

Installation, Operation  
and Maintenance Instructions



# e-IXP, e-IXPC, e-IXPF

Pumps according to ISO 2858 and ISO 5199

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# 1 Introduction and Safety

## 1.1 Introduction

### Purpose of this manual

This manual provides information on how to do the following in the correct manner:

- Installation
- Operation
- Maintenance.



### CAUTION:

This manual is an integral part of the unit. Be sure to read and understand the manual before installing the unit and putting it to use. The manual must always be made available to the user, stored in the proximity of the unit, and well kept.

### Supplementary instructions

The instructions and warnings of this manual apply to the standard unit as described in the sale documentation. Special version pumps may be supplied with supplementary instruction manuals. For situations not considered in the manual or in the commercial documentation, contact Xylem or its Authorised Distributor.

## 1.2 Hazard levels and safety symbols

Before using the unit, the user must read, understand and comply with the indications of the danger warnings in order to avoid the following risks:

- Injuries and health hazards
- Damage to the product
- Unit malfunction.

### Hazard levels

| Hazard level                                                                                        | Indication                                                                                           |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
|  <b>DANGER:</b>  | It identifies a dangerous situation which, if not avoided, causes serious injury, or even death.     |
|  <b>WARNING:</b> | It identifies a dangerous situation which, if not avoided, may cause serious injury, or even death.  |
|  <b>CAUTION:</b> | It identifies a dangerous situation which, if not avoided, may cause small or medium level injuries. |
| <b>NOTE:</b>                                                                                        | It identifies a situation which, if not avoided, may cause damage to property but not to people.     |

## Complementary symbols

| Symbol                                                                              | Description                               |
|-------------------------------------------------------------------------------------|-------------------------------------------|
|    | Electrical hazard                         |
|    | Hot surface hazard                        |
|    | Danger, pressurized system                |
|    | Specific marking for explosion protection |
|    | Do not use flammable liquids              |
|    | Do not use corrosive liquids              |
|  | Read the instruction manual               |
|  | Ionizing radiation hazard                 |

## 1.3 User safety

Strictly comply with current health and safety regulations.

### Qualified personnel

This unit must be used only by qualified users. Qualified users are people able to recognise the risks and avoid hazards during installation, use and maintenance of the unit.

## 1.4 Protection of the environment

### Disposal of packaging and product

Comply with the current regulations on sorted waste disposal.

### Leaking of fluid

If the unit contains lubricating fluid, take appropriate measures to prevent the dispersion of leaks into the environment.

### Sites exposed to ionizing radiations



#### **WARNING: Ionizing radiation hazard**

If the unit has been exposed to ionizing radiations, implement the necessary safety measures for the protection of people. If the unit needs to be dispatched, inform the carrier and the recipient accordingly, so that appropriate safety measures can be put in place.

## 1.5 Spare parts



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**WARNING:**

Replace all worn or faulty parts with original spare parts, to prevent unit malfunction and personal injury, as well as the warranty from becoming null and void.

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Identify the spare parts with the product codes directly on the site [www.lowara.com/spark](http://www.lowara.com/spark).  
Contact Xylem or its Authorised Distributor for technical information.

# 2 Handling and Storage

## 2.1 Unit inspection upon delivery

### 2.1.1 Package inspection

1. Check that quantity, descriptions and product codes match the order.
2. Check the packaging for any damage or missing components.
3. In case of immediately detectable damage or missing parts:
  - Accept the goods with reserve, indicating any findings on the transport document, or
  - Reject the goods, indicating the reason on the transport document.In both cases, promptly contact Xylem or its Authorised Distributor from whom the product was purchased.

### 2.1.2 Unpacking and inspection of the unit



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**CAUTION: Cut and abrasion hazard**

Always wear personal protective equipment.

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1. Remove the packaging.
2. Ensure sorting of all packaging materials in accordance with the applicable regulations.
3. Release the unit by removing the screws and/or cutting the straps, if fitted.
4. Check the unit for integrity and to make sure that there are no missing components.
5. In case of damage or missing components, promptly contact Xylem or its Authorised Distributor.

## 2.2 Guidelines for transport

### Precautions



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**WARNING: Crushing hazard**

The unit and components are heavy: risk of crushing.

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**WARNING:**

Always wear personal protective equipment.

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**WARNING:**

Check the gross weight marked on the packaging.

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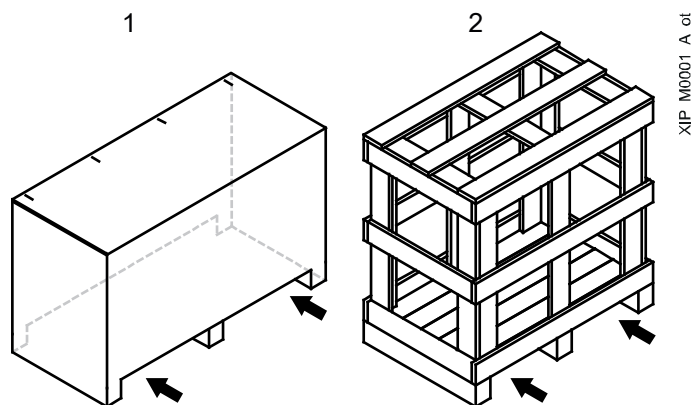
**WARNING:**

Handle the unit in compliance with the current regulations on "manual load handling", to avoid undesirable ergonomic conditions causing risks of back-spine injury.

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## 2.2.1 Handling of the packed unit using a forklift truck

The Figure shows the types of packaging and the lifting points.



1. Cardboard box with wooden base
2. Wooden crate

## 2.2.2 Lifting with a crane



### WARNING:

Use ropes, chains and/or slings (hereinafter referred to as "ropes"), hooks and/or clasps (hereinafter referred to as "hooks"), shackles or eyebolts that comply with the applicable directives and are suitable for use.



### WARNING:

It is forbidden to use the shaft end and/or the motor eyebolts to move the unit.



### NOTE:

Make sure that the harnessing does not hit and/or damage the unit.



### WARNING:

Lift and handle the unit slowly to avoid stability issues.

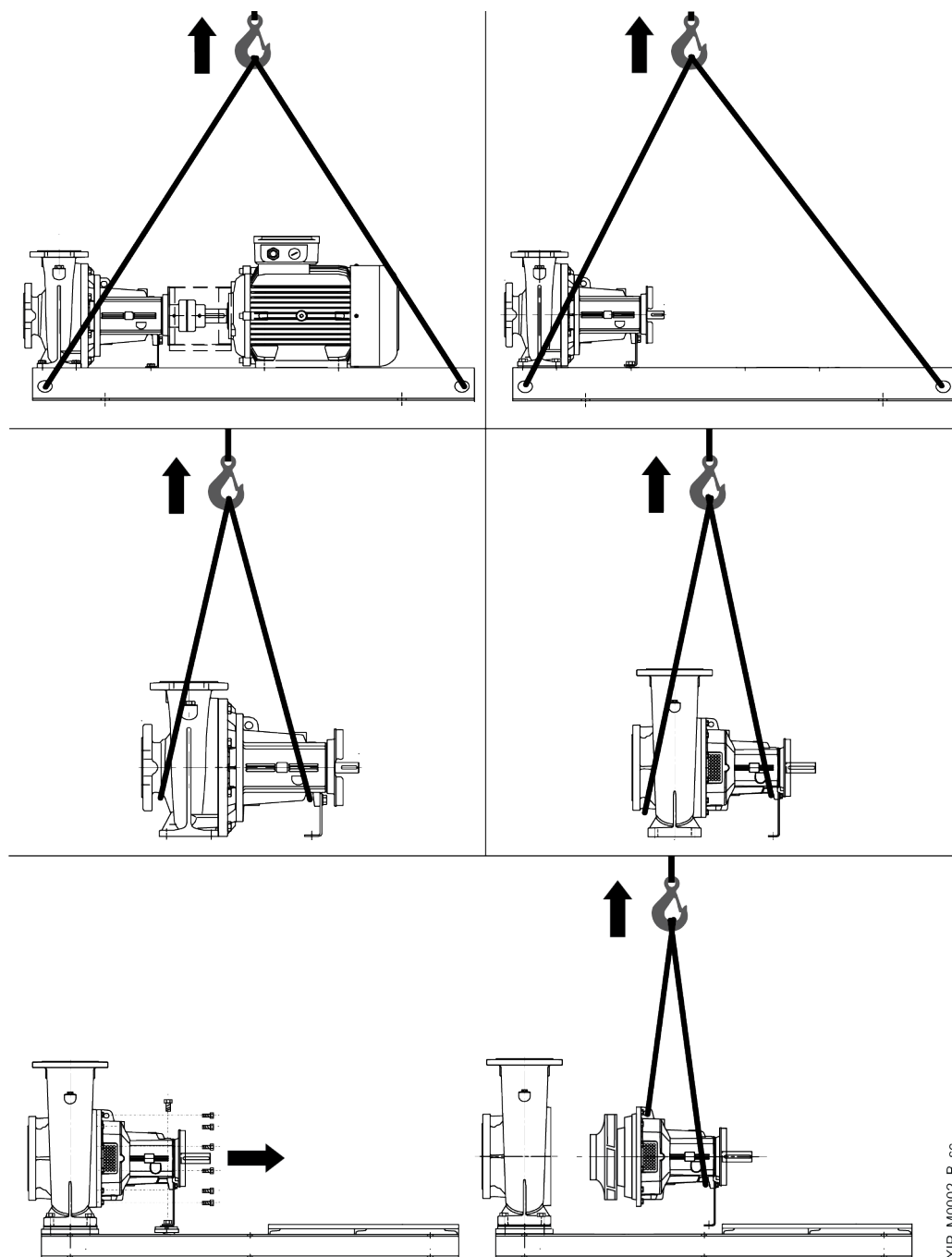
### WARNING:

During handling, make sure to avoid injury to people and animals, and/or damage to property.

### Preparing the unit for lifting

1. Depending on the model:
  - Attach the shackles to the eyelets, if any, and attach the ropes to the shackles, or
  - Use the ropes to make a tie harness.

The figure shows how to harness and lift the different models.



XIP\_M0002\_B\_sc

2. Fix the ropes to the crane.
3. Lift the crane and tension the ropes without lifting the unit.

### Lifting and positioning

1. Lift and move the unit slowly
2. Set the unit down slowly.
3. Depending on the model:
  - Release the ropes from the shackles, or
  - Release the harness.

## 2.3 Storage

### Precautions




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**WARNING:**

Pay attention to liquids that are excessively hot or cold.

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**WARNING:**

Make sure that the drained liquid cannot cause damage or injuries.

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**WARNING:**

It is prohibited to dispose of lubricant liquids and other hazardous substances in the environment.

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### 2.3.1 Storage of the packed unit

The unit must be stored:

- In a covered and dry place
  - Away from heat sources
  - Protected from dirt
  - Protected from vibrations
  - At an ambient temperature between -5°C and +40°C (23°F and 140°F), and relative humidity between 5% and 95%.
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**NOTE:**

Do not place heavy loads on top of the unit.

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**NOTE:**

Protect the unit from collisions.

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### 2.3.2 Long-term storage of the unit

1. Correctly empty the unit.
  2. Close the suction and discharge ports with caps or flanges.
  3. Follow the same instructions for the storage of the packed unit.
- 

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**NOTE:**

This operation is essential in environments with cold temperatures. Otherwise, any residual liquid in the unit could have an adverse effect on its condition and performance.

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For more information on long-term storage contact the Xylem sales company or Authorised Distributor.

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### 2.3.3 Return

1. Correctly empty the unit.
2. Wash and clean the unit, especially if used to process harmful, explosive, hot or potentially hazardous liquids.
3. Neutralize the unit further and blow with inert gas without water to dry it, in case of liquids the residues of which can cause corrosion damage due to moisture, or can ignite on contact with oxygen.
4. Please attach a completed release statement to the unit. Indicate the safety and decontamination measures implemented.

# 3 Description of the Product

## 3.1 Features

The product is a single-stage end suction pump in back pull-out configuration with bearing support, compliant with EN 22858 and ISO 2858. The product can be supplied as a pump unit (pump with electric motor), or as a pump only.

### Intended use

- Water supply
- Water transfer and circulation
- Process cooling and heating
- Cooling and heating in industrial buildings
- Industrial liquid transfer
- Boiler supply
- Remote heating and cogeneration
- Filtration and ultra-filtration systems
- Filtration in treatment systems
- Washers
- Galvanic processes and painting systems
- Cleaning of tanks and cisterns
- Mixing of liquids
- Water movement in water parks.

Observe the operating limits in Technical Information on page 41.



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#### **DANGER: Potentially explosive atmosphere hazard**

It is prohibited to start the unit in environments with potentially explosive atmospheres or with combustible dusts if it has no EX-approval.

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### Pumped liquids

- Water
- Sea water
- Salt water
- Demineralized water
- Hot water
- Acids
- Brine
- Petrochemical products
- Chlorides
- Heat transfer fluids
- Oils
- Solvents
- Detergents
- Condensation.



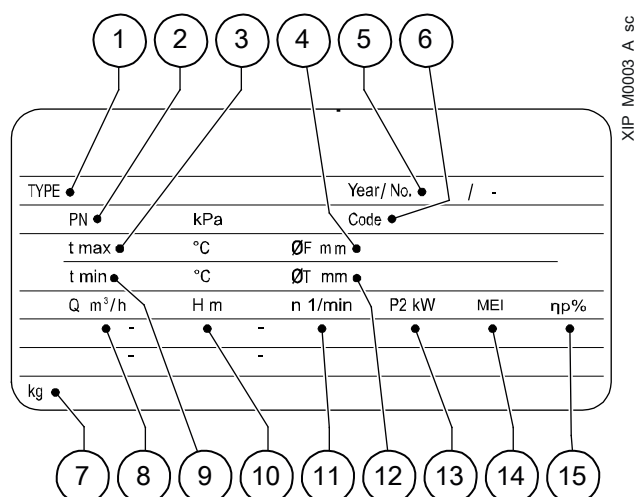
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#### **DANGER:**

Only EX approved units are allowed to pump flammable liquids.

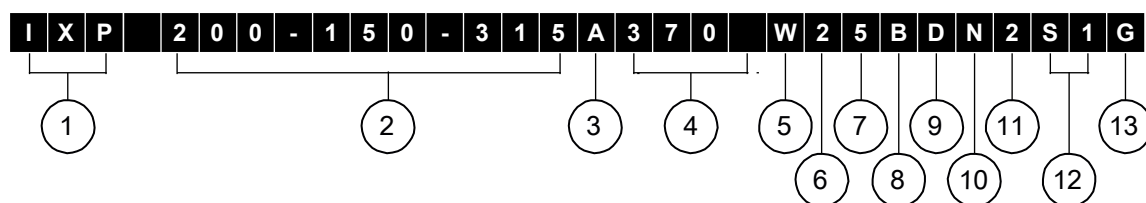
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## 3.2 Data plate



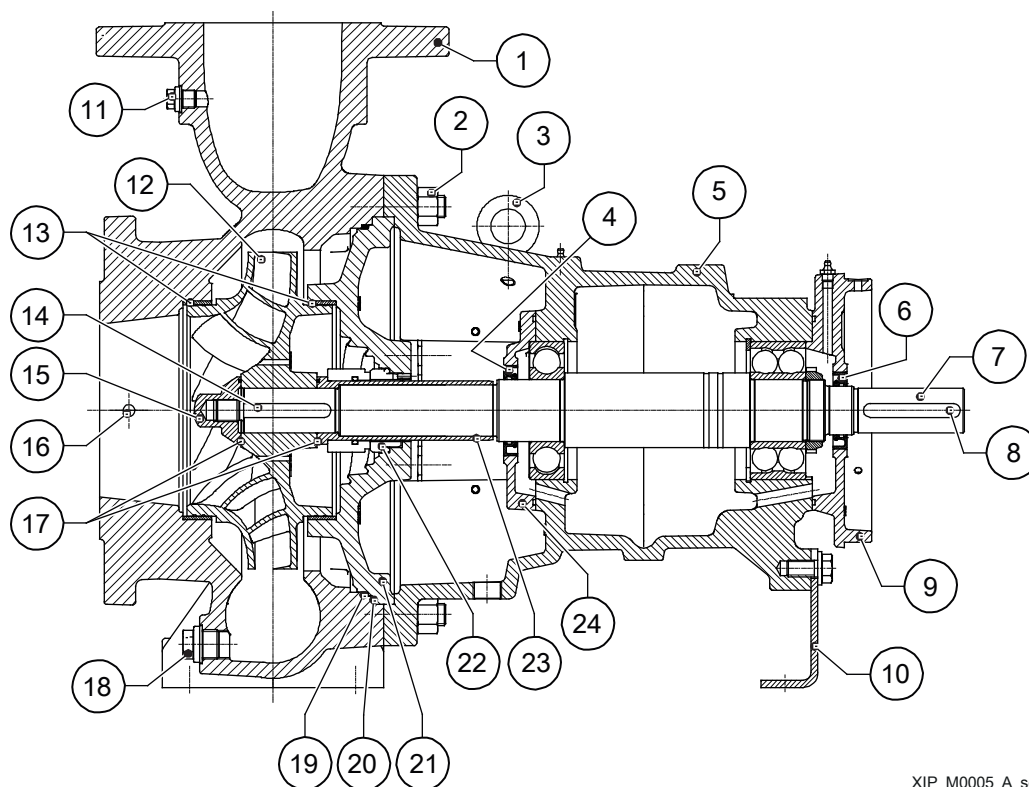
1. Pump or pump unit type
2. Maximum operating pressure
3. Maximum liquid operating temperature
4. Full impeller diameter (non-trimmed impellers only)
5. Manufacturing date + serial number
6. Product code
7. Weight
8. Flow rate range
9. Minimum liquid operating temperature
10. Head range
11. Rotation speed
12. Reduced impeller diameter (trimmed impellers only)
13. Pump unit absorbed power
14. Minimum efficiency index
15. Hydraulic efficiency at the best efficiency point

## 3.3 Identification code



1. Series name
2. Size from 40-25-160 to 600-600-600
3. Impeller with full [A], reduced [B, C or D], standard [ ] or special [X] diameter
4. Motor power in kWx10 (370) or, for bare shaft pump only, impeller diameter in mm (324)
5. Lowara motor [P, L], WEG [W], ABB [A], or other manufacturer's [X]
6. 2-pole [2], 4-pole [4] or 6-pole [6] motor
7. Frequency 50 Hz [5] or 60 Hz [6]
8. Standard operating pressure, discharge side, PN 16 bar [B], PN 25 bar [C], class 150 [R] or class 300 [S]
9. Pump body made of cast ductile iron [D], stainless steel [N], duplex [R], super duplex [T], super-austenitic stainless steel [U] or other material [X]
10. Impeller made of stainless steel [N], duplex [R], super duplex [T], super-austenitic stainless steel [U] or other material [X]
11. Mechanical seal made of SiC/Carbon/EPDM [4], SiC/Carbon/EPDM for hot water [6], SiC/Carbon/FKM [2], SiC/SiC/EPDM [Z], SiC/SiC/FKM [W] or other material [X]
12. Shaft sealing version
13. Bearing support lubricated with grease [G] or oil [O]

## 3.4 Part names



XIP\_M0005\_A\_sc

1. Volute casing
2. Bolt
3. Lifting lug
4. Shaft seal ring
5. Bearing support
6. Shaft seal ring
7. Shaft
8. Coupling key
9. Bearing cover
10. Support foot
11. Plug
12. Impeller
13. Wear ring
14. Impeller key
15. Impeller nut
16. Plug
17. O-ring
18. Plug
19. O-ring
20. Gasket; optional to 19
21. Casing cover
22. Mechanical seal
23. Shaft sleeve
24. Bearing cover

# 4 Installation

## 4.1 General precautions

Before starting, make sure that the safety instructions shown in **Introduction and Safety** on page 5 have been fully read and understood.




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**WARNING:**

All the hydraulic and electrical connections must be completed by a technician possessing the technical-professional requirements outlined in the current regulations.

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**WARNING:**

Always wear personal protective equipment.

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**WARNING:**

Always use suitable working tools.

---

## 4.2 Mechanical installation

### 4.2.1 Precautions




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**WARNING: Risk of injury due to improper floor installation**

Install the unit on a concrete or metal foundation base sufficiently strong to ensure permanent and rigid support, suitable for the size and weight of the unit and as flat and even as possible.

---

### 4.2.2 Installation area

1. Follow the provisions in **Operating environment** on page 41.
2. Place the unit in a raised position in relation to the floor.
3. Check that the air clearance between the wall and the motor fan grid is:
  - $\geq 100$  mm (4 in), to ensure suitable ventilation
  - $\geq 300$  mm (12 in), to allow inspection and removal of the motor.
4. Make sure that any leaks will not cause flooding to the installation area or submerge the unit.
5. Make sure that the unit is protected from sudden temperature changes.

### Permitted positions

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**NOTE:**

Only install the unit in the horizontal position, to allow self-venting.

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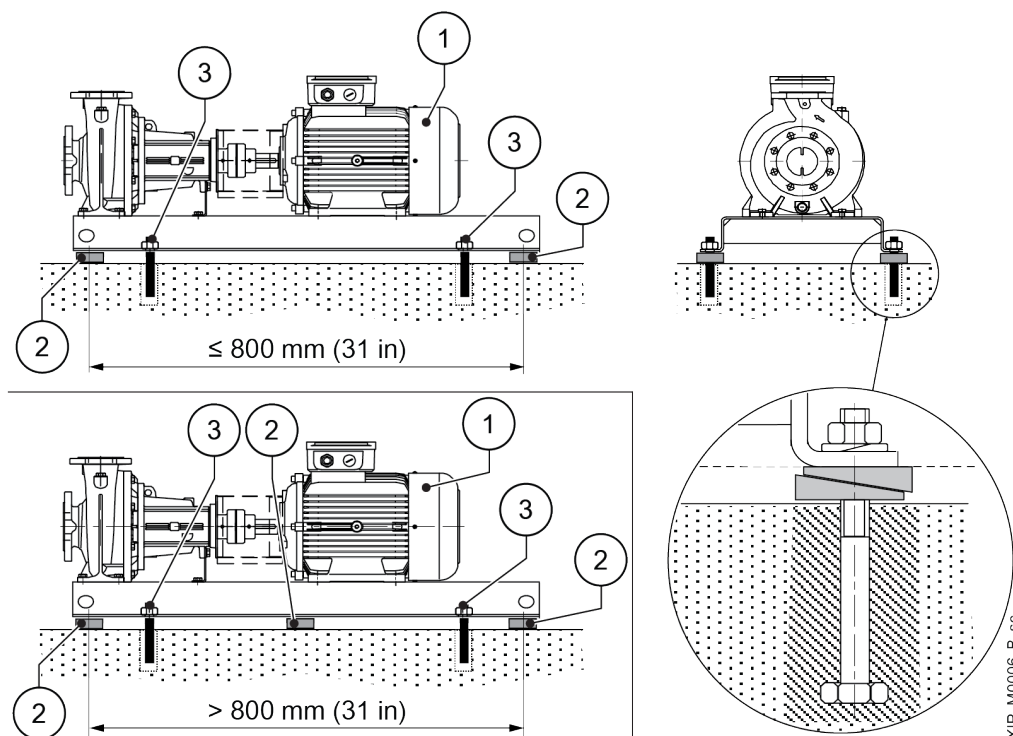
### 4.2.3 Installation on concrete foundation

#### Foundation requirements

- The concrete must have a compression resistance of C12/15 and meet the requirements of exposure class XC1 according to EN 206-1
- Sizes must be appropriate for the sizes of the unit support plate
- The foundation weight must be  $\geq 1.5$  times the unit weight ( $\geq 5$  times the weight of the unit if a quieter operation is required)
- The surface should be as flat and level as possible.

## Installation

The figure shows the position of the levelling shims depending on the distance of the tie rods.



- 1. Unit
- 2. Levelling thickness
- 3. Tie rod

1. Drill the tie rod holes in accordance with the quantity, diameter and centre distances shown in the technical catalogue.
2. Insert the tie rods into the holes and secure them with chemical anchors.
3. Remove the caps of the suction and discharge ports.
4. Place the unit on the foundation by inserting the tie rods into the holes in the plate.
5. Level the unit with a spirit level on the shaft and discharge port: the maximum permitted tolerance is 0.2 mm/m (0.0024 in/ft).
6. Align the suction and discharge ports to their piping.
7. If necessary, insert levelling shims between the plate and the foundation: If the distance between the tie rods is  $\geq 800$  mm (31 in), insert additional shims in the middle of the plate.
8. Tighten the nuts on the tie rods evenly and fully.

| Hexagon nut | Torque, Nm (lbf-in) |
|-------------|---------------------|
| M12         | 60 (44)             |
| M16         | 120 (89)            |
| M20         | 200 (148)           |
| M24         | 350 (258)           |
| M27         | 530 (391)           |



### DANGER: Explosion due to static charge

Make sure that the base plate is appropriately earthed.

## Reducing vibrations

The motor and the flow of liquid in the piping can generate vibrations, which may be amplified from the possible incorrect installation of the unit and the piping. See **Hydraulic connection** on page 17.

## 4.2.4 Frame installation

- The frame must be rigid and must not vibrate during operation
- The contact surface of the pump and motor feet support bases must be as level as possible
- Position the pump and the motor at a distance that allows the coupling to be fitted
- Ensure a gap of 4-6 mm (0.16-0.24 in) between the frame and the motor to allow for vertical adjustment in case of replacement.
- Make sure that pump and motor are securely attached to the frame.

## 4.3 Hydraulic connection

### 4.3.1 Precautions




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**WARNING:**

The piping system must be sized to ensure safety at the maximum operating pressure and temperature.

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**WARNING: Danger of hot and/or toxic liquid escaping from non-sealed piping system connections**

Support the piping system independently to prevent them from weighing on the unit. Secure the piping system to the unit ports making sure to comply with the permitted forces and torques. Install appropriate gaskets between the unit and the piping system.

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**WARNING: Hot surface hazard**

If the temperature exceeds 60°C (140°F), isolate the unit before touching it.

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**NOTE:**

When carrying out welding activities never use the unit for grounding: risk of pitting damage to the bearings.

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**NOTE:**

Residues from welding work or other impurities in the pipes lead to pump damage. The type and the duration of the cleaning activity during the flush and pickling operations must be in accordance with the used casing and sealing materials. Use a filter with 0.5 mm (0.02 in) mesh and 0.25 mm (0.01 in) wire diameter made of corrosion-resistant material. Insert a filter with a section three times that of the pipeline.

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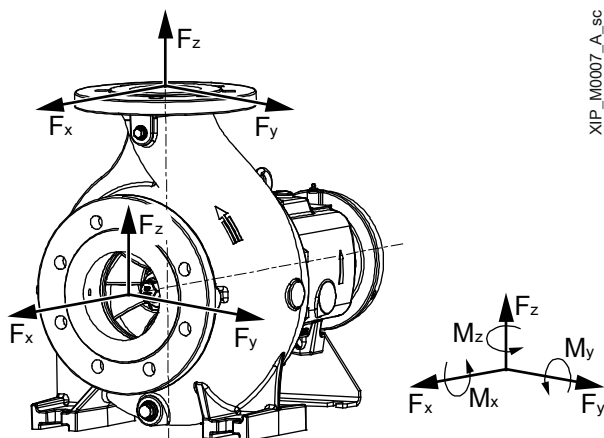
### 4.3.2 Guidelines for the hydraulic system

1. Support the piping system independently to prevent them from weighing on the unit.
2. Remove any welding residues, deposits and impurities from the piping system in order to avoid damage to the unit: the method and duration of the cleaning operation must be adapted to the materials of the unit and the gaskets.
3. To reduce the transmission of vibrations between the unit and the system and vice versa, install:
  - anti-vibration joints on the suction and discharge sides of the unit
  - dampers between the unit and the surface on which it is installed.
4. In order to reduce flow resistance, the pipe on the suction side must be:
  - As short and as straight as possible
  - For the section connected to the unit, straight and without bottlenecks, covering a length equal to at least six times the diameter of the suction port
  - Wider than the suction port; if necessary, install an eccentric reducer that is horizontal on top
  - Without bends; if this cannot be avoided, bends of a radius as wide as possible
  - Without traps and goosenecks

- With valves with a low specific flow resistance.
- 5. Install a check valve on the discharge side to prevent the liquid from flowing back into the pump unit when this is at standstill.
- 6. Install a diaphragm tank or flywheel to prevent water hammer.
- 7. Install a pressure gauge (or a vacuum pressure gauge, in case of suction lift installation) on the suction side, and a pressure gauge on the discharge side, for checking the actual operating pressure of the pump unit.
- 8. To exclude the unit from the system for the purpose of maintenance, install:
  - An on-off valve on the suction side
  - An on-off valve on the discharge side, downstream the check valve and pressure gauge, also useful for regulating the flow rate.
- 9. In case of suction lift installation, the suction pipe must have an increasing slope towards the unit exceeding 2%; to avoid air pockets.

### 4.3.3 Forces and torques that can be applied to the ports

The figure and the table show the maximum allowable forces and torques exerted by the piping system on the ports of the unit, depending on the material, with temperature up to 180°C (356°F).



Material code NN (UU)

| Model    | Suction port |           |      |      |       |             |      |      |       | Discharge port |           |      |      |       |             |      |      |       |
|----------|--------------|-----------|------|------|-------|-------------|------|------|-------|----------------|-----------|------|------|-------|-------------|------|------|-------|
|          | DN, mm       | Forces, N |      |      |       | Torques, Nm |      |      |       | DN, mm         | Forces, N |      |      |       | Torques, Nm |      |      |       |
|          |              | Fx        | Fy   | Fz   | ΣF    | Mx          | My   | Mz   | ΣM    |                | Fx        | Fy   | Fz   | ΣF    | Mx          | My   | Mz   | ΣM    |
| 40-25-   | 40           | 438       | 385  | 350  | 680   | 455         | 315  | 368  | 664   | 25             | 263       | 245  | 298  | 466   | 315         | 210  | 245  | 451   |
| 50-32-   | 50           | 578       | 525  | 473  | 912   | 490         | 350  | 403  | 724   | 32             | 315       | 298  | 368  | 568   | 385         | 263  | 298  | 553   |
| 65-50-   | 65           | 735       | 648  | 595  | 1146  | 525         | 385  | 420  | 775   | 50             | 525       | 473  | 578  | 912   | 490         | 350  | 403  | 724   |
| 65-40-   | 65           | 735       | 648  | 595  | 1146  | 525         | 385  | 420  | 775   | 40             | 385       | 350  | 438  | 680   | 455         | 315  | 368  | 664   |
| 80-65-   | 80           | 875       | 788  | 718  | 1379  | 560         | 403  | 455  | 826   | 65             | 648       | 595  | 735  | 1146  | 525         | 385  | 420  | 775   |
| 100-65-  | 80           | 875       | 788  | 718  | 1379  | 560         | 403  | 455  | 826   | 50             | 525       | 473  | 578  | 912   | 490         | 350  | 403  | 724   |
| 100-80-  | 100          | 1173      | 1050 | 945  | 1836  | 613         | 438  | 508  | 908   | 80             | 788       | 718  | 875  | 1379  | 560         | 403  | 455  | 826   |
| 100-65-  | 100          | 1173      | 1050 | 945  | 1836  | 613         | 438  | 508  | 908   | 65             | 648       | 595  | 735  | 1146  | 525         | 385  | 420  | 775   |
| 125-80-  | 125          | 1383      | 1243 | 1120 | 2170  | 735         | 525  | 665  | 1122  | 80             | 788       | 718  | 875  | 1379  | 560         | 403  | 455  | 826   |
| 125-100- | 125          | 1383      | 1243 | 1120 | 2170  | 735         | 525  | 665  | 1122  | 100            | 1050      | 945  | 1173 | 1836  | 613         | 438  | 508  | 908   |
| 150-125- | 150          | 1750      | 1575 | 1418 | 2748  | 875         | 613  | 718  | 1287  | 125            | 1243      | 1120 | 1383 | 2170  | 735         | 525  | 665  | 1122  |
| 200-150- | 200          | 2345      | 2100 | 1890 | 3672  | 1138        | 805  | 928  | 1674  | 150            | 1575      | 1418 | 1750 | 2748  | 875         | 613  | 718  | 1287  |
| 250-200- | 250          | 3340      | 2980 | 2700 | 5227  | 1780        | 1260 | 1460 | 2624  | 200            | 2100      | 1890 | 2345 | 3672  | 1138        | 805  | 928  | 1674  |
| 300-250- | 300          | 4000      | 3580 | 3220 | 6260  | 2420        | 1720 | 1980 | 3569  | 250            | 2980      | 2700 | 3340 | 5227  | 1780        | 1260 | 1460 | 2624  |
| 350-300- | 350          | 4660      | 4180 | 3760 | 7302  | 3100        | 2200 | 2540 | 4572  | 300            | 3580      | 3220 | 4000 | 6260  | 2420        | 1720 | 1980 | 3569  |
| 400-400- | 400          | 5320      | 4780 | 4300 | 8345  | 3880        | 2760 | 3180 | 5726  | 400            | 4780      | 4300 | 5320 | 8345  | 3880        | 2760 | 3180 | 5726  |
| 400-350- | 400          | 5320      | 4780 | 4300 | 8345  | 3880        | 2760 | 3180 | 5726  | 350            | 4180      | 3760 | 4660 | 7302  | 3100        | 2200 | 2540 | 4572  |
| 500-500- | 500          | 6640      | 5980 | 5380 | 10430 | 5780        | 4100 | 4720 | 8515  | 500            | 5980      | 5380 | 6640 | 10430 | 5780        | 4100 | 4720 | 8515  |
| 600-600- | 600          | 7960      | 7184 | 6460 | 12518 | 8080        | 5760 | 6640 | 11940 | 600            | 7184      | 6460 | 7960 | 12518 | 8080        | 5760 | 6640 | 11940 |

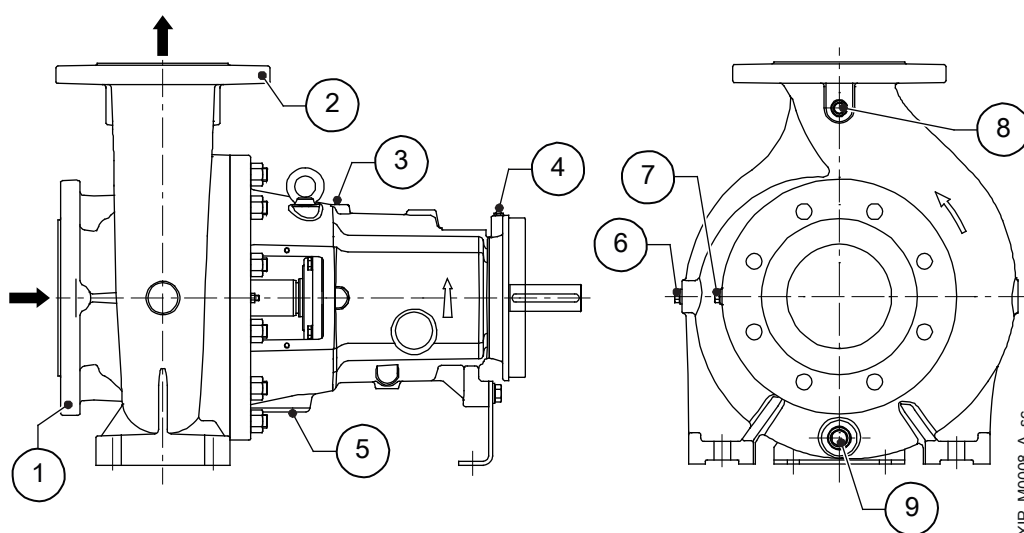
## Material code DN, RN, RR (TT)

| Model    | Suction port |                |                |                |       |                |                |                |       | Discharge port |                |                |                |       |                |                |                |       |
|----------|--------------|----------------|----------------|----------------|-------|----------------|----------------|----------------|-------|----------------|----------------|----------------|----------------|-------|----------------|----------------|----------------|-------|
|          | DN,<br>mm    | Forces, N      |                |                |       | Torques, Nm    |                |                |       | DN,<br>mm      | Forces, N      |                |                |       | Torques, Nm    |                |                |       |
|          |              | F <sub>x</sub> | F <sub>y</sub> | F <sub>z</sub> | ΣF    | M <sub>x</sub> | M <sub>y</sub> | M <sub>z</sub> | ΣM    |                | F <sub>x</sub> | F <sub>y</sub> | F <sub>z</sub> | ΣF    | M <sub>x</sub> | M <sub>y</sub> | M <sub>z</sub> | ΣM    |
| 40-25-   | 40           | 875            | 770            | 700            | 1360  | 910            | 630            | 735            | 1329  | 25             | 525            | 490            | 595            | 933   | 630            | 420            | 490            | 902   |
| 50-32-   | 50           | 1155           | 1050           | 945            | 1825  | 980            | 700            | 805            | 1449  | 32             | 630            | 595            | 735            | 1136  | 770            | 525            | 595            | 1106  |
| 65-50-   | 65           | 1470           | 1295           | 1190           | 2292  | 1050           | 770            | 840            | 1550  | 50             | 1050           | 945            | 1155           | 1825  | 980            | 700            | 805            | 1449  |
| 65-40-   | 65           | 1470           | 1295           | 1190           | 2292  | 1050           | 770            | 840            | 1550  | 40             | 770            | 700            | 875            | 1360  | 910            | 630            | 735            | 1329  |
| 80-65-   | 80           | 1750           | 1575           | 1435           | 2757  | 1120           | 805            | 910            | 1652  | 65             | 1295           | 1190           | 1470           | 2292  | 1050           | 770            | 840            | 1550  |
| 100-65-  | 80           | 1750           | 1575           | 1435           | 2757  | 1120           | 805            | 910            | 1652  | 50             | 1050           | 945            | 1155           | 1825  | 980            | 700            | 805            | 1449  |
| 100-80-  | 100          | 2345           | 2100           | 1890           | 3672  | 1225           | 875            | 1015           | 1816  | 80             | 1575           | 1435           | 1750           | 2757  | 1120           | 805            | 910            | 1652  |
| 100-65-  | 100          | 2345           | 2100           | 1890           | 3672  | 1225           | 875            | 1015           | 1816  | 65             | 1295           | 1190           | 1470           | 2292  | 1050           | 770            | 840            | 1550  |
| 125-80-  | 125          | 2765           | 2485           | 2240           | 4340  | 1470           | 1050           | 1330           | 2243  | 80             | 1575           | 1435           | 1750           | 2757  | 1120           | 805            | 910            | 1652  |
| 125-100- | 125          | 2765           | 2485           | 2240           | 4340  | 1470           | 1050           | 1330           | 2243  | 100            | 2100           | 1890           | 2345           | 3672  | 1225           | 875            | 1015           | 1816  |
| 150-125- | 150          | 3500           | 3150           | 2835           | 5496  | 1750           | 1225           | 1435           | 2573  | 125            | 2485           | 2240           | 2765           | 4340  | 1470           | 1050           | 1330           | 2243  |
| 200-150- | 200          | 4690           | 4200           | 3780           | 7343  | 2275           | 1610           | 1855           | 3348  | 150            | 3150           | 2835           | 3500           | 5496  | 1750           | 1225           | 1435           | 2573  |
| 250-200- | 250          | 5845           | 5215           | 4725           | 9148  | 3115           | 2205           | 2555           | 4593  | 200            | 4200           | 3780           | 4690           | 7343  | 2275           | 1610           | 1855           | 3348  |
| 300-250- | 300          | 7000           | 6265           | 5635           | 10955 | 4235           | 3010           | 3465           | 6245  | 250            | 5215           | 4725           | 5845           | 9148  | 3115           | 2205           | 2555           | 4593  |
| 350-300- | 350          | 8155           | 7315           | 6580           | 12779 | 5425           | 3850           | 4445           | 8001  | 300            | 6265           | 5635           | 7000           | 10955 | 4235           | 3010           | 3465           | 6245  |
| 400-400- | 400          | 9310           | 8365           | 7525           | 14604 | 6790           | 4830           | 5565           | 10020 | 400            | 8365           | 7525           | 9310           | 14604 | 6790           | 4830           | 5565           | 10020 |
| 400-350- | 400          | 9310           | 8365           | 7525           | 14604 | 6790           | 4830           | 5565           | 10020 | 350            | 7315           | 6580           | 8155           | 12779 | 5425           | 3850           | 4445           | 8001  |
| 500-500- | 500          | 11620          | 10465          | 9415           | 18253 | 10115          | 7175           | 8260           | 14900 | 500            | 10465          | 9415           | 11620          | 18253 | 10115          | 7175           | 8260           | 14900 |
| 600-600- | 600          | 13930          | 12572          | 11305          | 21907 | 14140          | 10080          | 11620          | 20894 | 600            | 12572          | 11305          | 13930          | 21907 | 14140          | 10080          | 11620          | 20894 |

## 4.3.4 Auxiliary Connections

## NOTE:

Unused or incorrectly used connections may cause malfunction and damage to the unit.



1. Suction port
2. Discharge port
3. Greasing unit M8 nipple
4. Greasing unit M8 nipple
5. G 1/2" drain
6. G 1/4" recirculation outlet (optional)
7. G 1/4" suction pressure port
8. G 1/4" discharge pressure port
9. G 1/2" drain

## 4.4 Alignment of the motor-pump coupling

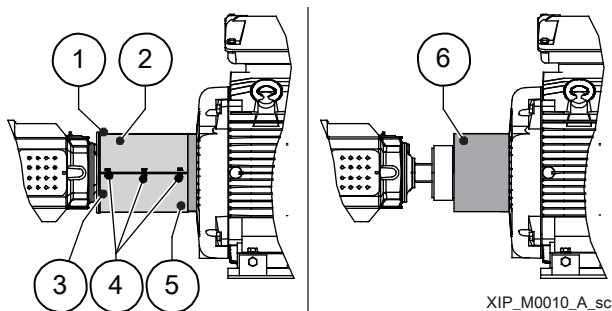
Check the alignment of the motor-pump coupling after the mechanical installation and hydraulic connection of the unit.



### **DANGER: Burning**

If the coupling is misaligned, it may overheat or overheat the bearings, resulting in burns.

### 4.4.1 Disassembling the coupling guards



1. Top fastener
2. Top coupling protection
3. Bottom fastener
4. Side fasteners
5. Bottom coupling protection
6. Adjustment ring

1. Unscrew the side fasteners.
2. Unscrew the top fastener.
3. Remove the top protection.
4. Unscrew the bottom fastener.
5. Remove the bottom protection.
6. Open and lift the adjustment ring.

### 4.4.2 Checking the coupling alignment

Figure 1: Standard coupling

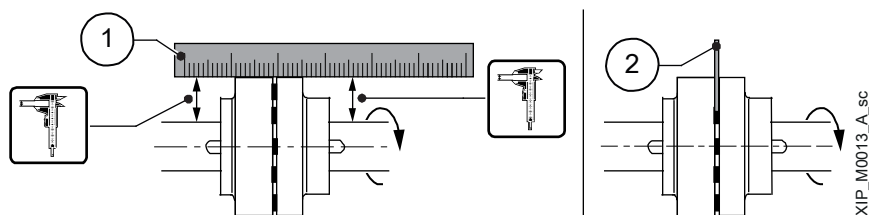
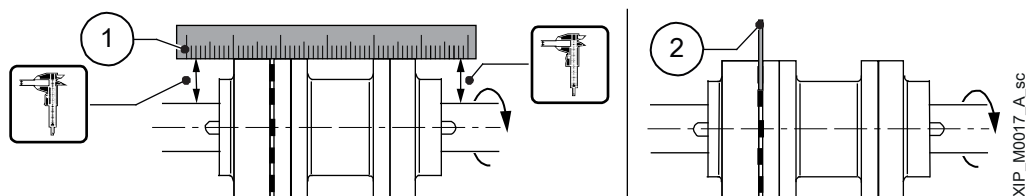


Figure 2: Coupling with spacer



1. Ruler
2. Thickness gauge

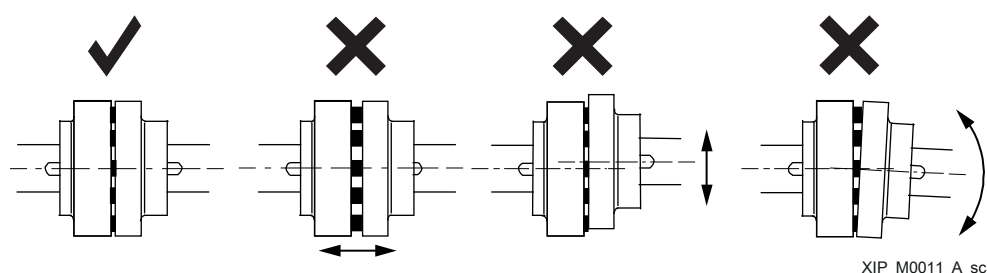
See Figure 1 or Figure 2, depending on the type of coupling.

1. Place a ruler on the half-couplings.
2. Measure the distances at the points shown in the figure.
3. Turn the coupling by hand a little and repeat the measurement.
4. Repeat step 3 several times: the radial alignment is correct if the distances in relation to the corresponding axes are the same at all points.
5. Check the distance between the half couplings with a feeler gauge.
6. Turn the coupling by hand a little and check the distance again.
7. Repeat step 6 several times: the axial alignment is correct if the distances are the same at all points.

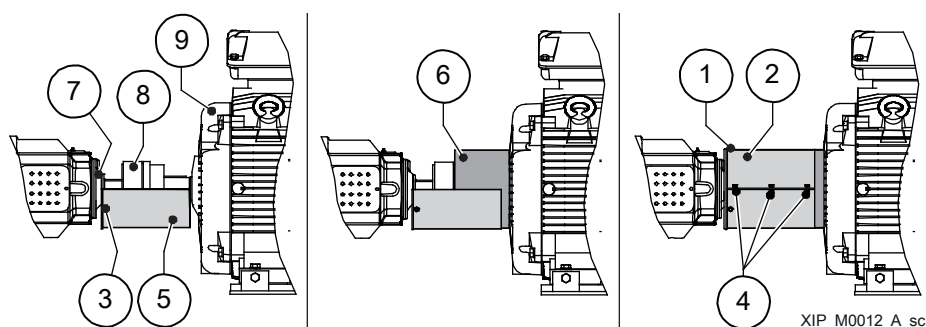
#### NOTE:

The radial and axial deviations between the half couplings must not exceed the values indicated by the manufacturer. Refer to the motor-pump coupling instruction manuals for more information.

The figure shows the correct alignment of the coupling.



### 4.4.3 Installing the coupling guards



1. Top fastener
2. Top coupling protection
3. Bottom fastener
4. Side fasteners
5. Bottom coupling protection
6. Adjustment ring
7. Bearing cover
8. Coupling
9. Motor

1. Reinstall the bottom protection by screwing the bottom fastener.
2. Insert the ring with the slot facing down and press it against the motor in the axial direction.
3. Reinstall the top protection and screw the top and side fasteners.

## 4.5 Bearing lubrication

### NOTE:

The pumps are delivered without oil. The bearing bracket must be filled with oil before commissioning/start-up.

1. Identify the lubrication type for the unit bearings by reading the last letter of the identification code:
  - G = with grease, standard
  - O = with oil, optional.
2. If the lubrication type is grease, the unit is delivered already filled with grease.
3. If the lubrication type is oil, before starting the unit fill:
  - The oil lubricated bearing bracket, see paragraph 6.2.3 on page 33 or
  - The oiler, optional.

## 4.6 Mechanical seals and auxiliary systems

1. Find the type of seal by reading the third and second last letter of the identification code.
2. Follow the instructions and the API PLAN standards in the table based on the type.

| Designation | Type of seal                                                                                            | API PLAN std | Instructions                                                                                                                                                                                                                                                                                                                                                               |
|-------------|---------------------------------------------------------------------------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S0          | Single mechanical seal – unbalanced – without/with shaft sleeve                                         | 1, 11        | Maintenance free mechanical seal                                                                                                                                                                                                                                                                                                                                           |
| S1          |                                                                                                         |              |                                                                                                                                                                                                                                                                                                                                                                            |
| S2          | Single mechanical seal – balanced                                                                       |              |                                                                                                                                                                                                                                                                                                                                                                            |
| CS          | Cartridge mechanical seal – Single                                                                      |              |                                                                                                                                                                                                                                                                                                                                                                            |
| S4          | Single mechanical seal – unbalanced/balanced – with Quench                                              | 61/62        | Connect the seal to the quench system: check the type and quantity of liquid in the technical data sheet or order confirmation.                                                                                                                                                                                                                                            |
| S5          |                                                                                                         |              |                                                                                                                                                                                                                                                                                                                                                                            |
| CQ          | Cartridge mechanical seal – Single with Quench                                                          |              |                                                                                                                                                                                                                                                                                                                                                                            |
| T3          | Single mechanical seal – balanced – Cooled version – with heat exchanger/with thermosiphon cooling tank | 23           | <ol style="list-style-type: none"> <li>1. Connect the seal to the heat exchanger</li> <li>2. Vent the circuit before starting.</li> </ol>                                                                                                                                                                                                                                  |
|             |                                                                                                         | 23T          | <ol style="list-style-type: none"> <li>1. Connect the seal to the thermosiphon cooling tank</li> <li>2. Vent the circuit before starting.</li> </ol>                                                                                                                                                                                                                       |
| S6          | Single mechanical seal – unbalanced/balanced – internal or external flush                               | 31/32        | Connect the seal to a flushing circuit: check the type and minimum pressure of the fluid in the technical data sheet or in the order confirmation.                                                                                                                                                                                                                         |
| S7          |                                                                                                         |              |                                                                                                                                                                                                                                                                                                                                                                            |
| CD          | Cartridge mechanical seal – Double                                                                      | 52/53A/54    | Connect the seal to a barrier loop or an external line. For more information, see the technical data sheet or the order confirmation, and the instruction manual of the seal manufacturer.                                                                                                                                                                                 |
| P2          | Gland packing with internal barrier of pumped liquid                                                    | -            | <ol style="list-style-type: none"> <li>1. Adjust the leak of the gland packing; see paragraph 4.6.1.</li> <li>2. Install a temperature detector.</li> </ol>                                                                                                                                                                                                                |
| P3          | Gland packing with external barrier liquid                                                              | -            | <ol style="list-style-type: none"> <li>1. Connect the seal to a flushing circuit: check the type and minimum pressure of the fluid in the technical data sheet or in the order confirmation.</li> <li>2. Adjust the leak of the gland packing; see paragraph 4.6.1.</li> <li>3. Install a temperature detector.</li> <li>4. Install a flushing liquid detector.</li> </ol> |

## 4.6.1 Stuffing box gland adjustment



### **WARNING: Injuries hazard**

Pay attention when adjusting the stuffing box gland with the unit in operation.

In normal operating conditions, the stuffing box gland must leak a small amount of liquid to adjust the leak:

1. Remove the adapter guards to get a better view of the seal leak.
2. Tighten the bolts of the stuffing box gland by hand.
3. Check that the stuffing box gland is centred and perpendicular to the shaft axis
4. Start the unit.
5. Wait 5 minutes.
6. Check that the stuffing box gland is leaking.
7. Regularly check the leaking of the stuffing box gland during the first hours of operation of the unit, gradually tightening the bolts until a leak rate of 30 to 100 drops per minute is reached.

### **NOTE:**

If there is no leak, stop the unit immediately and replace the seal.

8. Reinstall the guards.

## 4.7 Electrical connection

### 4.7.1 Precautions

#### Electrical measures



### **DANGER:**

For the electrical connections, make sure to comply with the requirements of the IEC 60079-14 standard.



### **DANGER: Electrical hazard**

Before starting work, check that the electric power supply is disconnected and locked out, to avoid unintentional restart of the unit, the control panel and the auxiliary control circuit.

### **NOTE:**

Only use dynamically balanced motors with half-sized key at the shaft end (IEC 60034-14), and with normal vibration rate (N).

### **NOTE:**

Only use single-phase or three-phase motors of a size and power compliant with European standards.

### **NOTE:**

The mains voltage and frequency must match the specifications on the data plates.

#### Ground



### **DANGER: Electrical hazard due to static charge**

Always connect the external protection conductor (ground) to the ground terminal before attempting to make any other electrical connections.



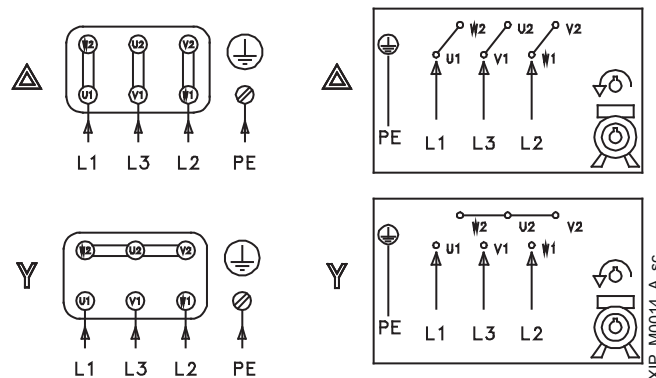
### **DANGER: Electrical hazard**

Install suitable systems for protection against indirect contact, in order to prevent lethal electric shocks.

## **4.7.2 Guidelines for electrical connection**

1. Check that the electrical leads are protected against:
  - High temperature
  - Vibrations
  - Collisions
  - Liquids.
2. Check that the power supply line is provided with:
  - A short circuit protection device of appropriate size
  - A mains disconnection device with contact opening distance ensuring complete disconnection for overvoltage III category conditions.

## **4.7.3 Motor connection**



1. Open the terminal box cover.
2. Insert the power cable in the cable gland.
3. Unsheathe the conductors.
4. Make sure that the protection conductor (ground) is longer than the phase conductors.
5. Refer to the wiring diagrams in the figure or inside the cover, insert the cores of the conductors into the respective holes and tighten the nuts or screws.
6. Tighten the cable gland.
7. Close the cover and tighten the screws.



### **WARNING:**

The above is by way of example and not exhaustive. Always refer to the motor manual for power supply tolerances and electrical connections.

## **4.7.4 Overload protection**

1. Install an appropriate motor protector in the control panel, with D curve in accordance with the current shown in the data plate.
2. Calibrate the motor protector depending on the use of the motor:
  - With full load, comply with the nominal current value on the data plate
  - With partial load, comply with the value of the operating current measured with a current pincer.

### 4.7.5 Operation with frequency converter


**WARNING:**

If a variable speed application is required, refer to the instructions and catalogues of the motor and frequency converter manufacturers.


**WARNING:**

Always refer to the motor manual for power supply tolerances and electrical connections.

The motors can be connected to a frequency converter for speed control.

- The converter exposes the insulation of the motor to a greater load, determined by the length of the connecting cable: observe the requirements of the Manufacturer of the frequency converter
- For applications requiring silent operation, install an outlet filter between the motor and the converter; a sinusoidal filter can reduce the noise even further
- The bearings of the motors, from size 315 S/M and up, are exposed to the risk of harmful currents: use electrically insulated bearings
- The conditions of installation must guarantee protection against voltage peaks between the terminals and/or  $dV/dt$  in the table:

| Motor size        | Voltage peak, V | $dV/dt$ , V/ $\mu s$ |
|-------------------|-----------------|----------------------|
| up to 90R (500 V) | < 650           | < 2200               |
| from 90R to 180R  | < 1400          | < 4600               |
| over 180R         | < 1600          | < 5200               |

Otherwise, use a motor with reinforced insulation<sup>1</sup> and a sinusoidal filter.

<sup>1</sup> Available on request

# 5 Use and operation

## 5.1 Precautions

Before starting, make sure that the safety instructions shown in **Introduction and Safety** on page 5 and in **Installation** on page 15 have been fully read and understood.



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**WARNING:**

Start-up and first operation must be done by a technician possessing the technical-professional requirements outlined in the current regulations.

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**DANGER: Electrical hazard**

Before starting work, check that the electric power supply is disconnected and locked out, to avoid unintentional restart of the unit, the control panel and the auxiliary control circuit.

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**DANGER: Electrical hazard**

If the unit is connected to the frequency converter, disconnect the mains power supply and wait at least 10 minutes for the residual current to dissipate.

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**DANGER: Overheating, damage**

Observe the operating limits for pressure, temperature, speed.

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**DANGER: Damage, breakdown**

The unit must be filled and vented properly before it can be started. It is prohibited to operate the unit when dry, not primed and below the rated flow rate.

---



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**DANGER: Burns due to temperature increase caused by contact between rotating and fixed parts**

If the coupling is misaligned, it may overheat or overheat the bearings, resulting in burns. Check the alignment of the motor-pump coupling at the operating temperatures and pressures.

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**DANGER: Hot and/or toxic liquid spillage**

It is prohibited to operate the unit with the on-off valves on the suction and discharge sides closed. If the unit needs to operate for more than a few seconds with the discharge valve closed, or below the minimum flow rate, install a bypass circuit.

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**WARNING:**

Always wear personal protective equipment.

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**WARNING:**

Always use suitable working tools.

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**WARNING: Danger of physical injury**

Check that the protection devices of the coupling are installed, when applicable.

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**WARNING: Electrical hazard**

Check that the unit is properly connected to the mains power supply.

**WARNING: Hot surface hazard**

Be aware of the extreme heat generated by the unit.

**WARNING:**

It is prohibited to place flammable materials near the unit.

**NOTE:**

Check that the shaft can turn smoothly.

**NOTE:**

It is prohibited to operate the unit with the bearing supports not lubricated.

**NOTE:**

The maximum pressure delivered by the unit at the discharge side, determined by the pressure available on the suction side, must not exceed the maximum pressure (PN).

## 5.2 Checking the rotation direction

**WARNING: Temperature increase due to contact between rotating and fixed parts**

Checking the direction of rotation by running the unit dry is strictly forbidden.

### Preparing the unit

1. Check that all the operations described in the previous paragraphs have been completed correctly.
2. Fill and vent the pump unit and the suction pipe.
3. If installed, start and if necessary, vent the auxiliary systems of the mechanical seal.
4. Shut off the discharge on-off valve almost completely.
5. Fully open the suction on-off valve.

### Checking the rotation direction

**NOTE:**

Incorrect rotation of pump and motor can loosen pump parts and damage the unit. Pay attention to the arrow indicating the rotation direction of the pump. Check the direction of rotation and, if it is incorrect, change the 2 phases of the electrical connection.

1. Locate the arrow on the adapter, the coupling or the cover, to determine the correct direction of rotation of the motor.
2. Start the unit.
3. Check the rotation direction through the motor cover.
4. Stop the unit.
5. In case of incorrect rotation direction:
  - Disconnect the power supply
  - Invert two of the three wires of the power supply cord.
6. Check the direction of rotation again.

## 5.3 Intended use

### Speed, pressure, temperature

The speed, pressure and temperature of the pump and shaft sealing should not exceed the limit values given in the data sheet and/or order confirmation. This can occur as a result of overly fast shutdown. Keep the values down by installing a non-return valve on the pressure side, fly wheel or air tank. They can cause temperature shock and damage or impair the function of single parts.

### Permitted nozzle loads and torques

The suction and discharge piping should be designed so that pump operation requires as little force as possible. If that is not possible, the values shown in **Forces and torques that can be applied to the ports** on page 18 must not be exceeded under any circumstances. This is valid with the pump in operation or at standstill and therefore for all possible pressures and temperatures of the unit.

### NPSH

The pumped liquid must have a minimum NPSH pressure at the impeller inlet to ensure cavitation-free operation and prevent failure of the pump.

When the system NPSH value (NPSHA) is higher than the pump NPSH value (NPSHR) under all operating conditions, this requirement is met.

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#### NOTE:

Check the NPSH value on pumping liquids near the vapour pressure. If the NPSH value of the pump remains lower, the material may be damaged due to cavitation or even destroyed due to overheating.

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The curves of every pump type show the NPSH-value of the pump (NPSHR).

## 5.4 Start-up



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#### WARNING:

Do not use the shut-off valve on the discharge side in the closed position to reduce the pump's flow rate for more than a few seconds. If the unit has to operate for more than a few seconds with closed discharge or for a longer period below the minimum flow, a bypass circuit must be installed that is either permanently active or controlled by a minimum flow valve to prevent overheating of the fluid in the pump.

---

### Checks before starting the unit

Perform checks after the following events:

- The first installation
- Extraordinary maintenance
- A period of inactivity.

Check:

- The mechanical installation
- The electrical installation
- The direction of rotation of the motor
- The unit has been filled with the required fluid and vented
- All required auxiliary connections and mechanical seals are installed
- The presence and level of the lubricating oil.

## Start up

1. Shut off the discharge on-off valve almost completely.
2. Fully open the suction on-off valve.
3. Start the unit.
4. Gradually open the discharge on-off valve and adjust it until the duty point is reached, as soon as the motor reaches full speed
5. With the unit in operation, check that:
  - No liquid is leaking from the unit or piping system
  - The nominal pressure is higher than the maximum pressure delivered by the unit
  - The current absorbed is within the rated limits.

Note: an automatic restart may only take place if it is ensured that the pump remains filled with liquid when it is at standstill.

## Operation limits:

### Flow min. / max.:

If no other data are given in the performance curves or data sheet, the following is valid:

$Q_{min} = 0,1 \times Q_{BEP}$  for short term operation

$Q_{min} = 0,3 \times Q_{BEP}$  for continuous operation

$Q_{max} = 1,2 \times Q_{BEP}$  for continuous operation<sup>2</sup>

$Q_{BEP}$  = Flow in best efficiency point

## 5.5 Stopping

1. Close the discharge on-off valve: If the discharge line is equipped with a check or non-return valve, the on-off valve can stay open.
2. Stop the unit.
3. Check that the motor stops and that it does not turn in the opposite direction.
4. Gradually re-open the valve and check that the motor remains still.
5. If installed, stop the auxiliary systems of the mechanical seal.

<sup>2</sup> On the condition that  $NPSH_{Application} > (NPSH_{Pump} + 0.5m)$

# 6 Maintenance

## 6.1 Precautions

Before starting, make sure that the safety instructions shown in **Introduction and Safety** on page 5 have been fully read and understood.



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**CAUTION:**

Maintenance must be done by a technician possessing the technical-professional requirements outlined in the current regulations.

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**DANGER: Explosion hazard due to inadequate maintenance**

Make sure that the unit is always regularly maintained.

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**DANGER: Explosion due to hot or toxic liquid escaping from the mechanical seal**

Pumping abrasive liquids can increase wear of the seal, and therefore result in the need for more frequent maintenance.

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**DANGER: Sparks can be produced during maintenance**

Always perform maintenance work on an explosion-proof pump in an area where there is no potentially explosive atmosphere.

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**DANGER: Electrical hazard**

Before starting work, check that the electric power supply is disconnected and locked out, to avoid unintentional restart of the unit, the control panel and the auxiliary control circuit.

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**DANGER: Electrical hazard**

If the unit is connected to the frequency converter, disconnect the mains power supply and wait at least 10 minutes for the residual current to dissipate.

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**WARNING:**

Always wear personal protective equipment.

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**CAUTION:**

Always use suitable working tools.

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**WARNING: Risk of crushing of hands and feet**

During maintenance and troubleshooting, secure the unit or parts of the unit to prevent tipping and falling.

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**WARNING:**

In the case of liquids that are excessively hot or cold, pay attention to the risk of injury.

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**WARNING:**

Make sure that the drained liquid cannot cause damage or injuries.

**WARNING:**

It is prohibited to dispose of lubricating fluids and other hazardous substances in the environment.

## 6.2 Periodic maintenance

**DANGER: Overtemperature due to friction**

Regularly check the coupling protection and other covers of rotating parts for deformation and enough clearance from the rotating parts.

**CAUTION: Excessive vibration of the unit due to mechanical failure or incorrect installation**

Check vibrations of the pump and motor on a regular basis or install a vibration monitoring system.

**DANGER: Risk of burns with hot and toxic fluid due to incorrect servicing of the shaft seal**

Regularly service the shaft seal.

**CAUTION: Excessive temperatures due to bearings running hot or defective bearing seals**

Regularly check the level of lubricant and the rolling elements of the bearings for noise during operation.

**DANGER: Leakage of hot and/or toxic fluid due to incorrect servicing of the barrier fluid system**

Regularly service the barrier fluid system and monitor the barrier fluid pressure.

Identify the lubrication type for the unit bearings by reading the last letter of the identification code:

- G = with grease, standard
- O = with oil, optional.

### General information

| Type of maintenance | Purpose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Interval      |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Check               | Check: <ul style="list-style-type: none"> <li>• That there are no lubricant leaks</li> <li>• Check the labyrinth seal rings or lip seal rings</li> <li>• That there are no unwanted noise or vibrations</li> <li>• The mechanical seal</li> <li>• The stuffing box gland</li> <li>• That there are no liquid leaks from the gaskets</li> <li>• Tightness of the screws and bolts</li> <li>• Coupling protection</li> <li>• Clogging of the filter in the suction pipe; clean if necessary</li> </ul> | Daily         |
| Control             | Check the temperature of the unit bearings                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |
|                     | Check the auxiliary connections                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Every week    |
|                     | Check the operation of the device in standby                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Every 2 weeks |

|                       |                                                                            |                                                                                              |
|-----------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Check                 | If the unit is subjected to chemical or abrasive wear, check its condition | Every 6 months                                                                               |
|                       | Check the terminal board for any signs of overheating and arc flashes      | Every year                                                                                   |
| Cleaning              | Clean the cooling fan                                                      | Every year                                                                                   |
| Check and replacement | Check the alignment of the coupling and replace any worn rubber parts      | Every 1000 hours of operation or every 3 months, when the first of the two limits is reached |
| Replacement           | Replace the motor bearings                                                 | Every 25000 hours of operation or every 5 years, when the first of the two limits is reached |

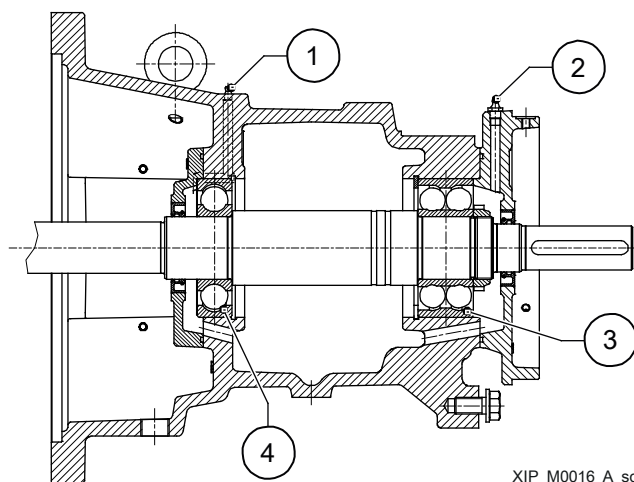
#### Units with grease lubrication, G

| Type of maintenance | Purpose                                                    | Interval                                                                                    |
|---------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Refill              | Top up the grease in the unit bearings, see section 6.2.1  | Every 4000 hours of operation or every year, when the first of the two limits is reached    |
| Replacement         | Replace the grease in the unit bearings, see section 6.2.2 | Every 8000 hours of operation or every 2 years, when the first of the two limits is reached |

#### Units with oil lubrication, O

| Type of maintenance | Purpose                                                                               | Operating temperature of the bearings, °C (°F) | Interval                                                                                 |
|---------------------|---------------------------------------------------------------------------------------|------------------------------------------------|------------------------------------------------------------------------------------------|
| Check               | Check the lubricant oil level                                                         | –                                              | Daily                                                                                    |
| Replacement         | First replacement of the oil in the unit bearings, see section 6.2.3                  | 80–90 (176–194)                                | 200 hours of operation                                                                   |
|                     |                                                                                       | < 80 (176)                                     | 300 hours of operation                                                                   |
|                     | Second and subsequent replacements of the oil in the unit bearings, see section 6.2.3 | 80–90 (176–194)                                | Every 3000 hours of operation or every year, when the first of the two limits is reached |
|                     |                                                                                       | 60–80 (140–176)                                | Every 4000 hours of operation or every year, when the first of the two limits is reached |
|                     |                                                                                       | < 60 (140)                                     | Every 8760 hours of operation or every year, when the first of the two limits is reached |

### 6.2.1 Grease top up



1. Greasing nipple
2. Greasing nipple
3. Thrust bearing
4. Radial bearing

Use NLGI n. 2 lithium bearing grease or similar.

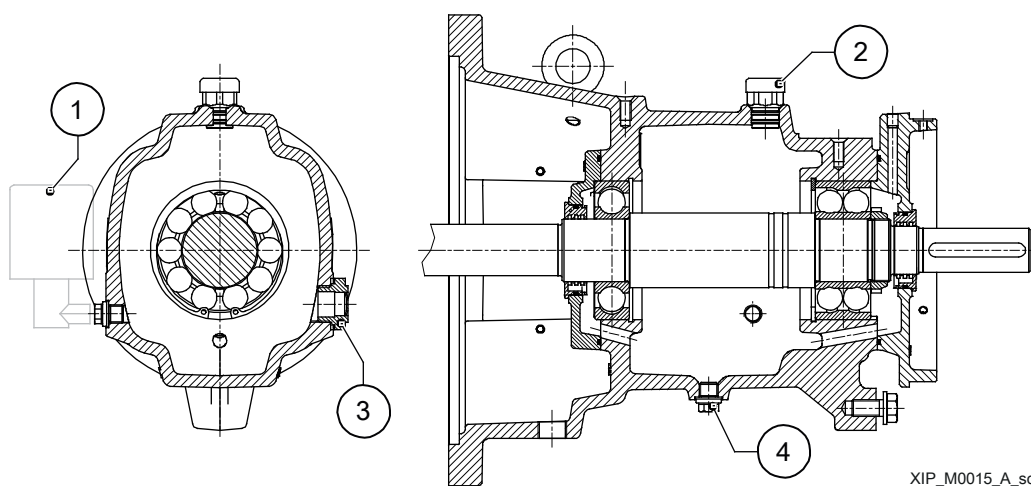
1. Clean the nipples.
2. Insert the greasing unit in the first nipple and refill.
3. Repeat the operation with the second nipple.

### 6.2.2 Replacing the grease

Use NLGI n. 2 lithium bearing grease or similar.

1. Disassemble the covers of the bearing supports.
2. Remove all existing grease and thoroughly clean the bearings.
3. Apply the amount of grease shown in paragraph 8.7 on page 44.
4. Refit the covers.

### 6.2.3 Changing the oil



1. Oiler, optional
2. Oil filling plug
3. Level indicator
4. Drain plug

Use CLP46 DIN 51517 or HD 20W/20 SAE oil with the following characteristics:

- Symbol according to DIN 51502
- Kinematic viscosity at 40°C (104°F):  $46 \pm 4 \text{ mm}^2/\text{s}$  ( $46 \pm 4 \text{ cSt}$ )
- Flashpoint according to Cleveland: 175°C (347°F)
- Pour point: -15°C (5°F)
- Operating temperature: higher than the permissible bearing temperature.

**NOTE:**

If the ambient temperature is below -10°C (14°F) use specific oil: contact Xylem or its Authorized Distributor.

1. Remove the drain plug.
2. Drain all the oil from the unit or, if the unit is new, of any residual liquid.
3. Close the drain plug.
4. Remove the filling plug.
5. Fill with the amount of oil shown in paragraph 8.7 on page 44: the correct level is the half point of the level indicator.
6. Insert the filling plug.

## 6.2.4 Inspection work

Check the coupling

| Type of maintenance | Purpose                                                             | Operating temperature of the bearings, °C (°F) | Interval                                              |
|---------------------|---------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------------|
| Check               | Check the radial clearance of the coupling parts                    | -                                              | Every 1000 operating hours<br>At least 4 times a year |
| Replacement         | Replace the worn parts and then check the alignment of the coupling | -                                              | When parts show signs of wear                         |

## 6.2.5 Replacement of the shaft seal

Mechanical seal

If liquid leaks from the mechanical seal, the seal is damaged and must be replaced.

Stuffing box

If the leakage rate can no longer be set correctly, the stuffing box is worn out and must be replaced.

**NOTE:**

Non timely replacement leads to increased wear on the shaft sleeve.

Replace the packing



**DANGER: Take pump out of operation**

Repack the stuffing box only after the pump has been stopped and depressurized and when the pump body has reached room temperature.

1. Remove the gland nuts of the stuffing box and push the stuffing box gland to the other side.
2. Remove the soft packing.
3. Insert the first soft packing with the cut face up.

**NOTE:**

There should be slight clearance between the soft packing and the shaft. This can be achieved by reducing the height of the packing rings with light hammer blows.

4. Insert each successive soft seal ring at 90° to the previous one.
5. Put the stuffing box back in place and fasten the nuts by hand.
6. Perform start-up following the same procedure for initial start-up in paragraph 5.4 on page 28.

## 6.3 Long periods of inactivity

1. Close the on-off valve on the suction side.
2. Completely empty the unit.
3. Protect the unit against freezing.
4. Before restarting the unit, check that the shaft is rotating freely, without mechanical impediments.

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### NOTE:

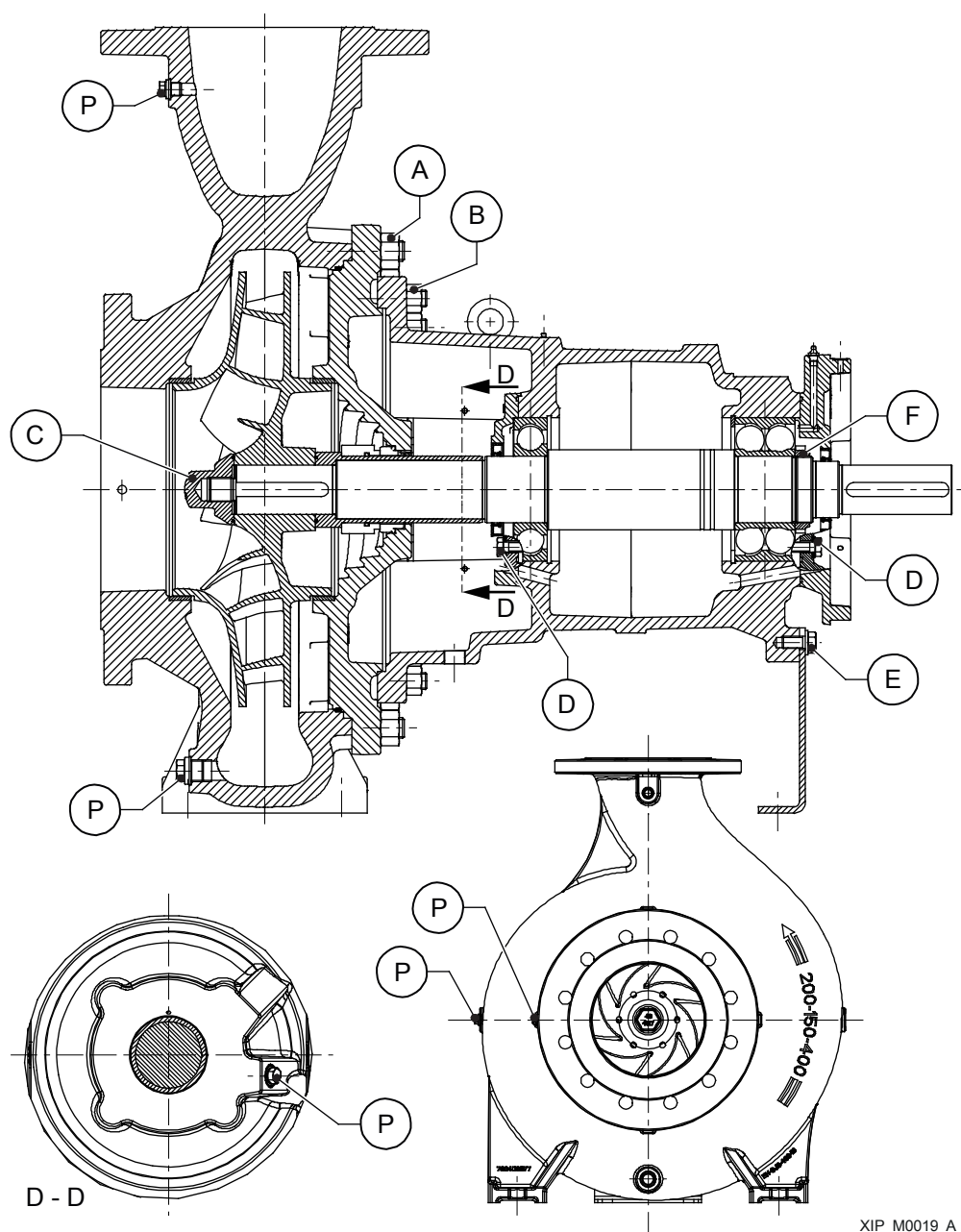
If the unit has not been used for more than 2 years, replace the grease in the bearings.

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## 6.4 Spare parts ordering

Identify the spare parts with the product codes directly on the site [www.lowara.com/spark](http://www.lowara.com/spark).  
Contact Xylem or its Authorised Distributor for further technical information.

## 6.5 Tightening torques



XIP\_M0019\_A\_sc

| Position number | Bolt size | Tightening torque, Nm (lbf-in) | Tool            |
|-----------------|-----------|--------------------------------|-----------------|
| A, B            | M12       | 55 (490)                       | Torque wrench   |
|                 | M16       | 100 (890)                      |                 |
|                 | M20       | 210 (1850)                     |                 |
|                 | M24       | 350 (3100)                     |                 |
| C               | M12X1.5   | 50 (440)                       |                 |
|                 | M16X1.5   | 80 (710)                       |                 |
|                 | M20X1.5   | 120 (1060)                     |                 |
|                 | M24X2     | 170 (1500)                     |                 |
|                 | M30X2     | 280 (2500)                     |                 |
| D               | M8        | 15 (130)                       | Standard wrench |
|                 | M10       | 30 (270)                       |                 |

|   |         |            |                 |
|---|---------|------------|-----------------|
|   | M12     | 50 (440)   |                 |
| E | M12     | 45 (400)   |                 |
|   | M16     | 80 (710)   |                 |
| F | M35X1.5 | 120 (1060) | Hook wrench     |
|   | M45X1.5 | 140 (1240) |                 |
|   | M55X2   | 160 (1400) |                 |
|   | M65X2   | 180 (1600) |                 |
|   | M70X2   | 200 (1800) |                 |
| P | G1/4    | 15 (130)   | Standard wrench |
|   | G1/2    | 60 (530)   |                 |

# 7 Troubleshooting

## 7.1 Precautions

Before starting the work, make sure that the safety instructions shown in **Introduction and Safety** on page 5, in **Use and operation** on page 26 and in **Maintenance** on page 30 have been fully read and understood.



### WARNING:

Maintenance must be done by a technician possessing the technical-professional requirements outlined in the current regulations.



### WARNING:

If a fault cannot be corrected or is not mentioned, contact Xylem or its Authorised Distributor.

## 7.2 The unit does not start

| Cause                                                               | Solution                                                                                                                                                            |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electric power supply cut off                                       | Restore the electric power supply                                                                                                                                   |
| The thermal overload protection of the motor has been triggered     | Reset the thermal overload protection on the control panel or the unit                                                                                              |
| The device for protection against the absence of liquid has tripped | <ul style="list-style-type: none"> <li>Check the liquid level in the tank and/or</li> <li>Adjust the device</li> </ul> If the problem continues, replace the device |
| Faulty capacitor (single-phase version)                             | Contact Xylem or its Authorised Distributor                                                                                                                         |
| Control panel faulty                                                | Check and repair or replace the control panel                                                                                                                       |
| Unit faulty                                                         | Contact Xylem or its Authorised Distributor                                                                                                                         |

## 7.3 The differential protection device (RCD) has tripped

| Cause                                     | Solution                                         |
|-------------------------------------------|--------------------------------------------------|
| Motor leaking                             | Check and repair or replace the motor            |
| Differential of unsuitable type or faulty | Check the type of differential and/or replace it |

## 7.4 The unit produces excessive noise and/or vibrations

| Cause                                                            | Solution                                               |
|------------------------------------------------------------------|--------------------------------------------------------|
| Cavitation                                                       | Increase the NPSH <sup>3</sup> available in the system |
| Unsuitable anchoring to the ground                               | Check the anchoring to the ground                      |
| Plant resonance                                                  | Check the installation                                 |
| Anti-vibration joint on the piping system not suitable or absent | Check and/or install the anti-vibration joint          |
| Foreign bodies in the unit                                       | Remove the foreign bodies                              |
| Motor bearings worn or faulty                                    | Replace the motor bearings                             |
| Unit mechanically seized                                         | Contact Xylem or its Authorised Distributor            |

<sup>3</sup> Net Positive Suction Head

## 7.5 The thermal overload protection triggers or the fuses trip

The motor thermal overload protection triggers or the fuses trip when the unit starts.

| Cause                                                                                            | Solution                                     |
|--------------------------------------------------------------------------------------------------|----------------------------------------------|
| The calibration value is too low in relation to the rated current of the motor                   | Recalibrate                                  |
| Missing power supply phase                                                                       | Check the power supply and restore the phase |
| Loose and/or faulty connections of the thermal overload protection                               | Tighten or replace the clamps and terminals  |
| Loose and/or incorrect and/or faulty (star-delta) connections in the terminal board of the motor | Tighten or replace the clamps and terminals  |
| Motor (coil) faulty                                                                              | Check and repair or replace the motor        |
| Pump unit mechanically seized                                                                    | Check and repair the pump unit               |
| Check valve faulty                                                                               | Replace the check valve                      |
| Foot check valve faulty                                                                          | Replace the foot valve                       |

## 7.6 The thermal overload protection triggers

The motor thermal overload protection triggers occasionally, or after the unit has been running for a few minutes.

| Cause                                                                             | Solution                                              |
|-----------------------------------------------------------------------------------|-------------------------------------------------------|
| It is calibrated at a value too low in relation to the rated current of the motor | Recalibrate                                           |
| Input voltage outside the rated limits                                            | Make sure the voltage values are correct              |
| Unbalanced input voltage                                                          | Make sure the voltage of the three phases is balanced |
| Wrong duty point, flow rate above the permitted limits                            | Bring the flow rate back within the permitted limits  |
| Liquid too thick                                                                  | Check the liquid                                      |
| Room temperature too high                                                         | Decrease the temperature                              |
| Unit faulty                                                                       | Contact Xylem or its Authorised Distributor           |

## 7.7 The motor becomes excessively hot

| Cause                                               | Solution                           |
|-----------------------------------------------------|------------------------------------|
| Room temperature too high                           | Decrease the temperature           |
| Motor cooling fan damaged                           | Replace the cooling fan            |
| Too many starts                                     | See paragraph 7.10                 |
| Frequency converter wrongly calibrated (if present) | See the frequency converter manual |

## 7.8 Little or no hydraulic performance

| Cause                                                                        | Solution                                                |
|------------------------------------------------------------------------------|---------------------------------------------------------|
| Three-phase motor turning in the wrong direction                             | Check the direction of rotation and change if necessary |
| Incorrect priming (there are air bubbles in the suction pipe or in the unit) | Repeat the priming procedure                            |
| Cavitation                                                                   | Increase the NPSH <sup>4</sup> available in the system  |
| Check valve blocked or partially clogged                                     | Replace the check valve                                 |
| Piping and/or unit clogged                                                   | Remove the clogging                                     |
| Discharge pipe throttled                                                     | Remove the throttling                                   |

<sup>4</sup> Net Positive Suction Head

## 7.9 When switched off, the unit turns in the opposite direction

| Cause                   | Solution                |
|-------------------------|-------------------------|
| Check valve faulty      | Replace the check valve |
| Foot check valve faulty | Replace the foot valve  |

## 7.10 The unit starts and stops too frequently

The unit with automatic start and stop device starts and stops too frequently.

| Cause                                                                                                                                     | Solution                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Incorrect priming (there are air bubbles in the suction pipe or in the unit)                                                              | Repeat the priming procedure                                                                                                                                                                         |
| Check valve locked in closed or partially closed position                                                                                 | Replace the check valve                                                                                                                                                                              |
| Foot valve locked in closed or partially closed position                                                                                  | Replace the foot valve                                                                                                                                                                               |
| Starter set incorrectly, or faulty                                                                                                        | Adjust or replace the starter                                                                                                                                                                        |
| Expansion vessel <ul style="list-style-type: none"> <li>• no pre-charge, or</li> <li>• undersized, or</li> <li>• not installed</li> </ul> | <ul style="list-style-type: none"> <li>• Pre-charge the expansion vessel, or</li> <li>• replace the expansion vessel with another suitable one, or</li> <li>• install an expansion vessel</li> </ul> |
| Oversized unit                                                                                                                            | Contact Xylem or its Authorised Distributor                                                                                                                                                          |

## 7.11 The unit does not stop

The unit with automatic start and stop device never stops.

| Cause                                                   | Solution                                                |
|---------------------------------------------------------|---------------------------------------------------------|
| The required flow rate is greater than the one expected | Reduce the required flow rate                           |
| Discharge pipe leaking                                  | Eliminate the leaks                                     |
| Three-phase motor turning in the wrong direction        | Check the direction of rotation and change if necessary |
| Pipes, on-off valves or filter clogged with impurities  | Remove the impurities                                   |
| Starter set incorrectly, or faulty                      | Adjust or replace the starter                           |
| The unit runs but there is little or no flow rate       | See paragraph 7.8                                       |

## 7.12 The unit is leaking at the mechanical seal

| Cause                                                                                                                                                       | Solution                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Damaged seal due to: <ul style="list-style-type: none"> <li>• wear</li> <li>• thermal shock</li> <li>• chemical incompatibility</li> <li>• other</li> </ul> | Replace the seal and check it to identify the cause of the damage.<br>Contact Xylem or its Authorised Distributor |

## 7.13 The frequency converter is in error mode or turned off

The frequency converter (if present) is in error mode or turned off

| Cause                              | Solution                           |
|------------------------------------|------------------------------------|
| See the frequency converter manual | See the frequency converter manual |

# 8 Technical Information

## 8.1 Operating environment

### Temperature

From -10 to 40°C (14-104°F), unless otherwise indicated on the data plate of the electric motor.

### Relative air humidity

< 50% at 40°C (104°F).

#### NOTE:

If the humidity exceeds the stated limits, contact Xylem or its Authorised Distributor.

### Elevation

< 1000 m (3280 ft) above sea level.

#### NOTE: Danger of motor overheating

If the unit is exposed to temperatures or installed at an altitude greater than those stated, reduce the power output of the motor according to the coefficients reported in the table. Otherwise, replace the motor with a more powerful one.

| Altitude m (ft)       | Power reduction coefficient |
|-----------------------|-----------------------------|
| 1000-1500 (3300-4900) | 0.97                        |
| 1500-2000 (4900-6600) | 0.95                        |

## 8.2 Temperature of pumped liquid

The table shows the permitted liquid temperatures according to the material of the standard non balanced seal with elastomeric bellow.

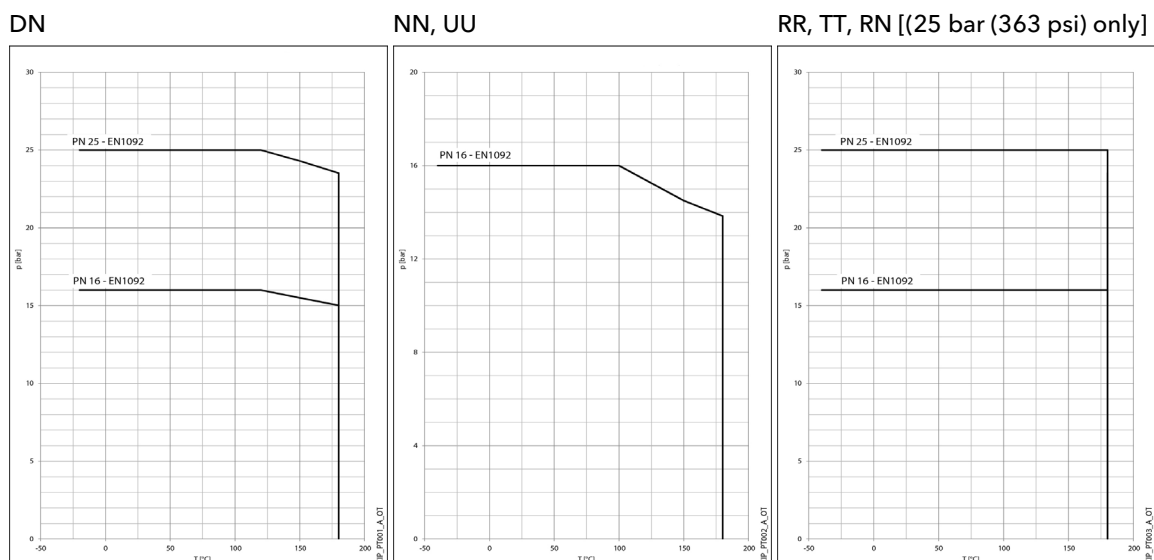
| Seal material | Minimum and maximum temperature, °C (°F) |
|---------------|------------------------------------------|
| BQ7EGG        | -25-120 (-13-248)                        |
| BQ7VGG        | -20-90 (-4-194)                          |
| Q7Q7EGG       | -25-120 (-13-248)                        |
| Q7Q7VGG       | -20-90 (-4-194)                          |

Note: The liquid temperature is always shown on the pump data plate as well as on the data sheet and the order confirmation.

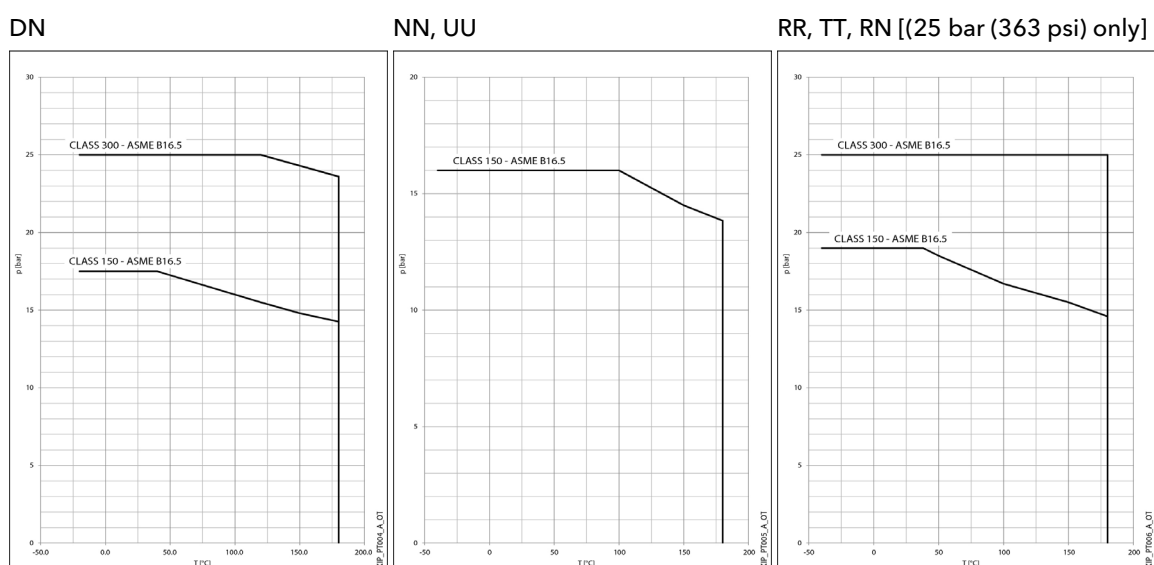
## 8.3 Maximum operating pressure

The chart shows the pumped liquid pressure and temperature limits permitted for the materials of the unit, depending on the type of flange.

EN 1092



ASME B16.5



## 8.4 Electrical specifications

See the motor data plate.

Permitted tolerances for the supply voltage

| Frequency, Hz | Phase ~ | No. of conductors + earth | UN, V $\pm$ %                      |
|---------------|---------|---------------------------|------------------------------------|
| 50            | 1       | 2 + 1                     | 220÷240 $\pm$ 6                    |
|               | 3       | 3 + 1                     | 230/400 $\pm$ 10, 400/690 $\pm$ 10 |
| 60            | 1       | 2 + 1                     | 220÷230 $\pm$ 6                    |
|               | 3       | 3 + 1                     | 220/380 $\pm$ 5, 380/660 $\pm$ 10  |

## 8.5 Maximum number of starts per hour

| Power, kW | Starts / h |
|-----------|------------|
| 0.75 – 3  | 60         |
| 4 – 7.5   | 40         |
| 11 – 22   | 25         |
| 30 – 37   | 16         |
| 45 – 75   | 8          |
| 90 – 160  | 4          |
| 200       | 3          |
| 355 – 500 | 2          |

Note: The above table is by way of example and not exhaustive. Always refer to the motor manual.

## 8.6 Sound pressure

Measured in free field at a distance of one metre from the unit, operating without load.

LpA, dB ± 3

| Power, kW                                   | Pump @ min <sup>-1</sup> |      |      | Pump with standard motor, @ min <sup>-1</sup> |      |      |
|---------------------------------------------|--------------------------|------|------|-----------------------------------------------|------|------|
|                                             | 2950                     | 1450 | 950  | 2950                                          | 1450 | 950  |
| 0.75, 1.1, 1.5, 2.2, 3, 4, 5.5, 7.5, 11, 15 | < 70                     | < 70 | < 70 | < 70                                          | < 70 | < 70 |
| 18.5                                        | < 70                     | < 70 | < 70 | 70.1                                          | < 70 | < 70 |
| 22                                          | < 70                     | < 70 | < 70 | 70.6                                          | < 70 | < 70 |
| 30                                          | < 70                     | < 70 | < 70 | 71.8                                          | < 70 | < 70 |
| 37                                          | 70.5                     | < 70 | < 70 | 73.8                                          | 73.4 | 70.1 |
| 45                                          | 71.5                     | 70.5 | 70.0 | 74.8                                          | 71.6 | 71.2 |
| 55                                          | 72.4                     | 71.4 | 70.9 | 76.9                                          | 72.7 | 71.9 |
| 75                                          | 73.8                     | 72.9 | 72.4 | 78.7                                          | 74.1 | 73.5 |
| 90                                          | 74.8                     | 73.8 | 73.3 | 79.7                                          | 74.8 | 74.2 |
| 110                                         | 75.7                     | 74.7 | 74.2 | 80.0                                          | 76.6 | 75.0 |
| 132                                         | 76.5                     | 75.6 | 75.0 | 80.9                                          | 77.2 | 75.6 |
| 160                                         | 77.4                     | 76.5 | 75.9 | 81.3                                          | 77.6 | 76.6 |
| 200                                         | 78.5                     | 77.6 | 77.0 | 82.3                                          | 78.9 | 78.5 |
| 250                                         | 79.5                     | 78.6 | 78.0 | 82.8                                          | 79.7 | 79.2 |
| 315                                         | -                        | 79.7 | 79.1 | -                                             | 80.7 | -    |
| 355                                         | -                        | 80.2 | 79.7 | -                                             | 81.1 | -    |
| 400                                         | -                        | 80.9 | 80.3 | -                                             | -    | -    |
| 450                                         | -                        | 81.4 | 80.9 | -                                             | -    | -    |
| 500                                         | -                        | 81.9 | 81.3 | -                                             | -    | -    |

## 8.7 Construction and maintenance data

| Model                  | Diameter of ports,<br>mm (in) |            | Shaft<br>diameter,<br>mm (in) | Mechanical seal,<br>mm (in) | Type of bearing |            | Quantity of grease,<br>pump side/motor side, g<br>(oz) | Quantity of<br>oil, L (US qt<br>dry) |
|------------------------|-------------------------------|------------|-------------------------------|-----------------------------|-----------------|------------|--------------------------------------------------------|--------------------------------------|
|                        | Suction                       | Discharge  |                               |                             | Pump side       | Motor side |                                                        |                                      |
| 40-25-160, 40-25-200   | 40 (1 1/2)                    | 25 (1)     | 24 (0.94)                     | 33 (1.30)                   | 6307-C3         | 3307-A-C3  | 5/15 (0.18/0.53)                                       | 0.3 (0.3)                            |
| 40-25-250              | 40 (1 1/2)                    | 25 (1)     | 32 (1.26)                     | 43 (1.69)                   | 6309-C3         | 3309-A-C3  | 10/20 (0.35/0.71)                                      | 0.7 (0.7)                            |
| 50-32-160, 50-32-200   | 50 (2)                        | 32 (1 1/4) | 24 (0.94)                     | 33 (1.30)                   | 6307-C3         | 3307-A-C3  | 5/15 (0.18/0.53)                                       | 0.3 (0.3)                            |
| 50-32-250              | 50 (2)                        | 32 (1 1/4) | 32 (1.26)                     | 43 (1.69)                   | 6309-C3         | 3309-A-C3  | 10/20 (0.35/0.71)                                      | 0.7 (0.7)                            |
| 65-50-160              | 65 (2 1/2)                    | 50 (2)     | 24 (0.94)                     | 33 (1.30)                   | 6307-C3         | 3307-A-C3  | 5/15 (0.18/0.53)                                       | 0.3 (0.3)                            |
| 65-40-200              | 65 (2 1/2)                    | 40 (1 1/2) | 24 (0.94)                     | 33 (1.30)                   | 6307-C3         | 3307-A-C3  | 5/15 (0.18/0.53)                                       | 0.3 (0.3)                            |
| 65-40-250, 65-40-315   | 65 (2 1/2)                    | 40 (1 1/2) | 32 (1.26)                     | 43 (1.69)                   | 6309-C3         | 3309-A-C3  | 10/20 (0.35/0.71)                                      | 0.7 (0.7)                            |
| 80-65-125, 80-65-160   | 80 (3)                        | 65 (2 1/2) | 24 (0.94)                     | 33 (1.30)                   | 6307-C3         | 3307-A-C3  | 5/15 (0.18/0.53)                                       | 0.3 (0.3)                            |
| 80-50-250, 80-50-315   | 80 (3)                        | 50 (2)     | 32 (1.26)                     | 43 (1.69)                   | 6309-C3         | 3309-A-C3  | 10/20 (0.35/0.71)                                      | 0.7 (0.7)                            |
| 100-80-125             | 100 (4)                       | 80 (3)     | 24 (0.94)                     | 33 (1.30)                   | 6307-C3         | 3307-A-C3  | 5/15 (0.18/0.53)                                       | 0.3 (0.3)                            |
| 100-80-160             | 100 (4)                       | 80 (3)     | 32 (1.26)                     | 43 (1.69)                   | 6309-C3         | 3309-A-C3  | 10/20 (0.35/0.71)                                      | 0.7 (0.7)                            |
| 100-65-200, 100-65-250 | 100 (4)                       | 65 (2 1/2) | 32 (1.26)                     | 43 (1.69)                   | 6309-C3         | 3309-A-C3  | 10/20 (0.35/0.71)                                      | 0.7 (0.7)                            |
| 100-65-315             | 100 (4)                       | 65 (2 1/2) | 42 (1.65)                     | 53 (2.09)                   | 6311-C3         | 3311-A-C3  | 15/30 (0.53/1.06)                                      | 0.9 (1.0)                            |
| 125-80-160, 125-80-200 | 125 (5)                       | 80 (3)     | 32 (1.26)                     | 43 (1.69)                   | 6309-C3         | 3309-A-C3  | 10/20 (0.35/0.71)                                      | 0.7 (0.7)                            |
| 125-80-250             | 125 (5)                       | 80 (3)     | 32 (1.26)                     | 43 (1.69)                   | 6309-C3         | 3309-A-C3  | 10/20 (0.35/0.71)                                      | 0.7 (0.7)                            |
| 125-80-315, 125-80-400 | 125 (5)                       | 80 (3)     | 42 (1.65)                     | 53 (2.09)                   | 6311-C3         | 3311-A-C3  | 15/30 (0.53/1.06)                                      | 0.9 (1.0)                            |
| 125-100-160            | 125 (5)                       | 100 (4)    | 32 (1.26)                     | 43 (1.69)                   | 6309-C3         | 3309-A-C3  | 10/20 (0.35/0.71)                                      | 0.7 (0.7)                            |
| 125-100-200            | 125 (5)                       | 100 (4)    | 32 (1.26)                     | 43 (1.69)                   | 6309-C3         | 3309-A-C3  | 10/20 (0.35/0.71)                                      | 0.7 (0.7)                            |
| 125-100-250            | 125 (5)                       | 100 (4)    | 42 (1.65)                     | 53 (2.09)                   | 6311-C3         | 3311-A-C3  | 15/30 (0.53/1.06)                                      | 0.9 (1.0)                            |
| 125-100-315            | 125 (5)                       | 100 (4)    | 42 (1.65)                     | 53 (2.09)                   | 6311-C3         | 3311-A-C3  | 15/30 (0.53/1.06)                                      | 0.9 (1.0)                            |
| 125-100-400            | 125 (5)                       | 125 (5)    | 42 (1.65)                     | 53 (2.09)                   | 6311-C3         | 3311-A-C3  | 15/30 (0.53/1.06)                                      | 0.9 (1.0)                            |
| 150-125-200            | 150 (6)                       | 125 (5)    | 42 (1.65)                     | 53 (2.09)                   | 6311-C3         | 3311-A-C3  | 15/30 (0.53/1.06)                                      | 0.9 (1.0)                            |
| 150-125-250            | 150 (6)                       | 125 (5)    | 42 (1.65)                     | 53 (2.09)                   | 6311-C3         | 3311-A-C3  | 15/30 (0.53/1.06)                                      | 0.9 (1.0)                            |
| 150-125-315            | 150 (6)                       | 125 (5)    | 42 (1.65)                     | 53 (2.09)                   | 6311-C3         | 3311-A-C3  | 15/30 (0.53/1.06)                                      | 0.9 (1.0)                            |
| 150-125-400            | 150 (6)                       | 125 (5)    | 42 (1.65)                     | 53 (2.09)                   | 6311-C3         | 3311-A-C3  | 15/30 (0.53/1.06)                                      | 0.9 (1.0)                            |
| 200-150-200            | 200 (8)                       | 150 (6)    | 42 (1.65)                     | 53 (2.09)                   | 6311-C3         | 3311-A-C3  | 15/30 (0.53/1.06)                                      | 0.9 (1.0)                            |
| 200-150-250            | 200 (8)                       | 150 (6)    | 42 (1.65)                     | 53 (2.09)                   | 6311-C3         | 3311-A-C3  | 15/30 (0.53/1.06)                                      | 0.9 (1.0)                            |
| 200-150-315            | 200 (8)                       | 150 (6)    | 48 (1.89)                     | 65 (2.56)                   | 6313-C3         | 3313-A-C3  | 20/40 (0.71/1.41)                                      | 1.8 (1.9)                            |
| 200-150-400            | 200 (8)                       | 150 (6)    | 48 (1.89)                     | 65 (2.56)                   | 6313-C3         | 3313-A-C3  | 20/40 (0.71/1.41)                                      | 1.8 (1.9)                            |
| 200-150-500            | 200 (8)                       | 150 (6)    | 60 (2.36)                     | 80 (3.15)                   | NU314-ECP       | 7314-A-C3  | 30/50 (1.05/2.12)                                      | 2.6 (2.8)                            |
| 250-200-250            | 250 (10)                      | 200 (8)    | 48 (1.89)                     | 65 (2.56)                   | 6313-C3         | 3313-A-C3  | 20/40 (0.71/1.41)                                      | 1.8 (1.9)                            |
| 250-200-315            | 250 (10)                      | 200 (8)    | 48 (1.89)                     | 65 (2.56)                   | 6313-C3         | 3313-A-C3  | 20/40 (0.71/1.41)                                      | 1.8 (1.9)                            |
| 250-200-400            | 250 (10)                      | 200 (8)    | 60 (2.36)                     | 80 (3.15)                   | NU314-ECP       | 7314-A-C3  | 30/50 (1.05/2.12)                                      | 2.6 (2.8)                            |
| 250-200-500            | 250 (10)                      | 200 (8)    | 60 (2.36)                     | 80 (3.15)                   | NU314-ECP       | 7314-A-C3  | 30/50 (1.05/2.12)                                      | 2.6 (2.8)                            |
| 250-200-600            | 250 (10)                      | 200 (8)    | 80 (3.15)                     | 100 (3.94)                  | NU320-ECP       | 7320-A-C3  | 40/80 (3.6/3.8)                                        | 6 (6.3)                              |
| 300-250-315            | 300 (12)                      | 250 (10)   | 48 (1.89)                     | 65 (2.56)                   | 6313-C3         | 3313-A-C3  | 20/40 (0.71/1.41)                                      | 1.8 (1.9)                            |
| 300-250-400            | 300 (12)                      | 250 (10)   | 60 (2.36)                     | 80 (3.15)                   | NU314-ECP       | 7314-A-C3  | 30/50 (1.05/2.12)                                      | 2.6 (2.8)                            |
| 300-250-500            | 300 (12)                      | 250 (10)   | 60 (2.36)                     | 80 (3.15)                   | NU314-ECP       | 7314-A-C3  | 30/50 (1.05/2.12)                                      | 2.6 (2.8)                            |
| 300-250-600            | 300 (12)                      | 250 (10)   | 80 (3.15)                     | 100 (3.94)                  | NU320-ECP       | 7320-A-C3  | 40/80 (3.6/3.8)                                        | 6 (6.3)                              |
| 350-300-350            | 350 (14)                      | 300 (12)   | 60 (2.36)                     | 80 (3.15)                   | NU314-ECP       | 7314-A-C3  | 30/50 (1.05/2.12)                                      | 2.6 (2.8)                            |
| 350-300-400            | 350 (14)                      | 300 (12)   | 60 (2.36)                     | 80 (3.15)                   | NU314-ECP       | 7314-A-C3  | 30/50 (1.05/2.12)                                      | 2.6 (2.8)                            |
| 350-300-450            | 350 (14)                      | 300 (12)   | 80 (3.15)                     | 100 (3.94)                  | NU320-ECP       | 7320-A-C3  | 40/80 (3.6/3.8)                                        | 6 (6.3)                              |
| 350-300-500            | 350 (14)                      | 300 (12)   | 80 (3.15)                     | 100 (3.94)                  | NU320-ECP       | 7320-A-C3  | 40/80 (3.6/3.8)                                        | 6 (6.3)                              |
| 400-400-400            | 400 (16)                      | 400 (16)   | 60 (2.36)                     | 80 (3.15)                   | NU314-ECP       | 7314-A-C3  | 30/50 (1.05/2.12)                                      | 2.6 (2.8)                            |
| 400-350-450            | 400 (16)                      | 350 (14)   | 80 (3.15)                     | 100 (3.94)                  | NU320-ECP       | 7320-A-C3  | 40/80 (3.6/3.8)                                        | 6 (6.3)                              |
| 500-500-500            | 500 (20)                      | 500 (20)   | 80 (3.15)                     | 100 (3.94)                  | NU320-ECP       | 7320-A-C3  | 40/80 (3.6/3.8)                                        | 6 (6.3)                              |
| 600-600-600            | 600 (24)                      | 600 (24)   | 80 (3.15)                     | 110 (4.33)                  | NU320-ECP       | 7320-A-C3  | 40/80 (3.6/3.8)                                        | 6 (6.3)                              |

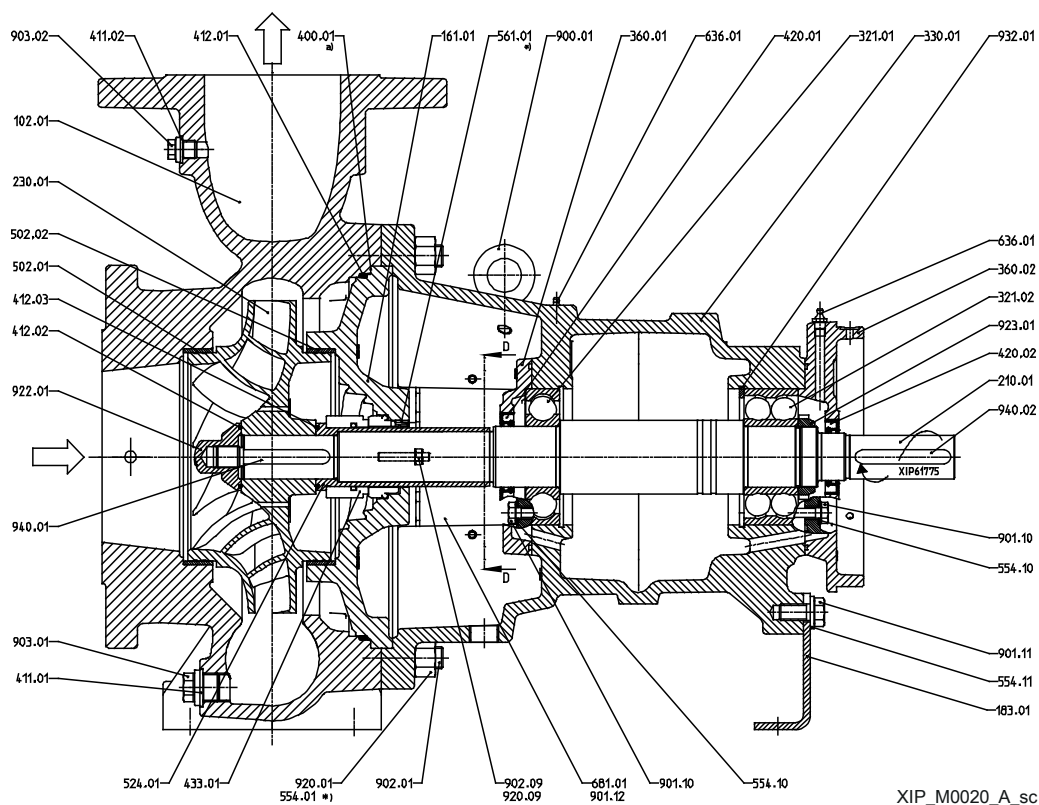
## 8.8 Section drawings and list of parts

### 8.8.1 Drawings

To find the drawing corresponding to your model, identify the type of mechanical seal and lubrication of the bearing support: see paragraph 3.3.

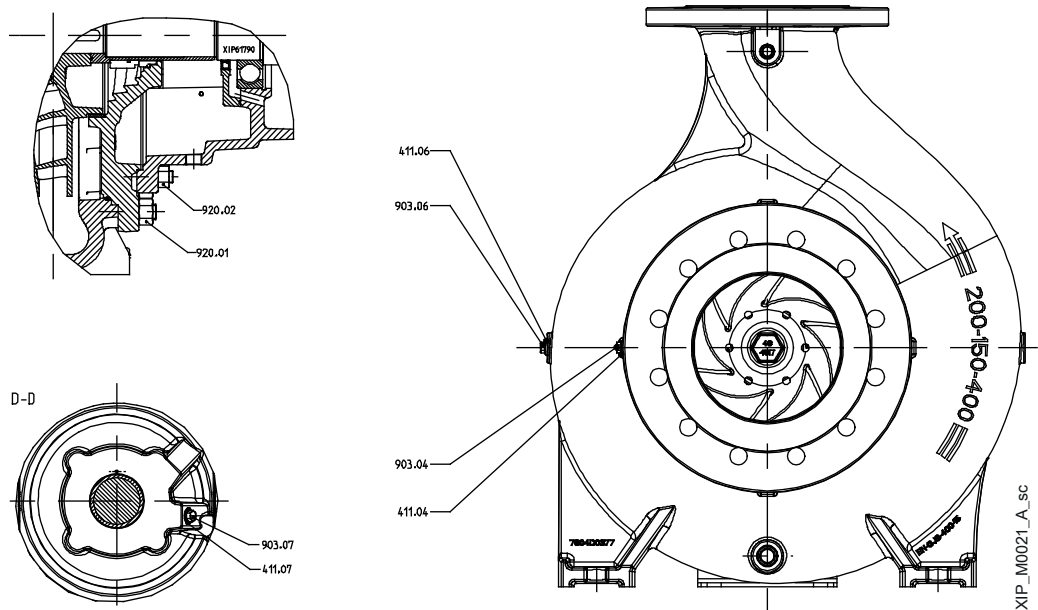
#### S1G with clamped casing cover

Unbalanced single mechanical seal with clamped casing cover and grease lubricated medium duty bearing bracket.



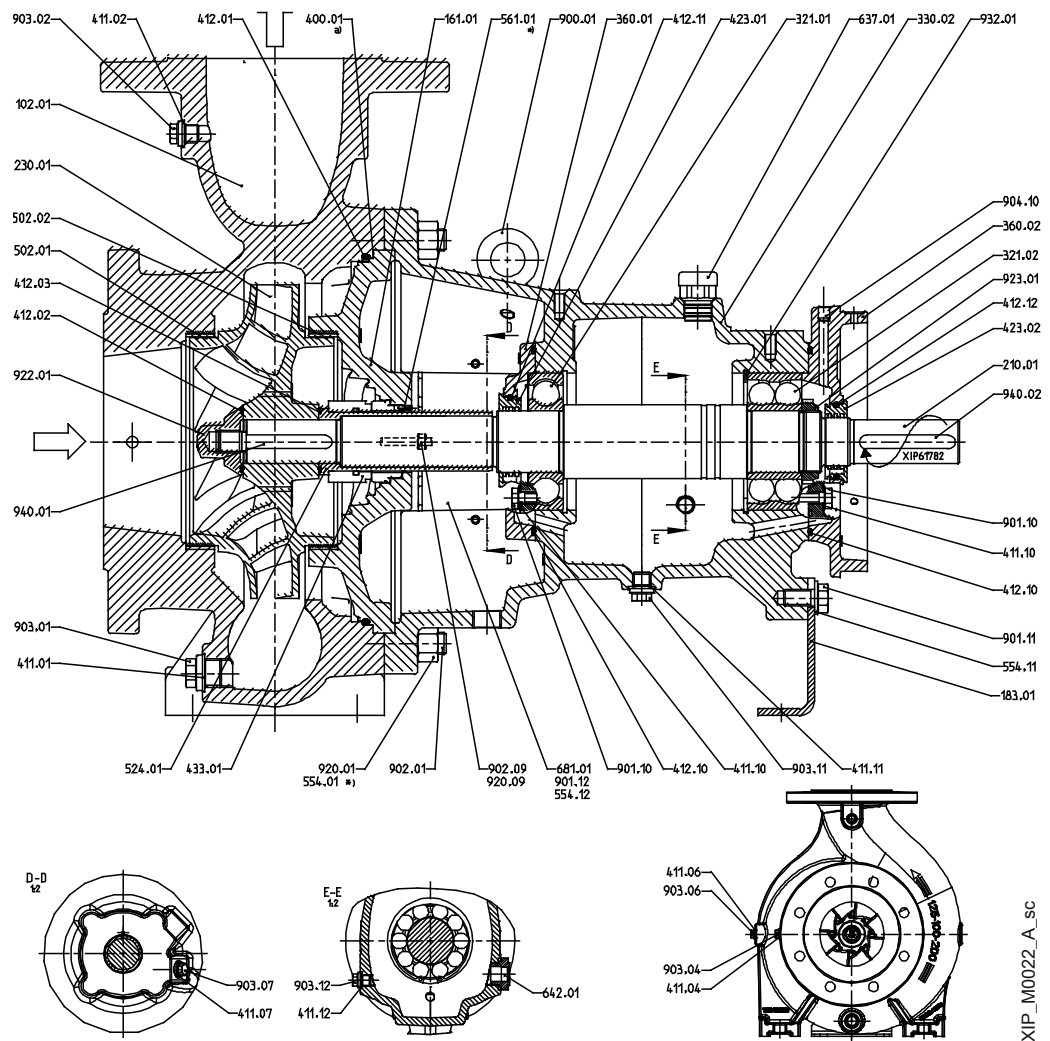
## S1G with bolted casing cover

Unbalanced single mechanical seal with casing cover bolted onto the casing and grease-lubricated medium-duty bearing bracket.



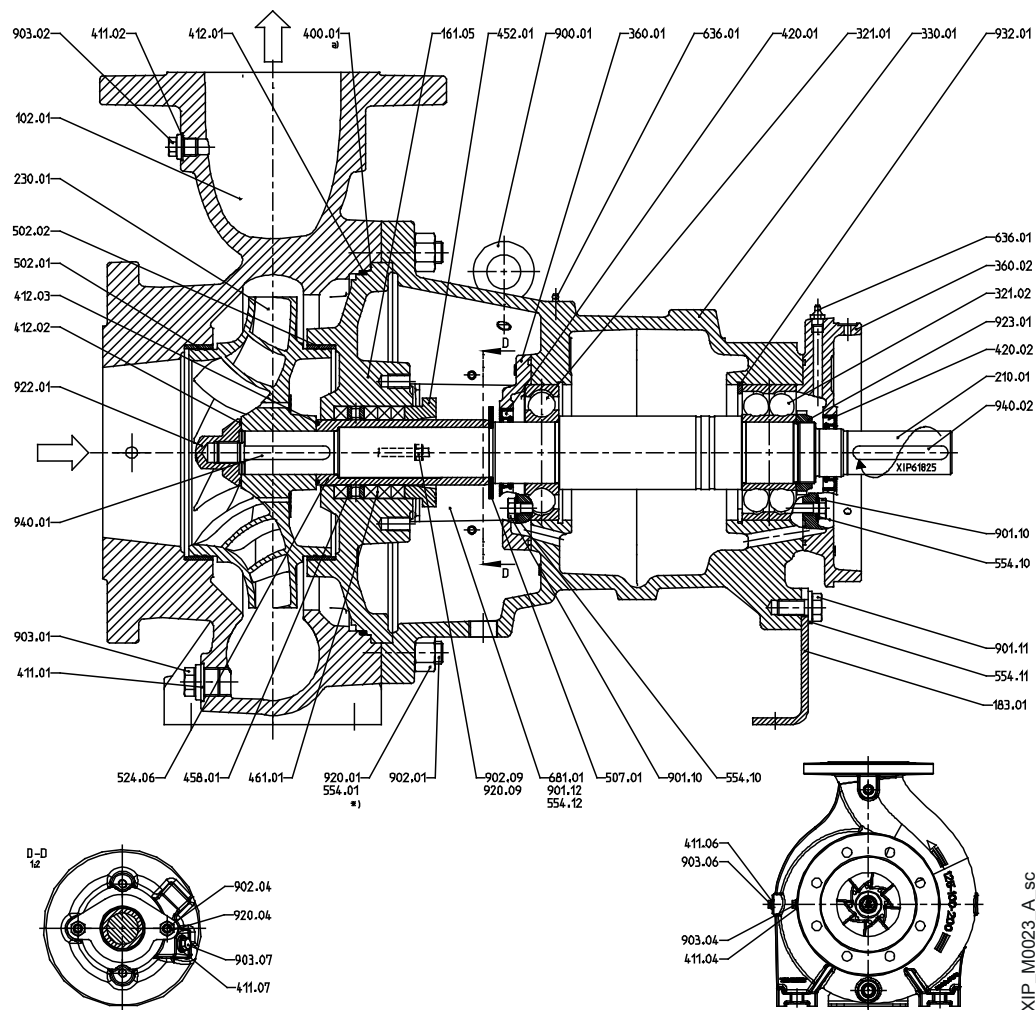
S10

Unbalanced single mechanical seal with clamped casing cover and oil lubricated medium duty bearing bracket.



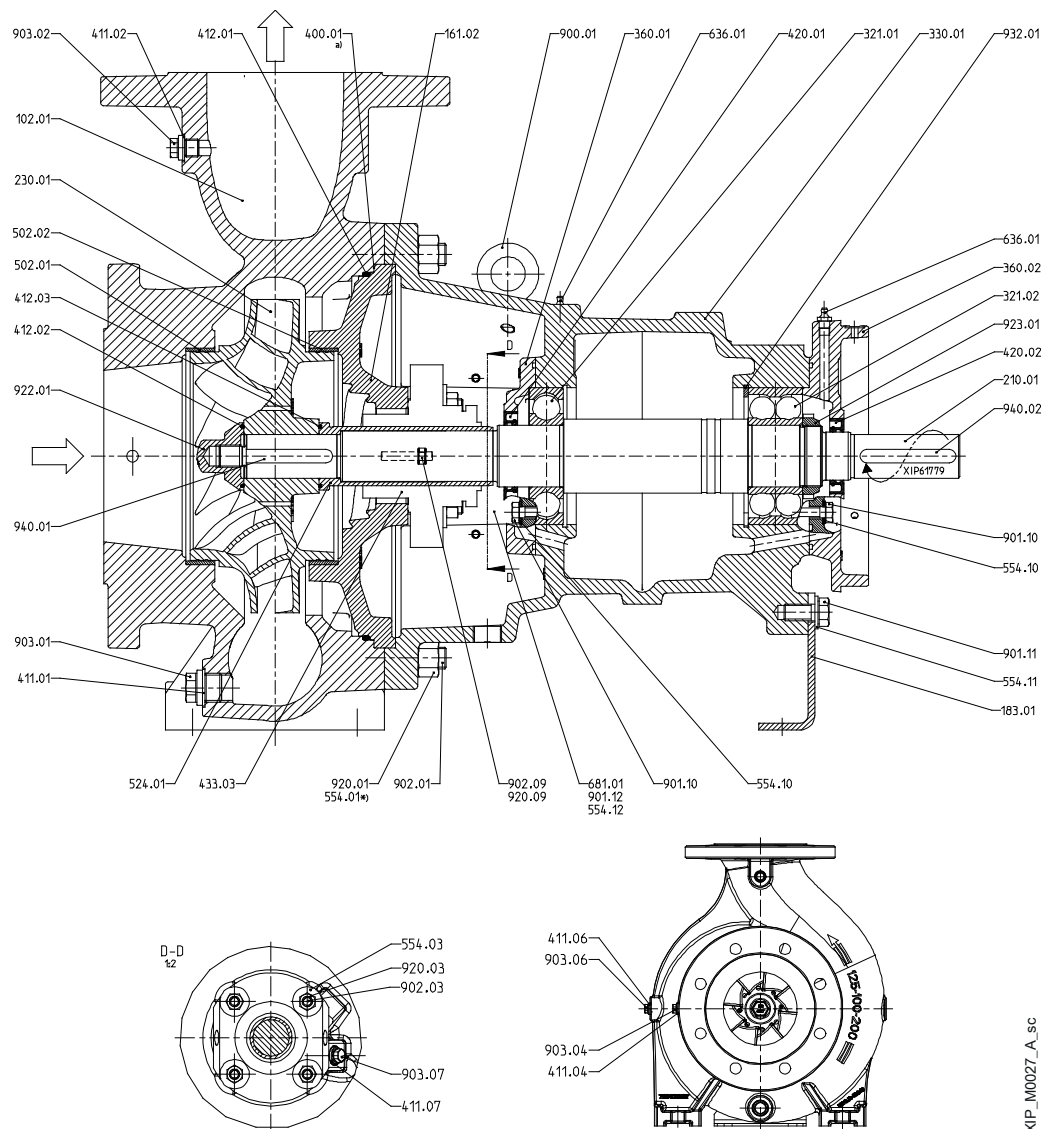
# P2G

Shaft sealing packing with internal flush, shaft sleeve and grease lubricated medium duty bearing bracket and radial lip seal ring.



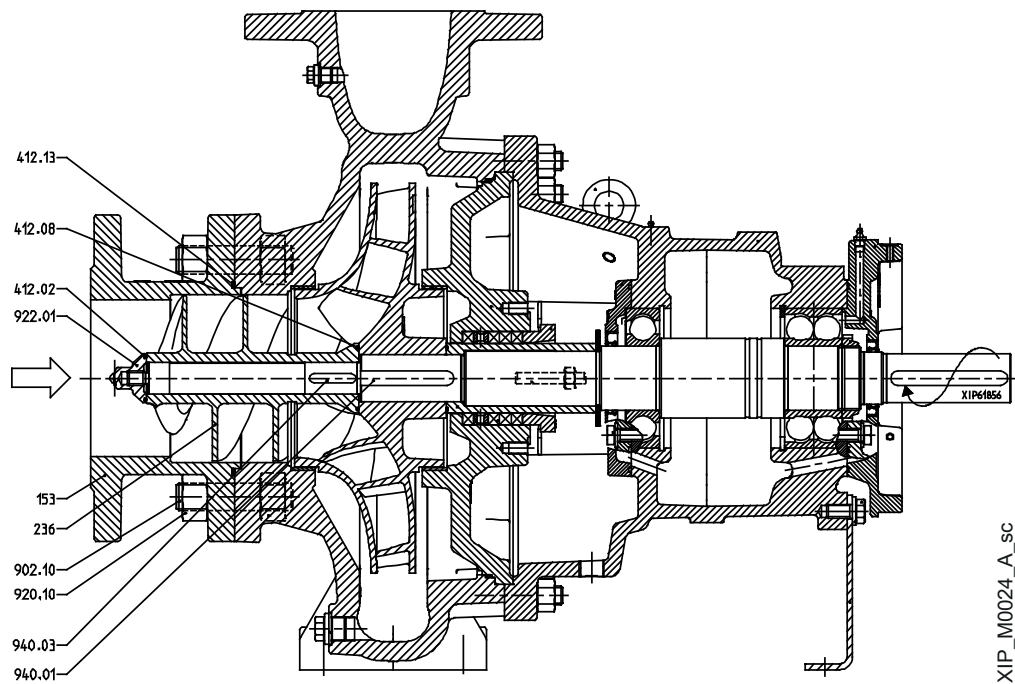
## CSG, CDG, CQG

Cartridge mechanical seal (single or double) with clamped casing cover and oil lubricated medium duty bearing bracket.



## IXPI

With inducer on extended shaft, shaft sealing packing with shaft sleeve and grease lubricated medium duty bearing bracket and radial lip seal ring.



## 8.8.2 List of parts

| Code            | Description                  |
|-----------------|------------------------------|
| 102.01          | Volute casing                |
| 161.01 - 161.05 | Cover                        |
| 183.01          | Foot                         |
| 210.01          | Shaft                        |
| 230.01          | Impeller                     |
| 321.01          | Ball bearing                 |
| 321.02          | Angular contact ball bearing |
| 330.01          | Bearing support              |
| 330.02          | Bearing support              |
| 360.01          | Bearing cover                |
| 360.02          | Bearing cover                |
| 400.01          | Gasket                       |
| 411.01 - 411.12 | Gasket                       |
| 412.01 - 412.12 | O-Ring                       |
| 420.01, 420.02  | Radial lip seal              |
| 423.01, 423.02  | Labyrinth seal ring          |
| 433.01, 433.11  | Mechanical seal unbalanced   |
| 433.02          | Mechanical seal balanced     |
| 433.03          | Cartridge mechanical seal    |
| 433.11          | Mechanical seal unbalanced   |
| 452.01          | Stuffing box gland           |
| 458.01          | Lantern ring                 |
| 461.01          | Soft packing                 |
| 471.01          | Quench cover                 |
| 471.02, 471.03  | Mechanical seal cover        |
| 488.01          | Pumping ring                 |
| 502.01, 502.02  | Wear ring                    |
| 507.01          | Splash ring                  |
| 524.01 - 524.06 | Shaft sleeve                 |
| 542.01          | Throttling bush              |
| 554.01 - 554.03 | Washer                       |
| 554.10 - 554.12 | Washer                       |
| 561.01 - 561.04 | Pin                          |
| 636.01          | Grease nipple                |
| 637.01          | Oil filling plug             |
| 642.01          | Oil level sight glass        |
| 681.01          | Safety guard                 |
| 703.01 - 703.05 | Auxiliary pipe               |
| 900.01          | Lifting ring                 |
| 901.10 - 901.12 | Hexagon head screw           |
| 902.01 - 902.04 | Stud                         |
| 902.09          | Stud                         |
| 903.01 - 903.12 | Plug                         |
| 904.01, 904.02  | Set screw                    |

|                 |                          |
|-----------------|--------------------------|
| 904.10          | Set screw                |
| 914.01 - 914.03 | Set screw                |
| 920.01 - 920.04 | Hexagon nut              |
| 920.09          | Hexagon nut              |
| 922.01          | Impeller nut             |
| 923.01          | Bearing nut self-locking |
| 932.01          | Retaining ring           |
| 940.01, 940.02  | Key                      |

| Code for additional inducer parts | Description    |
|-----------------------------------|----------------|
| 153                               | Suction nozzle |
| 236                               | Inducer        |
| 412.13                            | O-ring         |
| 902.10                            | Stud           |
| 920.10                            | Hexagon nut    |
| 940.03                            | Key            |

# 9 Disposal

## 9.1 Precautions



### WARNING:

The unit must be disposed of through approved companies specialised in the identification of different types of materials (steel, copper, plastic, etc.).



### WARNING:

It is prohibited to dispose of lubricating fluids and other hazardous substances in the environment.

## 9.2 WEEE (EU/EEA)



INFORMATION TO USERS pursuant to art. 14 of the Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE). The crossed bin symbol on the appliance or on its packaging indicates that the product at the end of its useful life must be collected separately and not disposed of together with other mixed urban waste. Appropriate separate collection for the subsequent start-up of the disused equipment for recycling, treatment and environmentally compatible disposal helps to avoid possible negative effects on the environment and on health and favors the re-use and / or recycling of the materials it is composed of the equipment.

WEEE other than WEEE from private households<sup>5</sup>: The separate collection of this equipment at the end of its life is organized and managed by the producer<sup>6</sup>. The user who wants to get rid of this equipment can then contact the producer and follow the system that it has adopted to allow the separate collection of equipment at the end of life, or select a supply chain independently authorized to manage.

## 9.3 WEEE (UK)



INFORMATION TO USERS pursuant to art. 44 of the The Waste Electrical and Electronic Equipment Regulations 2013 (S. I. 2013 No. 3113). The crossed bin symbol on the appliance or on its packaging indicates that the product at the end of its useful life must be collected separately and not disposed of together with other mixed urban waste. Appropriate separate collection for the subsequent start-up of the disused equipment for recycling, treatment and environmentally compatible disposal helps to avoid possible negative effects on the environment and on health and favors the re-use and / or recycling of the materials it is composed of the equipment.

WEEE other than WEEE from private households<sup>7</sup>: The separate collection of this equipment at the end of its life is organized and managed by the producer<sup>8</sup>. The user who wants to get rid of this equipment can then contact the producer and follow the system that it has adopted to allow the separate collection of equipment at the end of life, or select a supply chain independently authorized to manage.

<sup>5</sup> Classification according to product type, use and current local laws

<sup>6</sup> Producer of EEE as per Directive 2012/19/EU

<sup>7</sup> Classification according to product type, use and current local laws

<sup>8</sup> Producer of EEE as per WEEE Regulations 2013

# 10Declarations

Refer to the specific marking declaration found on the product.

## 10.1 EC Declaration of Conformity (Original)

Xylem Service Italia S.r.l., with headquarters in Via Vittorio Lombardi 14 - 36075 Montecchio Maggiore VI - Italy, hereby declares that the product

Pump unit (see the label on the «Safety and Other Information manual»)

fulfils the relevant regulations of the following European Directives

- Machinery 2006/42/EC and subsequent amendments (ANNEX II - natural or legal person authorised to compile the technical file: Xylem Service Austria GmbH - Ernst Vogel-Strasse 2 - 2000 Stockerau - Austria)
- Eco-design 2009/125/EC and subsequent amendments, Regulation (UE) 2019/1781 and subsequent amendments [electric motor, 3 ~, 50 or 60 or 50/60 Hz, if IE2 (PN  $\geq 0,12$  and  $< 0,75$  kW) or IE3 (PN  $\geq 0,75$  and  $\leq 1000$  kW) marked; variable speed drive (VSD), 3 ~, if IE2 marked], Regulation (EU) No 547/2012 and subsequent amendments (water pump, if MEI marked).

and the technical standards

- EN ISO 12100:2010, EN 809:1998+A1:2009, EN ISO 14120:2015, EN 60204-1:2018
- EN 60034-30:2009, EN 60034-2-1:2007, EN 60034-30-1:2014, EN 60034-2-1:2014.

Montecchio Maggiore, 17/05/2022

Marco Ferretti  
Chairman of the Board of Directors

rev.00



## 10.2 EU Declaration of Conformity (n. 59)

1. EMC - Apparatus/Product model:  
see the label on the «Safety and Other Information manual»  
RoHS - Unique identification of the EEE:  
IXP
2. Name and address of the manufacturer:  
Xylem Service Italia S.r.l.  
Via Vittorio Lombardi 14  
36075 Montecchio Maggiore VI  
Italy
3. This declaration of conformity is issued under the sole responsibility of the manufacturer.
4. Object of the declaration:  
Pump unit (see product data plate).
5. The object of the declaration described above is in conformity with the relevant Union harmonization legislation:
  - 2014/30/EU Directive of 26 February 2014 and subsequent amendments (electromagnetic compatibility)
  - 2011/65/EU Directive of 8 June 2011 and subsequent amendments, including the (EU) 2015/863 Directive (restriction of the use of certain hazardous substances in electrical and electronic equipment).
6. References to the relevant harmonized standards used or references to the other technical specifications, in relation to which conformity is declared:
  - EN 61000-6-1:2007, EN IEC 61000-6-1:2019, EN 61000-6-2:2005, EN IEC 61000-6-2:2019, EN 61000-6-3:2007+A1:2011, EN IEC 61000-6-3:2021, EN 61000-6-4:2007+A1:2011, EN IEC 61000-6-4:2019
  - EN IEC 63000:2018.

7. Notified body: -.
8. Additional information:  
 RoHS - Annex III - Applications exempted from the restrictions: lead as a binding element in steel, aluminium, copper alloys [6(a), 6(b), 6(c)].  
 VSD: if it is present, lead in solders and in electrical/electronic components [7(a), 7(c)-I].

Signed for and on behalf of:

Xylem Service Italia S.r.l

Montecchio Maggiore, 17/05/2022

Marco Ferretti

Chairman of the Board of Directors

rev.00



Optimize: if present, refer to documentation supplied with the monitoring device (Radio equipment 2014/53/EU and subsequent amendments, Restriction of the use of certain hazardous substances in electrical and electronic equipment 2011/65/EU and subsequent amendments, including the (EU) 2015/863 Directive).

Lowara is a trademark of Xylem Inc. or one of its subsidiaries.

## 10.3 UKCA Declaration of Conformity (Original)

Xylem Service Italia S.r.l., with headquarters in Via Vittorio Lombardi 14 - 36075 Montecchio Maggiore VI - Italy, hereby declares that the product

Pump unit (see the label on the «Safety and Other Information manual»)

fulfils the relevant provisions of the following UK legislative acts

- S.I. 2008/1597 - Supply of Machinery (Safety) Regulations 2008 and subsequent amendments (Schedule 2 - Part 2 - ANNEX II - natural or legal person authorised to compile the technical file: Xylem Service Austria GmbH - Ernst Vogel-Strasse 2 - 2000 Stockerau - Austria)
- S.I. 2010/2617 - Ecodesign for Energy-Related Products Regulations 2010 and subsequent amendments, S.I. 2021/745 - The Ecodesign for Energy-Related Products and Energy Information Regulations 2021 [electric motor, 3 ~, 50 or 60 or 50/60 Hz, if IE2 (PN  $\geq 0.12$  and  $< 0.75$  kW) or IE3 (PN  $\geq 0.75$  and  $\leq 1000$  kW) marked; variable speed drive (VSD), 3 ~, if IE2 marked], S.I. 2019/539 - The Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2019 (water pump, if MEI marked).

and the technical standards

- EN ISO 12100:2010, EN 809:1998+A1:2009, EN ISO 14120:2015, EN 60204-1:2018
- EN 60034-30:2009, EN 60034-2-1:2007, EN 60034-30-1:2014, EN 60034-2-1:2014.

Montecchio Maggiore, 17/05/2022

Marco Ferretti

Chairman of the Board of Directors

rev.00



## 10.4 UKCA Declaration of Conformity (n. 59)

1. EMC - Apparatus/Product model:  
see the label on the «Safety and Other Information manual»  
RoHS - Unique identification of the EEE:  
IXP
2. Name and address of the manufacturer:  
Xylem Service Italia S.r.l.  
Via Vittorio Lombardi 14  
36075 Montecchio Maggiore VI  
Italy
3. This declaration of conformity is issued under the sole responsibility of the manufacturer.
4. Object of the declaration:  
Pump unit (see product data plate).
5. The object of the declaration described above is in conformity with the relevant Union harmonization legislation:
  - S.I. 2016/1091 - The Electromagnetic Compatibility Regulations 2016 and subsequent amendments
  - S.I. 2012/3032 - The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 and subsequent amendments.
6. Reference to relevant harmonised standards used or references to other technical specifications in relation to which conformity is declared:
  - EN 61000-6-1:2007, EN IEC 61000-6-1:2019, EN 61000-6-2:2005, EN IEC 61000-6-2:2019, EN 61000-6-3:2007+A1:2011, EN IEC 61000-6-3:2021, EN 61000-6-4:2007+A1:2011, EN IEC 61000-6-4:2019
  - EN IEC 63000:2018.
7. Approved body: -.
8. Additional information:  
RoHS - Annex III of 2011/65/EU - Applications exempted from the restrictions: lead as a binding element in steel, aluminium, copper alloys [6(a), 6(b), 6(c)].  
VSD: if it present, lead in solders and in electrical/electronic components [7(a), 7(c)-I].

Signed for and on behalf of:  
Xylem Service Italia S.r.l

Montecchio Maggiore, 17/05/2022

Marco Ferretti  
Chairman of the Board of Directors

rev.00



Optimize: if present, refer to documentation supplied with the monitoring device (S.I. 2017/1206 - The Radio Equipment Regulations 2017 and subsequent amendments, S.I. 2012/3032 - The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 and subsequent amendments).

Lowara is a trademark of Xylem Inc. or one of its subsidiaries.

# 11 Warranty

## 11.1 Information

For information on the warranty refer to the commercial documentation.





# Xylem |'zīləm|

- 1) The tissue in plants that brings water upward from the roots;
- 2) A leading global water technology company.

We're a global team unified in a common purpose: creating innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

For more information on how Xylem can help you, go to [www.xylem.com](http://www.xylem.com)



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