil in gearbox

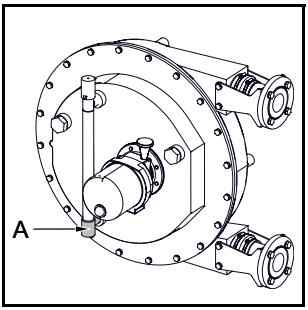
For information regarding the changing of oil in the gearbox and the type of oil to be used we refer to the documentation of the manufacturer of this item.

7.5 Replacing pump hose

The pump hose can be replaced without removing the pump cover. The pump must be in pump mode.

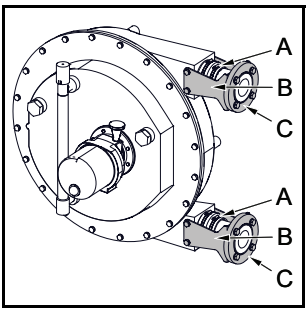
7.5.1 Remove the lubricant

1. Place a tray under the drain plug.
2. Remove the drain plug (A) and collect the lubricant in the tray.
3. Install the drain plug.

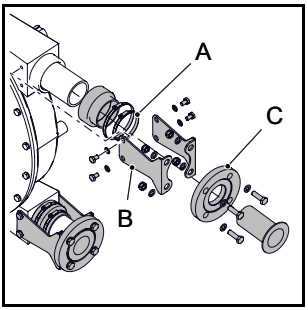


7.5.2 Remove the pump hose

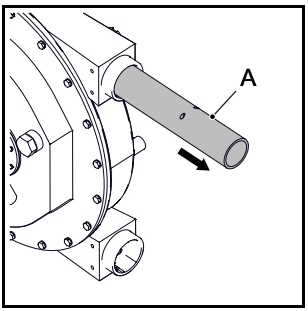
1. Shut off the valves on both suction and discharge side.
2. Disconnect the piping of the suction and discharge port.
3. Loosen the hose clamps (A) on the suction and discharge port.
4. Remove the flanges (C) of the suction and discharge port. If you remove the flange the insert is also pulled from the hose.



5. Remove the flange brackets (B).
6. Remove the hose clamps (A).

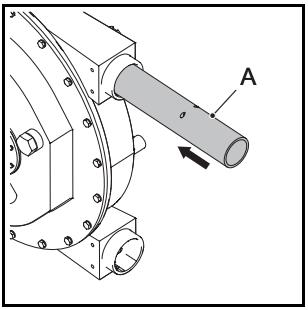


7. Remove the hose by jogging the drive motor.
8. Flush the casing cavity to remove any contamination.



7.5.3 Install the pump hose

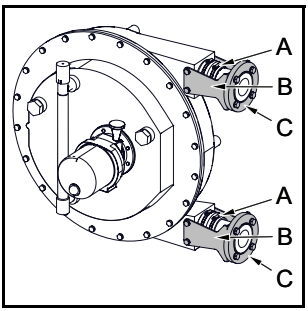
1. Clean the outside of the new pump hose.
2. Lubricate the external surface of the new pump hose with Bredel hose lubricant.
3. Insert the hose by jogging the drive motor. Stop the jogging when the hose sticks out equally at both ends. If necessary help inserting the hose by pressing it firmly into the port opening.



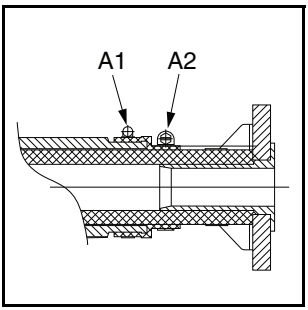
7.5.4 Fasten the pump hose

	Always start hose connection at the suction port and finish all steps before you start on the discharge port.

1. Install the flange brackets (B). Do not tighten the bolts!
2. Install the insert and the flange (C).
3. Connect the suction line.



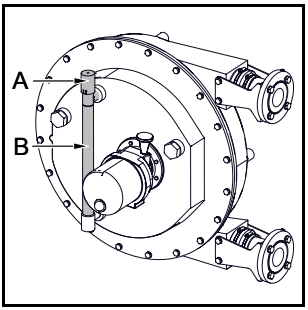
4. Jog the motor in the direction of the suction port to drive the hose against the flange face. Make sure the hose butts up against the flange face and that the insert is seated correctly.
5. Make sure that hose clamp (A2) is mounted directly against the vertical part of the rubber bush.
6. Tighten the hose clamps (A1 and A2).



7. Repeat the procedure for the discharge port.
8. Tighten the bolts of the flange brackets (B).

7.5.5 Fill the pump with lubricant

1. Remove the breather cap (A) and position a funnel in the breather.
2. Pour lubricant in the funnel until the lubricant level is half way the viewing glass (B).
3. Install the breather cap.



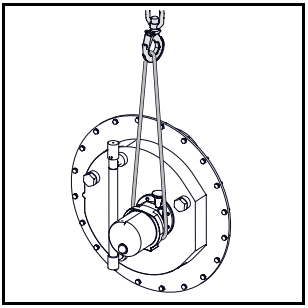
7.5.6 Finish the pump hose replacement

1. Open the suction and discharge valves.

⚠	**Caution** When the pressing shoes are worn the compression force of the hose could decrease. This can result in a loss of capacity due to backflow of the pumped liquid. Backflow results in a reduction of hose life.

7.6 Remove the cover

1. Remove the lubricant (refer to section 7.5.1).
2. Remove the pump hose (refer to section 7.5.2).
3. Place a strap on the cover and connect the strap to a crane.
4. Guide the cover by hand while you remove it.



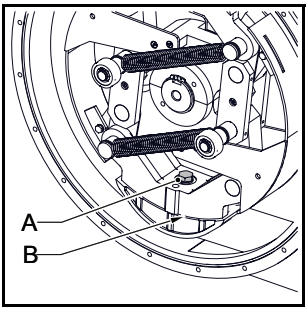
7.7 Exchanging replacement parts

7.7.1 Replacing pressing shoes

1. Remove the lubricant (refer to section 7.5.1).
2. Remove the pump hose (refer to section 7.5.2).

⚠	**Warning** The front cover should not be removed whilst the hose is in place. This can cause a deformation of the pump casing and can lead to too much tension in the bolts after refitting the cover.

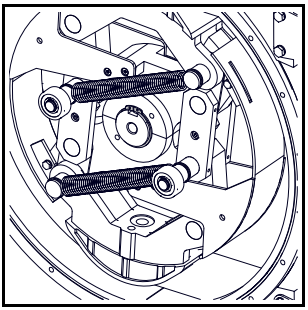
3. Remove the cover.
4. Loosen the bolt (A) a few turns.
5. Remove the shims (B).
6. Loosen the bolt (A) completely to remove the pressing shoe. If necessary replace the bolt.
7. Position the (new) pressing shoe.
8. Fit the removed shims again.
9. Tighten the retaining bolt (A), refer to section 11.1.7.
10. Repeat the procedure for the other pressing shoe.
11. Check the cover O-ring for damage and replace if necessary.
12. Install the cover. Tighten the bolts in the correct order, diagonally opposite of each other, refer to section 11.1.7.
13. Switch on the electrical supply.
14. Install the hose and refill the lubricant, refer to section 7.5.3 through 7.5.5.



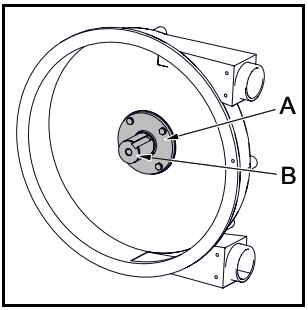
7.7.2 Replacing seal and bearings

1. Remove the lubricant (refer to section 7.5.1).
2. Remove the pump hose (refer to section 7.5.2).
3. Remove the cover.
4. Isolate the pump from the electrical supply.
5. Loosen the coupling on the drive end of the shaft.

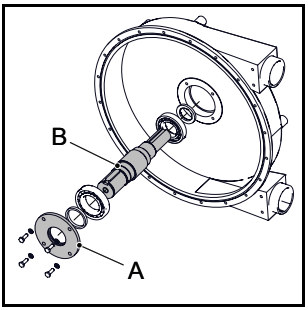
6. Remove the rotor retaining ring and pull the rotor off the shaft.



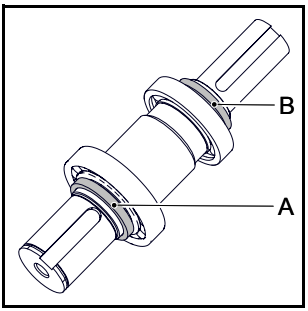
7. Remove the bearing cover (A).
8. Remove the shaft assembly (B) and check both bearings.



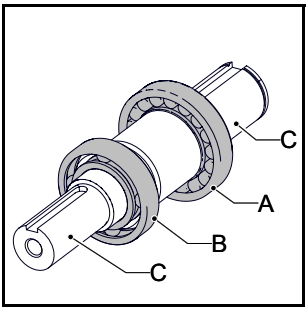
9. Use an arbor press and V-block to remove both bearings from shaft.



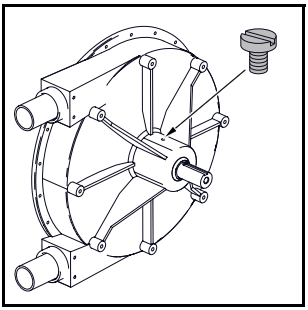
10. Use a file to deburr the key ways.
11. Remove the lip seals (A) and (B) from the housing and the bearing cover. It is recommended to replace seals whenever shaft has been removed.
12. Pre-grease bearings with lithium grease.



13. Coat shaft areas (C) with anti-seize compound to facilitate assembly.
14. Use an arbor press to press the ball bearing (A) and the roller bearing (B) on the shaft.



15. Press a new oil seal into the housing.
16. Insert a new joint ring into the bearing cover groove. Make sure the ring has the correct orientation.
17. Press the shaft assembly into the housing.
18. Add grease through the grease fitting until grease is forced through the exposed front bearing. Then take away grease nipple and plug the hole.
19. Install the bearing cover.
20. Place the rotor key and assemble rotor. Secure with retainer ring.
21. Check the cover O- ring for damage and replace if necessary.
22. Install the cover, refer to section 11.1.7 for bolt torques.
23. Fit the (new) pump hose (refer to section 7.5.3).

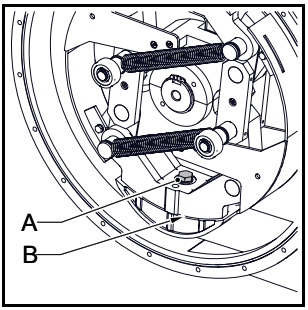


7.8 Hose compression force adjustment (shimming)

1. Remove the lubricant (refer to section 7.5.1).
2. Remove the pump hose (refer to section 7.5.2).

⚠	**Warning** The front cover should not be removed whilst the hose is in place. This can cause a deformation of the pump casing and can lead to too much tension in the bolts after refitting the cover.

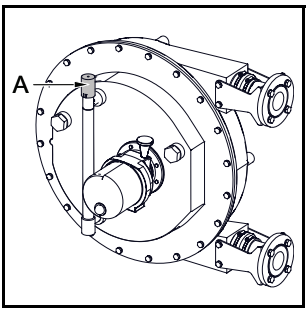
3. Remove the cover.
4. Loosen the bolt (A) a few turns.
5. Add or remove shims (B).
6. Tighten the retaining bolt(s), refer to section 11.1.7 for bolt torques.
7. Repeat the procedure for the other pressing shoe.
8. Check the cover O-ring for damage and replace if necessary.
9. Install the cover. Tighten the bolts in the correct order, diagonally opposite of each other, refer to section 11.1.7.
10. Switch on the electrical supply.
11. Install the hose and refill the lubricant, refer to section 7.5.3 through 7.5.5.



7.9 Fitting options

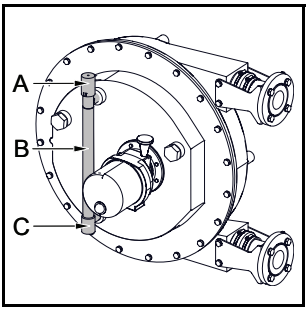
7.9.1 Fitting a high-level float switch

1. Remove the breather cap (A).
2. Install the breather cap with high level float switch.
3. Connect the high-level float switch to the auxiliary power circuit via the PVC cable (2 x 0.34 mm2). 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.



7.9.2 Fitting a low level float switch

1. Place a tray under the drain plug.
2. Remove the drain plug (C) and collect the lubricant.
3. Install the drain plug with the low level float switch and tighten it firmly.
4. Remove the breather cap (A) and position a funnel in the breather.
5. Refill with lubricant until the level is half way the inspection tube (B).
6. Install the breather cap.
7. Connect the low level float switch to the electrical supply.
   The electrical contact of the float switch is normally closed (NC). When the lubricant level is (too) low the contact will open.



7.9.3 Float switch power specification

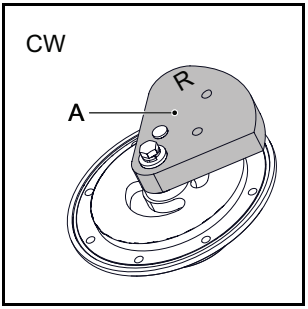
Specifications	
Voltage	Max. 230V AC/DC
Current	Max. 2A
Power	Max. 40VA

8 MAINTENANCE OF CAM AND ACTUATORS

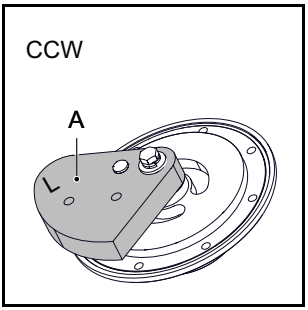
⚠	**Warning** Only use original Bredel parts when maintaining the hose pump. Otherwise Bredel cannot guarantee correct functioning of the pump, also see: “Safety” and “Warranties”.

8.1 Cam assembly

The cam assembly is available in two variants. One for clockwise (CW) and one for counter-clockwise (CCW) rotation. The type of variant can be determined by looking at the mark (A) on the cam as indicated in the picture.
The CW variant has the label R (right) and the CCW has the label L (left) engraved in the cam.
For ordering this pre-assembled part please contact your Bredel representative.



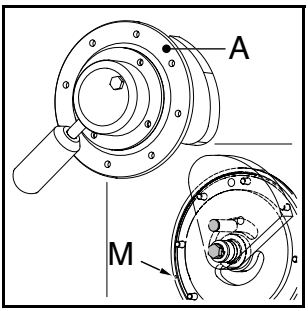
In this manual the definition of clockwise (CW) and counter clockwise (CCW) pump rotation is based on a viewing direction from non drive-end (NDE) towards drive-end (DE). In other words when looking at the pump front cover.



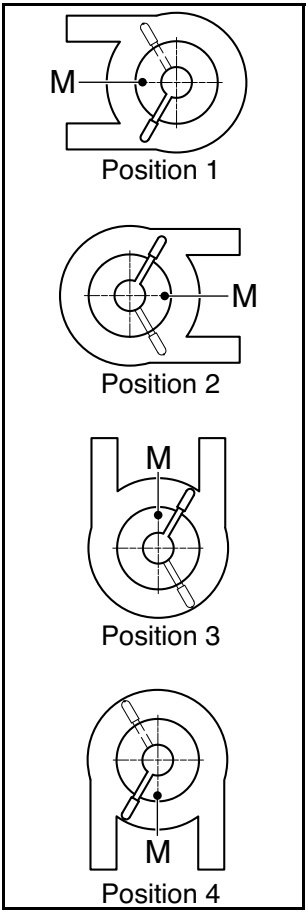
⚠	**Caution** You cannot exchange a CW cam assembly with a CCW cam assembly, and vice virsa, to change the rotation of the pump. The rotor also has a CW and CCW variant.

8.2 Manually operated actuator

The option of a manually operated actuator is available in two pre-assembled configurations. One for CW and one for CCW operation as indicated in section 8.5.1.
The orientation of the actuator relative to the drill mark (M) on the bracket (A) depends on the pump rotation and port orientation. The drill mark (M) is always orientated between the pump ports.



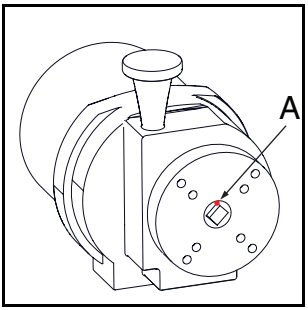
	The pump positions are defined as: (pump seen from the non drive-end (NDE) to drive-end (DE). In other words when looking at the pump front cover.) Position 1: ports towards the left Position 2: ports towards the right Position 3: ports upward Position 4: ports downward The actuator rotation is based on a viewing direction from DE to NDE. Since the actuator is mounted on the pump cover the viewing directions for defining pump rotation and actuator rotation are the same.



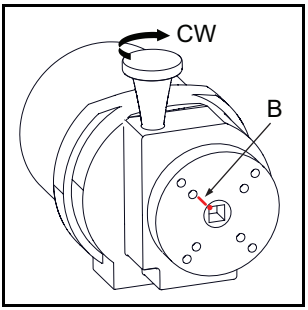
8.3 Positioning of the electrical actuator

The rotation angle of the electrical actuator is limited by two mechanical stops to an angle of 90-100°. The maximum allowable rotation angle is set by the cam assembly and is 116°. The actuator rotation angle range must be aligned to the cam assembly in such a way that at minimum and maximum rotation angle there still is clearance between the guiding pin on the cam and the sliding groove in the bracket.The middle position of the actuator can be determined as follows.

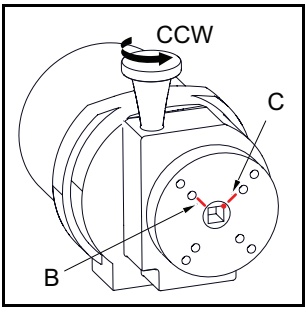
1. Take a corner of the actuator output shaft as reference. Mark this corner (A). Use a marker.



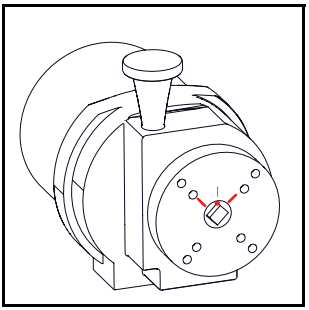
2. Turn the wheel on the actuator fully towards the CW direction until it is blocked.
3. Set a mark (B) at the actuator flange at the same angular position as the reference point.



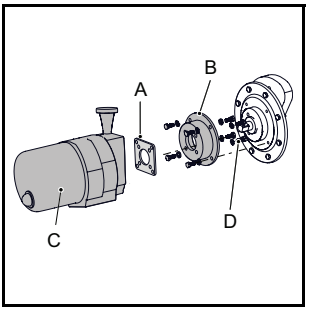
4. Turn the wheel on the actuator fully towards the CCW direction until it is blocked.
5. Set a mark (C) at the actuator flange at the same angular position as the reference point.



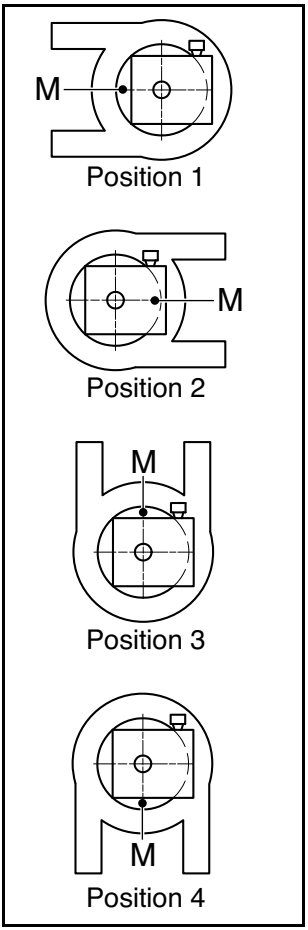
6. Turn the wheel on the actuator in CW direction until the angular position of the reference point is in the middle of (B) and (C). The actuator output shaft should be in the position as shown in the image.



Now mount the actuator to the cam-assembly using the drill mark (M) as reference. Place the plastic positioning plate (A) for centring the adaptor (B) at the bottom of the actuator (C). Use the 4 bolts and washers (D) to place the adapter onto the actuator.



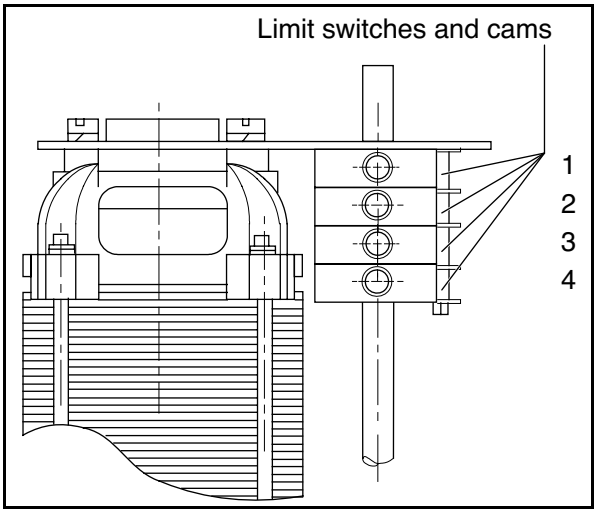
The orientation of the actuator relative to the drill mark (M) on the bracket depends on the pump rotation and port orientation. The drill mark (M) is always orientated between the pump ports. The actuator is always positioned horizontal with the manual turning wheel facing upwards.
Use the other 4 bolts and washers to place the adapter with actuator onto the cam assembly.



i	The pump positions are defined as: (pump seen from the non drive-end (NDE) to drive-end (DE). In other words when looking at the pump front cover.) Position 1: ports towards the left Position 2: ports towards the right Position 3: ports upward Position 4: ports downward The actuator rotation is based on a viewing direction from DE to NDE. Since the actuator is mounted on the pump cover the viewing directions for defining pump rotation and actuator rotation are the same.

i	In case the actuator rotation angle is more than 116° the mechanical stops need to be adjusted. Contact your Bredel representative.

The actuator is also equipped with limit switches that electrically limit the rotation angle. Normally these switches are set in the right position and do not need adjusting. After mounting the actuator to the cam assembly it must be checked if the limit switches turn of the actuator before the mechanical limit is reached.
To check the limit switches remove the cover.



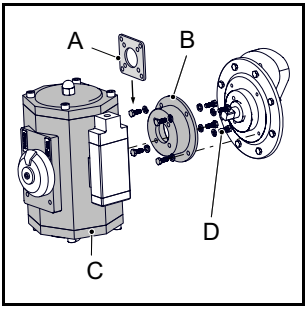
	In case the actuator rotation angle is more than 110° the limit switches need to be adjusted. Contact your Bredel representative.

The limit switches 1 and 2 are used to limit the stroke of the actuator. Two additional switches 3 and 4 are available for switching an external device. This allows you to trigger an external action related to limit switch 1 or 2.

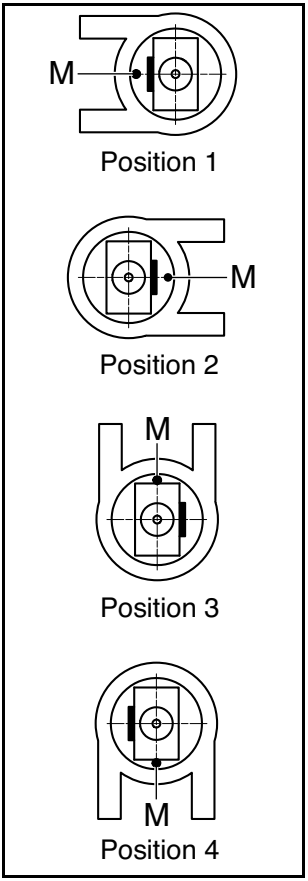
8.4 Positioning of the pneumatic actuator

In case of a pneumatic actuator first remove the dust caps from the air connections.

Place the plastic positioning plate (A) for centring the adaptor (B) at the bottom of the actuator (C). Use the 4 bolts and washers (D) to place the adapter onto the actuator.

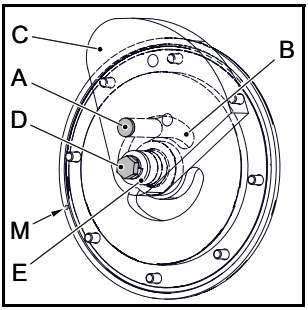


The orientation of the actuator relative to the drill mark (M) on the bracket depends on the pump rotation and port orientation. The drill mark (M) is always orientated between the pump ports. The actuator is always positioned with the air connection on the right (pump position 2 and 3) or on the left (pump position 1 and 4). Set the actuator in midposition by manually turning the indicator.

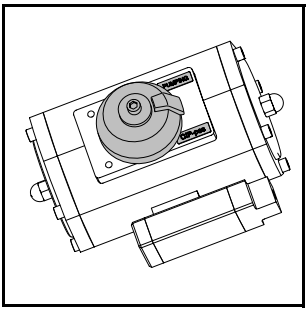


	The pump positions are defined as: (pump seen from the non drive-end (NDE) to drive-end (DE). In other words when looking at the pump front cover.) Position 1: ports towards the left Position 2: ports towards the right Position 3: ports upward Position 4: ports downward The actuator rotation is based on a viewing direction from DE to NDE. Since the actuator is mounted on the pump cover the viewing directions for defining pump rotation and actuator rotation are the same. The marks "open" and "closed" on the actuator refer to the valve position for which these actuators are mostly used.

	Make sure the pin (A) is in the middle of the groove (B). An offset of more than 15° can cause a wrong adjustment of the actuator.



Use the other 4 bolts and washers to place the adapter with actuator onto the cam assembly.
Check if the cam turns smoothly.
Check if the pin reaches both ends of the groove by manually turning the cam.
If not, the cam must be repositioned. This can be done as follows. Remove the adapter with actuator from the cam assembly. Loosen the bolt (D) and tap it with a synthetic hammer. This will release the clamping sets and the cam can now be adjusted. Retighten it afterwards with a torque of 40 Nm. Be sure that the cam (C) touches the collar of the shaft (E) and no extra axial play exists when tightening bolt (D).
Mount the adapter with actuator onto the cam mechanism and check again if the pin touches both ends of the groove.



Check at the same time if the indicator ridge on top of the actuator moves over the same angle left and right.
Position the indicator ridge pointing to the right or to the left.
Fit the position indicator, so that it can point to either “pumping” or “CIP. position” (refer to view 7 and 8 on the drawing in section 11.1.10).

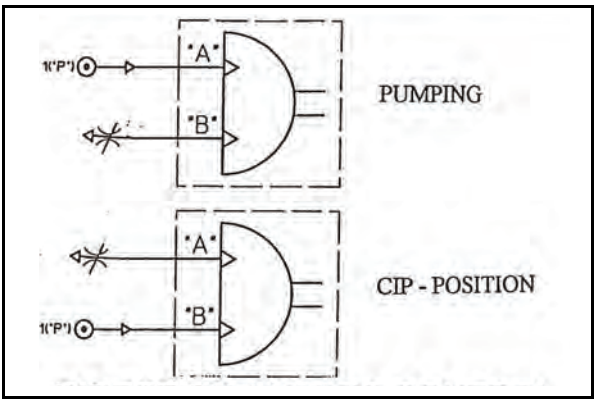
8.5 Direct pneumatic connection

	**Caution** When compressed air is supplied to the actuator ports directly the air flow should be reduced to prevent damage of the cam mechanism by fast switching movements.

Use a throttle valve and start with this valve almost closed when adjusting the actuator response. The adjustment should be as such that the turning of the cam from pumping to CIP and vice versa takes between 1 and 3 seconds.

8.5.1 Clockwise pump operation

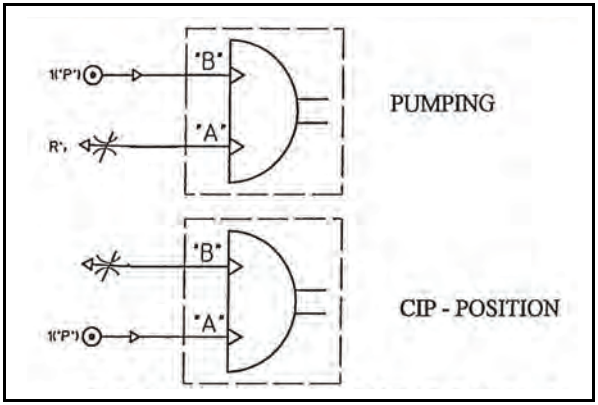
Pressurizing port A on the actuator will result in a counter clockwise rotation of the actuator towards "open" position. This brings the pump in pumping position.
Pressurizing port B on the actuator will result in a clockwise rotation of the actuator towards "closed" position. This brings the pump in CIP position.



8.5.2 Counter clockwise pump operation

Pressurizing port A on the actuator will result in a counter clockwise rotation of the actuator towards "open" position. This brings the pump in CIP position.

Pressurizing port B on the actuator will result in a clockwise rotation of the actuator towards "closed" position. This brings the pump in pumping position.

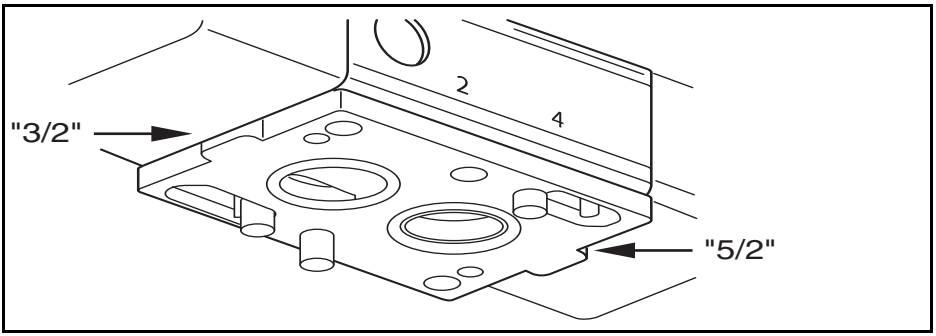


8.6 5/2 valve controlles connection

Specifications	
Max. air supply pressure	0,6 MPa (6 bar)
air consumption (approximately)	0,25 Litre per revolution (at 1 bar)
actuator and valve connection size	G1/4"

The valve can be controlled with 24 DC, 110V AC or 230V AC power. Check the specification on the valve.

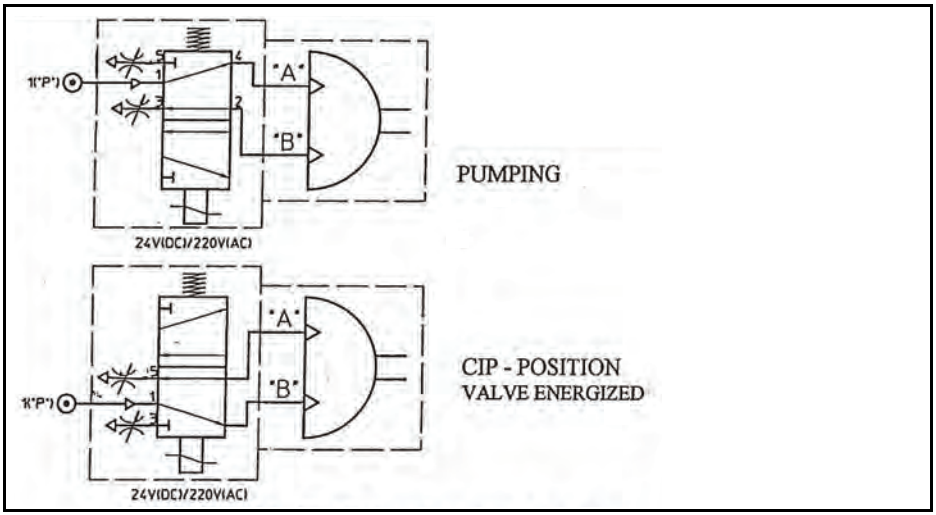
The valve has to be applied in 5/2 configuration. To achieve that position the conversion plate between spool valve and actuator as shown in the image. Both ports 2 and 4 of the valve should be visible when placing the conversion plate on the valve.



8.6.1 Clockwise pump operation

Pressurizing port 1 on the spool valve without electrically activating the valve will result in a counter clockwise rotation of the actuator towards "open" position. This brings the pump in pumping position.
Pressurizing port 1 on the spool valve and electrically activating the valve will result in a clockwise rotation towards of the actuator "closed" position. This brings the pump in CIP position.

Make sure the valve block is connected to the actuator body in such a way that ports 2 and 4 of the valve block are connected to ports B and A of the actuator body respectively.

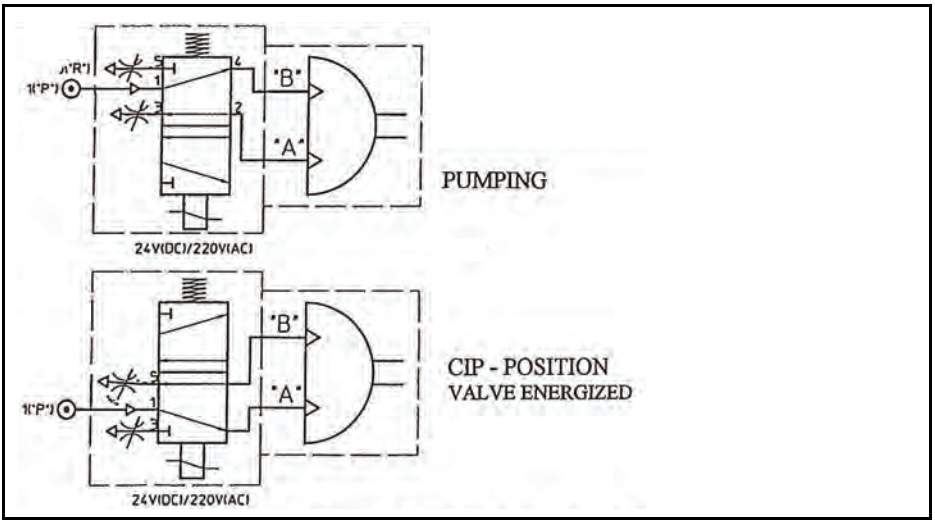


8.6.2 Counter clockwise pump operation

Pressurizing port 1 on the spool valve without electrically activating the valve will result in a clockwise rotation of the actuator towards "closed" position. This brings the pump in pumping position.

Pressurizing port 1 on the spool valve and electrically activating the valve will result in a counter clockwise rotation of the actuator towards "open" position. This brings the pump in CIP position.

Make sure the valve block is connected to the actuator body in such a way that ports 2 and 4 of the valve block are connected to ports A and B of the actuator body respectively.



8.6.3 Setting the valve controlled pneumatic actuator response

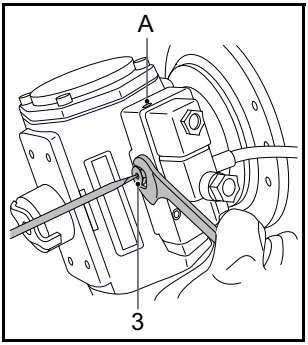
In case the pneumatic actuator is controlled by a solenoid 5/2 valve block one must adjust the air flow to reduce the rotation speed of the cam in order to avoid damage to the mechanism. This is done by adjusting the resistance of the air exhausts. The main air supply pressure does not need to be reduced.

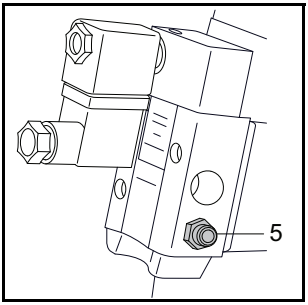
For adjusting the air flow two regulating screws in the gates 3 and 5 of the 5/2 valve block exist. The gate numbers are clearly indicated on the housing of the 5/2 valve block.
The regulating screws (3) and (5) must be adjusted in such way that the turning of the cam from normal to CIP takes between 1 and 3 seconds. Finding the setting

requires some testing with different screw settings. Based on the difference between the actual response time of the cam mechanism and the desired response time, adjust the screw.
The screw of gate 3 will control the time to switch to pumping condition.
The screw of gate 5 will control the time to switch to CIP position.

The turning screw (A) allows you to manually operate the actuator. Turning the screw in position 1 will turn the cam in one direction. This should be the CIP position. Setting the screw back to position 0 will move the cam in the other direction, i.e. to the pumping position.

1. Start with the regulating screws (3) and (5) fully turned in (ports closed). Then open them slightly by turning each screw back half a turn.
2. Connect the air supply to the actuator.
3. Switch the valve to manual by turning the screw (A) into position 1, now the actuator will move the cam. Determine if the movement is too slow, too quick or just about right.
4. Switch the turning screw (A) back to position 0, the cam will move in the opposite direction. Determine if the movement is too slow, too quick or just about right.
5. If the cam moves too quick the adjusting screws (3) and (5) need to be slightly turned in. If the cam, moves too slow the adjusting screws (3) and (5) need to be slightly turned out. Screw (3) regulates the time to switch to pumping condition. Screw 5 regulates the time to switch to CIP position.
6. Repeat steps 3-5 until the desired response is obtained.
7. After the right setting has been found, lock the screws (3) and (5) with the retaining nuts to fix their position.





8. Switch back to automatic control by setting the turning screw (A) in position 0. The pneumatic actuator is now ready for use.

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°C (-40°F) or higher than + 70°C (158°F).
Cover 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, the static load on the pump hose may have caused permanent deformation, which will reduce hose life.

9.2 Pump hose

Store the pump hose in a cool and dark room. Pump hoses have a limited storage life. It is strongly advised not to store the hose longer than 2 years.

10 TROUBLESHOOTING

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, please 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.
	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
High pump temperature.	Non standard hose lubricant used.	Consult the Bredel representative for the correct lubricant.
	Low lubricant level.	Add Bredel lubricant, for the required amount of lubricant refer to section 7.3.
	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, refer to section 11.1.8. Remove excess shims.
	High pump speed.	Reduce pump speed to a minimum. Consult with your Bredel representative for advice on optimum pump speeds.

Problem	Possible cause	Correction
Low capacity / pressure.	Shut-off valve in the suction line (partly) closed.	Fully open the valve.
	Under shimming of the pressing shoes.	Consult the diagram (refer to section 11.1.8).
	Hose rupture or badly worn hose.	Replace hose, refer to section 7.5.
	(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.

Problem	Possible cause	Correction
Vibration of the pump and pipework.	Suction and discharge lines are not secured correctly.	Check and secure pipework.
	High pump speed with long suction and discharge lines or high product specific gravity 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.
Broken front cover bolts.	Pump cover (dis)mounted with the hose in the pump.	Never (dis)mount the pump cover when the hose is still in the pump.

Problem	Possible cause	Correction
Short hose life.	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 16 bar. 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.
Hose pulled into the pump.	Insufficient or no hose lubricant in the pumphead.	Add extra lubricant, refer to section 7.3.
	No original Bredel lubricant.	Consult the Bredel representative for the correct lubricant.
	Extremely high inlet pressure - larger than 300 kPa.	Reduce the inlet pressure.

Problem	Possible cause	Correction
Lubricant leakage at bracket.	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 (refer to section 11.1.7).
	Bolts of hose clamps loose.	Tighten to the specified torque settings (refer to section 11.1.7).

11 SPECIFICATIONS

11.1 Pumphead

11.1.1 Performance

Description	Bredel CIP 40	Bredel CIP 50
Max. capacity, continuous [m3/h]	4.8	8.5
Max. capacity, intermittently [m3/h] *	9.6	17.5
Capacity per revolution [l/rev]	1.33	2.9
Max. permissible discharge pressure [kPa]	1600	
Permissible ambient temperature [°C]	- 20 to + 45	
Permissible product temperature [°C]	- 10 to + 80	
Sound level on 1m [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

Description	Material
Pump housing	Cast-iron
Cover	Steel
Pump rotor	Cast-iron
Pressing shoe	Aluminium
Pump support	Mild steel, galvanized
Flange bracket	Mild steel, galvanized
Mounting material of pump cover	Mild steel, galvanized
Mounting material of pump support	Mild steel, galvanized
Seals	Nitrile rubber
Bush	Chloroprene rubber

11.1.3 Actuator

Description	Product code
Pneumatic actuator	09155504
Spool valve 3/2 5/2	Z040535
Electric actuator	09260522

11.1.4 Lubricant

Required quantity of lubricant [Litres]	
Bredel CIP 40	Bredel CIP 50
10	20

Bredel Genuine Hose Lubricant is registered at NSF: NSF Registration No 123204; Category Code H1. Also refer to: www.NSF.org/USDA.

Components:

Glycerol	($C_3H_8O_3$)	50-100% w/w
Glycol	($C_2H_6O_2$)	2.5-10% w/w
Water	(H_2O)	

Consult your Bredel representative if you require additional information with respect to the safety data sheet

Warning
It is the users responsibility to ensure medium's chemical compatibility with the lubricant in the pumphead. Local Health and Safety regulations must be complied with.

An alternative lubricant is available based on silicone. Also compatibility with this lubricant must be checked if applied.
Refer to the chemical compatibility chart at www.wmpg.com/chemical or contact your Bredel representative for guidance.

11.1.5 Surface treatment

After surface preparation, one layer of two-component acrylate is used for surface protection. Standard colour is RAL9010 (White).
All galvanized parts, exclusive of mounting articles, have been provided with an electrolytic zinc layer of 15 –20 microns.

11.1.6 Weights and dimensions

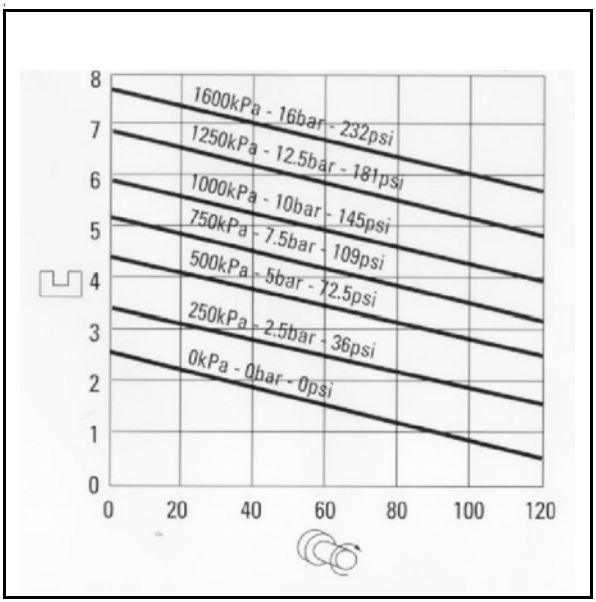
Description	Weights and dimensions per pump model	
series	Bredel CIP 40	Bredel CIP 50
Net weight pump [kg]	139	195
Gross weight pump [kg]	175	265
Dimensions crate [cm]	87x76x63	106x90x68
Cubage [m3]	0.42	0.65
Dimension pump hose [mm]	40x66x1490	50x80x1820
Weight pump hose [kg]	3.80	6.40
Quantity lubricant required [litres]	10	20
Weight lubricant [kg]	12	26
Weight supports (set) [kg]	43	56
Weight pump shaft [kg]	5	9.50
Weight rotor [kg]	12	24
Weight pressing shoes (set) [kg]	2	2.50
Weight pump cover [kg]	16	24
Weight pump housing [kg]	42	82
Flange connection, without inserts (set) [kg]	4.88	6.38
Insert (set) [kg]	0.34	0.46

11.1.7 Torques

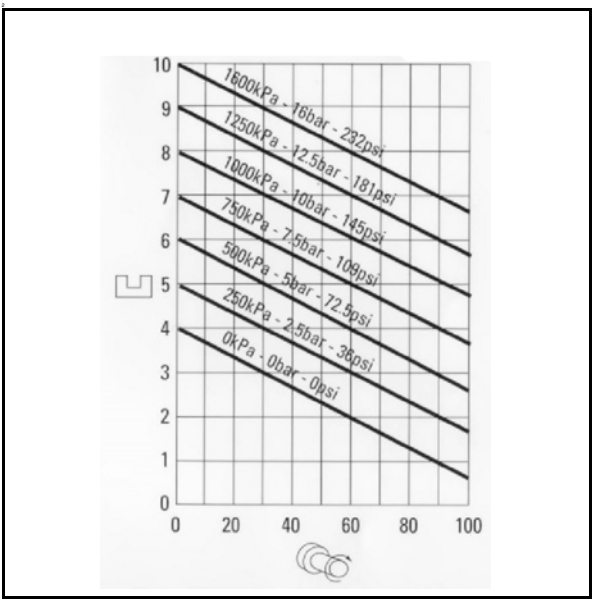
Description	Torques in [Nm] per pump type	
	Bredel CIP 40	Bredel CIP 50
Pressing shoe	120	160
Cover	50	50
Inspection window	1.75	7.75
Hose clamp	12	12
Rubber bush clamp	1.75	1.75
Flange bracket	50	50
Support	85	85

11.1.8 Shimming

Bredel CIP 40



Bredel CIP 50



When the product temperatures are above 60°C (140°F) always use one shim less than indicated. Always round up in number of shims.
For shimming in case of Bioprene hose contact your Bredel representative.

11.1.9 Parts list for Bredel CIP 40 and CIP 50 pump

The pump should be delivered with the cam in pumping position. The pumping position means that the cam is fully turned in the opposite direction of the pump direction. The CIP position means that the cam is fully turned in the direction of the pump direction.
Installation positions indicated on the drawings (page 66):

1. Rotor position for CCW rotation (Counter clockwise).
2. Rotor position for CW rotation (clockwise).
3. Pump lid position (option 1).
4. Pump lid position (option 2).
5. Pump lid position (option 3).
6. Pump lid position (option 4).

	* in the drawing means that there is a remark on the part in the table below.

POS. no.	Description	Remarks
020	pumphose NR	
040	pumphose NBR	
065	pumphose F-NBR	
070	pumphose CSM	
075	pumphose EPDM	
076	pumphose Bioprene	
101	pumphousing	
104	pumpshaft	
105	bearingcover	
106 SET	mounting support	
107	shim	
108	nameplate	
108A	metal tacks	
110	pressing shoe aluminium	
111	cylinder roller bearing	
112	deep groove ball bearing	
113	joint ring	
114	oil seal	
115	o-ring	
116	drive key	
117	rotor key	
118	snap ring	
119	rubber bush	
120	hoseclip	
121A	hoseclip	
122A	hoseclip	
123	rubbercord for cover	
124A	screw with cuppoint	

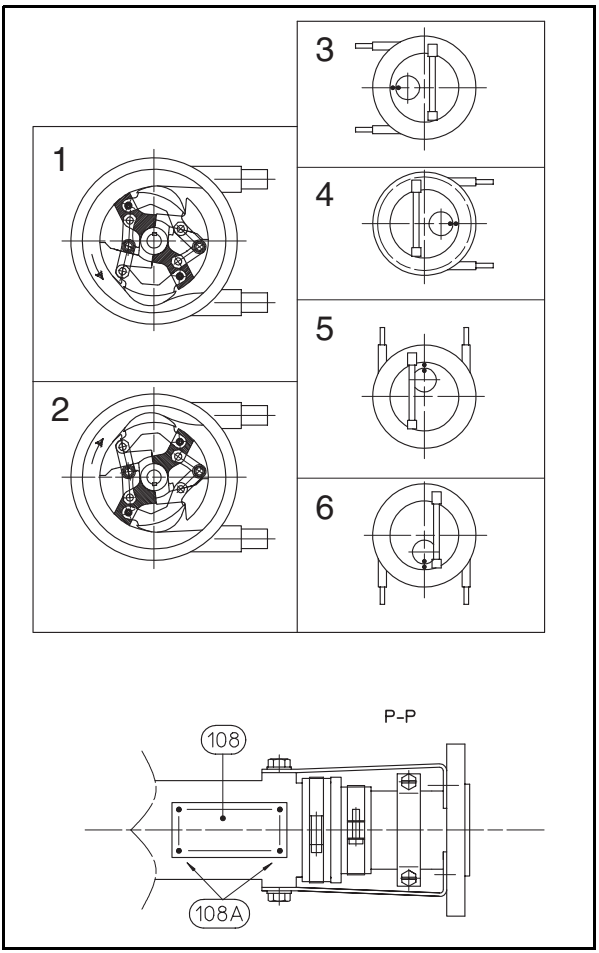
POS. no.	Description	Remarks
125	hexagon bolt	
126	spring washer	
127	pin	
128	hexagon screw	
129	spring washer	
137	PVC hose	
138	hose clip	
143	specially compounded lubricant	
144	Sticker	
145	T with hose nipple	
146	deseration pipe with hose nipple	
147	air breather cap	
148	drain plug	
152	grease	
153	cylinder screw	
154	cleansing sponge	
161	strip	
162	hexagon screw	
163	spring washer	
186	insert stainless steel	Choice of one of these inserts
187	insert PVC	
189	insert PP (polypropylene)	
190	insert PVDF	
197	flange bracket	
198	flange steel	Drawing shows the construction for the steel and Stainless steel insert. For the PVC, PP, and PVDF install with the chamfered side to the hose.
424	hexagon screw	
430	hexagon screw	
431	spring washer	
432	hexagon screw	
433	spring washer	

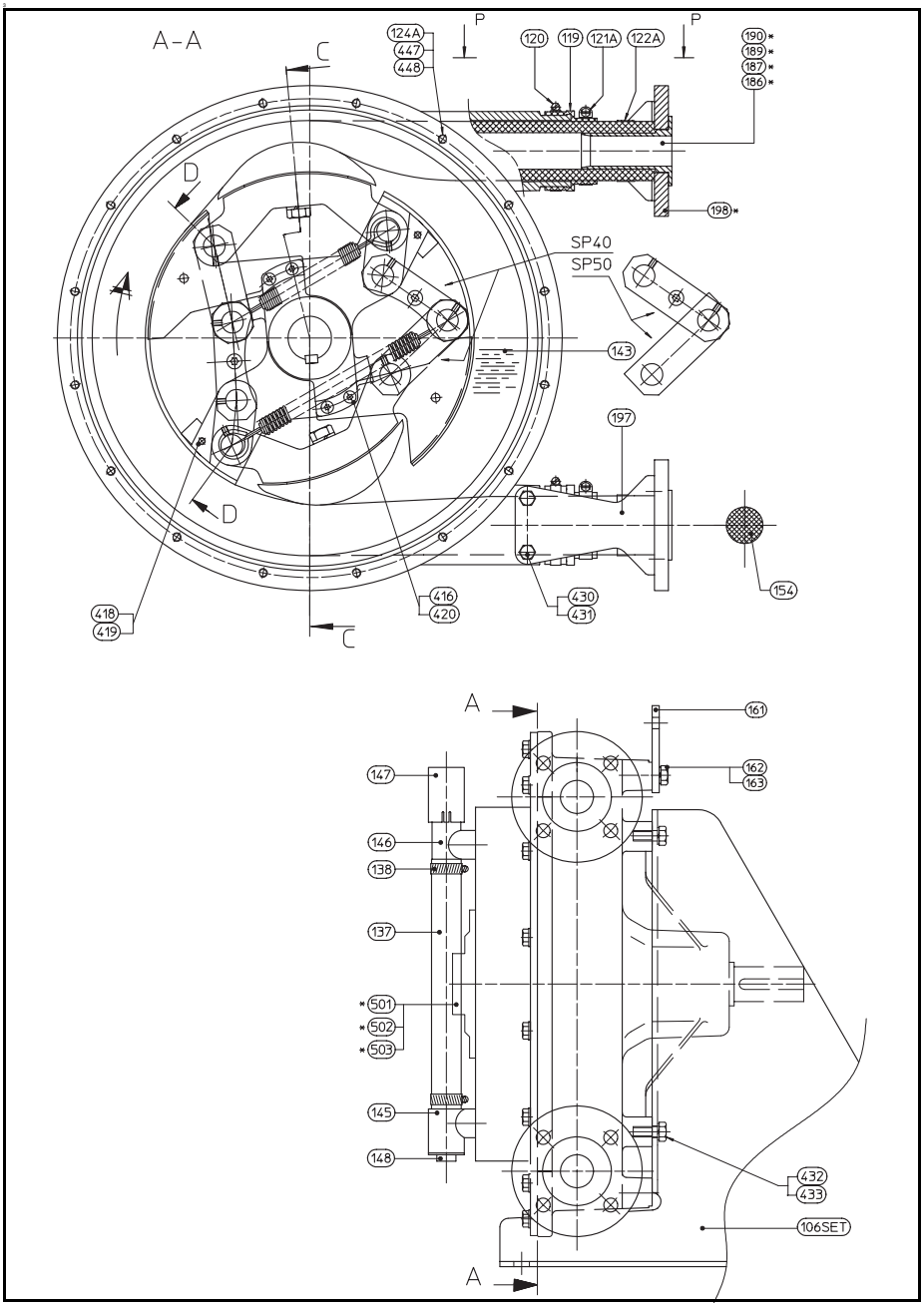
POS. no.	Description	Remarks
447	nut	
448	washer	
500	cover	
501	air operation module	Choice of one of these operation modules.
502	electrical operation module	
503	manual operation module	
527	blind rivet	
528L	safety warning sticker "left"	Use one of these stickers. The sticker is placed on the cover (500).
528R	safety warning sticker "right"	

Section D-D

POS. no.	Description
081	rotor complete cons. of
403	rotor
404	connecting ring
405	joint shaft
407	joint bracket
408	roller
409	snapring
413	joint shaft
414	bearing bush
415	guide for hose
416	countersunk screw
417	spring
418	hexagon screw
419	spring washer
420	countersunk spring washer
426	spring washer
434	distance piece
435	socket head screw
440	joint shaft
441	joint bracket

POS. no.	Description
444	joint piece
495	set screw

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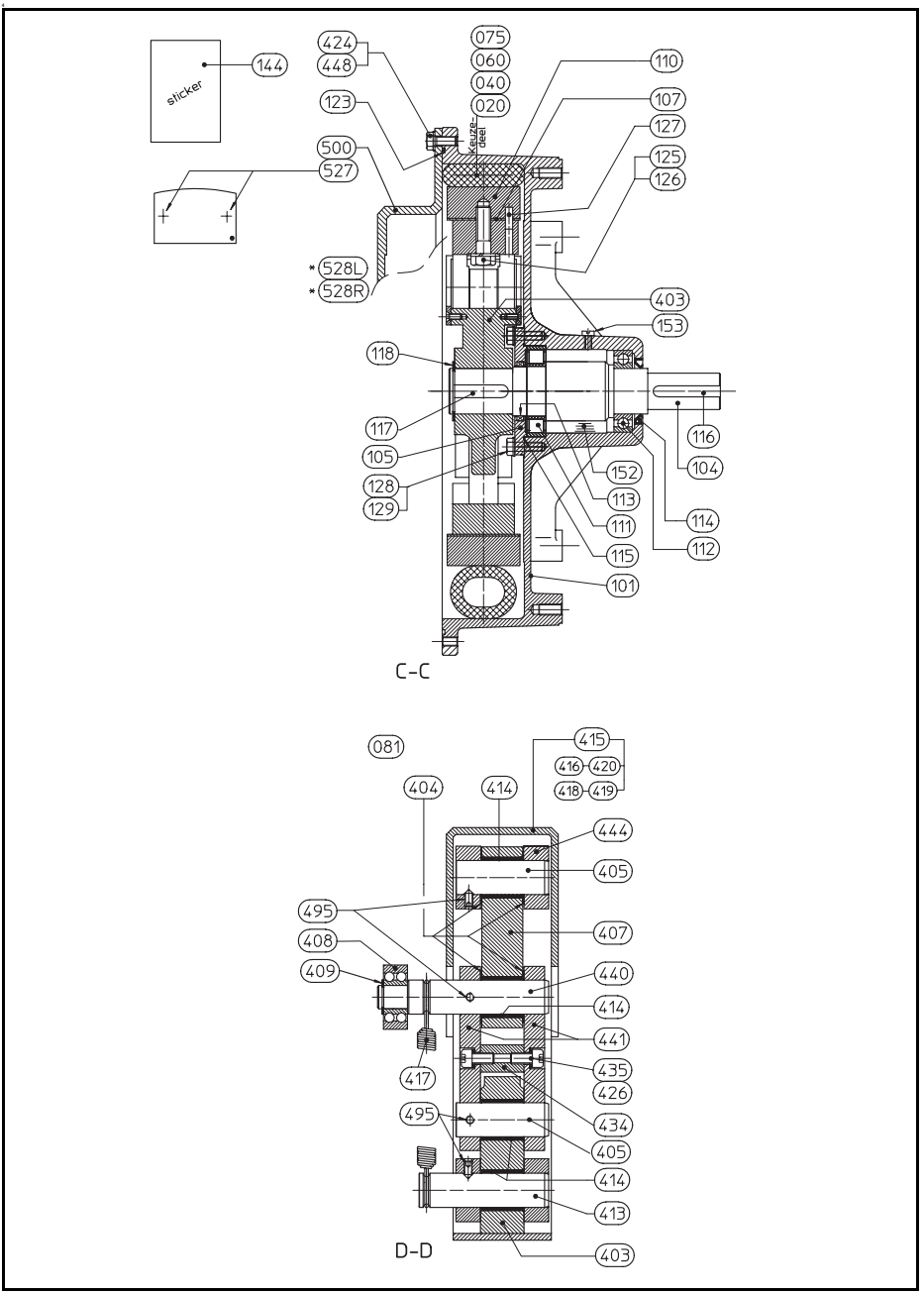
sticker
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424
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075
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500
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*528L
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D-D

11.1.10 Parts list air operation for CIP pumps

L = Airconnection, M = Marking

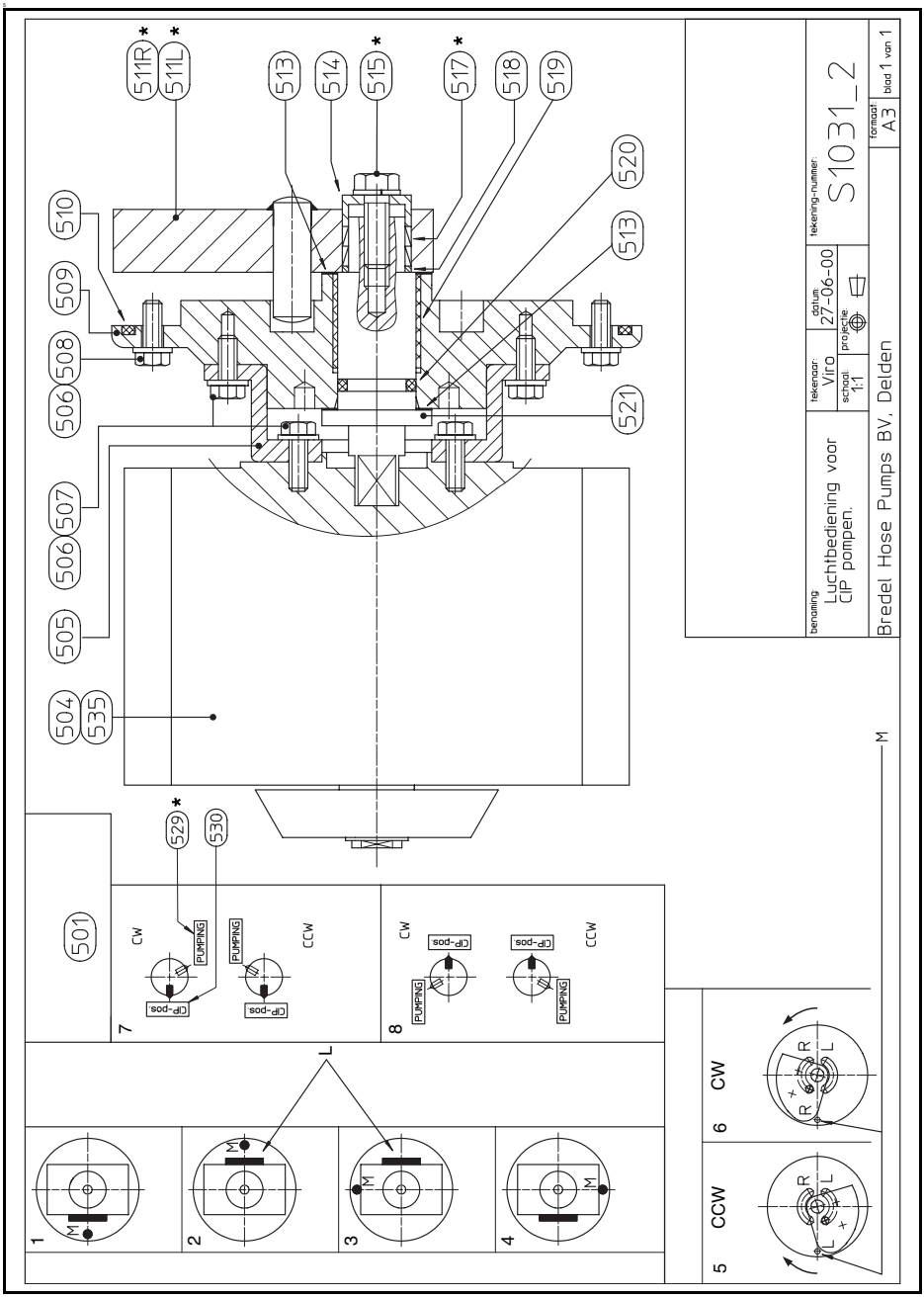
	* in the drawing means that there is a remark on the part in the table below.

Installation positions indicated on the drawing (page 70):

1. Actuator position with respect to the marking M (option 1).
2. Actuator position with respect to the marking M (option 2).
3. Actuator position with respect to the marking M (option 3).
4. Actuator position with respect to the marking M (option 4).
5. Cam position for CCW rotation (Counter clockwise). Cam is shown in the CIP position.
6. Cam position for CW rotation (clockwise). Cam is shown in the CIP position.
7. Position indication for option 1, and option 4. clockwise (CW), and Counter clockwise (CCW).
8. Position indication for option 2, and option 3. clockwise (CW), and Counter clockwise (CCW).

	The maximum air pressure is 6 bar.

POS. no.	Description	Remarks
501	air operation compl.consisting of:	
504	pneu. Actuator	
505	adapter electr/pneu operation	
506	hexagon screw	
507	washer	
508	copper washer	
509	bearing bracket	
510	o-ring	
511L	cam "left"	One of the cams is installed, depending on the pumping direction.
511R	cam "right"	
513	shim	
514	pressing washer	
515	hexagon screw	Fasten with a torque of 40 Nm.
517	clamping set	Lubricate with machine oil. Do not use oil with molybdenum (Molykote).
518	distance ring	
519	bearing bush	
520	o-ring	
521	shaft electr./pneu. operation	
529	tag plate "PUMPING"	Position is fixed with Loctite 460
530	tag plate "CIP pos."	
535	solenoid 5/2 valve block	


511R *
511L *
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515 *
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504
535
529 *
530
501
CW
PUMPING
CCW
CIP-pos.
PUMPING
CIP-pos.
7
CW
CIP-pos.
CIP-pos.
PUMPING
PUMPING
CCW
8
L
M
1
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5 CCW
6 CW
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Luchtbediening voor CIP pompen.
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tekening-nummer:
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Bredel Hose Pumps BV, Delden

11.1.11 Parts list electrical operation for CIP pumps

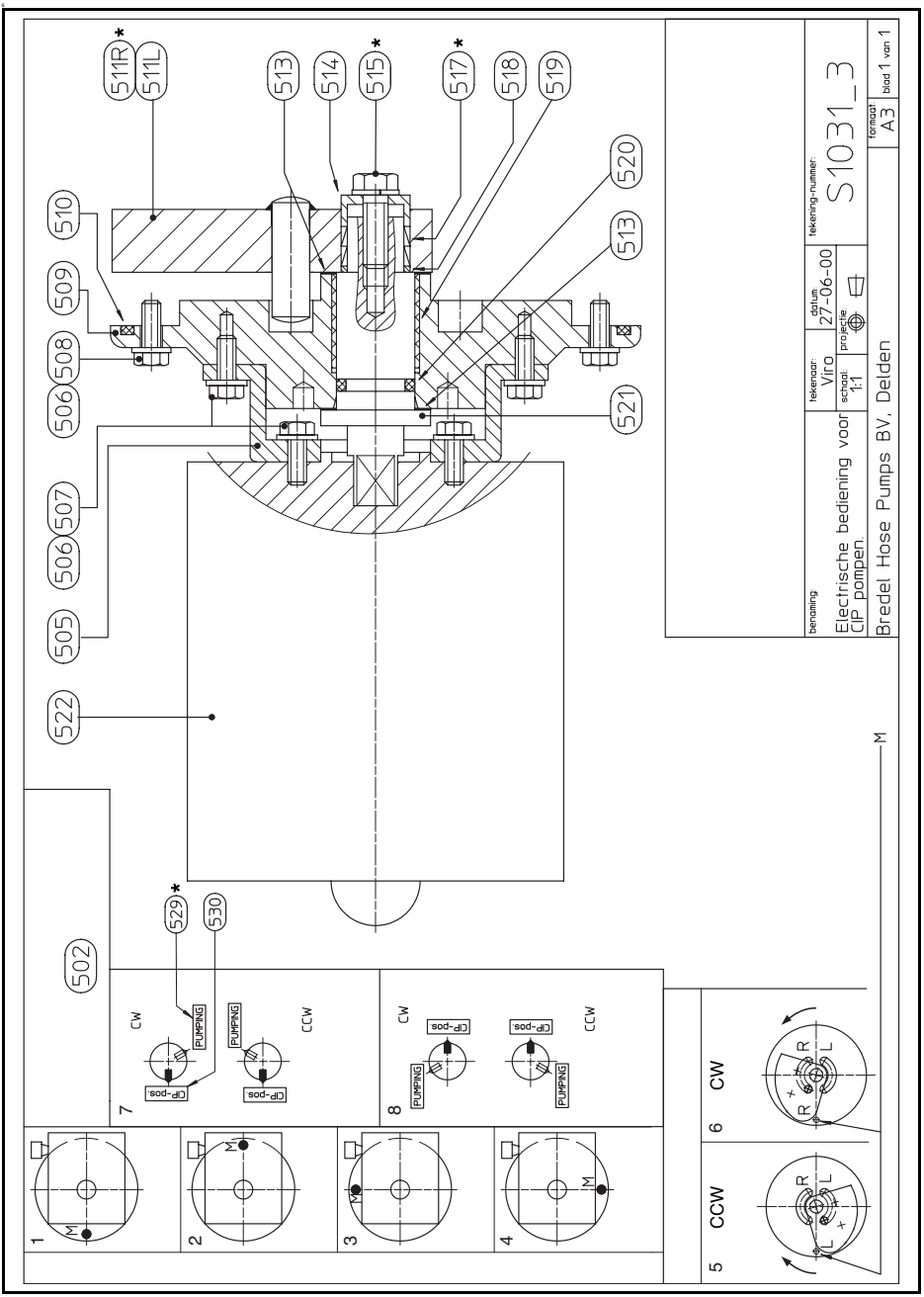
M = Marking

	* in the drawing means that there is a remark on the part in the table below.

Installation positions indicated on the drawing (page 73):

1. Actuator position with respect to the marking M (option 1).
2. Actuator position with respect to the marking M (option 2).
3. Actuator position with respect to the marking M (option 3).
4. Actuator position with respect to the marking M (option 4).
5. Cam position for CCW rotation (Counter clockwise). Cam is shown in the CIP position.
6. Cam position for CW rotation (clockwise). Cam is shown in the CIP position.
7. Position indication for option 1, and option 4. clockwise (CW), and Counter clockwise (CCW).
8. Position indication for option 2, and option 3. clockwise (CW), and Counter clockwise (CCW).

POS. no.	Description	Remarks
502	electr. operation compl. consisting of:	
505	adapter electr/pneu operation	
506	hexagon screw	
507	washer	
508	copper washer	
509	bearing bracket	
510	o-ring	
511L	cam "left”	One of the cams is installed, depending on the pumping direction.
511R	cam "right”	
513	shim	
514	pressing washer	
515	hexagon screw	Fasten with a torque of 40 Nm.
517	clamping set	Lubricate with machine oil. Do not use oil with molybdenum (Molykote).
518	distance ring	
519	bearing bush	
520	o-ring	
521	shaft elctr./pneu. Operation	
522	electr. actuator	
529	tag plate "PUMPING"	Position is fixed with Loctite 460
530	tag plate "CIP pos."	


511R*
511L
513
514
515*
517*
518
519
520
513
521
510
509
508
506
507
506
505
522
502
529*
530
benaming
Electrische bediening voor CIP pompen.
tekenaar: Viro
schaal: 1:1
projectie
datum 27-06-00
tekening-nummer: S1031_3
formaat: A3
blad 1 van 1
Bredel Hose Pumps BV, Delden
CW
CCW
PUMPING
CIP-pos
5 CCW
6 CW
7
8
1
2
3
4
M
R
L

11.1.12 Parts list manual operation for CIP pumps

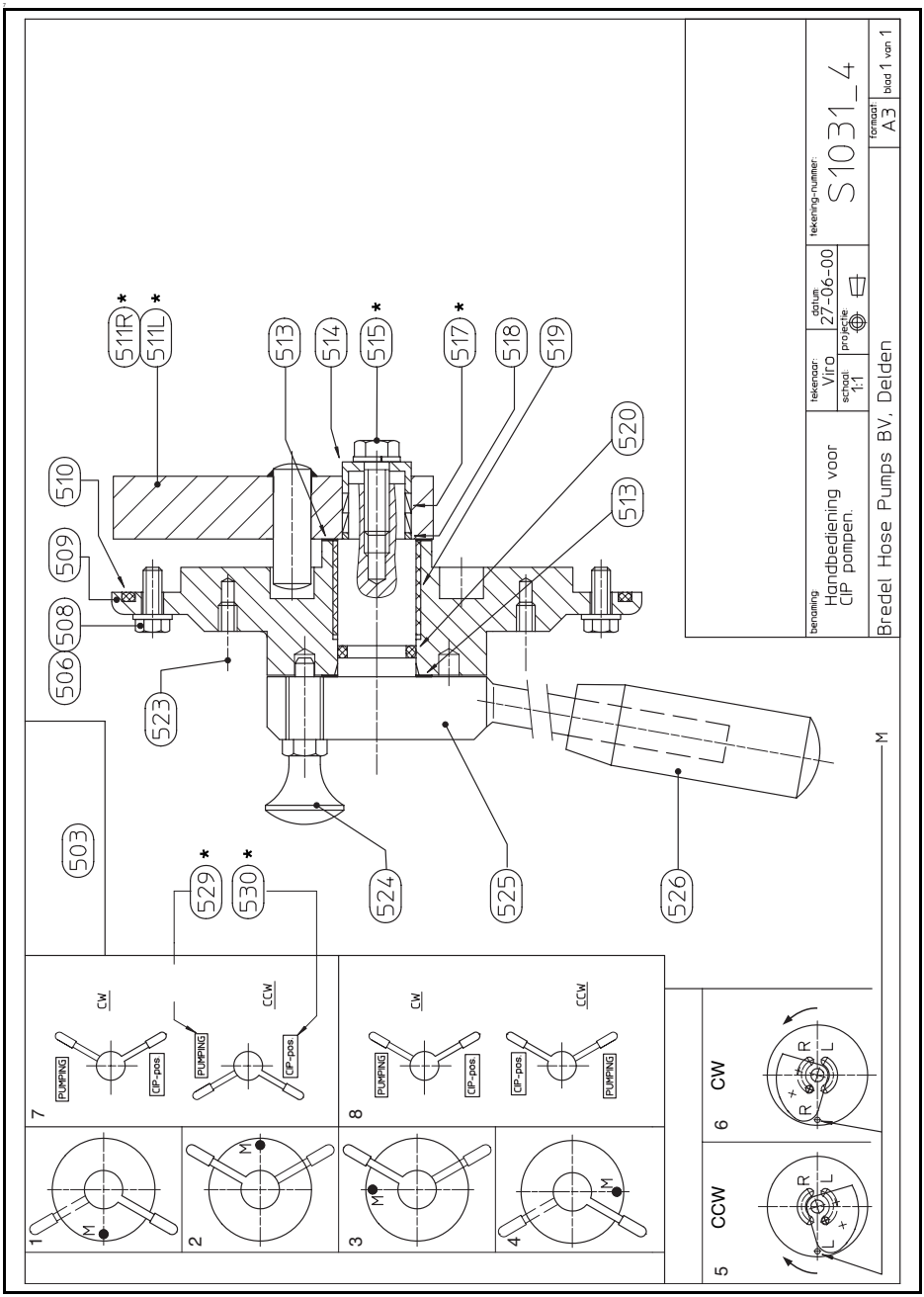
M = Marking

	* in the drawing means that there is a remark on the part in the table below.

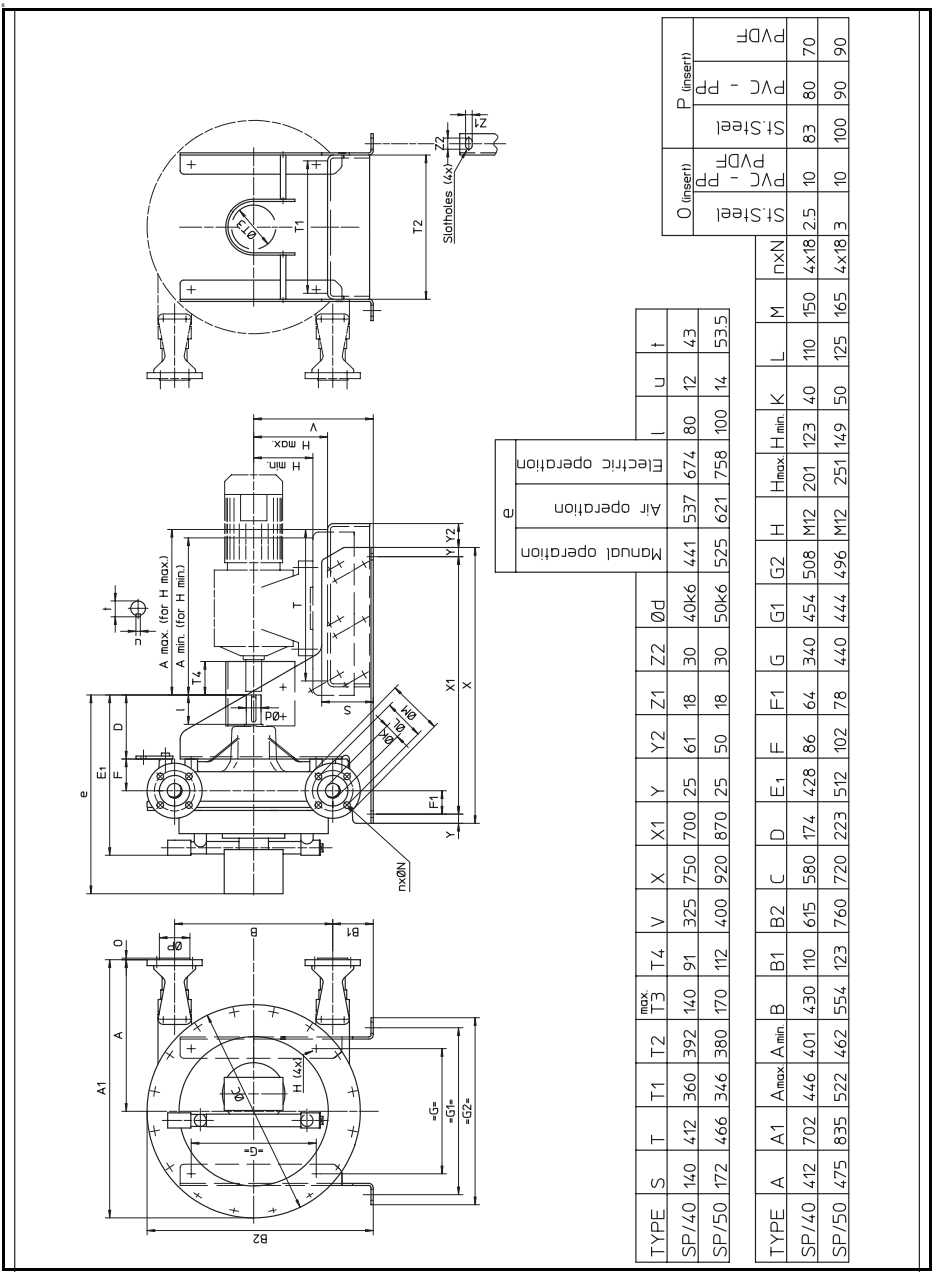
Installation positions indicated on the drawing (page 76):

1. Actuator position with respect to the marking M (option 1).
2. Actuator position with respect to the marking M (option 2).
3. Actuator position with respect to the marking M (option 3).
4. Actuator position with respect to the marking M (option 4).
5. Cam position for CCW rotation (Counter clockwise). Cam is shown in the CIP position.
6. Cam position for CW rotation (clockwise). Cam is shown in the CIP position.
7. Position indication for option 1, and option 4. clockwise (CW), and Counter clockwise (CCW).
8. Position indication for option 2, and option 3. clockwise (CW), and Counter clockwise (CCW).

POS. no.	Description	Remarks
503	manual operation compl. consisting of:	
506	hexagon screw.	
508	copper washer	
509	bearing bracket	
510	o-ring	
511L	cam "left"	One of the cams is installed, depending on the pumping direction.
511R	cam "right"	
513	shim	
514	pressing washer	
515	hexagon screw	Fasten with a torque of 40 Nm.
517	clamping set	Lubricate with machine oil. Do not use oil with molybdenum (Molykote).
518	distance ring	
519	bearing bush	
520	o-ring	
523	set screw	
524	index bolt	
525	shaft for manual operation	
526	lever	
529	tag plate "PUMPING"	Position is fixed with Loctite 460
530	tag plate "CIP pos."	


benaming
Handbediening voor CIP pompen.
tekenaar: Viro
schaal: 1:1
datum 27-06-00
projectie
tekening-nummer: S1031_4
formaat A3
blad 1 van 1
Bredel Hose Pumps BV, Delden
511R
511L
513
514
515
517
518
519
520
510
509
508
506
523
503
529
530
524
525
526
M
CW
CCW
PUMPING
CIP-pos
1
2
3
4
5 CCW
6 CW
7
8
R
L

Dimensional drawings Bredel 40 and 50 CIP



TYPE	S	T	T1	T2	T3 max.	T4	V	X	X1	Y	Y2	Z1	Z2	Ød	e: Manual operation	e: Air operation	e: Electric operation	l	u	t
SP/40	140	412	360	392	140	91	325	750	700	25	61	18	30	40k6	441	537	674	80	12	43
SP/50	172	466	346	380	170	112	400	920	870	25	50	18	30	50k6	525	621	758	100	14	53.5

TYPE	A	A1	Amax	Amin	B	B1	B2	C	D	E1	F	F1	G	G1	G2	H	Hmax	Hmin	K	L	M	nxN	O (insert): St.Steel	O (insert): PVC - PP	O (insert): PVDF	P (insert): St.Steel	P (insert): PVC - PP	P (insert): PVDF
SP/40	412	702	446	401	430	110	615	580	174	428	86	64	340	454	508	M12	201	123	40	110	150	4x18	2.5	10		83	80	70
SP/50	475	835	522	462	554	123	760	720	223	512	102	78	440	444	496	M12	251	149	50	125	165	4x18	3	10		100	90	90

EC declaration of conformity of the machinery

(according to Annex II.1.A of Directive 2006/42/EC on machinery)

We,

Watson-Marlow Bredel B.V.,

herewith declare, on our own responsibility that the following machinery fulfils all the relevant provisions of Directive 2006/42/EC:

Peristaltic hose pump,
Bredel CIP 40, Bredel CIP 50
for transportation of various kinds of fluids

In addition, the machinery complies with the harmonised standards, other standards or technical specifications, applicable requirements of these standards and/or specifications as listed below:
NEN-EN-ISO 12100-2, NEN-EN 809, NEN-EN-IEC 60204-1

The undersigned is responsible for compilation of the technical file and makes this declaration on behalf of the manufacturer.

J. van den Heuvel,
Managing Director

Watson-Marlow Bredel B.V.
Sluisstraat 7, 7491 GA Delden, The Netherlands
Delden, 01-08-2013

SAFETY FORM

Product Use and Decontamination Declaration

In compliance with the **Health & 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. **RGA 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 Details of substances pumped

3.1 Chemical Names

a) .....

b) .....

c) .....

d) .....

3.2 Precautions to be taken in handling these substances:

a) .....

b) .....

c) .....

d) .....

3.3 Action to be taken in the event of human contact:

a) .....

b) .....

c) .....

d) .....

3.4 Cleaning fluid to be used if residue of chemical is found during servicing;

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.

5 Signed .....

Name .....

Position .....

Date .....

Note:

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

.....

.....

.....

.....

.....

Watson-Marlow Bredel B.V.
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The Netherlands
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Fax: +31 (0)74 3761175

E-mail: Bredel@wmpg.com
Internet: www.bredel.com

29212322 TS07-003

Bredel

Hose Pumps

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F +31 (0)74 3761175
E bredel@wmpg.com www.bredel.com

Watson-Marlow Bredel Flexicon MasoSine

Watson-Marlow online

Our engineers around the world can help you choose the perfect pump and tubing for your needs.

More information? Our brochures are on our website – www.wmpg.com

Watson-Marlow...Innovation in Full Flow

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A Spirax-Sarco Engineering Company