

ATEX Instruction manual - Additional information for product use in a potentially explosive environment



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1 About this manual

1.1 How to use this manual

This manual is intended as an additional reference for qualified users to install, commission and maintain the product according to ATEX guidelines.

Before reading this manual, make sure to have read the user manual of the product supplied. The user manual contains all the information needed to start, operate and maintain the pump unit. Additionally, this ATEX manual highlights some topics that need extra attention for safe operation in a potentially explosive environment.

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:

- Pump,
- Gearbox,
- Electric motor,

are not included in this manual. However if additional documentation is supplied, you must follow the instructions in this additional documentation first. The manuals of the listed components are available on the Internet or are supplied with the product. In case of doubt, contact your representative of Watson-Marlow Bredel B.V. (hereafter called Bredel).

1.4 Symbols

In this manual the following symbols are used:



WARNING

Procedures which, if not carried out with the necessary care, may result 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



Information on environmentally-friendly disposal or recycling of materials.

2 ATEX

2.1 Introduction

This ATEX manual covers important instructions concerning the safe use of Bredel equipment in an explosive environment. The instructions are to be followed to comply with Directive 2014/34/EU – also referred to as ATEX 114 which deals with equipment and protective systems intended for use in potentially explosive atmospheres.

This manual must be used in combination with the other manuals supplied with the product.



WARNING

Explosive gas mixtures or concentrations of dust, in conjunction with hot, live and moving parts on the product, can lead to severe or fatal personal injuries.

Installation, operation and maintenance actions may only be performed by qualified personnel while taking the following into account:

- These instructions, together with all other available instructions for the product;
- Warning and information signs on the product;
- The specific regulations and requirements for the system in which the product will operate.

2.2 Zone classification

The ATEX directive distinguishes between industrial applications above ground (industry) indicated as Group II equipment and mining applications (below ground) indicated as group I equipment. Bredel products do not fall under group I.

Within group II, areas with an explosive environment are classified into zones. The zone describes the extent to which an environment is explosive. Zone 0 indicates a higher risk of explosion than zone 1 which requires stronger safety measures than zone 2. The presence of an explosive atmosphere (Ex) exists often (zone 0), sometimes (zone 1) or hardly (zone 2). Safe use of equipment requires stronger safety measures with lower zone numbers. Equipment safety measures are indicated by the equipment category. The zone is therefore linked to an equipment category which is allowed to be used in that specific zone. For Bredel equipment the equipment category is 2 or 3 which will be clearly indicated on the type plate on the equipment. The safety measures for gas (G) and dust (D) can be different. Therefore it is part of the equipment category.

		Gas		Dust	
Equipment group	Equipment category	Suitable for zone	Equipment category	Suitable for zone	
II	1G	0, 1, 2	1D	20, 21, 22	
II	2G	1,2	2D	21,22	
II	3G	2	3D	22	

The application user / owner must know the zone for the designated application where the equipment is to be installed and used.

The pump in operation

For an explosion three things are needed: fuel, oxygen (the explosive environment) and energy to start the reaction. This energy can be in the form of (frictional) heat or (electrical) spark. When the pump is in operation in an explosive environment the simultaneous presence of these three things must be avoided. Mostly this means making sure there is no energy source to trigger an explosion.

The presence of an explosive mixture is indicated by the zone and gas/dust group which indicates the sensitivity for ignition. If the mixture is easy to ignite it is classified as C. If it is more difficult to ignite it falls in class B. When it is hard to ignite it falls in class A. The classes are determined by the minimum ignition energy (MIE).

The energy to ignite a gas can come from high temperatures by heat convection or radiation. Energy can also come from an impact or fracture of mechanical parts and moving parts can build up static charge. In a hose pump the sliding friction between pump and rotor is reduced by a lubricant. The lubricant also transfers heat to the casing by convection. The lubricant is essential for safe pump operation and must be present in the pump at all times. Proper sizing of the equipment for the application and a robust design is key.

Inside the pump and the process piping there is mostly a flooded condition without the presence of air. However by nature a peristaltic pump can operate with poor suction conditions and suck in air. Therefore it cannot always be guaranteed that the pump is fully filled with fluid. Some process fluids are more volatile than others with low flashpoints meaning they can vaporize at low temperatures and form gases more easily. If these gases react well with oxygen they can be ignited by a small amount of energy. In some cases dry running protection might be required.

High viscosity fluids are better capable of building up electric charge. A conductive fluid more easily conducts the charge towards the (ground) surroundings. Most fluids are conductive. In case it is not, reduction of flow velocities or relaxation time can be a measure to limit the building up of charge. The properties of the hose materials, with which the fluid is in contact, are conductive avoiding the build-up of charge. Exceptions are the CSM and F-NBR hose material which can only be used when dry running is avoided. Pump hoses accumulate part of the elastic energy and heat up (hysteresis). The energy is removed from the surface by fluid convection. If the fluid is not present (dry running) this can lead to high temperatures which can ignite a mixture. Dry running must be avoided.

2.3 Control of ignition sources

Ignition hazard assessment

To identify possible risks an ignition hazard assessment has been carried out according to EN ISO 80079-36. The following standards were used for the assessment and mitigation:

- IEC 60079-32
- EN ISO 80079-36 and EN ISO 80079-37

To prevent ignition the following measures are applied:

- k, ignition prevention by liquid immersion
- b, ignition prevention by monitoring
- c, ignition prevention by constructional safety

Ignition prevention by liquid immersion (k)

The lubricant in the pump casing reduces friction and increases heat conductance to the surroundings. This also reduces temperature. The lubricant is conductive which prevents the building up of electric charge. During operation the lubricant level must stay within the recommended range. Therefore regularly inspect the level (at stand still). In case the level has dropped add new lubricant and before starting the pump check for traces of leakage. Check the levels daily to get a feel for the leakage rate. If more than 0,1 L of lubricant must be added every other day the pump must be stopped and serviced.



WARNING

Always check lubricant level during pump standstill. Make sure the amount is at the indicated level on the inspection window. If it is below add lubricant and check the pump for traces of leakage.



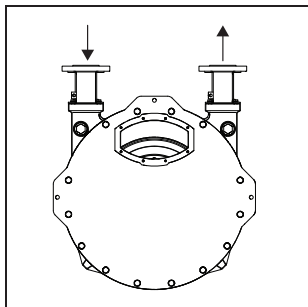
WARNING

**Use of non-Bredel lubricant is not allowed.
The use of silicone oil is not allowed.**

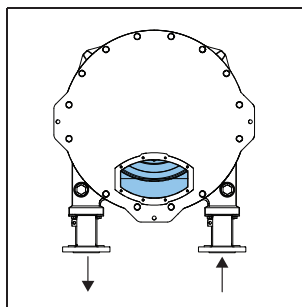
Special situations

For the Bredel pumps it is possible to place the pumphead with the hose connection facing upward or downwards (+/- 90° rotated from the default position). In case of the Bredel 40-2100, the cover has to rotate 90° as well and the inspection window is no longer suitable for visual inspection of the lubricant level. Refer to the figures.

For these positions, the pump must be equipped with low- and high-level switches for detecting the fluid level (limits).



Position 3



Position 4

Note: There is a special situation in which the inspection window cannot be used to check the lubricant level. This is the case: • For medium- and large-sized pumps with a hose bore of 40 mm and larger; and • When the orientation of the pump head is in position 3 or 4, the hose connection flanges are facing towards the top or bottom respectively.

Lubricant

The special Genuine Bredel hose lubricant is conductive, has a flashpoint well above 150 °C and an auto ignition temperature of more than 300 °C. The lubricant should be replaced with every 2nd hose change. In case the lubricant is contaminated by process fluid do not use it and dispose it via the appropriate channels with respect to the environment. If the lubricant has deteriorated by outside influences it should also be replaced. Indications of deterioration are discolouration to dark/grey, sludge appearance or a foam layer on top. Deteriorated lubricant can also lead to increased pump temperature and nasty smell close to the pump.



CAUTION

Always make sure the pump is filled with genuine Bredel lubricant of good quality and that the level is visible through the inspection window.

Ignition prevention by monitoring (b)

The lubricant quality and level should be acceptable at all times during operation. A high level lubricant detection is therefore mandatory. This high fluid level sensors switches of the pump when the hose has ruptured and the pump casing fills up with process fluid.

In case of seal wear, the lubricant can leak from the pump casing. However this kind of leakage will stop before the minimum allowable lubricant volume is reached. The lubricant can also leak via the pump port where the hose protrudes from the casing. This situation is considered as a rare malfunction and regular inspection of the lubricant level is sufficient as preventive measure. Nevertheless it is highly recommended to use a low fluid level sensor that switches of the pump when the lubricant volume is minimal. Low lubricant level detection is not available for Bredel 10, 15 and 20 pumps and not for APEX 10, 15, 20, 28 and 35 pumps.

Note: Not all pump types offer the option of minimum level detection. In case of doubt, contact your Bredel representative.

Note: The sensors operate in the same environment as the pump and have to be suitable for the same zone with intrinsically safe electrical connection.



CAUTION

If regular inspection of the pump is not possible, for example in case of remote operation, the use of proper monitoring devices is mandatory.



WARNING

Only use sensors that are approved by ATEX standards! The classification should be similar or higher than that of the pump. Please check the category and temperature class. In case of doubt, contact your Bredel representative.

Flow monitoring

The hose pump has a specific stroke capacity which is mainly independent of the discharge condition. The flow rate of the pump only changes proportionally with running speed. Over time, small changes in stroke capacity (less than 15%) are not uncommon and can come from:

- Hose deformation over time. The hose flattens over time and does not rebound completely to its original shape.
- Demanding suction conditions caused by (high) viscous fluids through (long) suction lines and/or suction line that has to cover a vertical distance. The larger pumps (bore size 50 and up) are more sensitive to this.
- Line blockage from clogged material. This can happen when, prior to a standstill period, the lines have not been flushed and the pumped fluid is one that has a tendency to harden or solidify.

If the pump capacity is much less than the datasheet value the pump is not working properly and this should be solved before the pump goes back in operation. Large deviations might be caused by:

- Under filling at the suction. The pump is not able to suck in the proper amount of fluid.
- Back flow. The hose compression is insufficient to seal against the discharge pressure. The pump has not enough shims or the wrong type of rotor is used.

A special case is with Bredel hoses with a non-conductive inner layer (CSM or F-NBR) and/or any hose in combination with use of non-conductive plastic inserts. One of the following protection measures must be taken:

- Only pump conductive fluids or dissolved in water combined with limited flow velocities below 1 m/s and sufficient relaxation times or
- Dry running is avoided by suitable actions within the facility and/or control devices or,
- In case of possible dry running, the system is inertised by nitrogen, carbon dioxide or water immediately when the fluid transfer ends.

Constructional safety (c)

The pumps are designed with various constructional safety measures, such as:

- Internal moving parts are greased or lubricated to prevent frictional heating to unacceptable levels.
- Pump parts are engineered and dimensioned to prevent fracture under severe operating conditions.
- Where possible conductive materials are applied and non-conductive materials are used for small parts and are not capable of accumulating any capacitive charge.



WARNING

Do not clean the plastic parts with a dry cloth. Always use a wet/moist cloth. This applies to the inspection window and plastic filling / breather arrangement.



WARNING

Make sure the pump is connected to earth by grounding (refer to par 4.6)

Pressure

In case the pump must operate at discharge pressures above 10 barg or suction pressures above 0 barg the use of two hose clamps per hose connection is highly recommended. This is also recommended for operation with high viscosity fluids especially with long flow lines. A good indication for high pressure operation are the amount of shim plates installed underneath the pressing shoes attached to the rotor. Use the shim-curve in the product manual to determine the discharge pressure for which the pump is set-up.



WARNING

Use two hose clamps per hose connection if the pump peak pressure is above 10 bar. Always make sure the pressure does not exceed 16 bar.

Temperature

Always make sure to stay within the performance window of the pump. At high medium temperatures the allowable operating window (pressure and flow) reduces.

The maximum pump temperature that can occur is based on an ambient temperature range of -20°C to 40°C. This temperature is expressed by a temperature class as indicated below:

Temperature class	Max. surface temperature [°C]
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

Special attention for the Duconite pump which has some parts made from PVC. The maximum allowable pump casing temperature must stay below 60°C.

Make sure the pump operates in a condition where the pump temperature stays below 60°C. If this cannot be guaranteed use an extra temperature sensing device to prevent the pump temperature to exceed 60°C.



WARNING

In case there is a significant risk of dust formation on the pump housing, gear box and/or motor, make sure the surface temperatures do not exceed any limit that is set by the dust.



WARNING

In case of a Duconite pump make sure the pump casing temperature stays below 60°C. In case of PVC inserts make sure the fluid temperature stays below 60°C.

2.4 Ordering spare parts

In case the pump is an ATEX version this must be mentioned explicitly when ordering spare parts.

2.5 Environment and disposal of waste



CAUTION

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

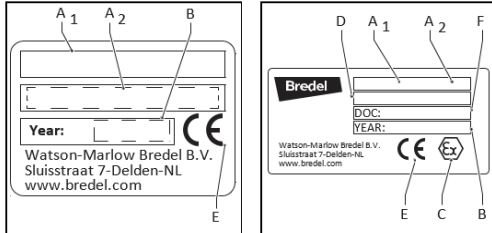
Enquire within your local government about the possibilities for reuse or environment-friendly processing of packaging materials, (contaminated) lubricant and oil.

3 Components

3.1 ATEX classification on the pumphead

Pump size 25 - 2100

Note: Each ATEX pump drive selection will be carried out by Bredel.

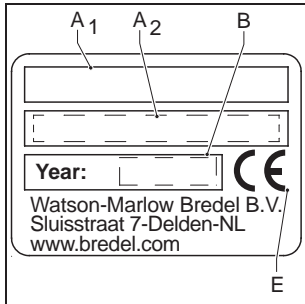


- A1 Pump type
- A2 Serial number
- B Year of manufacture
- C Ex: protection according to IEC80079-37
- D ATEX code (Refer to "ATEX" on page 7)
- E CE mark
- F NoBo construction file number

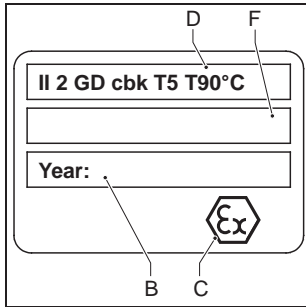
Pump size 10 - 20

Note: Each ATEX pump drive selection will be carried out by Bredel.

On small pumps, the additional ATEX classification is indicated on a separate name plate.



- A1 Pump type
- A2 Serial number
- B Year of manufacture
- E CE mark



- B Year of manufacture
- C Ex: protection according to IEC80079-37
- D ATEX code (Refer to "ATEX" on page 7)
- F NoBo construction file number

3.2 Drive

Typical modifications to a drive to make it suitable for use in a potentially explosive environment can be:

- A strengthened construction;
- Power derating; or
- Increase of ingress protection class (IP rating).

Note: Refer to the documentation of the drive for specific product information about operating in a potentially explosive environment.

3.3 Gearbox

Typical modifications to a gearbox to make it suitable for use in a potentially explosive environment can be:

- Increased oil level;
- Use of low friction seals; and
- Monitoring with extra sensors.

Sometimes no special measures are needed.

Note: Refer to the documentation of the gearbox for specific product information about operating in a potentially explosive environment.

3.4 Sensors



WARNING

When using sensors for speed detection and/or level detection, make sure these are properly connected according to the local regulations applicable to electrical systems in an explosive environment.

The speed sensors are available in special Ex version to make them suitable for use in a potentially explosive environment. This type of speed sensors is to be used in combination with an additional isolating switching amplifier.

The sensors used for level detection are suitable for use in an explosive environment, but these sensors operate at a lower voltage: 28 V instead of 230 V. In case of doubt, contact your Bredel representative.

In case additional sensors are used to monitor temperature (RTD, PTC, bi-metal switch) make sure it is suitable for use in the designated ATEX zone.

3.5 Pulsation damper



WARNING

When operating a pump with a pulsation damper in an explosive environment, make sure this part is not electrically isolated from the piping. The resistance to earth must be less than 1 MΩ.

The pulsation damper is not separately classed as ATEX equipment. It is considered as part of the pump and the ATEX code for the pump is applicable, which means it can operate under the same ATEX environment as the pump it is attached to.

Make sure the pulsation damper is installed, operated and maintained according to the instructions as supplied with the pulsation damper.

4 Installation and commissioning

4.1 Working environment

Before installing the pump, always check the identification plate of the pump. The ATEX classification must correspond with the conditions of the working environment. The ambient temperature range is -20°C to 40°C.

4.2 Installing the motor

1. Make sure the motor is suitable for use in a potentially explosive environment.
2. Make sure that the motor is properly connected to the mains power supply. Refer to the motor manual for the appropriate instructions.
3. Make sure the ingress protection level (IP class) is sufficient.



WARNING

The power supply must include an earth connection.

Note: Refer to the motor manual for specific instructions.

4.3 Installing the gearbox

Check the product documentation of the gearbox for any additional instructions for use in an explosive environment

Note: Refer to the gearbox manual for specific instructions.

4.4 Pumphead

There are no isolated conductive parts in the pump. By construction, all parts are electrically connected. The pump should be connected to the earth/ground via the earth connection of the electric motor.



WARNING

When using another type of drive or in case it is not possible to create an earth/ ground connection with less than 1 MΩ, one should make an additional PE (protective earth) connection with the pump unit. Refer to "Grounding the pump unit" on the facing page.

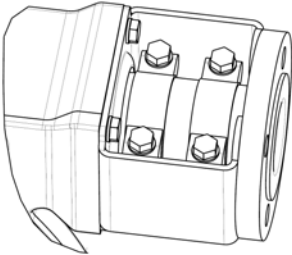
1. Check the type plate on the pumphead. The Ex code should match (or exceed) that of the zone requirements.
2. Remove any dust from the surface.
3. Check the lubricant level in the pump.

4.5 Hose installation

In case a hose needs to be installed follow the instructions in the product manual supplied with your pump. Make sure the outside of the hose is lubricated during installation to avoid dry friction. This can be done by wetting the outside with lubricant using a soaked cloth, brush or by hand. Also the inserts can be lightly wetted with lubricant to make the installation easier.

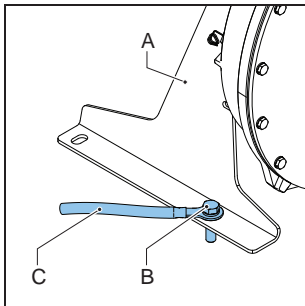
4.6 Hose connection

Proper installation of the hose and use specified components and mounting torques as indicated in the product manual. In case of highly viscous product, positive suction pressures and high discharge pressures use double hose clamps.



4.7 Grounding the pump unit

If you need to make a PE connection from the pump to the ground other than by using the earth/ground connection of the motor terminal box, carry out the following procedure

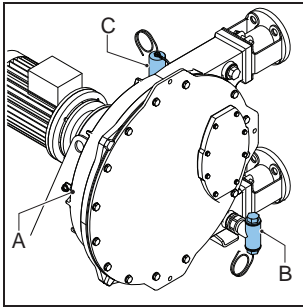


1. Use the base frame (A) to make the PE connection.
2. Slightly loosen one of the bolts (B) that attaches the pump unit to the surface.
3. Connect the PE wire (C) to the bolt.
4. Fasten the bolt.
5. Connect the PE wire to earth.

5 Operation

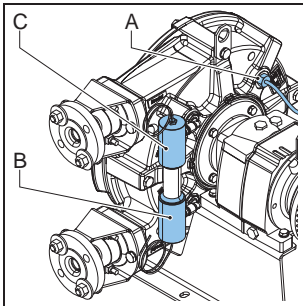
5.1 Start-up

Sensors



1. Check if the revolution counter (A), the low level switch (B) and the high level switch (C) are connected to the Programmable Logic Controller (PLC) or directly hard wired to the drive to make sure that the pump remains within the safe working limits.

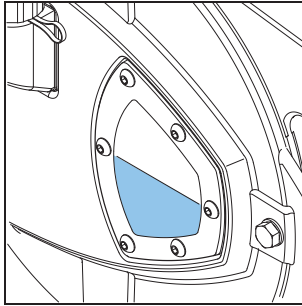
Note: The specific conditions in which the pump must operate determine the need for any of the sensors A, B and/or C.



2. Check if the level switches function properly. Refer to "Inspection of the level switches" on page 26

Lubricant

Check the lubricant level.



Note: The fluid level must be within the range as indicated by the minimum and maximum indicators on the inspection window. Refer to the product manual for further details. Refer to "Components" on page 14.

The hose

A pump with a new hose will initially heat up to a temperature of 10 °C to 20 °C above the longterm average pump temperature for that specific running condition. After a while the temperature stabilizes. The effect takes place within several hours up to one day. This is a normal process and is covered within the temperature class of the pump.

Before starting up the pump unit

Before starting up the system, check if:

1. Nothing obstructs the flow line;
2. The flow direction is correct;
3. The pump is installed correctly and according to the instructions. Refer to the product manual.

CAUTION



Avoid dry running!

The pump must not operate without the process fluid going through the pump. Dry running is only allowed for short periods of time, such as when exchanging the hose.

Operating range of the pump

Make sure that the pump operates within the allowable limits as stated in the user manual of the pump.

As an exception the pumps with hose bore size 40mm and beyond should not operate in the intermittent duty range. That is, outside the continuous operation area of the performance diagram. (A pump may operate intermittently as long as it is within the limits of continuous operation.)

Note: In case of intermittent operation, stick to the indicated periods for operation and standstill. This to make sure that the operating temperatures remain within the allowable limits. The pump casing and cover surface temperature should always remain below 90°C.

Note: *If needed use temperature sensors to monitor and limit the pump casing temperature or temperature detection devices to limit the temperature. Temperature sensors are not supplied with the product.*



WARNING

The operating range of the pump must not exceed the allowable limits in terms of speed, pressure and temperature.

6 Maintenance

6.1 Periodic inspection

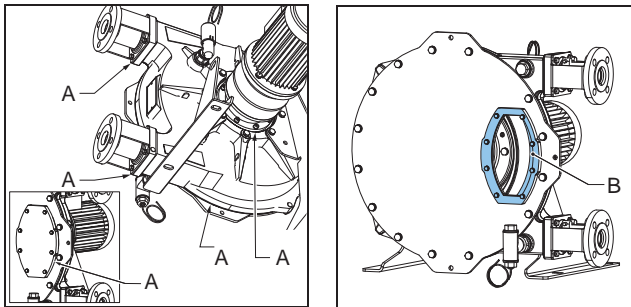
Introduction

1. Carry out the periodic inspections as given in the user manual of the pump. In case of doubt, contact your Bredel representative.
2. In case of operating the pump in a potentially explosive environment, pay extra attention to:
 - Fluid leakage
 - Leakage zone
 - Lubricant detection level
 - Surface temperatures
 - Dust deposits
 - Bearings

Refer to the next paragraphs on how to carry out this specific maintenance work.

Fluid leakage

1. Daily check the pump unit for signs of lubricant leakage at positions A.

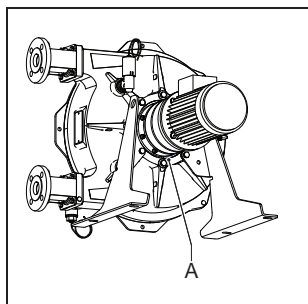


2. In case of lubricant leakage, immediately check the lubricant level (B).
3. Shut down the pump if the lubricant level is too low.
4. Add new lubricant
5. Determine the size of the leakage. If the pump needs to be filled up weekly, this is a sign of a worn seal.

Note: The pump can operate with a worn seal, but it is not recommended due to the increasing risk of dry running and the risk of consequential damage to the bearings.

6. In case of a worn seal, replace the seal. Refer to the instructions in the product manual.

Leakage detection zone



1. Make sure the leakage detection zone (A) is free from obstructions and is not clogged with dirt.
2. If necessary, clean the holes of the leakage detection zone.
3. Check if drops of lubricant are visible at the exit of the leakage detection zone. This can indicate a worn or damaged seal.



CAUTION

The replacement of seals must be done by well-trained personnel only.

Lubricant detection level

1. Check the lubricant level through the inspection window daily or use a low-level switch.

Note: It is advised to use a level switch to continuously monitor the fluid level. Refer to "Components" on page 14 and Refer to "Inspection of the level switches" on page 26.

2. If a level switch is used, check the condition and operation of this sensor monthly. Refer to "Inspection of the level switches" on page 26.

Surface temperatures



WARNING

The surface temperatures may not exceed 90 °C. Stop the pump if the temperature exceeds this temperature.

1. Check the surface temperature of the pumphead daily.

The pump is designed to make sure the surface temperatures under normal operating conditions remain below 90 °C. This limit is set by the material of the hose.

2. Check the surface temperatures of the drive and gearbox daily. The drive and gearbox temperatures should remain below the temperature limit as indicated on the identification plate. If the temperatures exceed that limit:
 - Check if the pump operates within the allowable limits of speed and pressure.

- Check the condition of the gearbox, drive and pumphead. Refer to the relevant product manuals for details on the necessary inspections.

Bearings

Note: *Bearings are greased for life and have integrated seals to prevent ingress of dirt. These bearings do not need maintenance during their operating life.*

1. It is advised to check the condition of the bearings during each seal replacement. Check the bearings for strange noises, clearance and wear.
2. If necessary, replace the bearings.

Pump types	Bearing replacement after
Bredel 10, 15, 20 / APEX 10, 15, 20	40.000 hr
Bredel 25, 32 / APEX 28, 35	20.000 hr
Bredel 40, 50, (2)65, (2)80, (2)100	15.000 hr

Pressing shoe

Every half year check the bolting torque of the pressing shoes and re-tighten if needed. Always use the original bolts and washers to mount the shoes to the rotor. This is not applicable to the Bredel pumps up to bore size 20 and the Apex pumps where the shoes are an integral part of the rotor.

Regular inspection scheme

In summary the following regular inspections must be done to guarantee safe operation

Inspection	Frequency
Lubricant level	Daily
Signs of leakage	Daily
Noises and vibration (pump, gear and drive)	Daily
Condition of the leakage detection zone	Weekly
Operating temperatures	With change of process conditions or monitor
Pump exterior (dust deposits)	weekly
Bolting torque pressing shoes	Every half year
Hose connection	With every hose replacement
Condition of casing and rotor	Every half year
Functioning of the levels sensor(s)	Every two months
Bearing condition	With each seal replacement Replace in time (Refer to "Bearings" on the previous page)

Level detection

The configuration of the level detection systems depends on the pump type. All Bredel pumps offer the possibility for a separate high level detection switch. However in case of low level detection, the Bredel 25- 32 series has a combined high and low level detection assembly. The small pumps up to size 20 do not have the option of low level detection

If available, the use of a low level switch is recommended. Refer to "Inspection of the level switches" on the facing page.



WARNING

Make sure that the level switch is suitable for use in a potentially explosive environment. In case of doubt, contact your Bredel representative.

6.2 Inspection of the level switches

Introduction

The procedure of the inspection of the level switches depends on the type of Bredel pump. All Bredel pumps offer the option for high lubricant level detection.

- The Bredel 40-2100 series offers the option of a separate high and low lubricant level detection.
- The Bredel 25-32 series only offers the low lubricant level detection in combination with the high lubricant level detection.

Inspection of the high level switch

Check the functioning of the high level switch every two months.

Refer to "Inspection of the high level switch" above and Refer to "Inspection of the high level switch (Bredel 10-20 and 40-2100, APEX)" below (Bredel series 25-32).

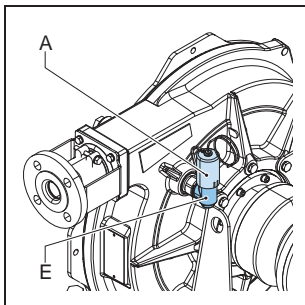
Inspection of the low level switch

Check the functioning of the low level switch every two months. This inspection can be done whilst draining the pump housing.

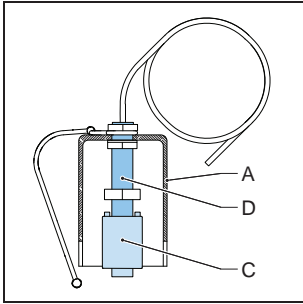
Refer to "Inspection of the low level switch" above (Bredel series 40- 2100) and Refer to " Inspection of the low level switch" on page 29 (Bredel series 25-32).

Note: In case the service interval on hose exchanges does not exceed a period of two months, the inspection of the low level switch can be combined with the hose replacement. Refer to the product manual.

Inspection of the high level switch (Bredel 10-20 and 40-2100, APEX)



1. Remove the sensor cap (A) and the sensor from the sensor housing (E).

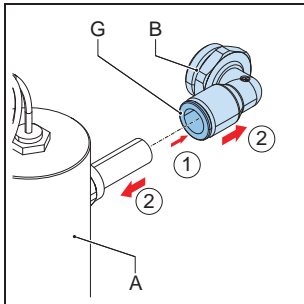


2. Move the floater body (C) to trigger a trip signal.

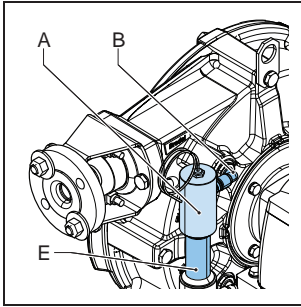
Note: The floater body should move easily along the sensor stem (D).

3. In case of strong fouling, it is advised to remove the sensor (C, D) from the sensor cap (A). Clean the sensor. Use some water and a dry cloth
4. Place the sensor (C, D) and sensor cap (A) back on the sensor housing (E).

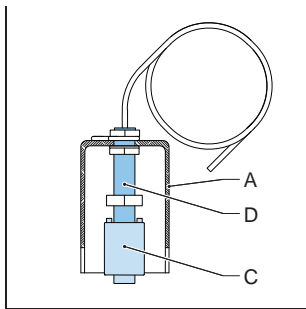
Inspection of the high level switch (Bredel series 25-32 with combined high and low level switch)



1. Disconnect the sensor cap (A) from the elbow fitting (B) by pushing back the spring supported ring (G) and simultaneously pulling the sensor cap to the side.



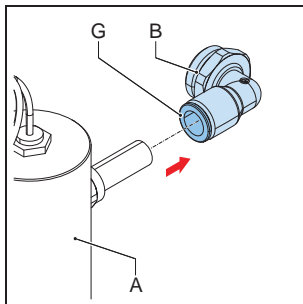
- Remove the sensor cap (A) and sensor from the sensor housing (E).



- Move the float body (C) to trigger a trip signal.

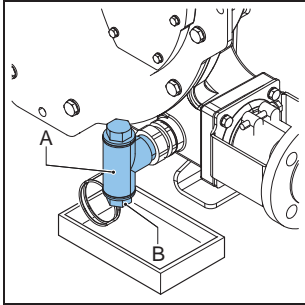
Note: The float body should move easily along the sensor stem (D).

- If necessary, clean the sensor (C, D), the sensor cap (A) and the sensor housing (E). Use some water and a dry cloth.



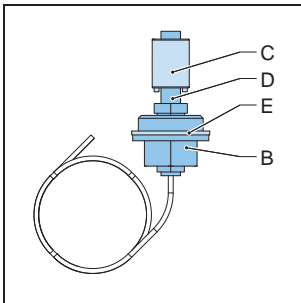
- Connect the sensor cap (A) and sensor by pushing the sensor cap into the elbow fitting (B).

Inspection of the low level switch



1. Place a tray under the sensor. Drain the lubricant from the pump housing by removing the sensor and nut (B) from the sensor housing (A).

Note: This should trigger a trip signal from the low level switch.

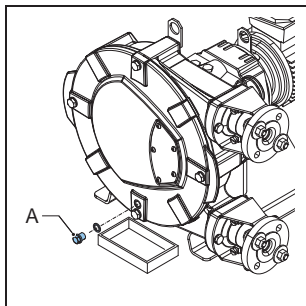


2. Move the floater body (C) to trigger a trip signal.

Note: The floater body should move easily along the sensor stem (D).

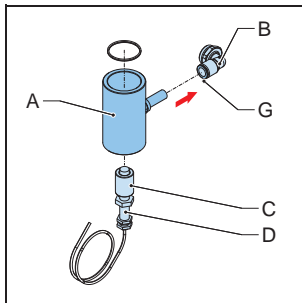
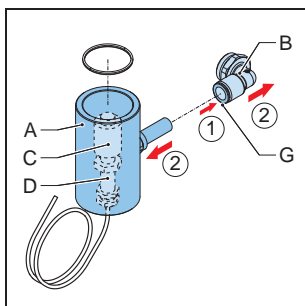
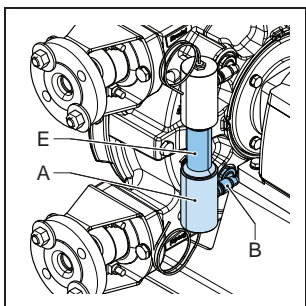
3. If necessary, clean the sensor (C, D) and the sensor housing (A) Use some water and a dry cloth.
4. Inspect the seal (E). If necessary, replace the seal.
5. Place the sensor and nut (B) back. If necessary, apply some sealant to the thread.
6. Fill the pump with Genuine Bredel Lubricant (see the product manual for details).

Inspection of the low level switch (Bredel series 25-32 with combined high and low level switch)



1. Place a tray under the pump housing. Drain the lubricant from the pump by removing the drain plug (A).

Note: This should trigger a trip signal from the low level switch.



2. Remove the sensor cap (A) by pushing back the spring supported ring (G) on the coupling (B) and simultaneously pull the sensor cap (A) to the side.
3. Remove the sensor (C, D) from the sensor housing (E).

4. In case of strong fouling, it is advised to remove the sensor (C, D) from the sensor cap (A). Clean the sensor. Use some water and a dry cloth.
5. Move the floater body (C) to trigger a trip signal.

Note: *The floater body (C) should move easily along the sensor stem (D).*

6. Place the sensor (C, D) and sensor cap (A) back by pushing the sensor cap into the elbow fitting (B).
7. Fill the pump with Genuine Bredel Lubricant (see the product manual for details).

6.3 Cleaning instructions

Cleaning the exterior of the pump



WARNING

Make sure to comply with the company rules for ATEX and make sure to avoid any static electricity during the cleaning.

Note: *It is advised to use (hot) water for cleaning. If necessary, it is possible to use mild cleaning agents. Please make sure these agents do not chemically attack the pump hose. In case of doubt, contact your Bredel representative*

1. Wipe off dust deposits with a wet cloth. The dust layer must be less than 5 mm during operation.
2. Clean the exterior of the pump unit. Refer to the user manual of the pump.
3. Hose the pump with clean water



CAUTION

Do not use high-pressure cleaning.



CAUTION

Do not aim the water jet directly on the hole for the leakage zone. This could lead to a fouled bearing cavity.



CAUTION

Do not use cleaning agents that may damage the pump hose.

Cleaning the interior of the pump

1. Clean the interior of the pump. Depending on the pumped process fluid, use clean water or a standard cleaning agent. Refer to the product manual.



CAUTION

Make sure all dirt is removed since this can damage the seal.

6.4 Replacing parts of the pump

Hose exchange

1. Drain and clean the pump housing thoroughly after a hose failure.
2. Check the interior of the pump casing and the pressing shoes for signs of damage or wear.
3. Follow the instructions for hose replacement as supplied with the pump (Refer to "Grounding the pump unit" on page 18) In case of positive suction pressure, carry out the hose clamping instructions. Refer to "Hose clamping instructions" below

Note: *Excessive wear can be a sign that the pumping conditions are not optimal. This can possibly lead to higher thermal loads than necessary and shorten the hose life.*

Hose clamping instructions

Make sure that the hose connection cannot be pulled off from the insert during normal operation by sufficiently tightening the bolts of the hose clamp. The bolts should be re-tightened after 24 hours to make sure the tightening is correct.

The standard instructions always apply, however under conditions of positive suction pressure and very viscous fluids, it is advised to place a second hose clamp next to the first hose clamp. Refer to "Hose connection" on page 18.

7 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
 Telephone Postal code
 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.

8 Contact

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The Netherlands

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