# CR, CRI, CRN

Installation and operating instructions


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GRUNDFOS

**Original installation and operating instructions**

## CONTENTS



Warning

Prior to installation, read these installation and operating instructions. Installation and operation must comply with local regulations and accepted codes of good practice.

## 1. Symbols used in this document

Warning

If these safety instructions are not observed, it may result in personal injury.

Warning

If these instructions are not observed, it may lead to electric shock with consequent risk of serious personal injury or death.

Warning

The surface of the product may be so hot that it may cause burns or personal injury.

Caution If these safety instructions are not observed, it may result in malfunction or damage to the equipment.

Note Notes or instructions that make the job easier and ensure safe operation.

## 2. Handling

When lifting the entire pump with motor, follow these instructions:

- Pump with motor sizes 0.37 - 5.5 kW:
  Lift the pump in the motor flange by means of straps or the like.
- Pump with motor sizes 7.5 - 22 kW:
  Lift the pump by means of the motor eyebolts.
- Pump with motor sizes 30-45 kW:
  Lift the pump by means of the lifting brackets on the motor flange.
- Pump with motor sizes 55-75 kW:
  Lift the pump by means of the eyebolts on the motor side.

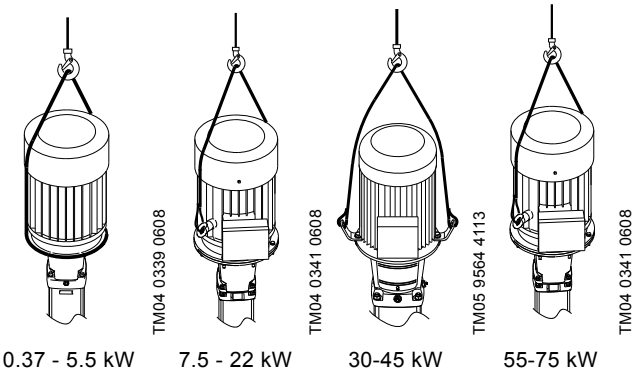


**Fig. 1** Correct lifting of a CR pump

In case of CR, CRI and CRN pumps with other motors than MG or Siemens, we recommend that you to lift the pump by means of the straps in the motor flange.

Warning

Make sure that the pump remains in a stable position during unpacking and installation by means of the straps used for lifting the pump.

Note that typically the centre of gravity of the pump is close to the motor.

## 3. Type designation

### 3.1 Type key for CR, CRI, CRN 1s, 1, 3, 5, 10, 15 and 20

| Example | CR | 3- | 10 | X- | X- | X- | X- | XXXX |
|---|---|---|---|---|---|---|---|---|
| Type range: CR, CRI, CRN | | | | | | | | |
| Rated flow rate in $m^3/h$ | | | | | | | | |
| Number of impellers | | | | | | | | |
| Code for pump version | | | | | | | | |
| Code for pipework connection | | | | | | | | |
| Code for materials | | | | | | | | |
| Code for rubber pump parts | | | | | | | | |
| Code for shaft seal | | | | | | | | |

### 3.2 Type key for CR, CRN 32, 45, 64, 90, 120 and 150

| Example | CR | 32- | 2 | 1- | X- | X- | X- | X- | XXXX |
|---|---|---|---|---|---|---|---|---|---|
| Type range: CR, CRN | | | | | | | | | |
| Rated flow rate in $m^3/h$ | | | | | | | | | |
| Number of stages | | | | | | | | | |
| Number of impellers with reduced diameter | | | | | | | | | |
| Code for pump version | | | | | | | | | |
| Code for pipework connection | | | | | | | | | |
| Code for materials | | | | | | | | | |
| Code for rubber pump parts | | | | | | | | | |
| Code for shaft seal | | | | | | | | | |

## 4. Applications

Grundfos multistage in-line centrifugal pumps, types CR, CRI and CRN, are designed for a wide range of applications.

**CR, CRI, CRN**

CR, CRI and CRN pumps are suitable for liquid transfer, circulation and pressure boosting of cold or hot clean liquids.

**CRN**

Use CRN pumps in systems where all parts in contact with the liquid are made of high-grade stainless steel.

**Pumped liquids**

Warning

The pumping media is not suitable for the pump as it can cause injury to persons or damage to the equipment.

Thin, clean, non-flammable, non-combustible or non-explosive liquids, not containing solid particles or fibres. The liquid must not attack the pump materials chemically.

When pumping liquids with a density and/or viscosity higher than that of water, use motors with correspondingly higher outputs, if required.

## 5. Technical data

### 5.1 Ambient temperature and altitude

| Motor power [kW] | Motor make | Motor efficiency class | Maximum ambient temperature [°C] | Maximum altitude above sea level [m] |
|---|---|---|---|---|
| 0.37 - 0.55 | Grundfos MG | - | +40 | 1000 |
| 0.75 - 22 | Grundfos MG | IE3 | +60 | 3500 |
| 30-75 | Siemens | IE3 | +55 | 2750 |

If the ambient temperature exceeds the above temperature values or the pump is installed at an altitude exceeding the above altitude values, the motor must not be fully loaded due to the risk of overheating. Overheating may result from excessive ambient temperatures or the low density and consequently low cooling effect of the air.

In such cases, it may be necessary to use a motor with a higher rated output.

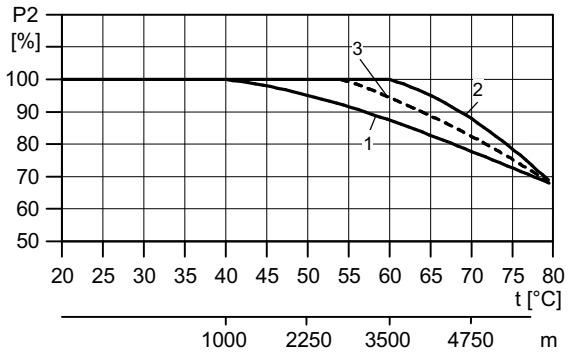


**Fig. 2** Motor output depends on temperature/altitude

| Pos. | Motor power [kW] | Motor make |
|---|---|---|
| 1 | 0.37 - 0.55 | MG |
| | 0.37 - 22 | MGE |
| 2 | 0.75 - 22 | MG |
| 3 | 30-75 | Siemens |

**Example**

Figure 2 shows that the load of an IE3 motor at an ambient temperature of 70 °C must not be loaded more than 89 % of the rated output. If the pump is installed 4750 metres above sea level, the motor must not be loaded more than 89 % of the rated output.

In cases where both the maximum temperature and the maximum altitude are exceeded, the derating factors must be multiplied (0.89 x 0.89 = 0.79).

Note

For motor bearing maintenance at ambient temperatures above 40 °C, see section *9. Maintenance*.

## 5.2 Liquid temperature

The table on page 16 states the relationship between liquid temperature range and maximum permissible operating pressure.

**Note** The maximum permissible operating pressure and liquid temperature ranges apply to the pump only.

## 5.3 Maximum permissible operating pressure and liquid temperature for the shaft seal

**Note** The diagram below applies to clean water and water containing anti-freeze liquids.

**CR, CRI, CRN 1s to 20 and CR, CRN 32 to 150**

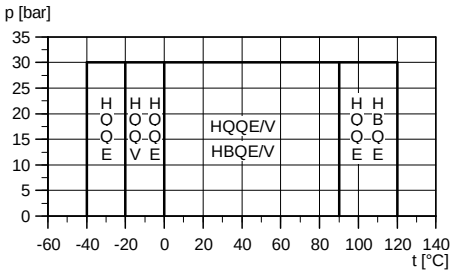


**Fig. 3** Maximum permissible operating pressure and liquid temperature

| Standard shaft seal | Motor [kW] | Max. temperature range [°C] |
|---|---|---|
| HQQE | 0.37 - 45 | -40 - 120 °C |
| HBQE | 55-75 | 0-120 °C |
| HQQV | 0.37 - 45 | -20 - 90 °C |
| HBQV | 55-75 | 0-90 °C |

You can clean CRI and CRN pumps in place (CIP) with a type H shaft seal with EPDM rubber parts, HxxE and liquids up to 150 °C for maximum 15 minutes.

**Note** The pumping of liquids above +120 °C may result in periodical noise and reduced pump life.

CR, CRI, CRN pumps are not suitable for the pumping of liquids above 120 °C for long periods.

## 5.4 Minimum inlet pressure

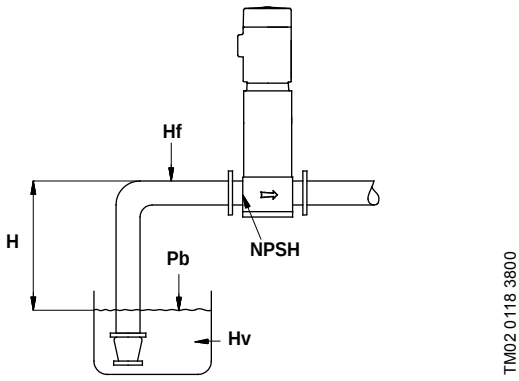


**Fig. 4** Schematic view of open system with a CR pump

Calculate the maximum suction lift "H" in metres head as follows:

H = $p_b$ x 10.2 - NPSH - $H_f$ - $H_v$ - $H_s$

$p_b$ = Barometric pressure in bar.
Barometric pressure can be set to 1 bar.
In closed systems, $p_b$ indicates the system pressure in bar.

NPSH = Net Positive Suction Head in metres head.
To be read from the NPSH curve on page 14 at the highest flow the pump will be delivering.

$H_f$ = Friction loss in inlet pipe in metres head at the highest flow the pump will be delivering.

$H_v$ = Vapour pressure in metres head, see fig. E on page 19.
$t_m$ = liquid temperature.

$H_s$ = Safety margin = minimum 0.5 metres head.

If the calculated "H" is positive, the pump can operate at a suction lift of maximum "H" metres head.

If the calculated "H" is negative, an inlet pressure of minimum "H" metres head is required. There must be a pressure equal to the calculated "H" during operation.

**Example**

$p_b$ = 1 bar.

Pump type: CR 15, 50 Hz.

Flow rate: 15 $m^3$/h.

NPSH (from page 14): 1.1 metres head.

$H_f$ = 3.0 metres head.

Liquid temperature: +60 °C.

$H_v$ (from fig. E, page 19): 2.1 metres head.

H = $p_b$ x 10.2 - NPSH - $H_f$ - $H_v$ - $H_s$ [metres head].

H = 1 x 10.2 - 1.1 - 3.0 - 2.1 - 0.5 = 3.5 metres head.

This means that the pump can operate at a suction lift of maximum 3.5 metres head.

Pressure calculated in bar: 3.5 x 0.0981 = 0.343 bar.

Pressure calculated in kPa: 3.5 x 9.81 = 34.3 kPa.

## 5.5 Minimum inlet pressure

The table on page 17 states the maximum permissible inlet pressure. However, the actual inlet pressure + maximum pump pressure (at no flow) must always be lower than the values stated in fig. A, page 16.

The pumps are pressure-tested at a pressure of 1.5 times the values stated in fig. B, page 17.

### 5.6 Minimum flow rate

Due to the risk of overheating, do not use the pump at flows below the minimum flow rate.

The curves below show the minimum flow rate as a percentage of the rated flow rate in relation to the liquid temperature.

- - - - = air-cooled top.

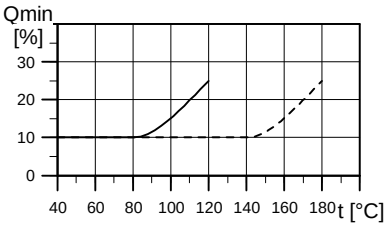


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**Fig. 5** Minimum flow rate

**Caution** The pump must not run against a closed outlet valve.

### 5.7 Electrical data

See motor nameplate.

### 5.8 Frequency of starts and stops

| Motor size [kW] | Maximum number of starts per hour |
|---|---|
| ≤ 2.2 | 250 |
| 3-4 | 100 |
| 5.5 - 11 | 50 |
| 18.5 - 22 | 40 |
| 30 | 90 |
| 37 | 50 |
| 45 | 80 |
| 55 | 50 |
| 75 | 50 |

### 5.9 Dimensions and weights

Dimensions: See fig. C, page 18.

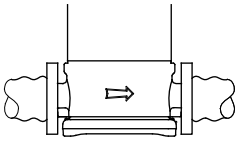
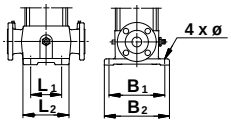
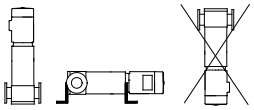
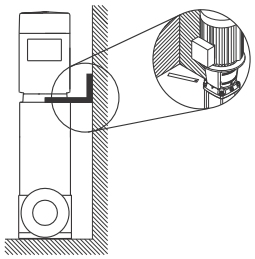
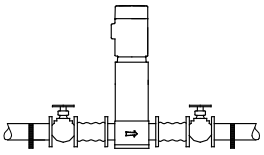
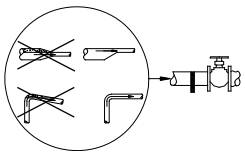
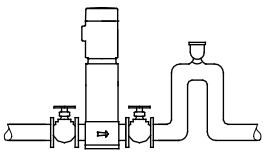
Weights: See label on the packing.

### 5.10 Sound pressure level

See fig. D, page 19.

## 6. Installation

The pump must be secured to a horizontal, plane and solid foundation by bolts through the holes in the base plate. When installing the pump, follow the procedure below in order to avoid damaging the pump.

| Step | Action |
|---|---|
| **1**  TM02 0013 3800 | Arrows on the pump base show the direction of flow of liquid through the pump. |
| **2**   TM00 2256 3393 | This information is stated on page 18:<br>• port-to-port lengths<br>• dimensions of the base<br>• pipework connections<br>• diameter and position of foundation bolts. |
| **3**  TM01 1241 4097 | You can install the pump vertically or horizontally. CR, CRN 120 and 150, 75 kW, only vertically. However, the motor must neither fall below the horizontal plane nor be installed upside down.<br>Make sure that an adequate supply of cool air reaches the motor cooling fan.<br>Motors above 4 kW must be supported. |
| 3a  TM05 7705 1013 | Additional support. As the centre of gravity on the pump is relative high, we recommend that pumps installed on ships, in areas with risk of earth quake or in systems which has to be moved are equipped with additional support brackets.<br>You can fit the bracket from the motor stool to the bulkhead of the ship, a rigid wall in a building or to a rigid part. |
| **4**  TM02 0116 3800 | To minimise possible noise from the pump, we advise you to fit expansion joints on either side of the pump.<br>Carry out the foundation or installation as described in section *6.1 Foundation*.<br>Fit the isolating valves on either side of the pump to avoid draining the system if the pump needs to be removed for cleaning, repair or replacement.<br>Always protect the pump against backflow by means of a non-return valve. |
| **5**  TM02 0114 3800 | Install the pipes so that air locks do not occur, especially on the inlet side of the pump. |
| **6**  TM02 0115 3800 | Fit a vacuum valve close to the pump if the installation has one of these characteristics:<br>• The outlet pipe slopes downwards away from the pump.<br>• There is a risk of siphon effect.<br>• Protection against backflow of unclean liquids is needed. |

## 6.1 Foundation

Warning

To avoid personal injury, make sure that the pump is mounted securely in all conditions.

Warning

Carry out the foundation or installation in accordance with the following instructions.

Grundfos recommends that you install the pump on a concrete foundation which is heavy enough to provide permanent and rigid support to the entire pump. The foundation must be capable of absorbing any vibration, normal strain or shock. The concrete foundation must have an absolutely level and even surface.

Place the pump on the foundation, and fasten it. The base plate must be supported on the whole area.

The following instruction applies when mounting the pump in vertical or horizontal position.

Place the pump on the foundation, and fasten it. See fig. 6.

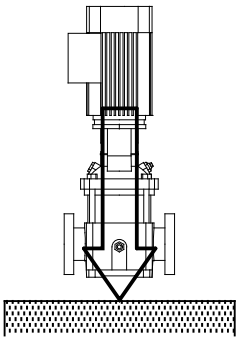


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**Fig. 6** Correct installation

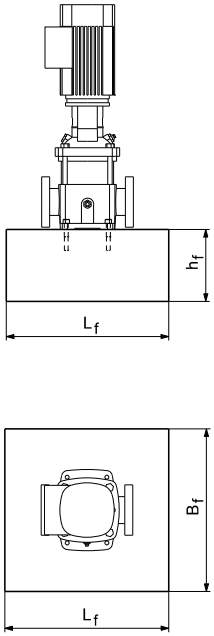


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**Fig. 7** Foundation, vertical mounting

The recommended length and width are shown in fig. 7. Note that the length and width of the foundation for pumps with motor size below or equal to 30 kW must be 200 mm larger than the base plate.

For pumps with motor size above or equal to 37 kW, the length and width must always be 1.5 x 1.5 ($L_f$ x $B_f$) metres.

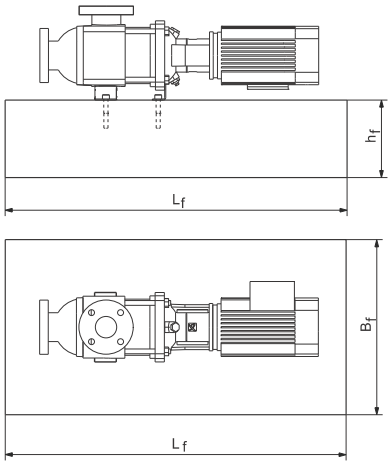


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**Fig. 8** Foundation, horizontal mounting

The foundation length and width must always be 200 mm larger than the length and width of the pump. See fig. 8.

The mass of the foundation must be at least 1.5 times the total mass of the pump. The minimum height of the foundation ($h_f$) can then be calculated:

$$h_f = \frac{m_{pump} \times 1.5}{L_f \times B_f \times \delta_{concrete}}$$

The density (δ) of concrete is usually taken as 2200 kg/$m^3$.

In installations where noise-less operation is particularly important, we recommend that you use a foundation with a mass up to 5 times that of the pump.

The foundation must be provided with bolts for fixing the base plate. See fig. 9.

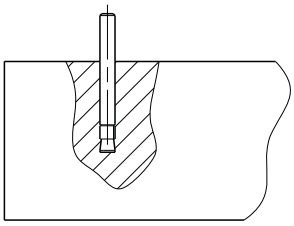

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**Fig. 9** Bolt in foundation

When the foundation bolts are in position, place the pump on the foundation. Then align the base plate using shims, if necessary, so that it is completely horizontal. See fig. 10.

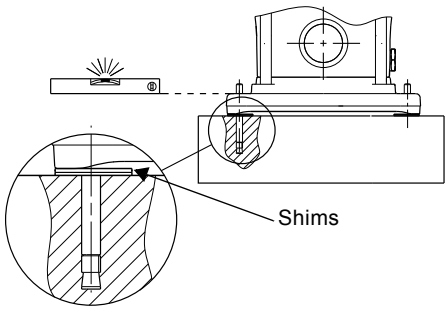


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**Fig. 10** Alignment with shims

### 6.2 Vibration dampening

If you use vibration dampers, install them under the foundation. Pumps with motor size below or equal to 30 kW can use vibration dampers as shown in fig. 11.

For pumps with motor sizes above or equal to 37 kW, use a Sylomer® plate as shown in fig. 12.

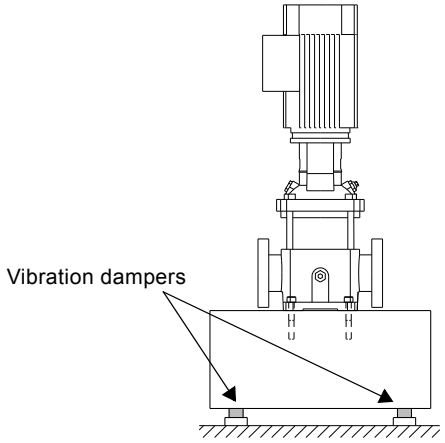


**Fig. 11** Pump on vibration dampers

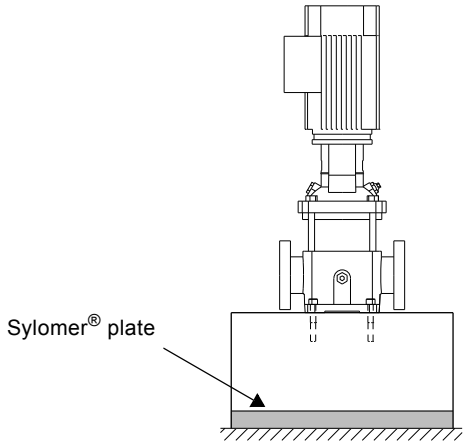


**Fig. 12** Pump on Sylomer® plate

### 6.3 Outdoor installation

When installed outdoors, we recommend that you provide the motor with a rain cover. We also recommend that you open one of the drain holes in the motor flange.

### 6.4 Hot or cold surfaces

Warning

When pumping hot or cold liquids, make sure that persons cannot accidentally come into contact with hot or cold surfaces.

Figure 13 shows which pump parts get as hot or cold as the pumped liquid.

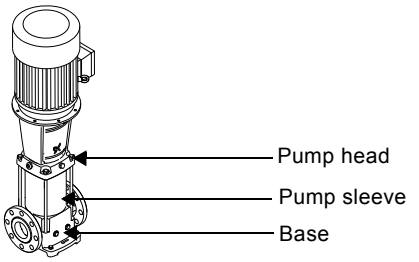


**Fig. 13** Hot or cold surfaces on a CR, CRI, CRN pump

### 6.5 Torques

**Caution** To minimize risk of damage to the equipment, make sure to tighten bolts according to recommendations.

The table shows the recommended torques for bolts in base and flanges.

| CR, CRI, CRN | Base [Nm] | Flange [Nm] | | |
|---|---|---|---|---|
| | | | DIN, JIS, ANSI | Oval |
| 1s-5 | 40 | M10 | - | 50-60 |
| 10-20 | 50 | M12 | 60 | 60-70 |
| 32-150 | 70 | M16 | 100 | 70-80 |
| | | M20 | 150 | - |
| | | M24 | 200 | - |

The bolt quality must be minimum 8.8.

## 6.6 Flange forces and torques

If not all loads reach the maximum permissible value stated in the tables below, one of these values may exceed the normal limit. Contact Grundfos for further information.

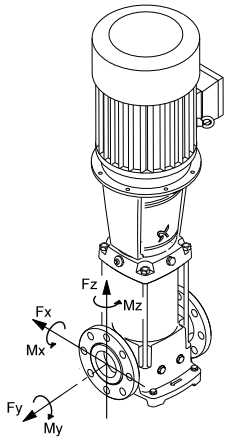


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**Fig. 14** Flange forces and torques

Y-direction: Inlet/outlet

Z-direction: Direction of chamber stack

X-direction: 90 ° from inlet/outlet

### Forces

The following tables represent values that applies according to the material quality.

**Force limits for CR cast-iron pump housing**

| Flange, DN [mm] | CR | Force, Y-direction [N] | Force, Z-direction [N] | Force, X-direction [N] |
|---|---|---|---|---|
| 25/32 | 1s-5 | 338 | 394 | 319 |
| 40 | 10 | 413 | 469 | 375 |
| 50 | 15 and 20 | 563 | 581 | 506 |
| 65 | 32 | 694 | 788 | 638 |
| 80 | 45 | 938 | 769 | 844 |
| 100 | 64 and 90 | 1256 | 1013 | 1125 |
| 125/150 | 120 and 150 | 1256 | 1013 | 1125 |

**Torque limits to CR cast-iron pump housing**

| Flange, DN [mm] | CR | Torque, Y-direction [Nm] | Torque, Z-direction [Nm] | Torque, X-direction [Nm] |
|---|---|---|---|---|
| 25/32 | 1s-5 | 300 | 175 | 125 |
| 40 | 10 | 400 | 275 | 200 |
| 50 | 15 and 20 | 450 | 325 | 250 |
| 65 | 32 | 500 | 350 | 300 |
| 80 | 45 | 325 | 400 | 550 |
| 100 | 64 and 90 | 375 | 475 | 625 |
| 125/150 | 120 and 150 | 375 | 475 | 625 |

**Force limits for CRI, CRN stainless-steel pumps housing**

| Flange, DN [mm] | CRI, CRN | Force, Y-direction [N] | Force, Z-direction [N] | Force, X-direction [N] |
|---|---|---|---|---|
| 25/32 | 1s-5 | 675 | 788 | 638 |
| 40 | 10 | 825 | 938 | 750 |
| 50 | 15 and 20 | 1125 | 1163 | 1013 |
| 65 | 32 | 1388 | 1575 | 1275 |
| 80 | 45 | 1875 | 1538 | 1688 |
| 100 | 64 and 90 | 2513 | 2025 | 2250 |
| 125/150 | 120 and 150 | 2513 | 2025 | 2250 |

**Torque limits to CRI, CRN stainless steel pump housing**

| Flange, DN [mm] | CRI, CRN | Torque, Y-direction [Nm] | Torque, Z-direction [Nm] | Torque, X-direction [Nm] |
|---|---|---|---|---|
| 25/32 | 1s-5 | 600 | 350 | 250 |
| 40 | 10 | 800 | 550 | 400 |
| 50 | 15 and 20 | 900 | 650 | 500 |
| 65 | 32 | 1000 | 700 | 600 |
| 80 | 45 | 650 | 800 | 1100 |
| 100 | 64 and 90 | 750 | 950 | 1250 |
| 125/150 | 120 and 150 | 750 | 950 | 1250 |

## 7. Electrical connection

The electrical connection must be carried out by an authorised electrician in accordance with local regulations.

Warning

Connect the CR pump to an external mains switch placed close to the pump and to a motor-protective circuit breaker or a CUE frequency converter. Make sure you can lock the mains switch in OFF position (isolated). Type and requirements as specified in EN 60204-1, 5.3.2.

Warning

Before removing the terminal box cover and before removing or dismantling the pump, make sure that the power supply has been switched off and that it cannot be accidentally switched on.

Caution Consider whether it is necessary to install an emergency stop switch.

The operating voltage and frequency are marked on the motor nameplate. Make sure that the motor is suitable for the power supply on which it will be used and the motor terminal connection is correct. You will find a wiring diagram in the terminal box.

### 7.1 Cable entry/screwed connection

All motors are supplied without screwed cable entries. The table below shows the numbers and sizes of cable entry holes of the terminal box (standard EN 50262).

| Motor [kW] | Number and size of cable entries | Description |
|---|---|---|
| 0.25 - 0.55 | 2 x M20 x 1.5 | The holes have precast threads and are closed with knock-out cable entries |
| 0.75 - 3.0 | 2 x M20 | The holes are closed with knock-out cable entries |
| 4.0 - 7.5 | 4 x M25 | The holes are closed with knock-out cable entries |
| 11-22 | 2 x M20<br>4 x M40 | The holes are closed with knock-out cable entries |
| 30-45 | 2 x M50 x 1.5 | Blanking plug |
| 55-75 | 2 x M63 x 1.5 | Blanking plug |

### 7.2 Three-phase connection

| | Mains supply [V] | | |
|---|---|---|---|
| | Delta connection | | Star connection |
| **50 Hz** | 220-240 | / | 380-415 |
| | 380-415 | / | 660-690 |
| **60 Hz** | 220-277 | / | 380-480[1)] |
| | 380-480 | / | 660-690 |

[1)] 60 Hz motors, 0.37 - 1.1 kW: 220-277/380-440 V.

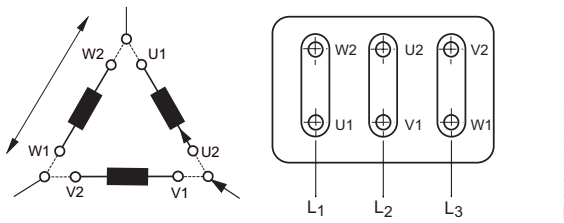



**Fig. 15** Delta connection

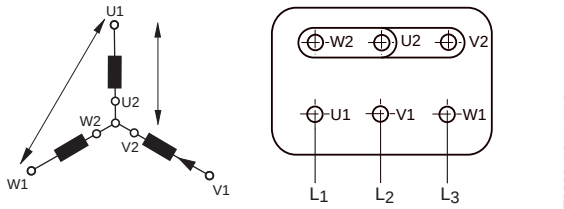


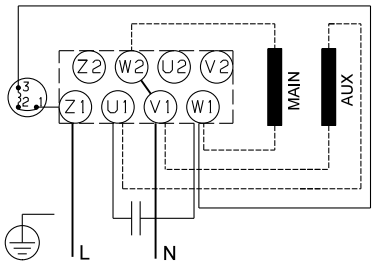

**Fig. 16** Star connection

If the motor is provided with PTC sensors or PTO contacts, the connection must be in accordance with the wiring diagram in the terminal box.

Connect three-phase motors to a motor-protective circuit breaker.

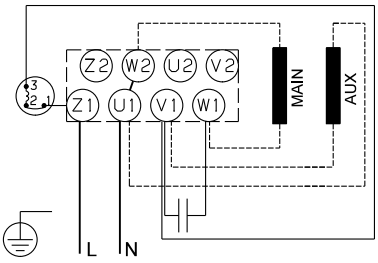
## 7.3 Single-phase connection

| | Mains supply [V] | | |
|---|---|---|---|
| | "Low voltage" | | "High voltage" |
| **50 Hz** | 220-230 | / | 240 |



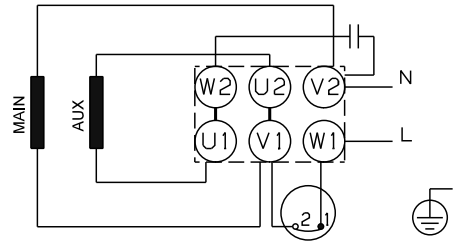

TM04 1693 1008

**Fig. 17** Connection, "low voltage", 0.37 - 0.75 kW



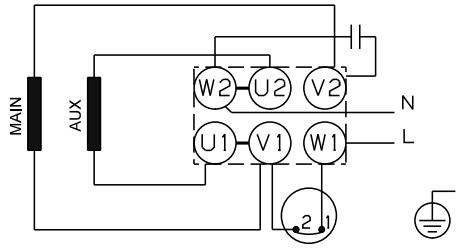

TM04 1694 1008

**Fig. 18** Connection, "high voltage", 0.37 - 0.75 kW




TM04 0345 0608

**Fig. 19** Connection, "low voltage", 1.1 - 2.2 kW




TM04 0344 0608

**Fig. 20** Connection, "high voltage", 1.1 - 2.2 kW

Single-phase Grundfos motors incorporate a thermal switch and require no additional motor protection.

## 7.4 Terminal box positions

You can turn the terminal box to four positions, in 90 ° steps. Follow this procedure:

1. If necessary, remove the coupling guards. Do not remove the coupling.
2. Remove the bolts securing the motor to the pump.
3. Turn the motor to the required position.
4. Replace and tighten the bolts.
5. Replace the coupling guards.

Carry out the electrical connection as shown in the diagram inside the terminal box cover.

## 7.5 Frequency converter operation

You can use 3-phase motors for frequency convertor operation following the conditions below. This section applies to motors defined in IEC 60034.

### 7.5.1 General conditions

Protect all motors used with frequency converters against voltage peaks and dU/dt according to IEC 60034-17. Grundfos recommends that you use insulated bearings for motors from frame size 225 (45 kW/2-pole, 30 kW/4-pole and 22 kW/6-pole).

**Mains voltage dependent conditions**

200-240 V

No output filters are required for frequency converter operated motors with mains voltages up to 240 V.

380-500 V

For frequency converter operated motors with motor cable length less than 25 metres and mains supply up to 460 V. No additional motor protection against voltage peaks is required. For frequency converter operated motors with motor cable length of more than 25 metres or mains supply higher than 460 V, sine-wave filters are required.

500 V and higher

Always use sine-wave filters for motors marked with 500 V or higher voltages. *

Exception

- Protect Grundfos motors types MG 71 and MG 80 (up to 1.1 kW/2-pole and up to 0.75 kW/4-pole) for supply voltages up to and including 440 V without phase insulation against voltage peaks above 650 V between the supply terminals.
- If you use MG 71 and MG 80 without phase insulation for input voltages above 240 V, it requires that you use sine save filters at the output of the frequency converter.
- MG 71 and MG 80 with phase insulation for use with variable frequency drives are available as standard products.

* Motors with reinforced insulation can be supplied as an option. These motors are according to IEC 60034-25 and therefore there is no need for sine-wave filters. This do not eliminate the requirement for insulated bearings from frame size 225.

### 7.5.2 Motors supplied by Grundfos

You can connect all three-phase MG motors with phase insulation to a frequency converter.

#### 7.5.3 Phase insulation, MG 71 and 80

MG motors, frame sizes 71 and 80, do not have phase insulation as standard. The motors are not suitable for frequency converter operation as they are not protected against the voltage peaks caused by the frequency converter operation. Only motors with a rated voltage equal to or above 460 V have phase insulation.

**Caution** Frequency converter operation of MG motors without phase insulation will cause damage to the motor.

We recommend that you protect all other motors against voltage peaks higher than 1200 V by 2000 V/µsec.

You can eliminate the above disturbances, i.e. both increased acoustic noise and detrimental voltage peaks by fitting an LC filter between the frequency converter and the motor.

For further information, contact the frequency converter or motor supplier.

#### 7.5.4 Other motor makes than those supplied by Grundfos

Contact Grundfos or the motor manufacturer.

## 8. Startup

**Caution** Do not start the pump until it has been filled with liquid and vented. If the pump runs dry, the pump bearings and the shaft seal may be damaged.

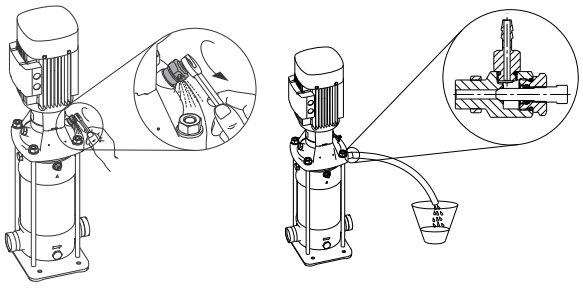



**Fig. 21** Vent valve, standard and an optional solution with hose connection

Warning

Pay attention to the direction of the vent hole and make sure that the escaping water does not cause injury to persons or damage to the motor or other components.

In hot-water installations, pay special attention to the risk of injury caused by scalding hot water.

Follow the instructions on page 34.

**CR, CRI, CRN 1s to 5**

For these pumps, we advise you to open the bypass valve during startup. See fig. 22 for bypass valve location. The bypass valve connects the inlet and outlet sides of the pump, thus making the filling procedure easier. Close the bypass valve again when the operation is stable.

When pumping liquids containing air, we advise you to leave the bypass valve open if the operating pressure is lower than 6 bar.

Close the bypass valve if the operating pressure constantly exceeds 6 bar. Otherwise the material at the opening will be worn because of the high liquid velocity.

### 8.1 Shaft seal run-in

Warning

Make sure that a leakage does not cause injury to persons or damage to the equipment.

The seal faces are lubricated by the pumped liquid, meaning that there may be a certain amount of leakage from the shaft seal.

When you start the pump for the first time, or when you install a new shaft seal, a certain run-in period is required before the leakage is reduced to an acceptable level. The time required for this depends on the operating conditions, i.e. every time the operating conditions change, a new run-in period will be started.

Under normal conditions, the leaking liquid will evaporate. As a result, no leakage will be detected.

## 9. Maintenance

Warning

Before starting work on the pump, make sure that all power supplies to the pump have been switched off and that they cannot be accidentally switched on.

Pump bearings and shaft seal are maintenance-free.

**Motor bearings**

Motors not fitted with grease nipples are maintenance-free.

Motors fitted with grease nipples must be lubricated with a high-temperature, lithium-based grease. See the instructions on the fan cover.

In the case of seasonal operation where the motor is idle for more than 6 months of the year, we recommend that you grease the motor when you take the pump out of operation.

Depending on the ambient temperature, replace or lubricate the motor bearings according to the table below. The table applies to 2-pole motors. The number of operating hours stated for bearing replacement are guidelines only.

| Motor size [kW] | Bearing replacement interval [operating hours] | | | | |
|---|---|---|---|---|---|
| | 40 °C | 45 °C | 50 °C | 55 °C | 60 °C |
| 0.37 - 0.75 | 18000 | - | - | - | - |
| 1.1 - 7.5 | 20000 | 15500 | 12500 | 10000 | 7500 |
| **Motor size [kW]** | **Lubrication interval [operating hours]** | | | | |
| | 40 °C | 45 °C | 50 °C | 55 °C | 60 °C |
| 11 - 18.5 | 4500 | 3400 | 2500 | 1700 | 1100 |
| 22 | 4000 | 3100 | 2300 | 1500 | 1000 |
| 30-55 | 4000 | 3000 | 2000 | 1500 | - |
| 75 | 2000 | 1500 | 1000 | 500 | - |

Intervals for 4-pole motors are twice as long as those for 2-pole motors.

If the ambient temperature is lower than 40 °C, then replace or lubricate the bearings at the intervals mentioned under 40 °C.

## 10. Frost protection

Drain pumps which are not being used during periods of frost to avoid damage.

Drain the pump by loosening the vent screw in the pump head and by removing the drain plug from the base.

Warning

Pay attention to the direction of the vent hole and make sure that the escaping water does not cause injury to persons or damage to the motor or other components.

In hot-water installations, pay special attention to the risk of injury caused by scalding hot water.

Do not tighten the vent screw and replace the drain plug until the pump is to be used again.

**CR, CRI, CRN 1s to 5**

Before replacing the drain plug in the base, screw the bypass valve out against the stop. See fig. 22.

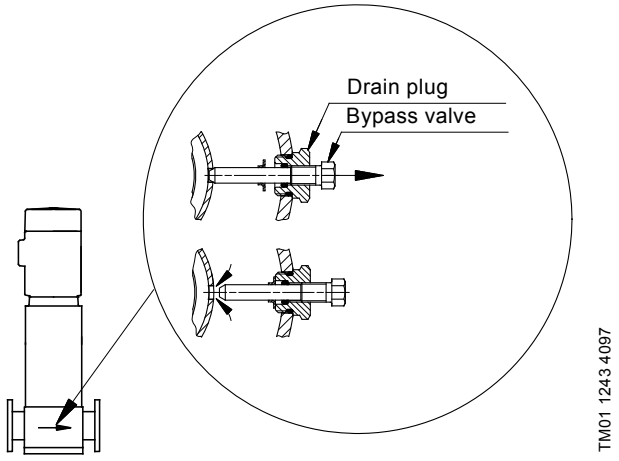



**Fig. 22** Location of drain plug and bypass valve

Fit the drain plug by tightening the large union nut followed by the bypass valve.

## 11. Service

We recommend that you repair pumps with motors of 7.5 kW and up at pump site. Necessary lifting equipment must be available.

Note

If you have used a pump for a liquid which is toxic or injurious to health, the pump will be classified as contaminated.

If Grundfos is requested to service the pump, contact Grundfos with details about the pumped liquid, etc. before the pump is returned for service. Otherwise, Grundfos can refuse to accept the pump for service.

Possible costs of returning the pump are to be paid by the customer.

However, any application for service, no matter to whom it may be made), must include details about the pumped liquid if you have used the pump for liquids which are toxic or injurious to health.

### 11.1 Service kits and manuals

Service documentation is available in Grundfos Product Center (http://product-selection.grundfos.com/).

If you have any questions, please contact the nearest Grundfos company or service workshop.

## 12. Fault finding

Warning

Before removing the terminal box cover and before removing or dismantling the pump, make sure that the power supply has been switched off and that it cannot be accidentally switched on.

| Fault | Cause | Remedy |
|---|---|---|
| 1. Motor does not run when started. | a) Supply failure. | Connect the power supply. |
| | b) The fuses are blown. | Replace fuses. |
| | c) The motor-protective circuit breaker has tripped. | Reactivate the motor-protective circuit breaker. |
| | d) The thermal protection has tripped. | Reactivate the thermal protection. |
| | e) The main contacts in the motor-protective circuit breaker are not making contact or the coil is faulty. | Replace contacts or magnetic coil. |
| | f) The control circuit is defective. | Repair the control circuit. |
| | g) The motor is defective. | Replace the motor. |
| 2. Motor-protective circuit breaker trips immediately when power supply is switched on. | a) One fuse is blown or the automatic circuit breaker is tripped. | Replace the fuse or cut in the circuit breaker. |
| | b) The contacts in the motor-protective circuit breaker are faulty. | Replace motor-protective circuit breaker contacts. |
| | c) The cable connection is loose or faulty. | Fasten or replace the cable connection. |
| | d) The motor winding is defective. | Replace the motor. |
| | e) The pump is mechanically blocked. | Remove the mechanical blocking of the pump. |
| | f) The motor-protective circuit breaker setting is too low. | Set the motor-protective circuit breaker correctly. |
| 3. Motor-protective circuit breaker trips occasionally. | a) The motor-protective circuit breaker setting is too low. | Set the motor-protective circuit breaker correctly. |
| | b) Low voltage at peak times. | Check the power supply. |
| 4. Motor-protective circuit breaker has not tripped but the pump does not run. | a) Check 1 a), b), d), e) and f). | |
| 5. Pump performance not constant. | a) The pump inlet pressure is too low (cavitation). | Check the inlet conditions. |
| | b) The inlet pipe or pump is partly blocked by impurities. | Clean the inlet pipe or pump. |
| | c) The pump draws in air. | Check the inlet conditions. |
| 6. Pump runs but gives no water. | a) The inlet pipe or pump is blocked by impurities. | Clean the inlet pipe or pump. |
| | b) The foot or non-return valve is blocked in closed position. | Repair the foot or non-return valve. |
| | c) There is a leakage in the inlet pipe. | Repair the inlet pipe. |
| | d) There is air in the inlet pipe or pump. | Check the inlet conditions. |
| | e) The motor runs in the wrong direction of rotation. | Change the direction of rotation of the motor. |
| 7. Pump runs backwards when switched off. | a) There is a leakage in the inlet pipe. | Repair the inlet pipe. |
| | b) The foot or non-return valve is defective. | Repair the foot or non-return valve. |
| 8. Leakage in shaft seal. | a) The shaft seal is defective. | Replace the shaft seal. |
| 9. Noise. | a) Cavitation. | Check the inlet conditions. |
| | b) The pump does not rotate freely due to frictional resistance, as a result of incorrect pump shaft position. | Adjust the pump shaft.<br>Follow the procedure in fig. F, G or H at the end of these instructions. |
| | c) Frequency converter operation. | See section *7.5 Frequency converter operation*. |

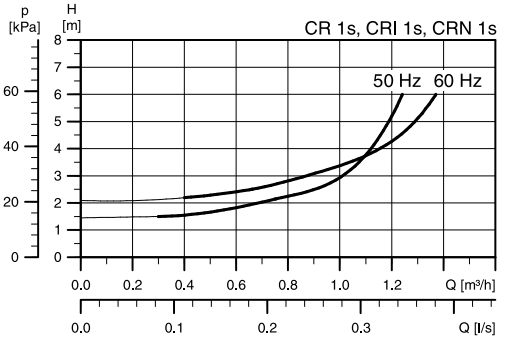
## 13. Disposing of the product

This product or parts of it must be disposed of in an environmentally sound way:

1. Use the public or private waste collection service.
2. If this is not possible, contact the nearest Grundfos company or service workshop.

## Appendix

### NPSH

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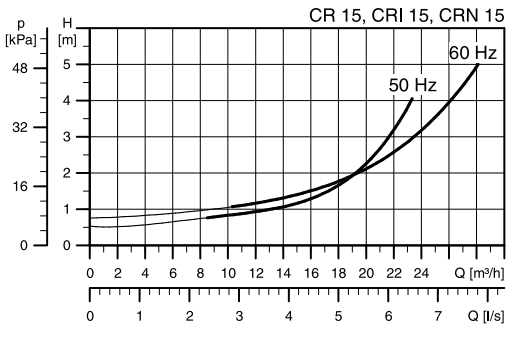


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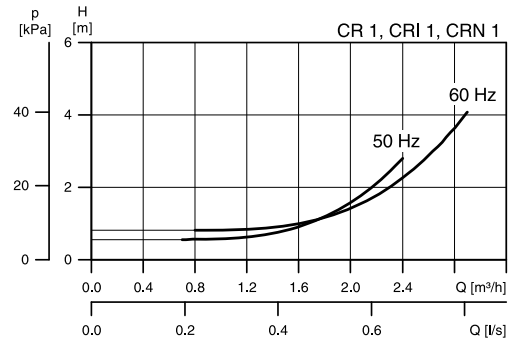


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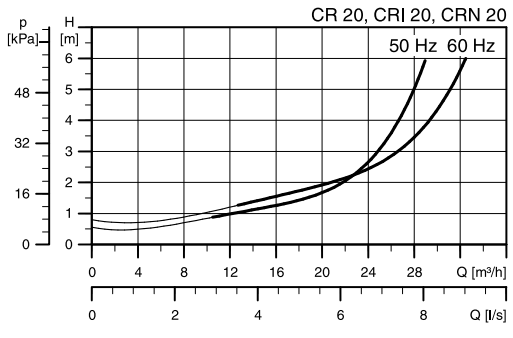


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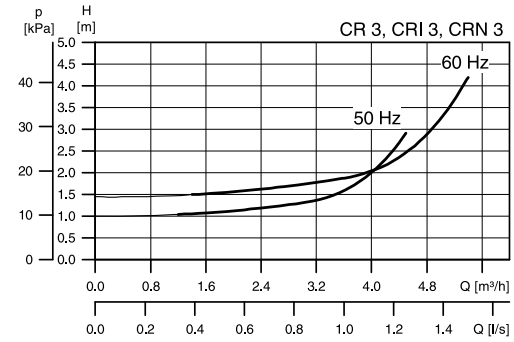


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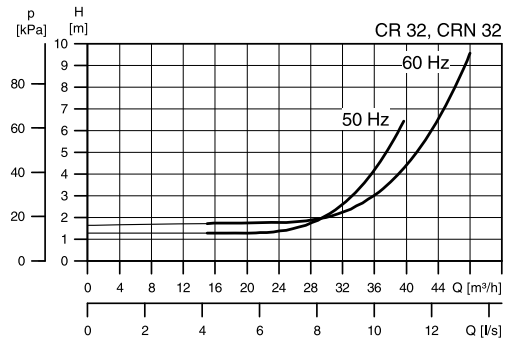


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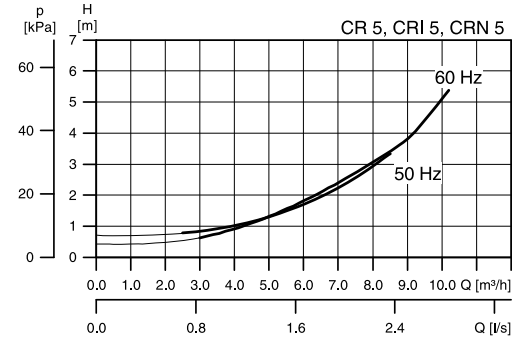


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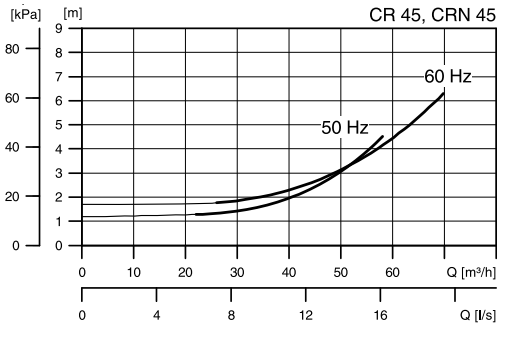


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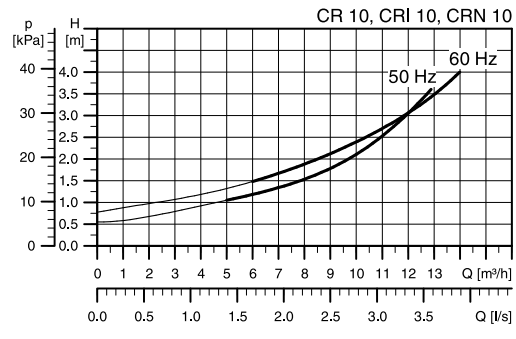


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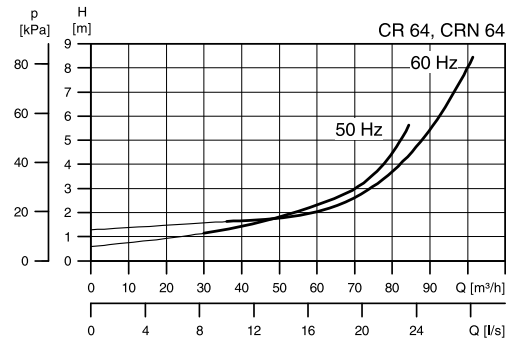


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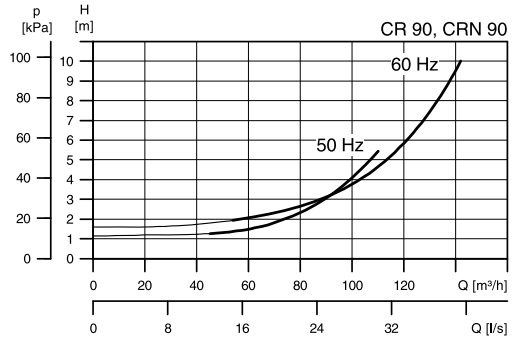


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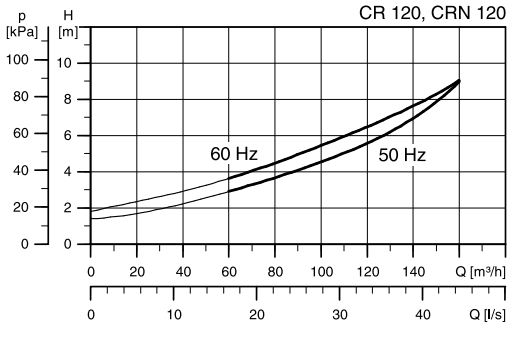
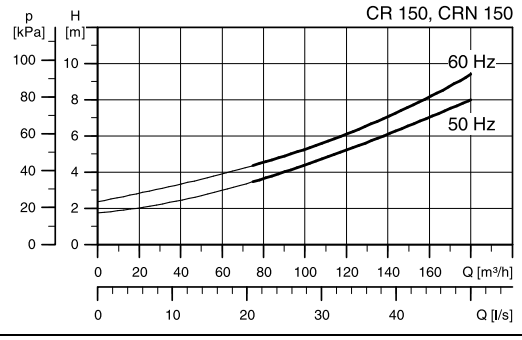



TM03 8764 2507




TM03 8765 2507

**Fig. A**

**Maximum permissible operating pressure / liquid temperature range**

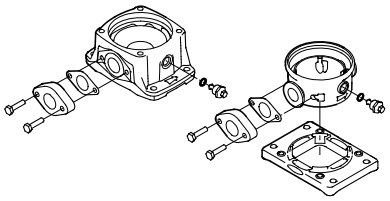
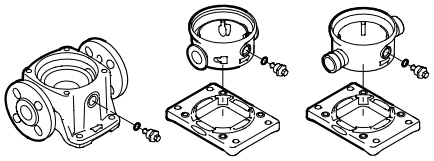
| | | | Oval | | PJE - CLAMP - CA - UNION DIN - FGJ | |
|---|---|---|---|---|---|---|
| | | |  | |  | |
| | | | **Operating pressure** | **Liquid temperature range** | **Operating pressure** | **Liquid temperature range** |
| **50 Hz** | CR, CRI, CRN 1s | | 16 bar | -20 °C to +120 °C | 25 bar | -20 °C to +120 °C |
| | CR, CRI, CRN 1 | | 16 bar | -20 °C to +120 °C | 25 bar | -20 °C to +120 °C |
| | CR, CRI, CRN 3 | | 16 bar | -20 °C to +120 °C | 25 bar | -20 °C to +120 °C |
| | CR, CRI, CRN 5 | | 16 bar | -20 °C to +120 °C | 25 bar | -20 °C to +120 °C |
| | CR, CRI 10-1 | → 10-16 | 16 bar | -20 °C to +120 °C | 16 bar | -20 °C to +120 °C |
| | CR, CRI 10-17 | → 10-22 | - | - | 25 bar | -20 °C to +120 °C |
| | CRN 10 | | - | - | 25 bar | -20 °C to +120 °C |
| | CR, CRI 15-1 | → 15-7 | 10 bar | -20 °C to +120 °C | - | - |
| | CR, CRI 15-1 | → 15-10 | - | - | 16 bar | -20 °C to +120 °C |
| | CR, CRI 15-12 | → 15-17 | - | - | 25 bar | -20 °C to +120 °C |
| | CRN 15 | | - | - | 25 bar | -20 °C to +120 °C |
| | CR, CRI 20-1 | → 20-7 | 10 bar | -20 °C to +120 °C | - | - |
| | CR, CRI 20-1 | → 20-10 | - | - | 16 bar | -20 °C to +120 °C |
| | CR, CRI 20-12 | → 20-17 | - | - | 25 bar | -20 °C to +120 °C |
| | CRN 20 | | - | - | 25 bar | -20 °C to +120 °C |
| | CR, CRN 32-1-1 | → 32-7 | - | - | 16 bar | -30 °C to +120 °C |
| | CR, CRN 32-8-2 | → 32-14 | - | - | 30 bar | -30 °C to +120 °C |
| | CR, CRN 45-1-1 | → 45-5 | - | - | 16 bar | -30 °C to +120 °C |
| | CR, CRN 45-6-2 | → 45-11 | - | - | 30 bar | -30 °C to +120 °C |
| | CR, CRN 45-12-2 | → 45-13-2 | - | - | 33 bar | -30 °C to +120 °C |
| | CR, CRN 64-1-1 | → 64-5 | - | - | 16 bar | -30 °C to +120 °C |
| | CR, CRN 64-6-2 | → 64-8-1 | - | - | 30 bar | -30 °C to +120 °C |
| | CR, CRN 90-1-1 | → 90-4 | - | - | 16 bar | -30 °C to +120 °C |
| | CR, CRN 90-5-2 | → 90-6 | - | - | 30 bar | -30 °C to +120 °C |
| | CR, CRN 120 | | - | - | 30 bar | -30 °C to +120 °C |
| | CR, CRN 150 | | - | - | 30 bar | -30 °C to +120 °C |
| **60 Hz** | CR, CRI, CRN 1s | | 16 bar | -20 °C to +120 °C | 25 bar | -20 °C to +120 °C |
| | CR, CRI, CRN 1 | | 16 bar | -20 °C to +120 °C | 25 bar | -20 °C to +120 °C |
| | CR, CRI, CRN 3 | | 16 bar | -20 °C to +120 °C | 25 bar | -20 °C to +120 °C |
| | CR, CRI, CRN 5 | | 16 bar | -20 °C to +120 °C | 25 bar | -20 °C to +120 °C |
| | CR, CRI 10-1 | → 10-10 | 16 bar | -20 °C to +120 °C | 16 bar | -20 °C to +120 °C |
| | CR, CRI 10-12 | → 10-17 | - | - | 25 bar | -20 °C to +120 °C |
| | CRN 10 | | 16 bar | -20 °C to +120 °C | 25 bar | -20 °C to +120 °C |
| | CR, CRI 15-1 | → 15-5 | 10 bar | -20 °C to +120 °C | - | - |
| | CR, CRI 15-1 | → 15-8 | - | - | 16 bar | -20 °C to +120 °C |
| | CR, CRI 15-9 | → 15-12 | - | - | 25 bar | -20 °C to +120 °C |
| | CRN 15 | | 10 bar | -20 °C to +120 °C | 25 bar | -20 °C to +120 °C |
| | CR, CRI 20-1 | → 20-5 | 10 bar | -20 °C to +120 °C | - | - |
| | CR, CRI 20-1 | → 20-7 | - | - | 16 bar | -20 °C to +120 °C |
| | CR, CRI 20-8 | → 20-10 | - | - | 25 bar | -20 °C to +120 °C |
| | CRN 20 | | 10 bar | -20 °C to +120 °C | 25 bar | -20 °C to +120 °C |
| | CR, CRN 32-1-1 | → 32-5 | - | - | 16 bar | -30 °C to +120 °C |
| | CR, CRN 32-6-2 | → 32-10-2 | - | - | 30 bar | -30 °C to +120 °C |
| | CR, CRN 45-1-1 | → 45-4 | - | - | 16 bar | -30 °C to +120 °C |
| | CR, CRN 45-5-2 | → 45-7 | - | - | 30 bar | -30 °C to +120 °C |
| | CR, CRN 64-1-1 | → 64-3 | - | - | 16 bar | -30 °C to +120 °C |
| | CR, CRN 64-4-2 | → 64-5-2 | - | - | 30 bar | -30 °C to +120 °C |
| | CR, CRN 90-1-1 | → 90-3 | - | - | 16 bar | -30 °C to +120 °C |
| | CR, CRN 90-4-2 | | - | - | 30 bar | -30 °C to +120 °C |
| | CR, CRN 120 | | - | - | 30 bar | -30 °C to +120 °C |
| | CR, CRN 150 | | - | - | 30 bar | -30 °C to +120 °C |

**Fig. B**

**Maximum inlet pressure for CR, CRI and CRN**

| 50 Hz | | 60 Hz | |
|---|---|---|---|
| **CR, CRI, CRN 1s** | | | |
| CR, CRI, CRN 1s-2 → CR, CRI, CRN 1s-36 | 10 bar | CR, CRI, CRN 1s-2 → CR, CRI, CRN 1s-27 | 10 bar |
| **CR, CRI, CRN 1** | | | |
| CR, CRI, CRN 1-2 → CR, CRI, CRN 1-36 | 10 bar | CR, CRI, CRN 1-2 → CR, CRI, CRN 1-25<br>CR, CRI, CRN 1-27 | 10 bar<br>15 bar |
| **CR, CRI, CRN 3** | | | |
| CR, CRI, CRN 3-2 → CR, CRI, CRN 3-29<br>CR, CRI, CRN 3-31 → CR, CRI, CRN 3-36 | 10 bar<br>15 bar | CR, CRI, CRN 3-2 → CR, CRI, CRN 3-15<br>CR, CRI, CRN 3-17 → CR, CRI, CRN 3-25 | 10 bar<br>15 bar |
| **CR, CRI, CRN 5** | | | |
| CR, CRI, CRN 5-2 → CR, CRI, CRN 5-16<br>CR, CRI, CRN 5-18 → CR, CRI, CRN 5-36 | 10 bar<br>15 bar | CR, CRI, CRN 5-2 → CR, CRI, CRN 5-9<br>CR, CRI, CRN 5-10 → CR, CRI, CRN 5-24 | 10 bar<br>15 bar |
| **CR, CRI, CRN 10** | | | |
| CR, CRI, CRN 10-1 → CR, CRI, CRN 10-6<br>CR, CRI, CRN 10-7 → CR, CRI, CRN 10-22 | 8 bar<br>10 bar | CR, CRI, CRN 10-1 → CR, CRI, CRN 10-5<br>CR, CRI, CRN 10-6 → CR, CRI, CRN 10-17 | 8 bar<br>10 bar |
| **CR, CRI, CRN 15** | | | |
| CR, CRI, CRN 15-1 → CR, CRI, CRN 15-3<br>CR, CRI, CRN 15-4 → CR, CRI, CRN 15-17 | 8 bar<br>10 bar | CR, CRI, CRN 15-1 → CR, CRI, CRN 15-2<br>CR, CRI, CRN 15-3 → CR, CRI, CRN 15-12 | 8 bar<br>10 bar |
| **CR, CRI, CRN 20** | | | |
| CR, CRI, CRN 20-1 → CR, CRI, CRN 20-3<br>CR, CRI, CRN 20-4 → CR, CRI, CRN 20-17 | 8 bar<br>10 bar | CR, CRI, CRN 20-1<br>CR, CRI, CRN 20-2 → CR, CRI, CRN 20-10 | 8 bar<br>10 bar |
| **CR, CRN 32** | | | |
| CR, CRN 32-1-1 → CR, CRN 32-4<br>CR, CRN 32-5-2 → CR, CRN 32-10<br>CR, CRN 32-11-2 → CR, CRN 32-14 | 4 bar<br>10 bar<br>15 bar | CR, CRN 32-1-1 → CR, CRN 32-2<br>CR, CRN 32-3-2 → CR, CRN 32-6<br>CR, CRN 32-7-2 → CR, CRN 32-10-2 | 4 bar<br>10 bar<br>15 bar |
| **CR, CRN 45** | | | |
| CR, CRN 45-1-1 → CR, CRN 45-2<br>CR, CRN 45-3-2 → CR, CRN 45-5<br>CR, CRN 45-6-2 → CR, CRN 45-13-2 | 4 bar<br>10 bar<br>15 bar | CR, CRN 45-1-1 → CR, CRN 45-1<br>CR, CRN 45-2-2 → CR, CRN 45-3<br>CR, CRN 45-4-2 → CR, CRN 45-7 | 4 bar<br>10 bar<br>15 bar |
| **CR, CRN 64** | | | |
| CR, CRN 64-1-1 → CR, CRN 64-2-2<br>CR, CRN 64-2-1 → CR, CRN 64-4-2<br>CR, CRN 64-4-1 → CR, CRN 64-8-1 | 4 bar<br>10 bar<br>15 bar | CR, CRN 64-1-1<br>CR, CRN 64-1 → CR, CRN 64-2-1<br>CR, CRN 64-2 → CR, CRN 64-5-2 | 4 bar<br>10 bar<br>15 bar |
| **CR, CRN 90** | | | |
| CR, CRN 90-1-1 → CR, CRN 90-1<br>CR, CRN 90-2-2 → CR, CRN 90-3-2<br>CR, CRN 90-3 → CR, CRN 90-6 | 4 bar<br>10 bar<br>15 bar | CR, CRN 90-1-1 → CR, CRN 90-2-2<br>CR, CRN 90-2-1 → CR, CRN 90-4-2 | 10 bar<br>15 bar |
| **CR, CRN 120** | | | |
| CR, CRN 120-1 → CR, CRN 120-2-1<br>CR, CRN 120-2 → CR, CRN 120-5-1<br>CR, CRN 120-6-1 → CR, CRN 120-7 | 10 bar<br>15 bar<br>20 bar | CR, CRN 120-1<br>CR, CRN 120-2-2 → CR, CRN 120-3<br>CR, CRN 120-4-1 → CR, CRN 120-5-2 | 10 bar<br>15 bar<br>20 bar |
| **CR, CRN 150** | | | |
| CR, CRN 150-1-1 → CR, CRN 150-1<br>CR, CRN 150-2-1 → CR, CRN 150-4-1<br>CR, CRN 150-5-2 → CR, CRN 150-6 | 10 bar<br>15 bar<br>20 bar | CR, CRN 150-1-1<br>CR, CRN 150-1 → CR, CRN 150-2<br>CR, CRN 150-3-2 → CR, CRN 150-4-2 | 10 bar<br>15 bar<br>20 bar |

Fig. C

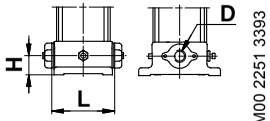
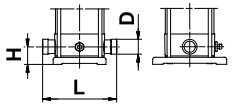
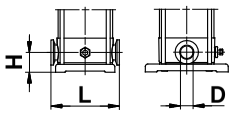
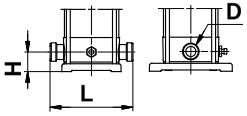
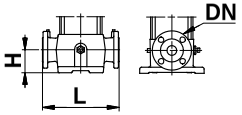
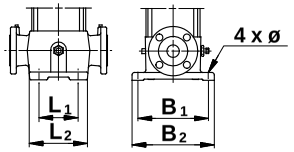
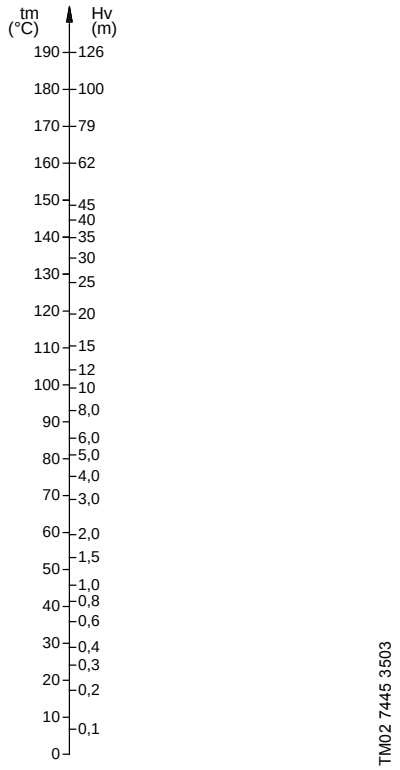
| Pump Type | Oval | | | PJE | | | CLAMP - FlexiClamp | | | UNION | | | DIN - FGJ | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| |  TM00 2251 3393 | | |  TM00 2252 3393 | | |  TM00 2253 3393 | | |  TM00 2254 3393 | | |  TM00 2255 3393 | | |  TM00 2256 3393 | | | | |
| | L [mm] | H [mm] | D [Rp] | L [mm] | H [mm] | D [mm] | L [mm] | H [mm] | D [mm] | L [mm] | H [mm] | D [G] | L [mm] | H [mm] | DN | $L_1$ [mm] | $L_2$ [mm] | $B_1$ [mm] | $B_2$ [mm] | Ø [mm] |
| **CR 1s** | 160 | 50 | 1 | - | - | - | - | - | - | - | - | - | 250 | 75 | 25/32 | 100 | 145 | 180 | 220 | 13 |
| **CRI, CRN 1s** | - | - | - | 210 | 50 | 42.2 | 162 | 50 | 30 | 228 | 50 | 2 | 250 | 75 | 25/32 | 100 | 150 | 180 | 220 | 13 |
| **CR 1** | 160 | 50 | 1 | - | - | - | - | - | - | - | - | - | 250 | 75 | 25/32 | 100 | 145 | 180 | 220 | 13 |
| **CRI, CRN 1** | - | - | - | 210 | 50 | 42.2 | 162 | 50 | 30 | 228 | 50 | 2 | 250 | 75 | 25/32 | 100 | 150 | 180 | 220 | 13 |
| **CR 3** | 160 | 50 | 1 | - | - | - | - | - | - | - | - | - | 250 | 75 | 25/32 | 100 | 145 | 180 | 220 | 13 |
| **CRI, CRN 3** | - | - | - | 210 | 50 | 42.2 | 162 | 50 | 30 | 228 | 50 | 2 | 250 | 75 | 25/32 | 100 | 150 | 180 | 220 | 13 |
| **CR 5** | 160 | 50 | 1 1/4 | - | - | - | - | - | - | - | - | - | 250 | 75 | 25/32 | 100 | 145 | 180 | 220 | 13 |
| **CRI, CRN 5** | - | - | - | 210 | 50 | 42.2 | 162 | 50 | 30 | 228 | 50 | 2 | 250 | 75 | 25/32 | 100 | 150 | 180 | 220 | 13 |
| **CR 10** | 200 | 80 | 1 1/2 | - | - | - | - | - | - | - | - | - | 280 | 80 | 40 | 130 | 178 | 215 | 256 | 13.5 |
| **CRI, CRN 10** | - | - | - | 261 | 80 | 60.1 | 202 | 80 | 50 | - | - | - | 280 | 80 | 40 | 130 | 200 | 215 | 248 | 13 |
| **CR 15** | 200 | 80 | 2 | - | - | - | - | - | - | - | - | - | 300 | 90 | 50 | 130 | 176 | 215 | 256 | 13.5 |
| **CRI, CRN 15** | - | - | - | 261 | 90 | 60.1 | 202 | 90 | 50 | - | - | - | 300 | 90 | 50 | 130 | 200 | 215 | 248 | 13 |
| **CR 20** | 200 | 80 | 2 | - | - | - | - | - | - | - | - | - | 300 | 90 | 50 | 130 | 176 | 215 | 256 | 13.5 |
| **CRI, CRN 20** | - | - | - | 261 | 90 | 60.1 | 202 | 90 | 50 | - | - | - | 300 | 90 | 50 | 130 | 200 | 215 | 248 | 13 |
| **CR 32** | - | - | - | - | - | - | - | - | - | - | - | - | 320 | 105 | 65 | 170 | 223 | 240 | 298 | 14 |
| **CRN 32** | - | - | - | - | - | - | - | - | - | - | - | - | 320 | 105 | 65 | 170 | 226 | 240 | 298 | 14 |
| **CR 45** | - | - | - | - | - | - | - | - | - | - | - | - | 365 | 140 | 80 | 190 | 248 | 266 | 331 | 14 |
| **CRN 45** | - | - | - | - | - | - | - | - | - | - | - | - | 365 | 140 | 80 | 190 | 251 | 266 | 331 | 14 |
| **CR 64** | - | - | - | - | - | - | - | - | - | - | - | - | 365 | 140 | 100 | 190 | 248 | 266 | 331 | 14 |
| **CRN 64** | - | - | - | - | - | - | - | - | - | - | - | - | 365 | 140 | 100 | 190 | 251 | 266 | 331 | 14 |
| **CR 90** | - | - | - | - | - | - | - | - | - | - | - | - | 380 | 140 | 100 | 199 | 261 | 280 | 348 | 14 |
| **CRN 90** | - | - | - | - | - | - | - | - | - | - | - | - | 380 | 140 | 100 | 199 | 261 | 280 | 348 | 14 |
| **CR 120** | - | - | - | - | - | - | - | - | - | - | - | - | 380 | 180 | 125 | 275 | 344 | 380 | 472 | 18 |
| **CRN 120** | - | - | - | - | - | - | - | - | - | - | - | - | 380 | 180 | 125 | 275 | 344 | 380 | 472 | 18 |
| **CR 150** | - | - | - | - | - | - | - | - | - | - | - | - | 380 | 180 | 125 | 275 | 344 | 380 | 472 | 18 |
| **CRN 150** | - | - | - | - | - | - | - | - | - | - | - | - | 380 | 180 | 125 | 275 | 344 | 380 | 472 | 18 |

**Fig. D**

**Airborne noise emitted by pumps with motors fitted by Grundfos**

| Motor [kW] | 50 Hz | 60 Hz |
|---|---|---|
| | $\bar{L}_{pA}$ [dB(A)] | $\bar{L}_{pA}$ [dB(A)] |
| 0.37 | 50 | 55 |
| 0.55 | 50 | 53 |
| 0.75 | 50 | 54 |
| 1.1 | 52 | 57 |
| 1.5 | 54 | 59 |
| 2.2 | 54 | 59 |
| 3.0 | 55 | 60 |
| 4.0 | 62 | 66 |
| 5.5 | 60 | 65 |
| 7.5 | 60 | 65 |
| 11 | 60 | 65 |
| 15 | 60 | 65 |
| 18.5 | 60 | 65 |
| 22 | 66 | 70 |
| 30 | 71 | 75 |
| 37 | 71 | 75 |
| 45 | 71 | 75 |
| 55 | 71 | 75 |
| 75 | 73 | 77 |

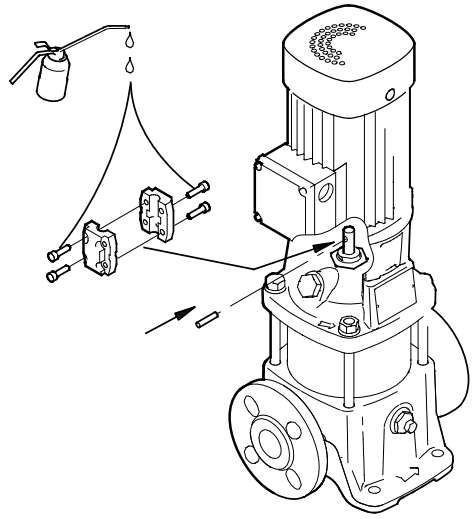
**Fig. E**



**CR, CRI, CRN 1s, 1, 3 and 5**

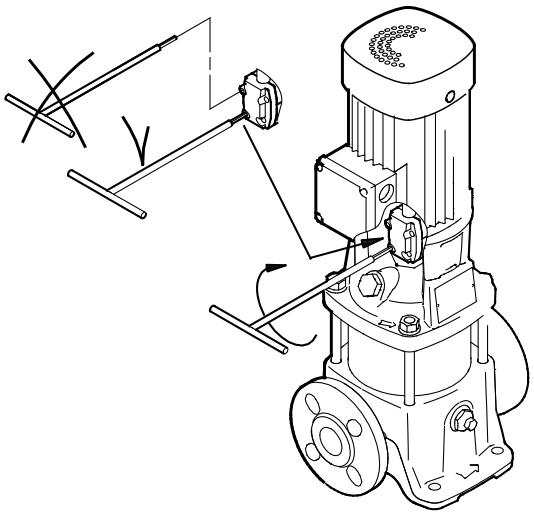
**Fig. F**

**A**



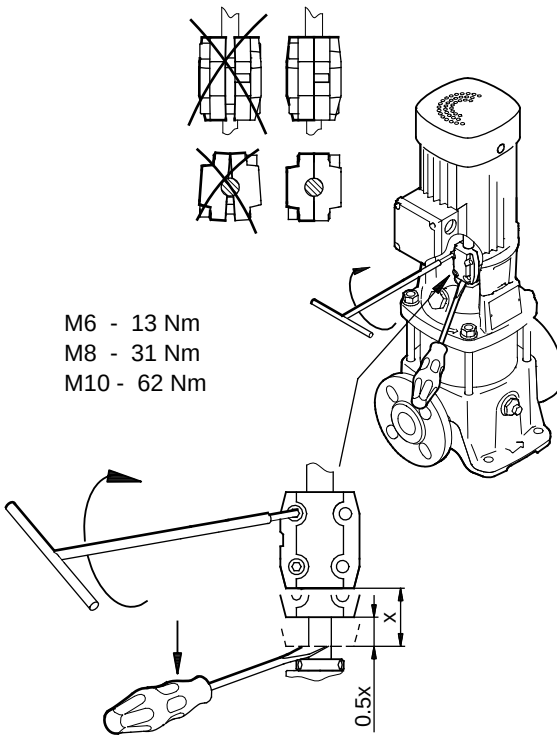
TM02 0459 4600

**B**



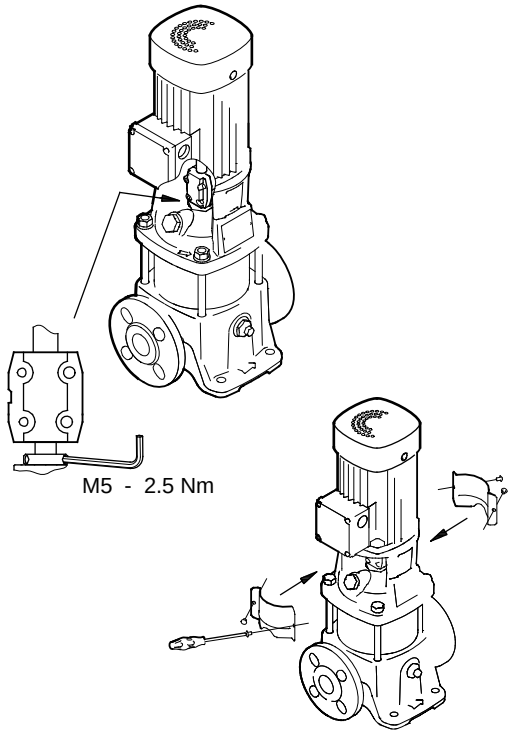
TM02 0460 4600

**C**




TM02 1051 0501

**D**

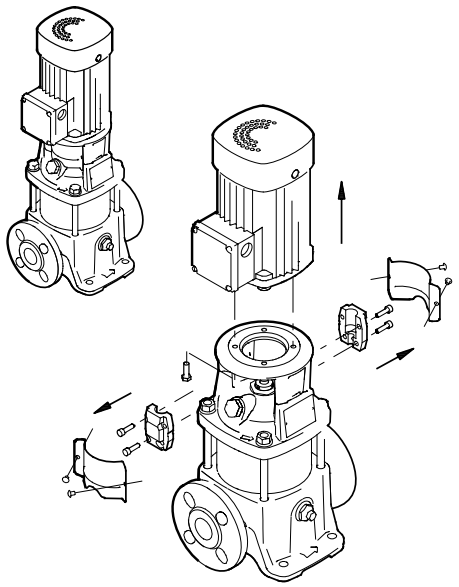



TM02 1052 0501

**CR, CRI, CRN 10, 15 and 20**

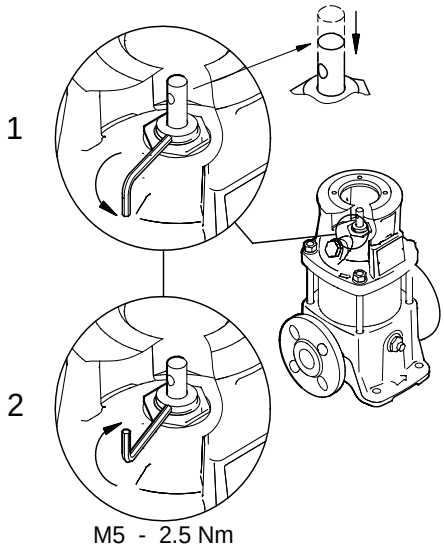
**Fig. G**

**A**



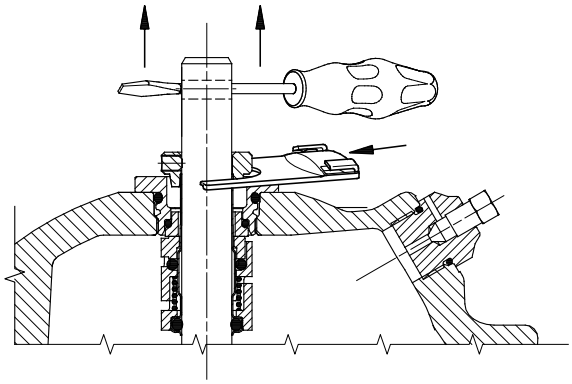
TM02 1045 0501

**B**



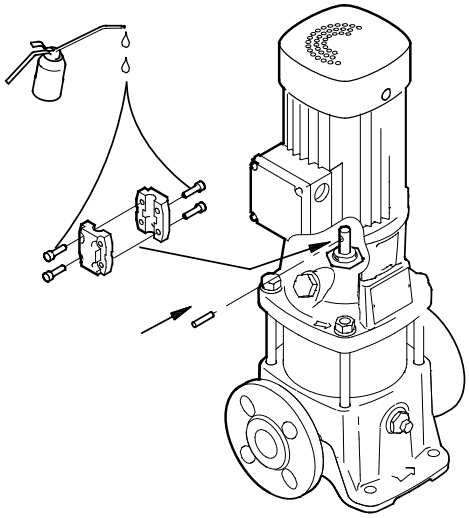

TM02 8500 0304

**C**



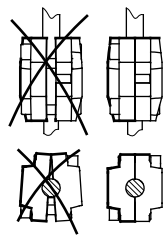
TM02 7923 4403

**D**

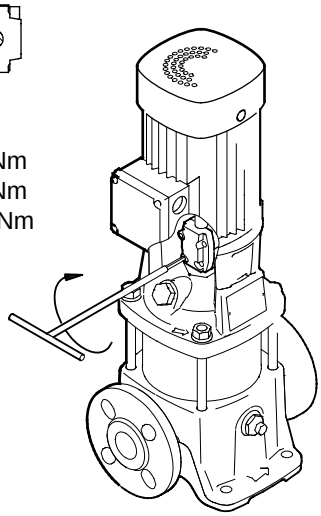


TM02 0459 4600

**E**

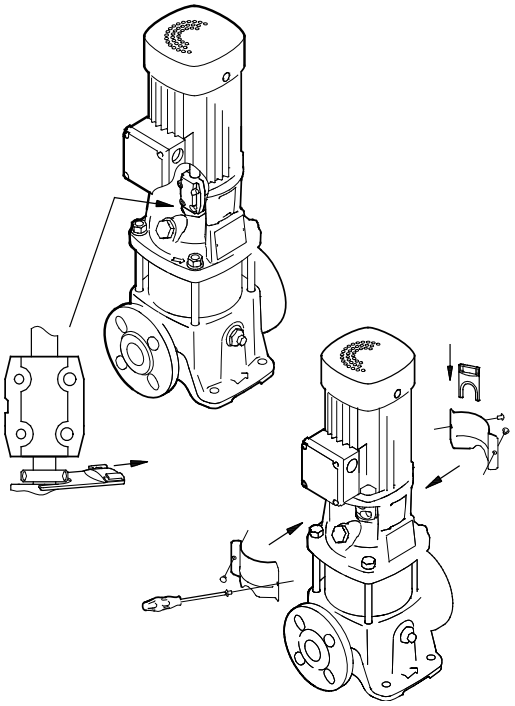


M6 - 13 Nm
M8 - 31 Nm
M10 - 62 Nm



TM02 8542 0404

**F**

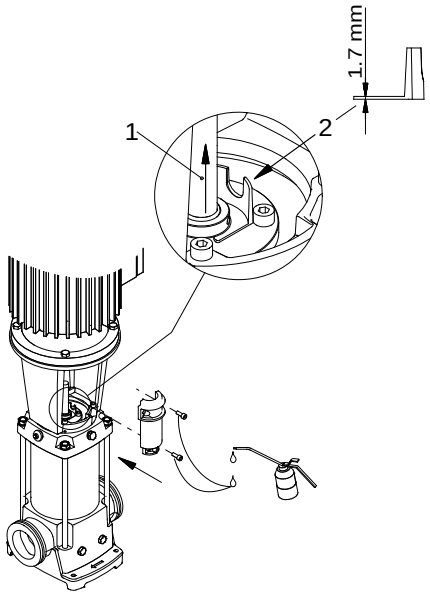


TM02 8515 0304

**CR, CRN 32, 45, 64, 90**

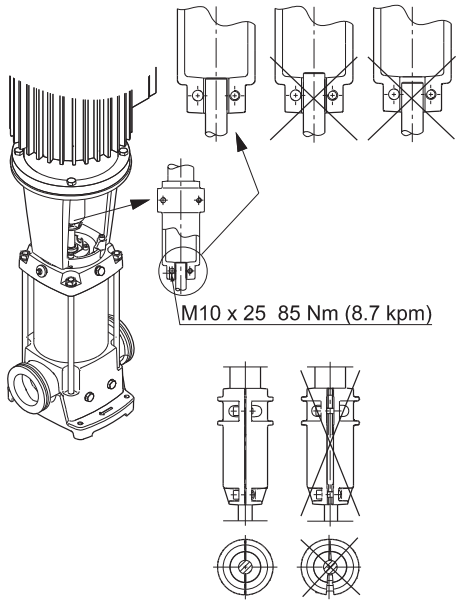
**Fig. H**

**A**



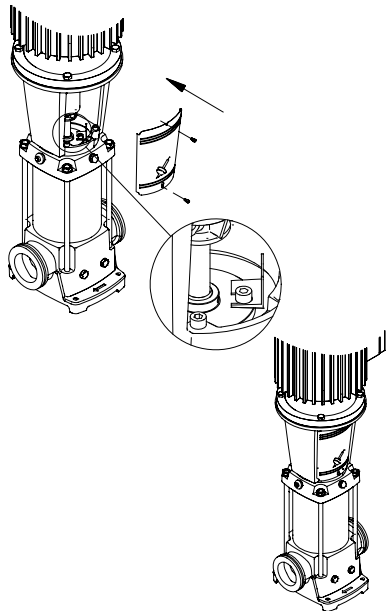

TM01 2144 3600

**B**




TM01 9878 4409

**C**

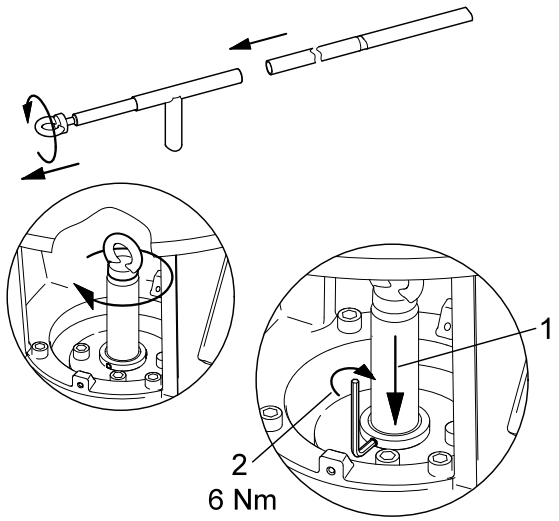


TM01 2146 3600

**CR, CRN 120 and 150**

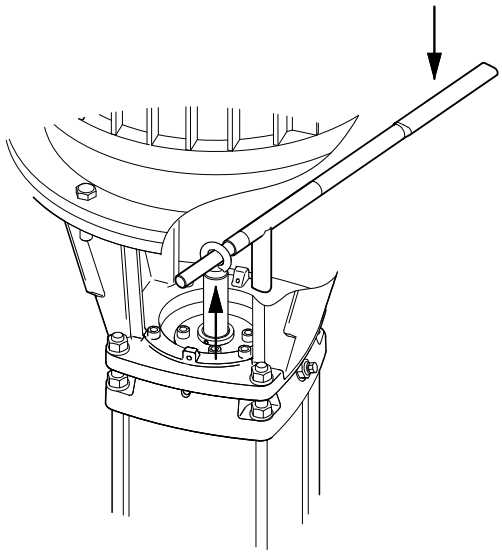
**Fig. I**

**A**



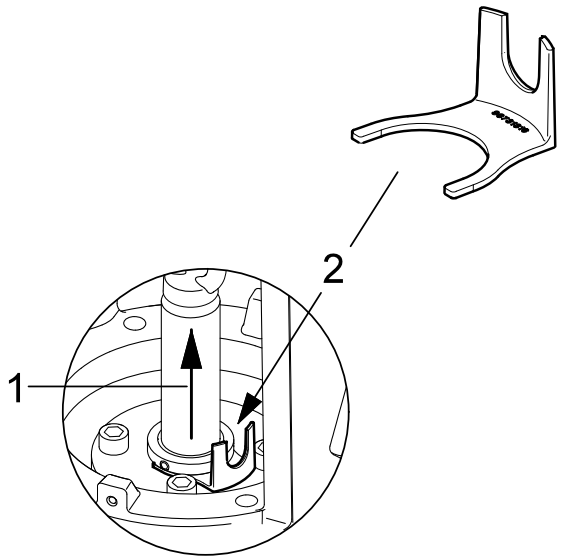

TM03 8903 2707

**B**



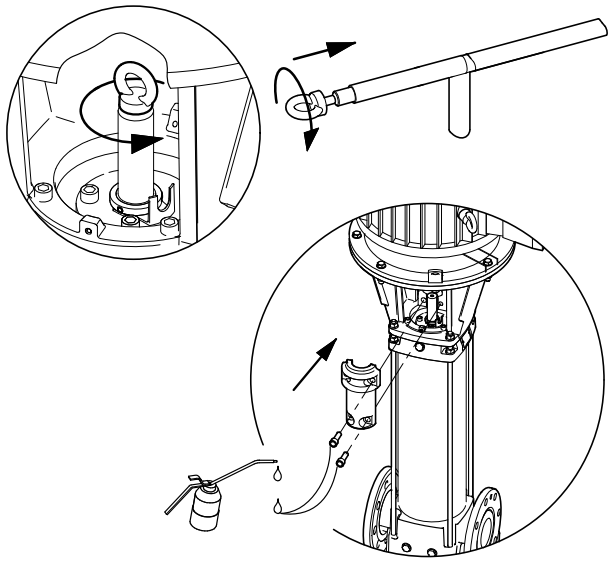
TM03 8904 2707

**C**



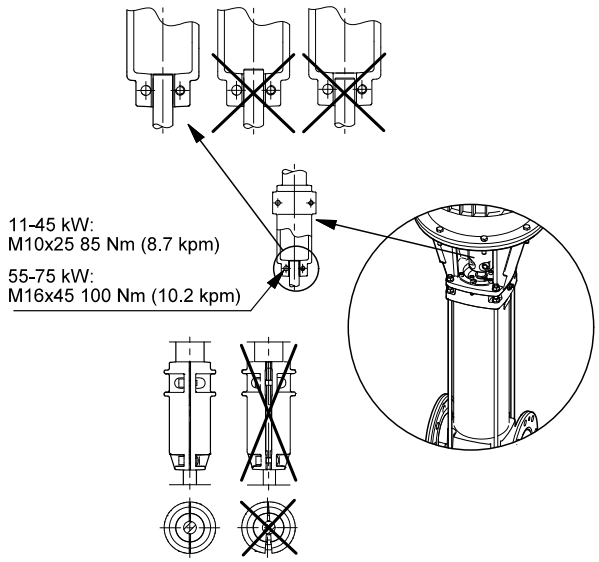

TM03 8905 2707

**D**



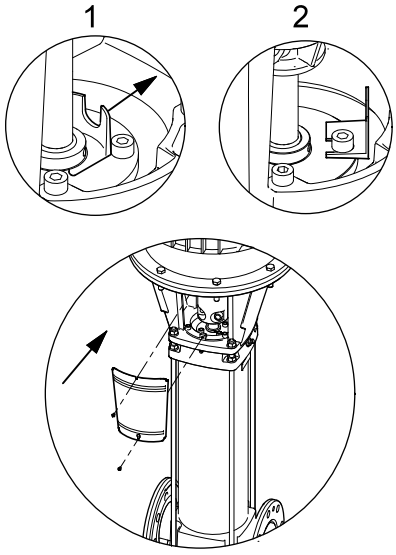
TM03 8906 2707

**E**




TM03 8907 2707

**F**




TM03 8908 2707

| Pos. | Designation | | | | | |
|---|---|---|---|---|---|---|
| | GB | BG | CZ | DE | DK | EE |
| 1 | Adapter flange | Преходен фланец | Mezipříruba | Zwischenflansch | Mellemflange | Ülemineku äärik |
| 1a | Motor stool | Столче на двигателя | Lucernaty motoru | Laterne | Mellemstykke | Mootoripukk |
| 2 | Pump head | Глава на помпата | Hlava čerpadla | Kopfstück | Topstykke | Pumba pea |
| 3 | Chamber, top | Горна камера | Horní článek | Oberste Kammer | Kammer, øverste | Ülemine vahepesa |
| 3a | Chamber without neck ring | Камера без пръстен | Článek bez mezerového kroužku | Kammer ohne Spaltring | Kammer uden tætningsring | Tihendusrõngata vahepesa |
| 4 | Chamber complete | Камера - комплект | Kompletní článek | Kammer komplett | Kammer komplet | Komplektne vahepesa |
| 4a | Chamber with bearing ring | Камера с лагерен пръстен | Článek s kroužkem ložiska | Kammer mit Lagerring | Kammer med lejering | Laagriga vahepesa |
| 5a | Chamber complete | Камера - комплект | Kompletní článek | Kammer komplett | Kammer komplet | Komplektne vahepesa |
| 6 | Base | Основа | Patka | Fußstück | Fodstykke | Alus |
| 6a | Stop pin | Шплент | Zarážkový kolík | Sperrzapfen | Rotationslås | Lukustustihvt |
| 6d | Guide plate for base | Водеща плоча за основата | Vodicí deska patky | Führungsplatte für Fußstück | Styreplade til fodstykke | Aluse juhtplaat |
| 6g | Bearing ring | Ролков лагер | Kroužek ložiska | Lagerring | Lejering | Alumine laager |
| 7 | Coupling guard | Предпазен капак на съединителят | Kryt spojky | Schutzschirm | Skærm | Ühendusmuhvi kate |
| 7a | Screw | Винт | Šroub | Schraube | Skrue | Kruvi |
| 8 | Coupling complete | Съединител - комплект | Kompletní spojka | Kupplung komplett | Kobling komplet | Komplektne ühendusmuhv |
| 9 | Screw | Винт | Šroub | Schraube | Skrue | Kruvi |
| 10 | Shaft pin | Шплент на вала | Válcový kolík | Zylinderstift | Stift | Võlli tihvt |
| 10a | Coupling half | | | | | |
| 12 | Flange (oval) | | | | | |
| 18 | Air vent screw | Винт за обезвъздушаване | Odvzdušňovací šroub | Entlüftungsschraube | Luftskrue | Õhutusventiil |
| 19 | Pipe plug | Тапа на тръбата | Zátka | Stopfen | Rørprop | Ääriku kork |
| 21 | Plug | Пробка | Zátka | Stopfen | Prop | Kork |
| 23 | Plug | Пробка | Zátka | Stopfen | Prop | Kork |
| 25 | Drain plug | Пробка за дрениране | Vypouštěcí zátka | Entleerungsstopfen | Tømmeprop | Tühjendusava kork |
| 26 | Staybolt | Шпилка | Rozpěrný šroub | Stehbolzen | Støttebolt | Distantspolt |
| 26a | Strap | Лента | Stahovací pás | Spannband | Spændebånd | Klamber |
| 26b | Screw | Винт | Šroub | Schraube | Skrue | Kruvi |
| 26c | Washer | Шайба | Podložka | Unterlegscheibe | Spændeskive | Seib |
| 28 | Screw | Винт | Šroub | Schraube | Skrue | Kruvi |
| 28a | Screw | Винт | Šroub | Schraube | Skrue | Kruvi |
| 31 | Screw | Винт | Šroub | Schraube | Skrue | Kruvi |
| 32 | Washer | | | | | |
| 32a | Washer | Шайба | Podložka | Unterlegscheibe | Spændeskive | Seib |
| 35 | Screw | Винт | Šroub | Schraube | Skrue | Kruvi |
| 36 | Nut | Гайка | Matice | Mutter | Møtrik | Mutter |
| 36a | Nut | Гайка | Matice | Mutter | Møtrik | Mutter |
| 37 | O-ring/gasket | О-пръстен/уплътнение | O-kroužek/těsnicí kroužek | O-Ring/Dichtung | O-ring/pakning | O-ring/tihend |
| 38 | O-ring | О-пръстен | O-kroužek | O-Ring | O-ring | O-ring |
| 38a | O-ring | О-пръстен | O-kroužek | O-Ring | O-ring | O-ring |
| 39 | Gasket | | | | | |
| 44 | Inlet part complete | Входяща част - комплект | Kompletní vtoková část | Einlaufteil komplett | Indløbsdel komplet | Komplektne imiosa |
| 44a | Inlet part upper | | | | | |
| 44b | Inlet part lower | | | | | |
| 45 | Neck ring | Пръстен | Mezerový kroužek | Spaltring | Tætningsring | Tihendusrõngas |
| 45a | Neck ring complete | Пръстен - комплект | Kompletní mezerový kroužek | Spaltring komplett | Tætningsring komplet | Tihendusrõngas |
| 47 | Bearing ring | Търкалящ лагер | Kroužek ložiska | Lagerring | Lejering | Laager |
| 47a | Bearing with driver | Търкалящ лагер с винт за застопоряване | Ložisko s unašečem | Lager mit Mitnehmer | Leje med medbringer | Juhikuga vahelaager |
| 47b | Bearing ring, rotating | Търкалящ лагер - въртящ | Kroužek ložiska otočný | Lagerring, rotierend | Lejering, roterende | Laager, pöörlev |
| 47c | Bush | Лагерна втулка | Pouzdro | Buchse | Bøsning | Puks |
| 47d | Retaining ring | Спирателен пръстен | Přídržný kroužek | Haltering | Låsering | Lukustusrõngas |
| 47e | Retaining ring | Спирателен пръстен | Přídržný kroužek | Haltering | Låsering | Lukustusrõngas |
| 48 | Split cone nut | Гайка на разрязания конус | Matice upínacího pouzdra | Mutter für Klemmbuchse | Møtrik for klembøsning | Lõhismutter |
| 49 | Impeller | Работно колело | Oběžné kolo | Laufrad | Løber | Tööratas |
| 49a | Impeller | Работно колело | Oběžné kolo | Laufrad | Løber | Tööratas |
| 49b | Split cone | Разрязан конус | Upínací pouzdro | Klemmbuchse | Klembøsning | Survepuks |
| 49c | Wear ring | Износващ се пръстен | Těsnicí kruh | Verschleißring | Slidring | Kulutusrõngas |
| 50a | Outlet part/top guide vanes | | | | | |
| 51 | Pump shaft | Вал на помпата | Hřídel čerpadla | Pumpenwelle | Pumpeaksel | Pumba võll |
| 55 | Sleeve | Външна втулка | Vnější plášť | Mantel | Svøb | Kattesärk |
| 56 | Base plate | Основна плоча | Základová deska | Grundplatte | Fodplade | Alusplaat |
| 56a | Base plate | Основна плоча | Základová deska | Grundplatte | Fodplade | Alusplaat |
| 56c | Screw | Винт | Šroub | Schraube | Skrue | Kruvi |
| 56d | Washer | Шайба | Podložka | Unterlegscheibe | Spændeskive | Seib |
| 57 | O-ring | О-пръсетн | O-kroužek | O-Ring | O-ring | O-ring |
| 58 | Seal carrier | Носач на уплътнението | Unašeč ucpávky | Halter für Wellenabdichtung | Holder for akseltætning | Tihendi kandur |
| 58a | Screw | Винт | Šroub | Schraube | Skrue | Kruvi |
| 60 | Spring | Пружина | Pružina | Feder | Fjeder | Vedru |
| 61 | Seal driver | Водач | Unašeč | Mitnehmer | Medbringer | Võllitihendi juhik |
| 62 | Stop ring | Зегерка | Dorazový kroužek | Stopring | Stopring | Lukustusrõngas |
| 64 | Spacing pipe | Дистанционна тръба | Distanční pouzdro | Distanzhülse | Afstandsbøsning | Distantspuks |
| 64a | Spacing pipe | Дистанционна тръба | Distanční pouzdro | Distanzhülse | Afstandsbøsning | Distantspuks |
| 64b | Spacing pipe | | | | | |
| 64c | Clamp, splined | Шлицова клема | Drážková spona | Spannstück, Vielnut | Spændestykke, spline | Soontega puks |
| 64d | Spacing pipe | Дистанционна тръба | Distanční pouzdro | Distanzhülse | Afstandsbøsning | Distantspuks |
| 65 | Neck ring retainer | Държач на пръстена | Přídržka mezerového kroužku | Halter für Spaltring | Holder for tætningsring | Tihendusrõnga klamber |
| 66 | Washer | Шайба | Podložka | Unterlegscheibe | Spændeskive | Seib |
| 66a | Washer | Шайба | Podložka | Unterlegscheibe | Spændeskive | Seib |

| Pos. | Designation | | | | | |
|---|---|---|---|---|---|---|
| | GB | BG | CZ | DE | DK | EE |
| 66b | Lock washer | Контра - шайба | Pojistná podložka | Sicherungsblech | Låseskive | Vedruseib |
| 67 | Nut/screw | Гайка/Винт | Matice/Šroub | Mutter/Schraube | Møtrik/Skrue | Mutter/Kruvi |
| 69 | Spacing pipe | Дистанционна тръба | Distanční pouzdro | Distanzhülse | Afstandsbøsning | Distantspuks |
| 76 | Nameplate set | Табела - комплект | Sada štítků | Schildersatz | Skiltesæt | Pumba sildik |
| 76a | Rivet | | | | | |
| 77 | Pump head cover | | | | | |
| 100 | O-ring | О-пръстен | O-kroužek | O-Ring | O-ring | O-ring |
| 105 | Shaft seal | Уплътнение на вала | Hřídelová ucpávka | Wellenabdichtung | Akseltætning | Võllitihend |
| 201 | Flange | Фланец | Příruba | Flansch | Flange | Äärik |
| 203 | Retaining ring | Спирателен пръстен | Přídržný kroužek | Haltering | Låsering | Lukustusrõngas |

| Pos. | Designation | | | | |
|---|---|---|---|---|---|
| | ES | FI | FR | GR | HR |
| 1 | Brida acoplamiento | Välilaippa | Bride d'adaptation | Φλάντζα προσαρμογής | međuprirubnica |
| 1a | Acoplamiento | Moottorin jalusta | Lanterne moteur | Στήριγμα κινητήρα | međukomad |
| 2 | Cabezal bomba | Pumppupää | Tête de pompe | Κεφαλή αντλίας | glava crpke |
| 3 | Cámara superior | Pesä/ylin | Chambre supérieure | Θάλαμος, άνω | gornja komora |
| 3a | Cámara sin anillo de junta | Pesä, ilman kaularengasta | Chambre sans bague d'étanchéité | Θάλαμος χωρίς δακτύλιο λαιμού | komora bez rascijepljenog prstena |
| 4 | Cámara completa | Täydellinen pesä | Chambre complète | Θάλαμος πλήρης | kompletna komora |
| 4a | Cámara con anillo cojinete | Pesä laakerirenkailla | Chambre avec bague de palier | Θάλαμος με δακτύλιο εδράνου | komora s ležajnim prstenom |
| 5a | Cámara completa | Täydellinen pesä | Chambre complète | Θάλαμος πλήρης | kompletna komora |
| 6 | Base | Jalkakappale | Pied de pompe | Βάση | nožni dio |
| 6a | Pasador tope | Pidätintappi, lukitustappi | Goupille d'arrêt | Πείρος συγκράτησης | zatik |
| 6d | Placa guía para base | Ohjauslevy jalustaan | Plaque pour pied de pompe | Πλάκα οδηγός γιά τη βάση | vodilica za nožni dio |
| 6g | Anillo cojinete | Laakerirengas | Joint de palier | Δακτύλιος εδράνου | prsten ležaja |
| 7 | Protector acoplamiento | Kytkimen suoja | Protège-accouplement | Προφυλακτήρας συνδέσμου | zaštita spojke |
| 7a | Tornillo | Ruuvi | Vis | Κοχλίας | vijak |
| 8 | Acoplamiento completo | Täydellinen kytkin | Accouplement complet | Σύνδεσμος πλήρης | spojka kompletna |
| 9 | Tornillo | Ruuvi | Vis | Κοχλίας | vijak |
| 10 | Pasador eje | Akselitappi | Goupille cylindrique | Πείρος άξονα | zatik vratila |
| 18 | Tornillo purga aire | Ilmausruuvi | Vis de purge | Τάπα εξαερισμού | odzračni vijak |
| 19 | Tapón tubería | Putkitulppa | Bouchon | Τάπα σωλήνα | čep |
| 21 | Tapón | Tulppa | Bouchon | Τάπα | čep |
| 23 | Tapón | Tulppa | Bouchon | Τάπα | čep |
| 25 | Tapón purga | Tyhjennystulppa | Bouchon de vidange | Τάπα αποστράγγισης | čep za pražnjenje |
| 26 | Espárrago sujeción | Pinnapultti | Goujon | Κοχλίες συγκράτησης | sprežni vijak |
| 26a | Tirante | Haka (säppi) | Tirant d'assemblage | Τιράντα | zatezna traka |
| 26b | Tornillo | Ruuvi | Vis | Κοχλίας | vijak |
| 26c | Arandela | Aluslevy | Rondelle | Ροδέλα | podložna pločica |
| 28 | Tornillo | Ruuvi | Vis | Κοχλίας | vijak |
| 28a | Tornillo | Ruuvi | Vis | Κοχλίας | vijak |
| 31 | Tornillo | Ruuvi | Vis | Κοχλίας | vijak |
| 32a | Arandela | Aluslevy | Rondelle | Ροδέλα | podložna pločica |
| 35 | Tornillo | Ruuvi | Vis | Κοχλίας | vijak |
| 36 | Tuerca | Mutteri | Ecrou | Περικόχλιο | matica |
| 36a | Tuerca | Mutteri | Ecrou | Περικόχλιο | matica |
| 37 | Junta tórica/junta | O-rengas tiiviste | Joint/bague | Δακτύλιος-Ο/παρέμβυσμα | O-prsten/brtva |
| 38 | Junta tórica | O-rengas | Joint | Δακτύλιος-Ο | O-prsten |
| 38a | Junta tórica | O-rengas | Joint | Δακτύλιος-Ο | O-prsten |
| 44 | Parte aspiración completa | Täydellinen sisäosa | Partie aspiration complète | Πλήρες εσωτερικό μέρος | ulazni dio kompletan |
| 45 | Anillo tope | Kaularengas | Bague d'étanchéité | Δακτύλιος λαιμού | rascijepljeni prsten |
| 45a | Anillo tope completo | Täydellinen kaularengas | Bague d'étanchéité complète | Δακτύλιος λαιμού πλήρης | rascijepljeni prsten kompletan |
| 47 | Anillo cojinete | Laakerirengas | Bague de palier | Δακτύλιος εδράνου | prsten ležaja |
| 47a | Cojinete con engranaje | Ohjainlaakeri | Bague de palier avec driver | Εδρανο με οδηγό | prsten ležaja sa zahvatnikom |
| 47b | Anillo cojinete giratorio | Laakerirengas, pyörivä | Bague de palier tournante | Δακτύλιος εδράνου στρεφόμενος | prsten ležaja, rotirajući |
| 47c | Manguito | Holkki | Douille | Φωλιά | tuljak |
| 47d | Anillo cierre | Lukitusrengas | Bague de blocage | Δακτύλιος συγκράτησης | pridržni prsten |
| 47e | Anillo cierre | Lukitusrengas | Bague de blocage | Δακτύλιος συγκράτησης | pridržni prsten |
| 48 | Tuerca casquillo cónico | Kartioholkki mutteri | Ecrou de cône de serrage | Περικόχλιο διαιρούμενου κώνου | matica za konusni prsten |
| 49 | Impulsor | Juoksupyörä | Roue | Πτερωτή | rotor |
| 49a | Impulsor | Juoksupyörä | Roue | Πτερωτή | rotor |
| 49b | Casquillo cónico | Kartioholkki | Cône de serrage | Διαιρούμενος κώνος | konusni prsten |
| 49c | Anillo desgaste | Kulutusrengas | Bague d'usure | Δακτύλιος φθοράς | potrošni prsten |
| 51 | Eje bomba | Pumppuakseli | Arbre de pompe | Αξονας αντλίας | vratilo crpke |
| 55 | Camisa exterior | Ulompi vaippa | Chemise | Εξωτερικό χιτώνιο | plašt |
| 56 | Placa base | Jalustalevy | Plaque de base | Πλάκα βάσης | osnovna ploča |
| 56a | Placa base | Jalustalevy | Plaque de base | Πλάκα βάσης | osnovna ploča |
| 56c | Tornillo | Ruuvi | Vis | Κοχλίας | vijak |
| 56d | Arandela | Aluslevy | Rondelle | Ροδέλα | podložna pločica |
| 57 | Junta tórica | O-rengas | Joint | Δακτύλιος-Ο | O-prsten |
| 58 | Soporte cierre | Tiivistekannatin | Toc d'entraînement | Φορέας στυπιοθλίπτη | držač brtve |
| 58a | Tornillo | Ruuvi | Vis | Κοχλίας | vijak |
| 60 | Muelle | Jousi | Ressort | Ελατήριο | opruga |
| 61 | Guía de cierre | Tiivisteen vetotappi | Toc d'entrainement | Οδηγός στεγανοποιητικού | zahvatnik |
| 62 | anillo de tope | Pysäytinrengas | Bague d'arrêt | Τερματικός δακτύλιος | zaustavni prsten |
| 64 | Casquillo espaciador | Väliholkki | Douille d'entretoise | Αποστάτης | odstojnik |
| 64a | Casquillo espaciador | Väliholkki | Douille d'entretoise | Αποστάτης | odstojnik |
| 64c | Casquillo ranurado | Kiristin, rihlattu | Pièce de serrage | Στεφάνη με εγκοπές | zatezni komad, višeutorni |
| 64d | Casquillo espaciador | Väliholkki | Douille entretoise | Αποστάτης | odstojnik |
| 65 | Retén anillo junta | Kaulusrenkaan pidin | Support pour bague d'étanchéité | Στήριγμα δακτυλίου λαιμού | držač za rascijepljeni prsten |

| Pos. | Designation | | | | |
|---|---|---|---|---|---|
| | ES | FI | FR | GR | HR |
| 66 | Arandela | Aluslevy | Rondelle | Ροδέλα | podložna pločica |
| 66a | Arandela | Aluslevy | Rondelle | Ροδέλα | podložna pločica |
| 66b | Arandela cierre | Lukitusaluslevy | Rondelle de blocage | Συγκράτηση ροδέλας | sigurnosna pločica |
| 67 | Tuerca/Tornillo | Mutteri/Ruuvi | Ecrou/Vis | Περικόχλιο/Κοχλίας | matica/vijak |
| 69 | Casquillo espaciador | Väliholkki | Douille entretoise | Αποστάτης | odstojnik |
| 76 | Juego placa identificación | Arvokilpisarja | Plaque d'identification | Σετ πινακίδας | natpisne pločice |
| 100 | Junta tórica | O-rengas | Joint | Δακτύλιος-Ο | O-prsten |
| 105 | Cierre | Akselitiiviste | Garniture mécanique | Στυπιοθλίπτης | brtva vratila |
| 201 | Brida | Laippa | Bride | Φλάντζα | prirubnica |
| 203 | Anillo cierre | Lukitusrengas | Bague de blocage | Δακτύλιος συγκράτησης | pridržni prsten |

| Pos. | Designation | | | | |
|---|---|---|---|---|---|
| | HU | IT | LT | NL | PL |
| 1 | csatlakozó karima | Flangie adattatrici | Tarpinis flanšas | Adapterflens | Kołnierz przejściowy |
| 1a | motortartó közdarab | Lanterna del motore | Variklio atrama | Lantaarnstuk | Podstawa silnika |
| 2 | szivattyúfej | Testa pompa | Siurblio galvutė | Pompkop | Głowica pompy |
| 3 | felső kamra | Camera superiore | Viršutinė kamera | Bovenste kamer | Komora górna |
| 3a | közkamra résgyűrű nélkül | Camera senza collarino | Kamera be kaklelio žiedo | Kamer zonder spaltring | Komora bez pierścienia bieżnego |
| 4 | komplett közkamra | Camera completa | Kamera | Kamer compleet | Komora, kompletna |
| 4a | csapágyas közkamra | Camera con cuscinetto | Kamera su guolio žiedu | Kamer met lager | Komora z pierścieniem oporowym łożyska |
| 5a | komplett közkamra | Camera completa | Kamera | Kamer compleet | Komora, kompletna |
| 6 | talp | Base | Korpusas | Voetstuk | Podstawa |
| 6a | rögzítő tüske | Molla di arresto | Fiksatorius | Anti rotatie stift | Kołek ustalający |
| 6d | áramlásrendező tányér | Guida per basamento | Korpuso centravimo plokštelė | Geleideplaat voor voetstuk | Dolna płyta kierująca |
| 6g | csapágygyűrű | Cuscinetto | Atraminis guolis | Lager | Pierścień oporowy łożyska |
| 7 | tengelykapcsoló burkolat | Giunti di protezione | Movos apsauga | Koppeling beschermer | Osłona sprzęgła |
| 7a | csavar | Vite | Varžtas | Schroef | Śruba |
| 8 | komplett tengelykapcsoló | Giunto completo | Visa mova | Koppeling compleet | Sprzęgło, komplet |
| 9 | csavar | Vite | Varžtas | Schroef | Śruba |
| 10 | tengelyretesz | Molla albero | Veleno kaištis | Stift | Klin mocujący wału |
| 18 | légtelenítő csavar | Vite della ventola | Oro išleidimo angos varžtas | Ontluchtings-schroef | Śruba odpowietrzająca |
| 19 | karima zárócsavar | Tappo | Vamzdžio kamštelis | Plug | Korek |
| 21 | zárócsavar | Tappo | Kamštelis | Plug | Korek |
| 23 | zárócsavar | Tappo | Kamštelis | Plug | Korek |
| 25 | ürítőcsavar | Tappo spurgo | Skysčio išleidimo kamštelis | Aftapplug | Korek spustowy |
| 26 | összefogó rúd | Tiranti | Sąvarža | Trekstag | Śruba ściągająca |
| 26a | összefogó pánt | Tirante | Juostinė apkaba | Spanband | Ściąg |
| 26b | csavar | Vite | Varžtas | Schroef | Śruba |
| 26c | távtartó | Rondella | Poveržlė | Sluitring | Podkładka |
| 28 | csavar | Vite | Varžtas | Schroef | Śruba |
| 28a | csavar | Vite | Varžtas | Schroef | Śruba |
| 31 | csavar | Vite | Varžtas | Schroef | Śruba |
| 32a | távtartó | Rondella | Poveržlė | Sluitring | Podkładka |
| 35 | csavar | Vite | Varžtas | Schroef | Śruba |
| 36 | csavaranya | Dado | Veržlė | Moer | Nakrętka |
| 36a | csavaranya | Dado | Veržlė | Moer | Nakrętka |
| 37 | O-gyűrű/tömítés | O ring/guranizione | Žiedas/tarpiklis | O-ring pakking | Pierścień O-ring/uszczelka |
| 38 | O-gyűrű | O ring | Žiedas | O-ring | Pierścień O-ring |
| 38a | O-gyűrű | O ring | Žiedas | O-ring | Pierścień O-ring |
| 44 | komplett belső rész | Parte interna completa | Visa įsiurbimo dalis | Inlaatdeel compleet | Komora wlotowa |
| 45 | résgyűrű | Collarino | Kakliuko žiedas | Spaltring | Pierścień bieżny |
| 45a | komplett résgyűrű | Colalrino completo | Visas kakliuko žiedas | Spaltring compleet | Pierścień bieżny, obrotowy |
| 47 | csapágygyűrű | Cuscinetto | Guolis | Lager | Pierścień oporowy łożyska |
| 47a | csapágy, megvezetővel | Cuscinetto con guida | Įstatoma guolis | Lager met meenemer | Łożysko z zabierakiem |
| 47b | csapágygyűrű, forgórész | Cuscinetto rotante | Besisukantis guolis | Lager roterend | Pierścień łożyskowy |
| 47c | persely | Boccola | Įvorė | Bus | Tulejka |
| 47d | rögzítő gyűrű | Anello di arresto | Laikantysis žiedas | Borgring | Pierścień mocujący |
| 47e | rögzítő gyűrű | Anello di arresto | Laikantysis žiedas | Borgring | Pierścień mocujący |
| 48 | szorítókúp anya | Dado bussola conica | Skelta kūginė veržlė | Klembusmoer | Nakrętka tulei stożkowej |
| 49 | járókerék | Girante | Darbaratis | Waaier | Wirnik |
| 49a | járókerék | Girante | Darbaratis | Waaier | Wirnik |
| 49b | szorítókúp | Bussola conica | Skelta kūginė įvorė | Klembus | Tuleja stożkowa |
| 49c | kopógyűrű | Anello di usura | Dėvėjimosi žiedas | Slijtring | Pierścień bieżny |
| 51 | szivattyú tengely | Albero pompa | Siurblio velenas | Pompas | Wał pompy |
| 55 | köpenycső | Camicia esterna | Išorinis cilindras | Mantel | Płaszcz |
| 56 | alaplap | Basamento | Korpuso pagrindas | Voetplaat | Podstawa |
| 56a | alaplap | Basamento | Korpuso pagrindas | Voetplaat | Podstawa |
| 56c | csavar | Vite | Varžtas | Schroef | Śruba |
| 56d | távtartó | Rondella | Poveržlė | Sluitring | Podkładka |
| 57 | O-gyűrű | O ring | Žiedas | O-ring | Pierścień O-ring |
| 58 | tömítés zárófedél | Porta tenuta | Riebokšlio laikiklis | Houder voor asafdichting | Mocowanie uszczelnienia |
| 58a | csavar | Vite | Varžtas | Schroef | Śruba |
| 60 | rugó | Molla | Spyruoklė | Veer | Sprężyna |
| 61 | vezető gyűrű | Guida guarnizione | Riebokšlio tarpiklis | Meenemer | Zabierak |
| 62 | stopgyűrű | Anello di arresto | Fiksavimo žiedas | Stopring | Pierścień stopowy |
| 64 | távtartó gyűrű | Tubo distanziale | Tarpinė įvorė | Afstandsbus | Tulejka dystansowa |
| 64a | távtartó gyűrű | Tubo distanziale | Tarpinė įvorė | Afstandsbus | Tulejka dystansowa |
| 64c | hornyos rögzítőgyűrű | Giunto | Apkaba, skelta | Spanstuk, splined | Tulejka wielowypustowa |
| 64d | távtartó gyűrű | Tubo distanziale | Tarpinė įvorė | Afstandsbus | Tulejka dystansowa |
| 65 | résgyűrű rögzítő | Fermo per collarino | Kakliuko žiedo laikiklis | Houder voor spaltring | Tulejka dystansowa |

| Pos. | Designation | | | | |
|---|---|---|---|---|---|
| | HU | IT | LT | NL | PL |
| 66 | távtartó | Rondella | Poveržlė | Sluitring | Podkładka |
| 66a | távtartó | Rondella | Poveržlė | Sluitring | Podkładka |
| 66b | rögzítő alátét | Blocco per rondella | Fiksuojamoji poveržlė | Borgring | Podkładka zabezpieczająca |
| 67 | csavaranya/csavar | Dado/Vite | Fiksuojamoji veržlė/Varžtas | Moer/Schroef | Nakrętka/Śruba |
| 69 | távtartó gyűrű | Tubo distanziale | Tarpinė įvorė | Afstandsbus | Tulejka dystansowa |
| 76 | adattábla készlet | Targhetta | Vardinė plokštelė | Typeplaat set | Tabliczka znamionowa |
| 100 | O-gyűrű | O ring | Žiedas | O-ring | Pierścień O-ring |
| 105 | tengelytömítés | Tenuta meccanica | Riebokšlis | Asafdichting | Uszczelnienie wału |
| 201 | karima | Flangia | Flanšas | Flens | Kołnierz |
| 203 | rögzítő gyűrű | Blocca flangia | Laikantysis žiedas | Borgring | Pierścień mocujący |

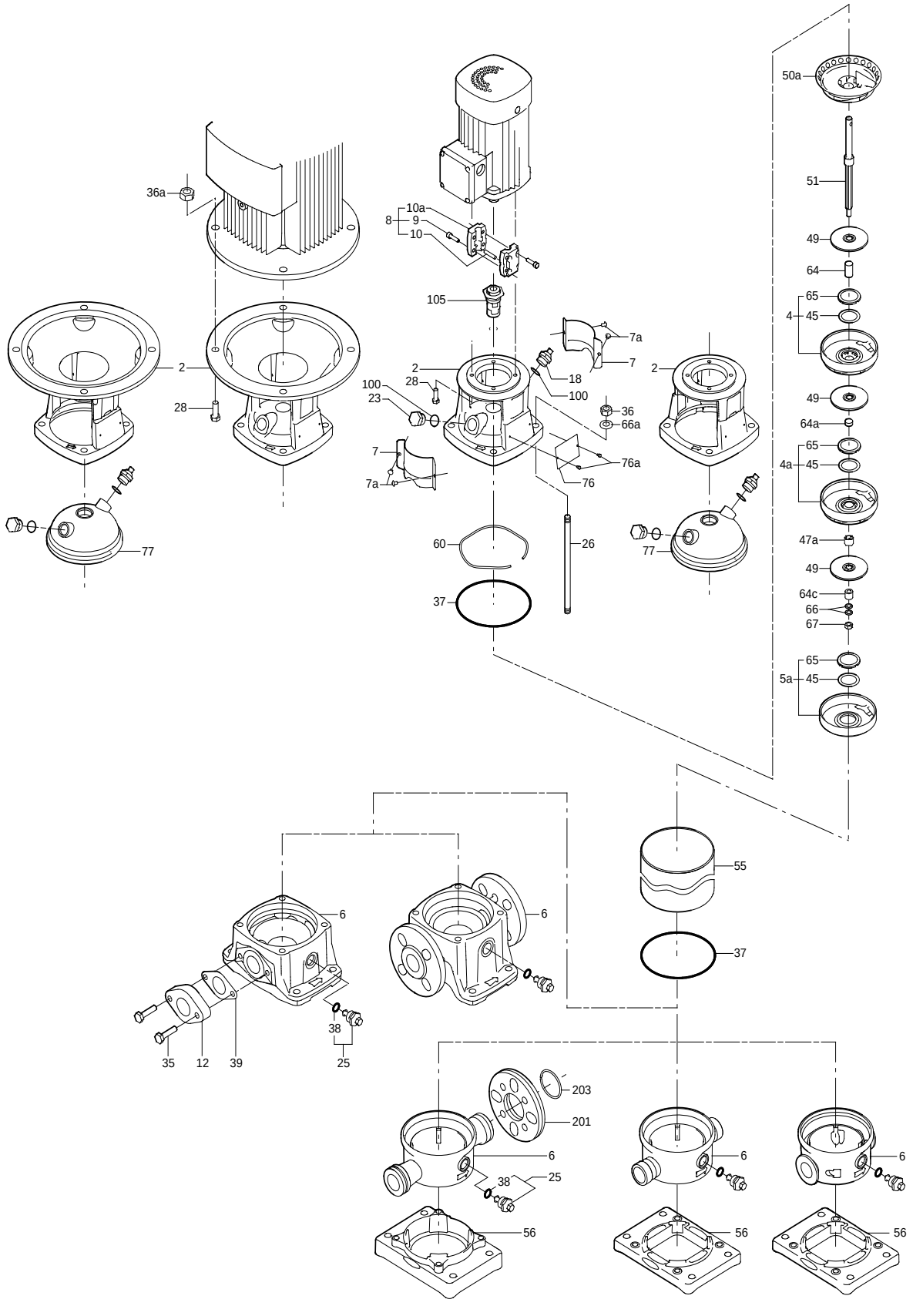
| Pos. | Designation | | | | |
|---|---|---|---|---|---|
| | PT | RO | RS | RU | SE |
| 1 | Flange do adaptador | Flanşa de adaptare | Prirubnica podešavanja | Промежуточный фланец | Mellanfläns |
| 1a | Adaptador do motor | Scaunul motorului | Oslonac motora | Фонарь | Mellanstycke |
| 2 | Cabeça da bomba | Capul pompei | Glava pumpe | Головная часть насоса | Toppstycke |
| 3 | Câmara superior | Camera superioară | Gornje kućište | Верхняя камера | Kammare, övre |
| 3a | Câmara sem aro | Camera fără inel de uzură | Kućište bez oslonog prstena | Камера без щелевого уплотнения | Mallankammare utan tätningsring |
| 4 | Câmara completa | Camera completă | Kompletno kućište | Камера в сборе | Kammare komplett |
| 4a | Câmara com casquilho | Camera cu lagăr | Kućište sa ležišnim prstenom | Камера с подшипниковым кольцом | Mellankammare med lager |
| 5a | Câmara completa | Camera completă | Kompletno kućište | Камера в сборе | Kammare komplett |
| 6 | Base | Baza pompei | Element oslonca | Основание | Fotstycke |
| 6a | Pino | Ştift de blocare | Zaustavni štift | Стопорный штифт | Stoppsprint |
| 6d | Prato-guia da base | Placa de ghidaj pentru baza pompei | Vodeća ploča osnove | Направляющая плита для опоры/лапы | Styrplatta till fotstycke |
| 6g | Casquilho | Lagăr | Prsten kugličnog ležaja | Подшипниковое кольцо | Bottenlager |
| 7 | Protecção do acoplamento | Apărătoare de protecţie | Zaštita spojnice | Защитный кожух | Kopplingsskärm |
| 7a | Parafuso | Şurub | Zavrtanj | Винт | Skruv |
| 8 | Acoplamento completo | Cuplaj complet | Komplet spojnice | Муфта в сборе | Koppling komplett |
| 9 | Parafuso | Şurub | Zavrtanj | Винт | Skruv |
| 10 | Pino do veio | Ştiftul axului | Cilindrični štift | Цилиндрический штифт | Cylinderstift |
| 18 | Parafuso de purga | Şurub de aerisire | Zavrtanj za odzračivanje | Винт вентиляционного отверстия | Luftskruv |
| 19 | Bujão da tubagem | Dop filetat pentru ţeavă | Žep cevi | Заглушка | Rörpropp |
| 21 | Bujão da tubagem | Dop | Čep | Заглушка | Propp |
| 23 | Bujão da tubagem | Dop | Čep | Заглушка | Propp |
| 25 | Bujão de drenagem | Dop (buşon) de golire | Drenažni čep | Заглушка сливного отверстия | Tömningspropp |
| 26 | Perno | Prezoane | Osnovni zavrtanj | Стяжной болт | Stödbult |
| 26a | Tirante | Clemă | Osigurač | Стяжная лента | Spännband |
| 26b | Parafuso | Şurub | Zavrtanj | Винт | Skruv |
| 26c | Anilha | Şaibă | Podloška | Шайба | Bricka |
| 28 | Parafuso | Şurub | Zavrtanj | Винт | Skruv |
| 28a | Parafuso | Şurub | Zavrtanj | Винт | Skruv |
| 31 | Parafuso | Şurub | Zavrtanj | Śruba | Skruv |
| 32a | Anilha | Şaibă | Podloška | Шайба | Bricka |
| 35 | Parafuso | Şurub | Zavrtanj | Винт | Skruv |
| 36 | Fêmea | Piuliţă | Matica | Гайка | Mutter |
| 36a | Fêmea | Piuliţă | Matica | Гайка | Mutter |
| 37 | O-ring/junta | O-ring/garnitură | O-zaptivni prsten | Уплотнительное кольцо круглого сечения/ прокладка | O-ring/packning |
| 38 | O-ring | O-ring | O-prsten | Уплотнительное кольцо круглого сечения | O-ring |
| 38a | O-ring | O-ring | O-prsten | Уплотнительное кольцо круглого сечения | O-ring |
| 44 | Aspiração completa | Parte de intrare completă | Komplet ulazni deo | Деталь всасывающей полости в сборе | Inloppsdel komplett |
| 45 | Aro | Inel de etanşare | Osloni prsten | Щелевое уплотнение | Tätningsring |
| 45a | Aro completo | Inel de etanşare complet | Komplet oslonog prstena | Щелевое уплотнение в сборе | Tätningsring, komplett |
| 47 | Casquilho | Lagăr | Prsten kugličnog ležaja | Кольцо подшипника | Lager |
| 47a | Casquilho com guia | Lagăr cu cuzinet | Kuglični ležaj sa prstenom | Подшипник с "поводком" | Lager med medbringare |
| 47b | Casquilho rotativo | Lagăr rotativ | Kuglični ležaj rotirajući | Вращающееся кольцо подшипника | Lagerring, roterande |
| 47c | Manga | Bucşa | Čaura | Втулка | Bussning |
| 47d | Retentor | Inel de blocare | Noseći prsten | Стопорное кольцо | Låsbricka |
| 47e | Retentor | Inel de blocare | Noseći prsten | Стопорное кольцо | Låsbricka |
| 48 | Fêmea cónica | Piuliţă cu strângere pe con | Matica konusne čaure | Гайка для зажимной втулки | Mutter för klämbussning |
| 49 | Impulsor | Rotor | Obrtno kolo pumpe | Рабочее колесо | Pumphjul |
| 49a | Impulsor | Rotor | Obrtno kolo pumpe | Рабочее колесо | Pumphjul |
| 49b | Casquilho cónico | Con de strângere | Konusna čaura | Разжимная втулка | Klämbussning |
| 49c | Aro de desgaste | Inel de uzură | Habajući prsten | Антифрикционное кольцо | Slitring |
| 51 | Veio | Axul pompei | Osovina pumpe | Вал насоса | Pumpaxel |
| 55 | Camisa exterior | Manta exterioară | Spoljna zaštita | Кожух | Mantel |
| 56 | Base | Placa de bază | Osnovna ploča | Плита-основание | Fotstycke |
| 56a | Base | Placa de bază | Osnovna ploča | Плита-основание | Fotstycke |
| 56c | Parafuso | Şurub | Zavrtanj | Śruba | Skruv |
| 56d | Anilha | Şaibă | Podloška | Шайба | Bricka |
| 57 | O-ring | O-ring | O-prsten | Уплотнительное кольцо круглого сечения | O-ring |
| 58 | Suporte do empanque | Suport pentru etanşare | Kućište zaptivanja osovine | Базовая деталь уплотнения вала | Hållare för axeltätning |
| 58a | Parafuso | Şurub | Zavrtanj | Винт | Skruv |
| 60 | Mola | Arc | Opruga | Пружина | Fjäder |
| 61 | Batente do espaçador | Distanţier pentru etanşarea mecanică | Pogonaš zaptivaca | Пружина торцового уплотнения | Medbringare |
| 62 | Mola de encosto | Semering | Zaustavni prsten | Стопорное кольцо | Stoppring |
| 64 | Espaçador | Tub distanţier | Odstojna čaura | Промежуточная втулка | Avståndsbussning |
| 64a | Espaçador | Tub distanţier | Odstojna čaura | Промежуточная втулка | Avståndsbussning |
| 64c | Casquilho escatelado | Suport canelat | Osigurač saumetkom | Шлицевая зажимная гильза | Avståndsbussning (spline) |
| 64d | Espaçador | Tub distanţier | Odstojna čaura | Промежуточная втулка | Avståndsbussning |
| 65 | Retentor do aro | Suport pentru inelul de etanşare | Držač oslonog prstena | Базовая деталь щелевого уплотнения | Hållare för tätningsring |

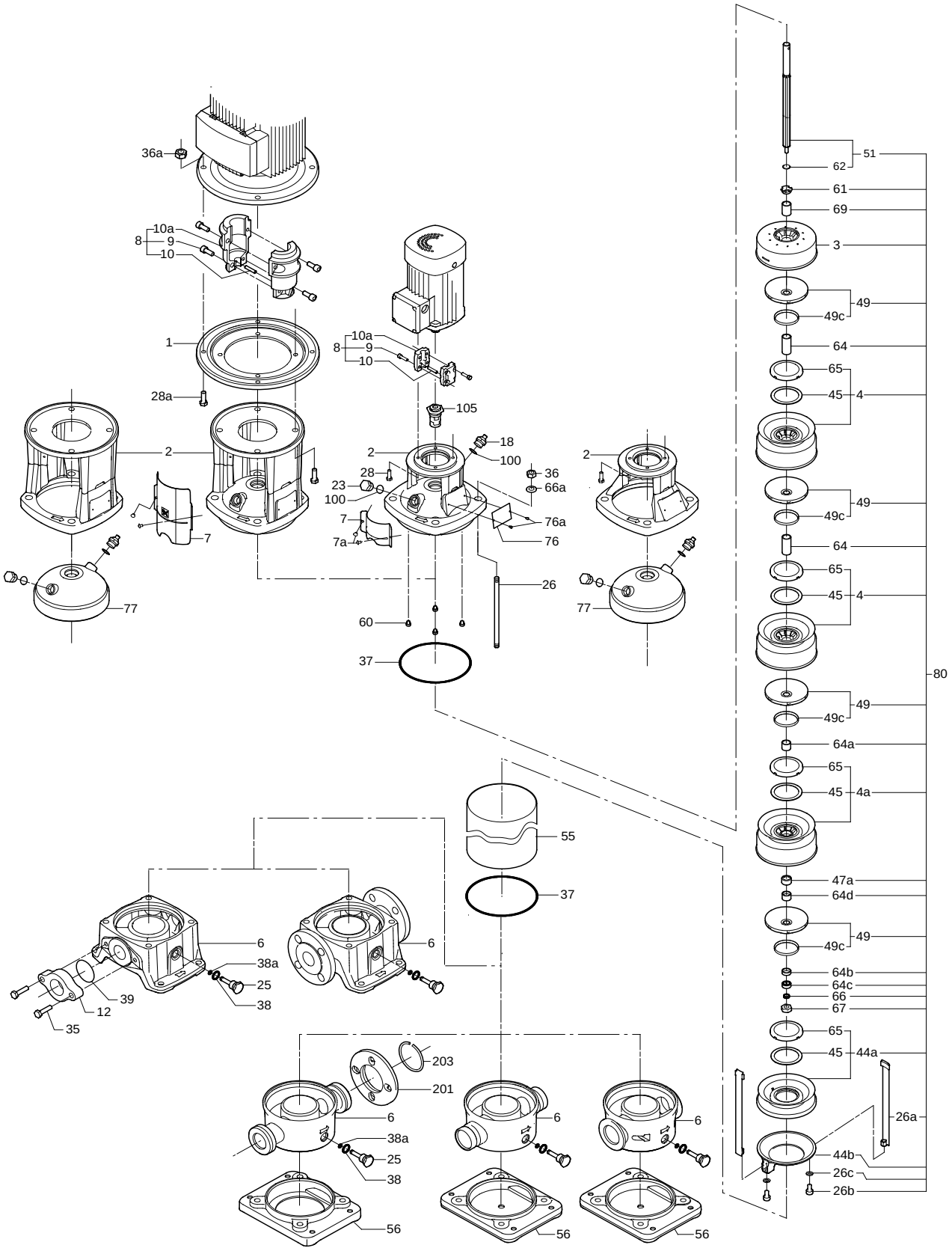
| Pos. | Designation | | | | |
|---|---|---|---|---|---|
| | PT | RO | RS | RU | SE |
| 66 | Anilha | Şaibă | Podloška | Шайба | Bricka |
| 66a | Anilha | Şaibă | Podloška | Шайба | Bricka |
| 66b | Anilha retentora | Şaibă de blocare | Osiguravajuća podloška | Стопорная шайба | Låsbricka |
| 67 | Fêmea/Parafuso | Piuliţă/Şurub | Matica/Zavrtanj | Гайка/Śruba | Mutter/Skruv |
| 69 | Espaçador | Tub distanţier | Odstojna čaura | Промежуточная втулка | Avståndsbussning |
| 76 | Chapa de identificação | Eticheta | Pločica označavanja | Фирменная табличка с техническими параметрами в сборе | Typskylt |
| 100 | O-ring | O-ring | O-prsten | Уплотнительное кольцо круглого сечения | O-ring |
| 105 | Empanque mecânico | Etanşare mecanică | Zaptivač osovine | Уплотнение вала | Axeltätning |
| 201 | Flange | Flanşa | Prirubnica | Фланец | Fläns |
| 203 | Anel retentor | Inel de blocare | Osloni prsten | Стопорное кольцо | Låsbricka |

| Pos. | Designation | | | | |
|---|---|---|---|---|---|
| | SI | SK | TR | UA | KZ |
| 1 | Vmesna prirobnica | Medzipríruba | Küçültme flanşı | Перехідник | Аралық фланец |
| 1a | Konzola motorja | Lucerna | Motor oturağı | Опора електродвигуна | Шам |
| 2 | Glava črpalke | Horné teleso čerpadla | Pompa başı | Головна частина насоса | Сорғының жоғарғы бөлігі |
| 3 | Najvišja stopnja | Horná komora | Bölme, üst | Камера, верх | Жоғарғы камера |
| 3a | Stopnja brez režnega obroča | Komora bez rozperného krúžka | Boyun halkasız bölme | Камера без ущільнювального кільця | Саңылаусыз тығыздау камерасы |
| 4 | Stopnja komplet | Kompletná komora | Komple bölme | Набір камер | Жинақталған камера |
| 4a | Stopnja z ležajnim obročem | Komora s ložiskovým krúžkom | Yatak halkalı bölme | Камера з кільцем підшипника | Подшипник сақинасы бар камера |
| 5a | Stopnja komplet | Kompletná komora | Komple bölme | Набір камер | Жинақталған камера |
| 6 | Podnožje črpalke | Spodné teleso čerpadla | Taban | Основа | Табаны |
| 6a | Zaporni zatič | Uzáverný kolík | Stop pimi | Штифт зупинки | Ұстағыш штифт |
| 6d | Vodilna plošča za podnožje črpalke | Vodiaca platňa pre spodné teleso | Taban için kılavuz plakası | Направляюча плита для основи | Тіреулердің/аяқтардың бағыттағыш плитасы |
| 6g | Ležajni obroč | Ložiskový krúžok | Yatak halkası | Кільце опори | Подшипник сақина |
| 7 | Zaščitni pokrov | Ochranný kryt spojky | Kaplin koruması | Захисний кожух | Қорғағыш қаптама |
| 7a | Vijak | Skrutka | Vida | Гвинт | Винт |
| 8 | Sklopka komplet | Kompletná spojka | Komple kaplin | Муфта в сборі | Жинақталған муфта |
| 9 | Vijak | Skrutka | Vida | Гвинт | Винт |
| 10 | Cilindrični zatič | Zylindrický kolík | Şaft pimi | Штифт валу | Цилиндрлі штифт |
| 18 | Odzračevalni vijak | Odvzdušňovacia skrutka | Hava tahliye vidası | Гвинт вентиляційного клапана | Желдету саңылауының винті |
| 19 | Čep | Zátka | Boru tapası | Трубна заглушка | Тығын |
| 21 | Čep | Zátka | Tapa | Кабельний ввід | Тығын |
| 23 | Čep | Zátka | Tapa | Кабельний ввід | Тығын |
| 25 | Izpraznjevalni čep | Vypúšťacia skrutka | Tahliye tapası | Пробка дренажного отвору | Ағызу саңылауының тығыны |
| 26 | pritrjevalni vijak | Stahovacie skrutky | Germe civatası, saplama | Шпилька | Тарту бұрандасы |
| 26a | Zatezni pas | Stahovacie spony | Şerit | Стрічка | Тартқыш бау |
| 26b | Vijak | Skrutka | Vida | Гвинт | Винт |
| 26c | Podložka | Podložka | Pul | Шайба | Шайба |
| 28 | Vijak | Skrutka | Vida | Гвинт | Винт |
| 28a | Vijak | Skrutka | Vida | Гвинт | Винт |
| 31 | Vijak | Skrutka | Vida | Гвинт | Винт |
| 32a | Podložka | Podložka | Pul | Шайба | Шайба |
| 35 | Vijak | Skrutka | Vida | Гвинт | Винт |
| 36 | Matica | Matica | Somun | Гайка | Гайка |
| 36a | Matica | Matica | Somun | Гайка | Гайка |
| 37 | O-tesnilo/ tesnilo | O-krúžok/tesnenie | O-ring/conta | Ущільнювальне кільце/прокладка | Дөңгелек қималы тығыздағыш сақина/ аралық қабат |
| 38 | O-tesnilo | O-krúžok | O-ring | Ущільнювальне кільце | Дөңгелек қималы тығыздағыш сақина |
| 38a | O-tesnilo | O-krúžok | O-ring | Ущільнювальне кільце | Дөңгелек қималы тығыздағыш сақина |
| 44 | Vstopni del komplet | Vtoková časť komplet | Komple emme kısmı | Всмоктуюча частина повна | Жиналған сорғыш қуыстағы бөлшек |
| 45 | Režni obroč | Tesniaci krúžok | Boyun halkası | Ущільнювальне кільце | Саңылау тығыздағыш |
| 45a | Režni obroč komplet | Tesniaci krúžok komplet | Komple boyun halkası | Ущільнювальне кільце повне | Жинақталған саңылау тығыздағыш |
| 47 | Ležajni obroč | Ložiskový krúžok | Yatak halkası | Кільце опори | Подшипник сақинасы |
| 47a | Ležaj z nosilcem | Ložisko s unášačom | Sürücülü yatak halkası | Опора з двигуном | "Жібі бар" подшипник |
| 47b | Ležajni obroč, rotirajoč | Ložiskový krúžok, rotujúci | Yatak halkası, döner | Кільце опори, що обертається | Подшипниктің айналғыш сақинасы |
| 47c | Puša | Medzikrú-žok/vložka | Burç | Втулка | Втулка |
| 47d | Držalni obroč | Držný krúžok | Tespit halkası | Стопорне кільце | Ұстағыш сақина |
| 47e | Držalni obroč | Držný krúžok | Tespit halkası | Стопорне кільце | Ұстағыш сақина |
| 48 | Matica za pritrdilno pušo | Matica so stahovacou vložkou | Yarık koni somunu | Гайка для розтискної втулки | Қысқыш втулка гайкасы |
| 49 | Rotor črpalke | Obežné koleso | Kanat | Робоче колесо | Жұмыс дөңгелегі |
| 49a | Rotor črpalke | Obežné koleso | Kanat | Робоче колесо | Жұмыс дөңгелегі |
| 49b | Pritrdilna puša | Stahovacia vložka | Kapalı somun | Розтискна втулка | Босату втулкасы |
| 49c | Obrabni obroč | Uzatváracií krúžok | Aşınma halkası | Кільце щілинного ущільнення | Антифрикциялық сақина |
| 51 | Os črpalke | Hriadeľ | Mil | Вал насоса | Сорғы білігі |
| 55 | Plašč | Plášť | Dış ceket | Зовнішня втулка | Қаптама |
| 56 | Osnovna plošča | Základová platňa | Şase | Плита-основа | Астыңғы плита |
| 56a | Osnovna plošča | Základová platňa | Şase | Плита-основа | Астыңғы плита |
| 56c | Vijak | Skrutka | Vida | Гвинт | Винт |
| 56d | Podložka | Podložka | Pul | Шайба | Шайба |
| 57 | O-tesnilo | O-krúžok | O-ring | Ущільнювальне кільце | Дөңгелек қималы тығыздағыш сақина |
| 58 | Držalo drsnega tesnila | Držiak upchávky hriadeľa | Salmastra taşıyıcı | Тримач ущільнення | Білік тығыздағышының негізгі бөлшегі |
| 58a | Vijak | Skrutka | Vida | Гвинт | Винт |
| 60 | Vzmet | Spružina | Yay | Пружина | Серіппе |
| 61 | Gonilo tesnila | Unášač | Salmastra yuvası | Оправлення ущільнення | Бүйірлік тығыздау серіппесі |
| 62 | Stop prstan | Dorazový krúžok | Kitleme somunu | Стопорне кільце | Ұстағыш сақина |
| 64 | Distančnik | Dištančné puzdro | Ayar ara parçası | Втулка | Аралық втулка |
| 64a | Distančnik | Dištančná puzdro | Ayar ara parçası | Втулка | Аралық втулка |
| 64c | Natezni kos, utorni | Španovací kus, drážkovaný | Kelepçe boru | Шлицевий хомут | Тісті қысқыш гильза |
| 64d | Distančnik | Dištančné puzdro | Ayar ara parçası | Втулка | Аралық втулка |
| 65 | Držalo režnega obroča | Držiak pre tesniaci krúžok | Boğaz aşınma halkası | Фіксатор ущільнювального кільця | Саңылау тығыздағышының негізгі бөлшегі |

| Pos. | Designation | | | | |
|---|---|---|---|---|---|
| | SI | SK | TR | UA | KZ |
| 66 | Podložka | Podložka | Pul | Шайба | Шайба |
| 66a | Podložka | Podložka | Pul | Шайба | Шайба |
| 66b | Varnostna podložka | Zaisťovací plech | Kitleme pulu | Стопорна шайба | Ұстағыш шайба |
| 67 | Matica/Vijak | Matica/Skrutka | Somun/Vida | Гайка/гвинт | Гайка/ винт |
| 69 | Distančnik | Dištančné puzdro | Ayar ara parçası | Втулка | Аралық втулка |
| 76 | Tipska ploščica | Štítok čerpadla | Etiket | Шилдик насоса | Жинақталған техникалық параметрлері бар фирмалық тақташа |
| 100 | O-tesnilo | O-krúžok | O-ring | Ущільнювальне кільце | Дөңгелек қималы тығыздағыш сақина |
| 105 | Drsno tesnilo | Upchávka hriadeľa | Mekanik salmastra | Торцеве ущільнення валу | Білік тығыздағышы |
| 201 | Prirobnica | Príruba | Flanş | Фланець | Фланец |
| 203 | Držalni obroč | Tesniaci krúžok/tesnenie | Tutucu halka | Стопорне кільце | Ұстағыш сақина |

## CR, CRI, CRN 1s, 1, 3 and 5




36a
10a
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28a
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7
77
105
18
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66a
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23
100
7
7a
76a
76
26
60
37
51
62
61
69
3
49
49c
64
65
45
4
64a
4a
47a
64d
64b
64c
66
67
44a
26a
44b
26c
26b
80
55
6
38a
25
38
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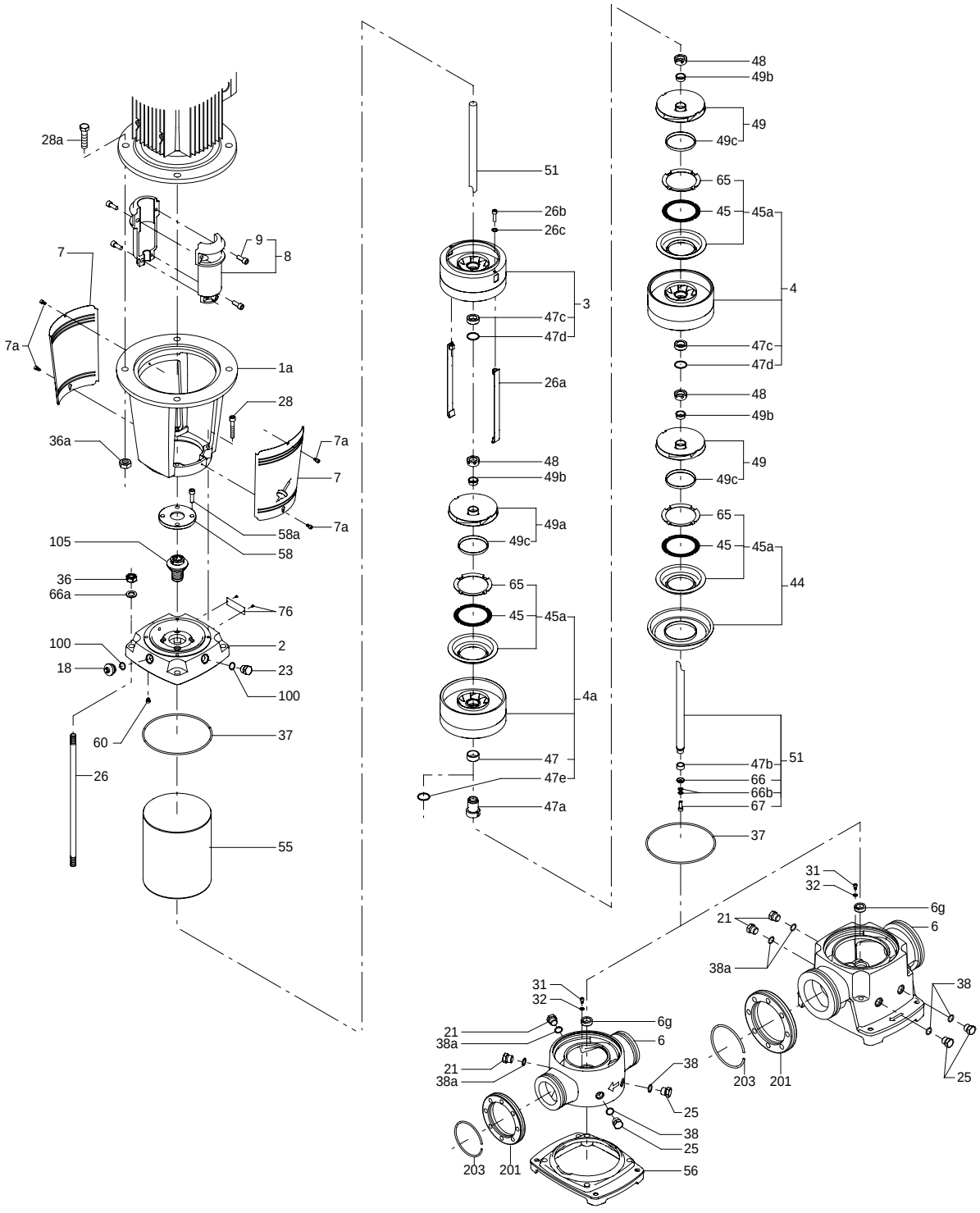
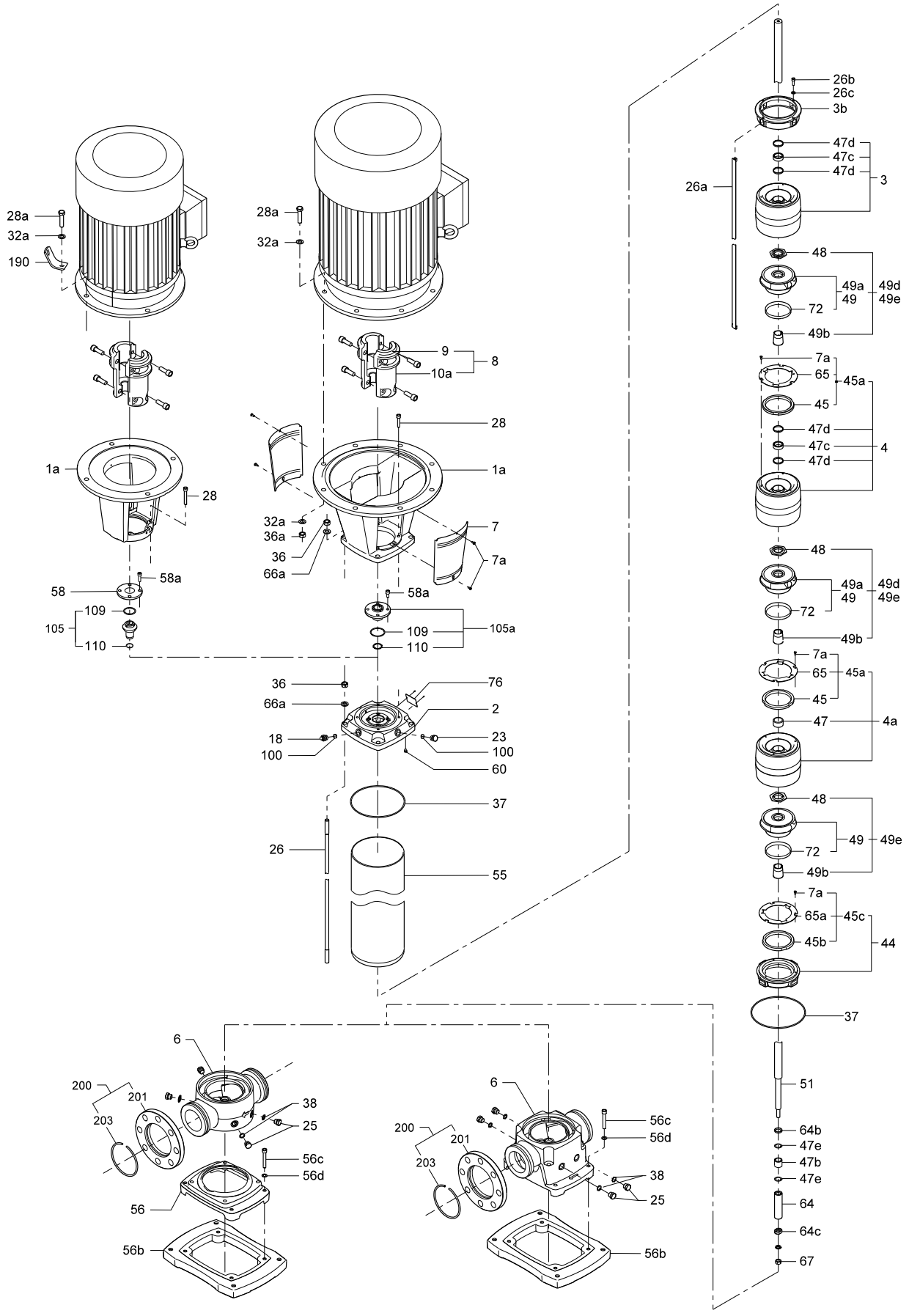
12
35
203
201
56
TM02 7383 3403

## CR, CRN 32, 45, 64 and 90




TM01 9996 3600

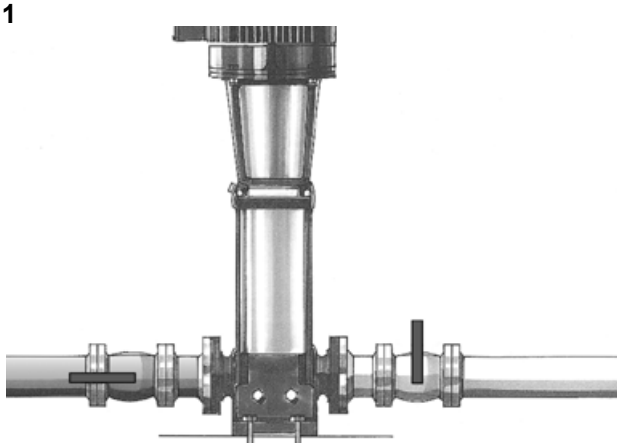
## CR, CRN 120 and 150




TM03 6001 4106

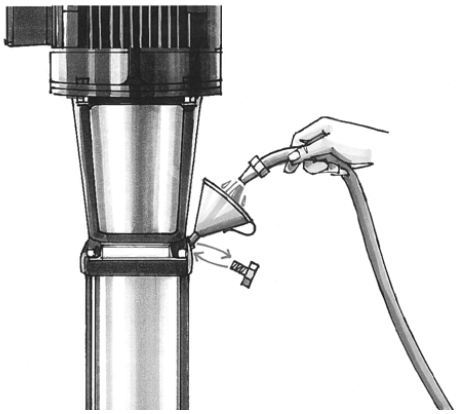
## Startup

**1**



TM01 1403 4497

**2**

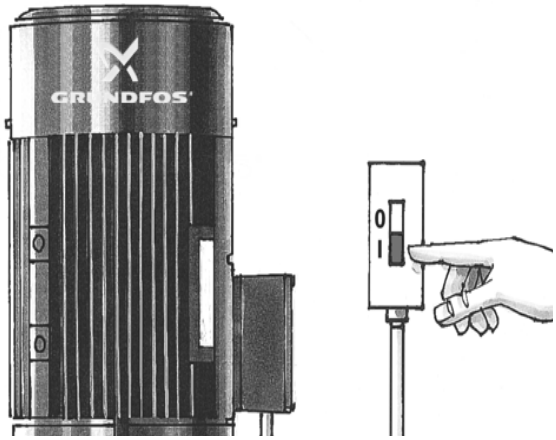


TM01 1404 4497

**3**

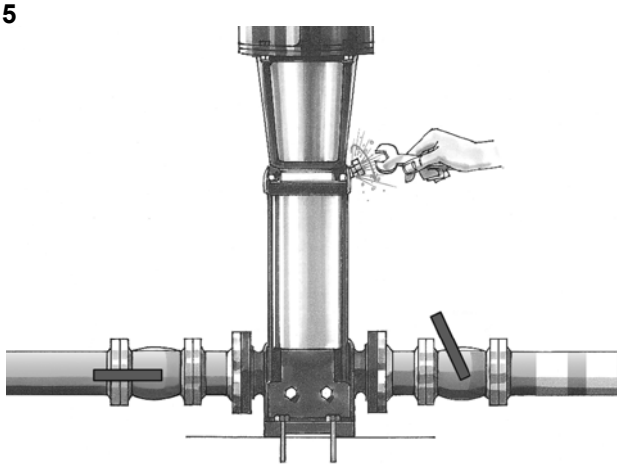

TM01 1405 4497

**4**



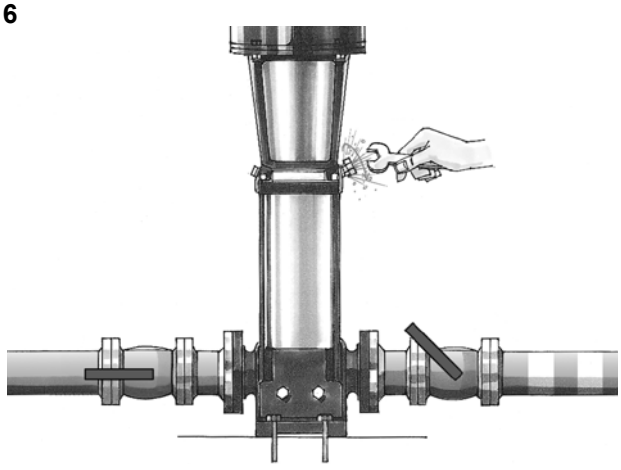

TM01 1406 4497

**5**



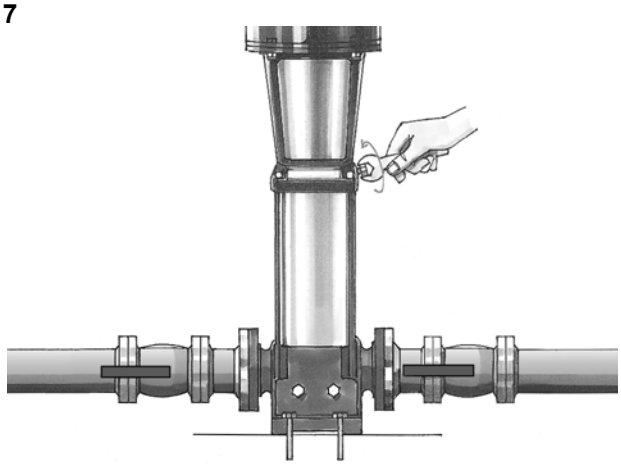
TM01 1407 4497

**6**



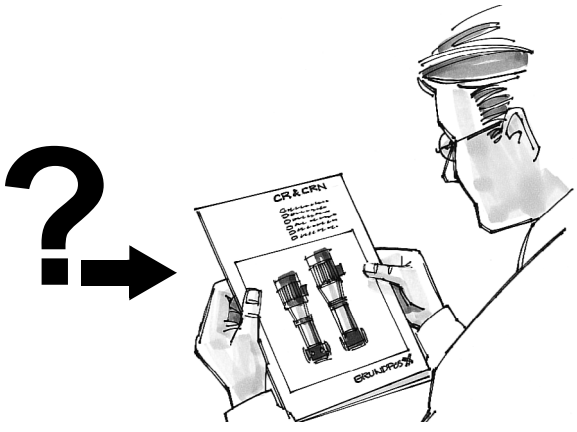
TM01 1408 4497

**7**



TM01 1409 4497

**8**




TM01 9988 3600

## GB Startup

| | |
|---|---|
| **1**<br>Close the isolating valve on the outlet side of the pump and open the isolating valve on the inlet side. | **2**<br>Remove the priming plug from the pump head and slowly fill the pump with liquid. Replace the priming plug and tighten securely. |
| **3**<br>See the correct direction of rotation of the pump on the motor fan cover. | **4**<br>Start the pump and check the direction of rotation. |
| **5**<br>Vent the pump by means of the vent valve in the pump head. At the same time, open the outlet isolating valve a little. | **6**<br>Continue to vent the pump. At the same time, open the outlet isolating valve a little more. |
| **7**<br>Close the vent valve when a steady stream of liquid runs out of it. Completely open the outlet isolating valve. | **8**<br>For further information, see page 11. |

## BG Пускане в действие

| | |
|---|---|
| **1**<br>Затваря се спирателния кран на напорната страна, а този на смукателната се отваря. | **2**<br>Демонтира се пробката за пълнене и помпата бавно се пълни. |
| **3**<br>Вижте правилната посока на въртене на капака на мотора. | **4**<br>Включете помпата и проверете правилността на посоката на въртене. |
| **5**<br>Обезвъздушете през обезвъздушителния вентил като същевременно малко отворете крана на напорната страна. | **6**<br>Продължете да обезвъздушавате като отваряте крана на напорната страна повече. |
| **7**<br>Затворете обезвъздушителния вентил, когато от него протече флуид. Отворете изцяло крана на напорната страна. | **8**<br>За повече информация виж страница 25. |

## CZ Uvedení do provozu

| | |
|---|---|
| **1**<br>Uzavřete uzavírací armaturu na výtlačné straně čerpadla a otevřete uzavírací armaturu na sací straně čerpadla. | **2**<br>Z hlavy čerpadla vyšroubujte plnicí zátku a do čerpadla pomalu nalévejte kapalinu.<br>Plnící zátku vraťte na své místo a pevně utáhněte. |
| **3**<br>Podle šipky na krytu ventilátoru motoru čerpadla zjistěte směr otáčení hřídele čerpadla. | **4**<br>Zapněte čerpadlo a zkontrolujte, zda směr otáčení odpovídá směru uvedenému na krytu ventilátoru motoru. |
| **5**<br>Čerpadlo odvzdušněte pomocí odvzdušňovacího ventilu umístěného ve hlavě čerpadla. Současně mírně pootevřete uzavírací armaturu na výtlačné straně čerpadla. | **6**<br>Pokračujte v odvzdušňování čerpadla. Současně otevřete poněkud více uzavírací armaturu na výtlačné straně čerpadla. |
| **7**<br>Odvzdušňovací ventil uzavřete, jakmile jím začne vytékat kapalina bez vzduchu. Otevřete naplno uzavírací armaturu na výtlačné straně čerpadla tak, abyste dosáhli pracovního bodu čerpadla. | **8**<br>Další informace viz str. 37. |

## DK Idriftsætning

| | |
|---|---|
| **1**<br>Luk afspærringsventilen på pumpens afgangsside og åbn afspærringsventilen på pumpens tilgangsside. | **2**<br>Afmontér spædeproppen i topstykket og spæd pumpen langsomt. Montér derefter spædeproppen igen. |
| **3**<br>Se pumpens korrekte omdrejningsretning på motorens ventilatorskærm. | **4**<br>Start pumpen og kontrollér pumpens omdrejningsretning. |
| **5**<br>Udluft pumpen på udluftningsventilen, som er placeret i topstykket. Åbn samtidig afspærringsventilen på pumpens afgangsside lidt. | **6**<br>Fortsæt med at udlufte pumpen. Åbn samtidig afspærringsventilen på pumpens afgangsside lidt mere. |
| **7**<br>Luk udluftningsventilen, når der løber en jævn væskestrøm ud af den. Åbn afspærringsventilen på pumpens afgangsside helt. | **8**<br>For yderligere information, se side 61. |

## DE Inbetriebnahme

| 1 | 2 |
|---|---|
| Das druckseitige Absperrventil schließen und das saugseitige Absperrventil öffnen. | Einfüllstopfen demontieren und Pumpe langsam auffüllen. Einfüllstopfen wieder einschrauben und fest anziehen. |
| **3** | **4** |
| Siehe richtige Drehrichtung auf der Lüfterhaube des Motors. | Pumpe einschalten und Drehrichtung der Pumpe prüfen. |
| **5** | **6** |
| Pumpe über Entlüftungsventil im Kopfstück der Pumpe entlüften. Gleichzeitig das druckseitige Absperrventil ein wenig öffnen. | Die Entlüftungsvorgehensweise fortsetzen. Gleichzeitig das druckseitige Absperrventil ein bisschen mehr öffnen. |
| **7** | **8** |
| Entlüftungsventil schließen, wenn das Medium aus dem Ventil herausläuft. Das druckseitige Absperrventil ganz öffnen. | Für weitere Informationen, siehe Seite 49. |

## EE Käivitamine

| 1 | 2 |
|---|---|
| Sulgege ventiil pumba survepoolel ja avage ventiil pumba imipoolel. | Eemaldage pumbalt täiteava kork ja täitke pump aegamööda vedelikuga. Pange kork tagasi oma kohale ja kinnitage hoolikalt. |
| **3** | **4** |
| Pöörlemissuund on tähistatud nooltega ventilaatori kattel. | Käivitage pump ja kontrollige selle pöörlemissuunda. |
| **5** | **6** |
| Ventileerige pumpa selle peas paikneva õhutusventiili abil. Samal ajal avage veidi survepoole ventiili. | Jätkake pumba ventileerimist. Samal ajal avage veelgi rohkem survepoole ventiili. |
| **7** | **8** |
| Sulgege õhutusventiil niipea, kui vedelik hakkab ühtlaselt välja voolama. Avage survepoole ventiil täielikult. | Edasine informatsioon: vt. lk. 73. |

## GR Εκκίνηση

| 1 | 2 |
|---|---|
| Κλείστε τη βάνα απομόνωσης στην πλευρά κατάθλιψης της αντλίας και ανοίξτε τη βάνα απομόνωσης στην πλευρά αναρρόφησης. | Αφαιρέστε την τάπα πλήρωσης από την κεφαλή της αντλίας και γεμίστε σιγάσιγά την αντλία με υγρό. Επανατοποθετήστε την τάπα πλήρωσης και σφίξτε τη καλά. |
| **3** | **4** |
| Δείτε τη σωστή φορά περιστροφής της αντλίας στο κάλυμμα ανεμιστήρα του κινητήρα. | Θέστε την αντλία σε λειτουργία και ελέγξτε τη φορά περιστροφής. |
| **5** | **6** |
| Εξαερώστε την αντλία με τη βοήθεια της βαλβίδας εξαέρωσης στην κεφαλή της αντλίας. Ταυτόχρονα, ανοίξτε λίγο τη βάνα απομόνωσης κατάθλιψης. | Συνεχίστε την εξαέρωση της αντλίας. Ταυτόχρονα, ανοίξτε λίγο ακόμη τη βάνα απομόνωσης κατάθλιψης. |
| **7** | **8** |
| Κλείστε τη βαλβίδα εξαέρωσης όταν πια η ροή του υγρού που εξέρχεται είναι σταθερή. Ανοίξτε τελείως τη βάνα απομόνωσης κατάθλιψης. | Για περισσότερες πληροφορίες, βλέπε σελίδα 121. |

## ES Puesta en marcha

| 1 | 2 |
|---|---|
| Cerrar la válvula de corte en el lado de descarga de la bomba y abrir la válvula de corte en el lado de aspiración. | Quitar el tapón de cebado del cabezal de la bomba y llenar la bomba despacio de agua. Volver a poner el tapón de cebado y apretarlo bien. |
| **3** | **4** |
| Comprobar el sentido de giro correcto de la bomba en la tapa del ventilador del motor. | Poner la bomba en marcha y comprobar el sentido de giro. |
| **5** | **6** |
| Purgar la bomba mediante la válvula de purga en el cabezal de la bomba. Al mismo tiempo, abrir un poco la válvula de corte de la descarga. | Seguir purgando la bomba. Al mismo tiempo abrir un poco más la válvula de corte de la descarga. |
| **7** | **8** |
| Cerrar la válvula de purga cuando salga por la misma un flujo constante de líquido. Abrir la válvula de corte de la descarga completamente. | Para más información, ver pág. 85. |

## FR Mise en route

| | |
|---|---|
| **1**<br>Fermer la vanne d'isolement du côté refoulement et ouvrir la vanne d'isolement du côté aspiration de la pompe. | **2**<br>Démonter le bouchon d'amorçage de la tête de pompe et amorcer lentement la pompe. Remettre en place le bouchon d'amorçage. |
| **3**<br>Voir le sens correct de rotation de la pompe sur le capot du ventilateur du moteur. | **4**<br>Démarrer la pompe et vérifier son sens de rotation. |
| **5**<br>Purger la pompe par la vis de purge située dans la tête de pompe. Ouvrir simultanément légèrement la vanne d'isolement du côté refoulement. | **6**<br>Continuer à purger la pompe. Ouvrir simultanément un peu plus la vanne d'isolement du côté refoulement. |
| **7**<br>Fermer la vis de purge lorsqu'un filet d'eau homogène s'écoule. Ouvrir entièrement la vanne d'isolement du côté refoulement. | **8**<br>Pour plus d'informations, voir page 109. |

## HR Puštanje u pogon

| | |
|---|---|
| **1**<br>Zatvoriti zaporni ventil na tlačnoj strani a otvoriti zaporni ventil na usisnoj strani. | **2**<br>Skinuti čep za punjenje pa crpku polagano napuniti. Ponovno vratiti čep za punjenje te ga čvrsto pritegnuti. |
| **3**<br>Prekontrolirati ispravni smjer vrtnje na poklopcu ventilatora motora. | **4**<br>Uključiti crpku pa ispitati ispravni smjer vrtnje crpke. |
| **5**<br>Odzračiti crpku preko odzračnog ventila u glavi crpke. Istovremeno malo otvoriti zaporni ventil na tlačnoj strani. | **6**<br>Nastaviti s odzračivanjem. Istovremeno još malo jače otvoriti zaporni ventil na tlačnoj strani. |
| **7**<br>Zatvoriti odzračni ventil kad medij počne izlaziti na ventilu. Potpuno otvoriti zaporni ventil na tlačnoj strani. | **8**<br>Za daljnje obavijesti vidi str. 133. |

## IT Avviamento

| | |
|---|---|
| **1**<br>Chiudere la valvola di intercettazione sul lato di mandata della pompa e aprire quella sul lato di aspirazione. | **2**<br>Rimuovere il tappo di adescamento dalla testa pompa e versare lentamente il liquido nella pompa. Reinserire il tappo e chiuderlo accuratamente. |
| **3**<br>Osservare il corretto senso di rotazione della pompa sul coperchio della ventola motore. | **4**<br>Avviare la pompa e controllare il senso di rotazione. |
| **5**<br>Sfiatare la pompa per mezzo della valvola di sfiato sulla testa pompa.<br>Contemporaneamente, aprire leggermente la valvola di mandata. | **6**<br>Continuare a sfiatare la pompa, continuando contemporaneamente ad aprire la valvola di mandata. |
| **7**<br>Chiudere la valvola di sfiato quando fuoriesce un flusso di liquido costante. Aprire completamente la valvola di mandata. | **8**<br>Per ulteriori informazioni vedere pagina 157. |

## KZ Сорғыны іске қосу

| | |
|---|---|
| **1**<br>Қысымды магистральдағы жапқыш вентилін жабыңыз, сорғыш магистральдағы жапқыш вентилін ашыңыз. | **2**<br>Ауаны шығару үшін бұранда қақпақты бұраңыз және құятын мойнынан сұйықтықты құйыңыз. Қақпақты қайтадан салып қатты тартыңыз. |
| **3**<br>Сорғының жоғарғы жағында және желдеткіштің сыртында көрсеткімен көрсетілген айналу бағытын дұрыс анықтаңыз. | **4**<br>Сорғыны қосып, айналудың бағытын тексеріңіз. |
| **5**<br>Сорғының жоғарғы жағындағы ауаны шығару үшін сорғыдан ауаны клапан арқылы шығарыңыз. Қысымды магистральдағы жапқыш вентильді бір уақытта кішкене ашыңыз. | **6**<br>Ауа шығаруды жалғастырыңыз. Қысымды магистральдағы жапқыш вентильді бір уақытта тағы кішкене ашыңыз. |
| **7**<br>Сұйықтық клапаннан аға бастағанда, оны жабыңыз. Қысымды магистральдағы жапқыш вентильді толығымен ашып тастаңыз. | **8**<br>Әрі қарай 315-беттегі ақпаратты қараңыз. |

## LT Paleidimas

| 1 | 2 |
|---|---|
| Uždarykite vožtuvą siurblio išvado pusėje ir atidarykite vožtuvą siurblio įvado pusėje. | Siurblio galvutėje atsukite pripildymo kamštelį ir siurblį lėtai pripildykite skysčio. Įstatykite pripildymo kamštelį ir gerai užveržkite. |
| **3** | **4** |
| Pažiūrėkite ant variklio ventiliatoriaus gaubto, kokia yra teisinga siurblio sukimosi kryptis. | Paleiskite siurblį ir patikrinkite sukimosi kryptį. |
| **5** | **6** |
| Per siurblio galvutėje esantį oro išleidimo vožtuvą išleiskite iš siurblio orą.<br>Tuo pačiu metu truputį atidarykite išvado vožtuvą. | Tęskite oro išleidimą. Tuo pačiu metu truputį daugiau atidarykite išvado vožtuvą. |
| **7** | **8** |
| Oro išleidimo vožtuvą uždarykite, kai iš jo pradeda tekėti nusistovėjusi skysčio čiurkšlė. Visiškai atidarykite išvado vožtuvą. | Daugiau informacijos pateikta 169 puslapyje. |

## HU Üzembehelyezés

| 1 | 2 |
|---|---|
| A nyomóoldali elzárószelepet zárjuk el, a szívóoldali elzárószelepet nyissuk ki. | A betöltőcsavart vegyük ki és a szivattyút lassan töltsük fel.<br>A betöltőcsavart csavarjuk vissza és szorosan húzzuk meg. |
| **3** | **4** |
| Nézzük meg a motor ventillátorfedelén a helyes forgásirányt. | Kapcsoljuk be a szivattyút és ellenőrizzük forgásirányát. |
| **5** | **6** |
| A szivattyú fejrészén lévő légtelenítőszelepen át légtelenítsük a szivattyút. Egyidejűleg kissé nyissuk meg a nyomóoldali elzárószelepet. | Folytassuk a légtelenítést, egyidejűleg kissé jobban nyissuk meg a nyomóoldali elzárószelepet. |
| **7** | **8** |
| Amikor a légtelenítőszelepen már a levegőmentes szállított közeg lép ki, zárjuk el a szelepet. A nyomóoldali elzárószelepet teljesen nyissuk ki. | Bővebb információ a 145. oldalon. |

## NL In bedrijf nemen

| 1 | 2 |
|---|---|
| Sluit de scheidingsafsluiter aan de perszijde van de pomp en open de afsluiter aan de zuigzijde. | Verwijder de ontluchtingsschroef van de pompkop en vul de pomp langzaam met vloeistof. Breng de ontluchtingsschroef terug op zijn plaats en zorg dat deze stevig vast zit. |
| **3** | **4** |
| Kijk of de draairichting van de pomp klopt (zie beschermkap van de motorventilator). | Start de pomp en controleer de draairichting. |
| **5** | **6** |
| Ontlucht de pomp met behulp van de ontluchtingsklep in de pompkop. Open tegelijkertijd de persafsluiter een beetje. | Ontlucht de pomp verder. Doe tegelijkertijd de persafsluiter iets verder open. |
| **7** | **8** |
| Sluit de ontluchtingsklep wanneer het medium gelijkmatig uit de ontluchtingsopening stroomt. Open de persafsluiter volledig. | Voor verdere informatie zie pagina 181. |

## UA Запуск

| 1 | 2 |
|---|---|
| Закрити запірний кран на виході насоса та відкрити запірний кран на всмоктувальному трубопроводі. | Викрутити заглушку з верхньої частини насоса та повільно заповнити насос рідиною. Вкрутити заглушку. |
| **3** | **4** |
| Перевірити правильний напрямок обертання насоса, що вказаний на кришці вентилятора. | Запустити насос та перевірити напрямок обертання. |
| **5** | **6** |
| Видалити повітря з насоса з допомогою повітряного клапана в верхній частині насоса. Одночасно привідкрити вихідний запірний кран. | Продовжувати видаляти повітря з насоса. Одночасно відкрити вихідний кран ще трохи більше. |
| **7** | **8** |
| Закрити повітряний клапан, коли постійний потік рідини потече з насоса. Повністю відкрити вихідний запірний кран. | Далі див. стор. 303. |

## PL Uruchomienie

| | |
|---|---|
| **1**<br>Zamknąć zawór odcinający na tłoczeniu pompy i otworzyć zawór odcinający na ssaniu. | **2**<br>Z głowicy pompy zdjąć korek zalewowy i napełnić pompę cieczą. Założyć korek i dokręcić go mocno. |
| **3**<br>Poprzez pokrywę wentylatora silnika sprawdzić, czy kierunek obrotów pompy jest prawidłowy. | **4**<br>Uruchomić pompę i jeszcze raz sprawdzić kierunek obrotów. |
| **5**<br>Poprzez otwór odpowietrzający na głowicy pompy odpowietrzyć pompę. Jednocześnie lekko otworzyć zawór odcinający na tłoczeniu. | **6**<br>Dalej odpowietrzać pompę. Jednocześnie jeszcze trochę otworzyć zawór odcinający na tłoczeniu. |
| **7**<br>Gdy z otworu odpowietrzającego zacznie wypływać stały strumień cieczy, zamknąć go. Całkowicie otworzyć zawór odcinający na tłoczeniu. | **8**<br>Dalsze informacje, patrz str. 193. |

## PT Arranque inicial

| | |
|---|---|
| **1**<br>Feche a válvula de seccionamento do lado da descarga e abra a válvula de seccionamento do lado da aspiração. | **2**<br>Retire o bujão de purga da cabeça da bomba e lentamente encha esta com o líquido. Monte o bujão de purga. |
| **3**<br>Certifique-se de que o sentido de rotação da bomba está correcto, i.e., está de acordo com o que se indica na tampa do ventilador do motor. | **4**<br>Efectue o arranque da bomba e verifique o sentido de rotação. |
| **5**<br>Purgue a bomba por meio da respectiva válvula, existente na cabeça da bomba. Ao mesmo tempo, abra ligeiramente a válvula de seccionamento do lado da descarga. | **6**<br>Continue a purgar a bomba. Ao mesmo tempo, abra um pouco mais a válvula de seccionamento do lado da descarga. |
| **7**<br>Feche a válvula de purga quando um caudal uniforme começar a sair por ela. Abra agora completamente a válvula de seccionamento do lado da descarga. | **8**<br>Para mais informação, consulte a página 205. |

## RU Ввод насоса в эксплуатацию

| | |
|---|---|
| **1**<br>Запорный вентиль в напорной магистрали закрыть, а запорный вентиль во всасывающей магистрали открыть. | **2**<br>Отвернуть резьбовую пробку отверстия для удаления воздуха и медленно залить через заправочную горловину жидкость. Снова вставить пробку для выпуска воздуха и прочно затянуть. |
| **3**<br>Определить правильное направление вращения, указанное стрелкой на головной части насоса и на кожухе вентилятора. | **4**<br>Включить насос и проверить направление вращения. |
| **5**<br>Удалить из насоса воздух через клапан для удаления воздуха в головной части насоса. Одновременно немного открыть запорный вентиль в напорной магистрали. | **6**<br>Продолжать операцию удаления воздуха. Одновременно еще немного приоткрыть запорный вентиль в напорной магистрали. |
| **7**<br>Когда жидкость начнет вытекать через клапан для удаления воздуха, закрыть его. Полностью открыть запорный вентиль в напорной магистрали. | **8**<br>Далее смотрите информацию на стр. 241. |

## RO Punerea în funcţiune

| 1 | 2 |
|---|---|
| Închideţi vana de refulare şi deschideţi vana de aspiraţie complet. | Desfaceţi ventilul de amorsare din capul pompei şi încet umpleţi pompa cu lichid. Strângeţi bine ventilul după umplere. |
| **3** | **4** |
| Urmăriţi sensul corect de rotaţie al pompei indicat la partea superioară a motorului la ventilator. | Porniţi pompa şi verificaţi sensul de rotaţie. |
| **5** | **6** |
| Aerisiţi pompa prin intermediul ventilului de aerisire situat în capul pompei. In acelaşi timp deschideţi vana de refulare. | Continuaţi să aerisiţi pompa. In acelaşi timp deschideţi vana de refulare progresiv. |
| **7** | **8** |
| Inchideţi ventilul de aerisire când apa începe să arunce prin orificiu.<br>Se va deschide complet vana de refulare. | Pentru mai multe informaţii vedeţi pagina 217. |

## SK Uvedenie do prevádzky

| 1 | 2 |
|---|---|
| Uzavrite uzatváraciu armatúru na výtlačnej strane čerpadla a otvorte uzatváraciu armatúru na sacej strane čerpadla. | Z hlavy čerpadla vyskrutkujte plniacu zátku a do čerpadla pomaly nalievajte kvapalinu.<br>Plniacu zátku naskrutkujte späť a pevne ju dotiahnite. |
| **3** | **4** |
| Podľa šípky na kryte ventilátora motora čerpadla zistite smer otáčania sa hriadeľa čerpadla. | Zapnite čerpadlo a skontrolujte, či smer otáčania sa hriadeľa zodpovedá smeru uvedenom na kryte ventilátora motora. |
| **5** | **6** |
| Čerpadlo odvzdušnite pomocou odvzdušňovacieho ventila umiestneného v hlave čerpadla. Súčastne mierne pootvorte uzatváraciu armatúru na výtlačnej strane čerpadla. | Pokračujte v odvzdušňovaní čerpadla. Súčastne trochu pootvorte uzatváraciu armatúru na výtlačnej strane čerpadla. |
| **7** | **8** |
| Odvzdušňovací ventil uzatvorte akonáhle z neho začne vytekať kvapalina. Naplno otvorte uzatváraciu armatúru na výtlačnej strane čerpadla tak, aby ste dosiahli pracovný bod čerpadla. | Dalšie informácie, viď. str. 278. |

## SI Zagon

| 1 | 2 |
|---|---|
| Tlačni zaporni ventil zapreti in odpreti sesalni zaporni ventil. | Čep odprtine za nalivanje odpreti in črpalko počasi napolniti. Ponovno priviti čep in močno pritegniti. |
| **3** | **4** |
| Kontrolirati je potrebno pravilno smer vrtenja na pokrovu hlajenja motorja. | Vklopiti črpalko in preveriti smer vrtenja črpalke. |
| **5** | **6** |
| Črpalko odzračiti s pomočjo odzračevalnega ventila na glavi črpalke. Istočasno nekoliko odpreti zaporni ventil na tlačni strani. | Odzračevalni postopek nadaljevati. Istočasno na tlačni strani še bolj odpreti zaporni ventil. |
| **7** | **8** |
| Odzračevalni ventil zapreti, ko prične iztekati medij. Zaporni ventil na tlačni strani popolnoma odpreti. | Za obširnejše informacije glej stran 266. |

## RS Puštanje u rad

| 1 | 2 |
|---|---|
| Zatvoriti zaustavni ventil na potisnoj strani i otvoriti zaustavni ventil na usisnoj strani. | Demontirati ulivni priključak i polako napuniti pumpu.<br>Ponovo ušrafiti ulivni priključak i čvrsto ga pritegnuti. |
| **3** | **4** |
| Uočiti pravilan smer obrtanja na poklopcu ventilatora motora. | Uključiti pumpu i proveriti smer obrtanja pumpe. |
| **5** | **6** |
| Odzračiti pumpu preko odzračnog ventila na glavi pumpe.<br>Istovremeno malo otvoriti zaustavni ventil na potisnoj strani. | Nastaviti sa postupkom odzračivanja.<br>Istovremeno zaustavni ventil na potisnoj strani otvoriti još malo više. |
| **7** | **8** |
| Kada radni fluid počne da ističe iz ventila zatvoriti odzračni ventil.<br>Zaustavni ventil na potisnoj strani potpuno otvoriti. | Za dalje informacije, vidi stranu 229. |

## FI Käyttöönotto

| | |
|---|---|
| **1**<br>Sulje pumpun painepuolen sulkuventtiili ja avaa tulopuolen sulkuventtiili. | **2**<br>Irroita pumpun yläkappaleen täyttötulppa ja täytä pumppu hitaasti. Asenna täyttötulppa tämän jälkeen. |
| **3**<br>Tarkista tuuletinkannesta pumpun oikea pyörimissuunta. | **4**<br>Käynnistä pumppu ja varmista oikea pyörimissuunta. |
| **5**<br>Ilmaa pumppu yläkappaleessa sijaitsevan ilmausruuvin kautta. Aukaise samalla hiukan pumpun painepuolen sulkuventtiiliä. | **6**<br>Jatka pumpun ilmaamista ja avaa pumpun painepuolen sulkuventtiiliä hiukan enemmän. |
| **7**<br>Sulje ilmausventtiili kun siitä suihkuaa tasainen vesivirta. Aukaise pumpun painepuolen sulkuventtiili kokonaan. | **8**<br>Lisätietoja sivuilla 97. |

## SE Igångkörning

| | |
|---|---|
| **1**<br>Stäng avstängningsventilen på pumpens trycksida och öppna avstängningsventilen på sugsidan. | **2**<br>Avlägsna spädproppen i toppstycket och fyll pumpen långsamt. Sätt sedan tillbaka proppen. |
| **3**<br>Kontrollera rätt rotationsriktning enligt motorns fläktkåpa. | **4**<br>Starta pumpen och kontrollera pumpens rotationsriktning. |
| **5**<br>Avlufta pumpen med hjälp av ventilen på toppstycket. Öppna samtidigt avstängningsventilen på pumpens trycksida något. | **6**<br>Fortsätt avlufta pumpen. Öppna samtidigt avstängningsventilen på trycksidan lite till. |
| **7**<br>Stäng avluftningsventilen när en jämn vätskeström kommer ut ur den. Öppna avstängningsventilen på trycksidan helt. | **8**<br>För ytterligare information, se sida 254. |

## TR İlk çalıştırma

| | |
|---|---|
| **1**<br>Pompanın basma tarafındaki izolasyon vanasını kapatın ve emme tarafındaki izolasyon vanasını açın. | **2**<br>Doldurma tapasını pompa başından sökün ve pompayı sıvı ile doldurun. Doldurma tapasını tekrar yerine takın ve sağlam bir şekilde sıkın. |
| **3**<br>Motor fan kapağında bulunan doğru pompa dönüş yönüne bakın. | **4**<br>Pompayı çalıştırın ve dönüş yönünü kontrol edin. |
| **5**<br>Pompa başında bulunan tahliye valfı yardımıyla pompanın havasını alın. Aynı anda, basma izolasyon valfını biraz açın. | **6**<br>Pompanın havasını almaya devam edin. Aynı anda, basma izolasyon valfını biraz daha açın. |
| **7**<br>Düzenli bir sıvı akışı gerçekleştiğinde, tahliye valfını kapatın. Basma izolasyon valfını tamamen açın. | **8**<br>İlave bilgiler için, sayfa 290'e bakın. |

## GB: EC/EU declaration of conformity

We, Grundfos, declare under our sole responsibility that the products CR, CRI, CRN to which the declaration below relates, are in conformity with the Council Directives listed below on the approximation of the laws of the EC/EU member states.
**Note:** There are two sets of Council Directives and standards listed below. One set applies until and including 19th April 2016. The other set applies from 20th April 2016 and onwards.

## BG: Декларация за съответствие на ЕС/ЕО

Ние, фирма Grundfos, заявяваме с пълна отговорност, че продуктите CR, CRI, CRN за които се отнася настоящата декларация, отговарят на следните директиви на Съвета за уеднаквяване на правните разпоредби на държавите-членки на ЕС/ЕО.
**Забележка:** По-долу има изброени две групи директиви и стандарти на Съвета. Едната група е в сила до 19 април 2016 г. включително. Другата група е в сила от 20 април 2016 г.

## CZ: Prohlášení o shodě EU

My firma Grundfos prohlašujeme na svou plnou odpovědnost, že výrobky CR, CRI, CRN, na které se toto prohlášení vztahuje, jsou v souladu s níže uvedenými ustanoveními směrnice Rady pro sblížení právních předpisů členských států Evropského společenství.
**Poznámka:** Níže jsou uvedeny dvě sady směrnic Rady a standardů. První sada je platná do 19. dubna 2016 (včetně). Druhá sada platí od 20. dubna 2016.

## DE: EG-/EU-Konformitätserklärung

Wir, Grundfos, erklären in alleiniger Verantwortung, dass die Produkte CR, CRI, CRN, auf die sich diese Erklärung beziehen, mit den folgenden Richtlinien des Rates zur Angleichung der Rechtsvorschriften der EG-/EU-Mitgliedsstaaten übereinstimmen.
**Hinweis:** Nachfolgend sind zwei Gruppen aus Richtlinien des Rates und Standards aufgeführt. Eine Gruppe gilt bis einschließlich 19. April 2016. Die andere Gruppe gilt ab dem 20. April 2016.

## DK: EF/EU-overensstemmelseserklæring

Vi, Grundfos, erklærer under ansvar at produkterne CR, CRI, CRN som erklæringen nedenfor omhandler, er i overensstemmelse med Rådets direktiver der er nævnt nedenfor, om indbyrdes tilnærmelse til EF/EU-medlemsstaternes lovgivning.
**Bemærk:** Der er angivet to sæt af Rådets direktiver og standarder nedenfor. Det ene sæt gælder til og med 19. april 2016. Det andet sæt gælder fra og med 20. april 2016.

## EE: EÜ / ELi vastavusdeklaratsioon

Meie, Grundfos, kinnitame ja kanname ainuisikulist vastutust selle eest, et toode CR, CRI, CRN, mille kohta all olev deklaratsioon käib, on kooskõlas Nõukogu Direktiividega, mis on nimetatud all pool vastavalt vastuvõetud õigusaktidele ühtlustamise kohta EÜ / EL liikmesriikides.
**Märkus:** Allpool onloetletud kaks nõukogu direktiive ja standardeid. Ühed kehtivad kuni 19. aprill 2016 (kaasa arvatud). Teised kehtivad alates 20.04.2016 ja edasi.

## ES: Declaración de conformidad de la CE/UE

Grundfos declara, bajo su exclusiva responsabilidad, que los productos CR, CRI, CRN a los que hace referencia la siguiente declaración cumplen lo establecido por las siguientes Directivas del Consejo sobre la aproximación de las legislaciones de los Estados miembros de la CE/UE.
**Nota:** A continuación se recogen dos conjuntos de normas y Directivas del Consejo. Uno de ellos es válido hasta el 19 de abril de 2016. El otro es válido a partir del 20 de abril de 2016.

## FI: EY/EU-vaatimustenmukaisuusvakuutus

Grundfos vakuuttaa omalla vastuullaan, että tuotteet CR, CRI, CRN, joita tämä vakuutus koskee, ovat EY/EU:n jäsenvaltioiden lainsäädännön lähentämiseen tähtäävien Euroopan neuvoston direktiivien vaatimusten mukaisia seuraavasti.
**Huomautus:** Seuraavassa on lueteltu kaksi erilaista neuvoston direktiivien ja standardien sarjaa. Yhden sarjan viimeinen voimassaolopäivä on 19. huhtikuuta 2016. Toinen sarja on voimassa 20. huhtikuuta 2016 alkaen.

## FR: Déclaration de conformité CE/UE

Nous, Grundfos, déclarons sous notre seule responsabilité, que les produits CR, CRI, CRN, auxquels se réfère cette déclaration, sont conformes aux Directives du Conseil concernant le rapprochement des législations des États membres CE/UE relatives aux normes énoncées ci-dessous.
**Remarque :** Deux groupes de Directives du Conseil et normes sont énoncés ci-dessous. Un groupe s'applique jusqu'au 19 avril 2016 inclus. L'autre groupe entrera en vigueur le 20 avril 2016.

## GR: Δήλωση συμμόρφωσης ΕΚ/ΕΕ

Εμείς, η Grundfos, δηλώνουμε με αποκλειστικά δική μας ευθύνη ότι τα προϊόντα CR, CRI, CRN, στα οποία αναφέρεται η παρακάτω δήλωση, συμμορφώνονται με τις παρακάτω Οδηγίες του Συμβουλίου περί προσέγγισης των νομοθεσιών των κρατών μελών της ΕΚ/ΕΕ.
**Σημείωση:** Υπάρχουν δύο σετ Οδηγιών Συμβουλίου και προτύπων που παρατίθενται παρακάτω. Το ένα σετ ισχύει μέχρι και την 19η Απριλίου 2016. Το άλλο σετ ισχύει από την 20η Απριλίου 2016 και μετέπειτα.

## HR: EC/EU deklaracija sukladnosti

Mi, Grundfos, izjavljujemo s punom odgovornošću da su proizvodi CR, CRI, CRN, na koja se izjava odnosi u nastavku, u skladu s direktivama Vijeća dolje navedene o usklađivanju zakona država članica EZ-a / EU-a.
**Napomena:** Postoje dva seta direktiva vijeća i standarda navedenih dolje. Jedan set se odnosi do, i uključujući 19 Travanja 2016. Drugi set se odnosi na datume od 20 travnja 2016 i naprijed.

## HU: EC/EU megfelelőségi nyilatkozat

Mi, a Grundfos vállalat, teljes felelősséggel kijelentjük, hogy a(z) CR, CRI, CRN termékek, amelyre az alábbi nyilatkozat vonatkozik, megfelelnek az Európai Közösség/Európai Unió tagállamainak jogi irányelveit összehangoló tanács alábbi előírásainak.
**Megjegyzés:** Az alábbiakban a Tanács irányelvei és szabványai közül két csomagot ismertetünk. Az egyik csomag 2016. április 19-ével bezárólag érvényes. A másik csomag 2016. április 20-tól érvényes.

## IT: Dichiarazione di conformità CE/UE

Grundfos dichiara sotto la sua esclusiva responsabilità che i prodotti CR, CRI, CRN, ai quale si riferisce questa dichiarazione, sono conformi alle seguenti direttive del Consiglio riguardanti il riavvicinamento delle legislazioni degli Stati membri CE/UE.
**Nota:** Di seguito sono elencate due serie di direttive del Consiglio e norme. Una serie si applca fino al19 aprile 2016 (incluso). La seconda serie si applica a partire dal 20 aprile 2016.

## LT: EB/ES atitikties deklaracija

Mes, Grundfos, su visa atsakomybe pareiškiame, kad produktai CR, CRI, CRN, kuriems skirta ši deklaracija, atitinka žemiau nurodytas Tarybos Direktyvas dėl EB/ES šalių narių įstatymų suderinimo.
**Pastaba.** Žemiau nurodytos dvi Tarybos Direktyvų ir standartų grupės. Viena grupė galioja iki 2016 m. balandžio 19 d. imtinai. Kita grupė galioja nuo 2016 m. balandžio 20 d.

## NL: EG/EU-conformiteitsverklaring

Wij, Grundfos, verklaren geheel onder eigen verantwoordelijkheid dat de producten CR, CRI, CRN, waarop de onderstaande verklaring betrekking heeft, in overeenstemming zijn met de onderstaande Richtlijnen van de Raad inzake de onderlinge aanpassing van de wetgeving van de EG-/EU-lidstaten.
**Opmerking:** Hieronder worden twee reeksen Richtlijnen van de Raad en normen weergegeven. De ene set geldt tot en met 19 april 2016. De andere set is vanaf 20 april 2016 van kracht.

## PL: Deklaracja zgodności WE/UE

My, Grundfos, oświadczamy z pełną odpowiedzialnością, że nasze produkty CR, CRI, CRN, których deklaracja niniejsza dotyczy, są zgodne z następującymi dyrektywami Rady w sprawie zbliżenia przepisów prawnych państw członkowskich.
**Uwaga:** Poniżej podano dwa zestawy dyrektyw i norm. Pierwszy zestaw obowiązuje do 19 kwietna 2016 r. włącznie. Drugi zacznie obowiązywać 20 kwietnia 2016 r.

## PT: Declaração de conformidade CE/UE

A Grundfos declara sob sua única responsabilidade que os produtos CR, CRI, CRN, aos quais diz respeito a declaração abaixo, estão em conformidade com as Directivas do Conselho sobre a aproximação das legislações dos Estados Membros da CE/UE.
**Nota:** Abaixo estão listados dois grupos de Directivas do Conselho e normas. Um dos grupos é aplicável até 19 de Abril de 2016, inclusive. O outro grupo é aplicável a partir de 20 de Abril de 2016, inclusive.

## RO: Declaraţia de conformitate CE/UE

Noi Grundfos declarăm pe propria răspundere că produsele CR, CRI, CRN, la care se referă această declaraţie, sunt în conformitate cu Directivele de Consiliu specificate mai jos privind armonizarea legilor statelor membre CE/UE.
**Notă:** Există două seturi de directive şi standarde ale Consiliului specificate mai jos. Un set se aplică până la, şi inclusiv în 19 aprilie 2016. Celălalt set se aplică de la 20 aprilie 2016 şi în continuare.

## RS: Deklaracija o usklađenosti EC/EU

Mi, kompanija Grundfos, izjavljujemo pod punom vlastitom odgovornošću da je proizvod CR, CRI, CRN, na koji se odnosi deklaracija ispod, u skladu sa dole prikazanim direktivama Saveta za usklađivanje zakona država članica EC/EU.
**Napomena:** Ispod su navedena dva seta direktiva Saveta. Jedan set se odnosi na vreme do i uključuje 19. april 2016. Drugi set se odnosi na vreme od 20. aprila 2016. pa nadalje.

## RU: Декларация о соответствии нормам ЕЭС/ЕС

Мы, компания Grundfos, со всей ответственностью заявляем, что изделия CR, CRI, CRN, к которым относится нижеприведённая декларация, соответствуют нижеприведённым Директивам Совета Евросоюза о тождественности законов стран-членов ЕЭС/ЕС.
**Примечание:** Существует два комплекта Директив Совета Евросоюза и стандартов, перечисленных ниже. Один комплект применяется до 19 апреля 2016 г. включительно. Второй комплект применяется начиная с 20 апреля 2016 г.

## SE: EG/EU-försäkran om överensstämmelse

Vi, Grundfos, försäkrar under ansvar att produkterna CR, CRI, CRN, som omfattas av nedanstående försäkran, är i överensstämmelse med de rådsdirektiv om inbördes närmande till EG/EU-medlemsstaternas lagstiftning som listas nedan.
**Obs!** Det finns två uppsättningar rådsdirektiv och standarder listade nedan. En uppsättning gäller till och med den 19 april 2016. Den andra uppsättningen gäller från den 20 april 2016 och tills vidare.

## SI: Izjava o skladnosti ES/EU

V Grundfosu s polno odgovornostjo izjavljamo, da je izdelek CR, CRI, CRN, na katerega se spodnja izjava nanaša, v skladu s spodnjimi direktivami Sveta o približevanju zakonodaje za izenačevanje pravnih predpisov držav članic ES/EU.
**Opomba:** Spodaj sta navedeni dve skupini direktiv Sveta o približevanju zakonodaje. Ena skupina se nanaša na obdobje do in vključno z 19. aprilom 2016. Druga skupina se nanaša na obdobje od 20. aprila 2016 naprej.

## SK: Prehlásenie o zhode s EC/EU

My, spoločnosť Grundfos, vyhlasujeme na svoju plnú zodpovednosť, že produkty CR, CRI, CRN na ktoré sa vyhlásenie uvedené nižšie vzťahuje, sú v súlade s ustanoveniami nižšie uvedených smerníc Rady pre zblíženie právnych predpisov členských štátov Európskeho spoločenstva/EÚ.
**Poznámka:** Existujú dva súbory smerníc a noriem Rady uvedené nižšie. Jeden súbor platí do a vrátane 19.4.2016. Druhý súbor platí od 20.4.2016 ďalej.

## TR: EC/AB uygunluk bildirgesi

Grundfos olarak, aşağıdaki bildirim konusu olan CR, CRI, CRN ürünlerinin, EC/AB Üye ülkelerinin direktiflerinin yakınlaştırılmasıyla ilgili durumun aşağıdaki Konsey Direktifleriyle uyumlu olduğunu ve bununla ilgili olarak tüm sorumluluğun bize ait olduğunu beyan ederiz.
**Not:** Aşağıda belirtilen iki küme Konsey Direktifleri ve Standartları bulunmaktadır. Bir küme 19 Nisan 2016 dahil bu tarihe kadar geçerlidir. Diğer küme 20 Nisan 2016 sonrası için geçerlidir.

## UA: Декларація відповідності директивам EC/EU

Ми, компанія Grundfos, під нашу одноосібну відповідальність заявляємо, що вироби CR, CRI, CRN, до яких відноситься нижченаведена декларація, відповідають директивам EC/EU, переліченим нижче, щодо тотожності законів країн-членів ЄС.
**Примітка:** Існує два комплекти директив та стандартів EC/EU, перелічених нижче. Один комплект застосовується до 19 квітня 2016 р. Другий комплект застосовується з 20 квітня 2016 р.

## KZ: Сәйкестік жөніндегі ЕҚ/ЕО декларациясы

Біз, Grundfos, ЕҚ/ЕО мүше елдерінің заңдарына жақын төменде көрсетілген Кеңес директиваларына сәйкес төмендегі декларацияға қатысты CR, CRI, CRN өнімдері біздің жеке жауапкершілігімізде екенін мәлімдейміз.
**Ескертпе:** Кеңес директивалары мен стандарттарының төменде көрсетілгендей екі жиынтығы бар. Бірінші жиынтық 2016 жылдың 19-шы сәуіріне дейін қолданылады. Ал басқа жиынтық 2016 жылдың 20-шы сәуірінен бастап қолданылады.

## إقـرار مطابقـة EC/EU

نقـر نحـن، جرونـدفوس، بمقتضـى مسـؤوليتنا الفرديـة بـأن المنتجيـن CR, CRI, CRN، اللـذين يختـص بهمـا الإقـرار أدنـاه، يكونـان مطـابقين لتوجيهـات المجلـس المـذكورة أدنـاه بشـأن التقريـب بيـن قـوانين الـدول أعضـاء المجموعـة الأوروبيـة/الاتحاد الأوروبـي (EC/EU).
يلحوظـة: يوجـد أدنـاه مجموعتـان مـن توجيهـات ومعـايير المجلـس. مجموعـة تنطبـق حـت وتشـمل 19 إبريـل 2016. وتنطبـق المجموعـة الأخـرى مـن 20 إبريـل 2016 فصـاعدا.

These Directives and standards apply until and including 19th April 2016:

— Machinery Directive (2006/42/EC).
  Standard used: EN 809:1998, A1:2009.

— Ecodesign Directive (2009/125/EC).
  Electric motors:
  Commission Regulation No 640/2009.
  Applies only to three-phase Grundfos motors marked IE2 or IE3. See the motor nameplate.
  Standard used: EN 60034-30:2009.

— Ecodesign Directive (2009/125/EC).
  Water pumps:
  Commission Regulation No 547/2012.
  Applies only to water pumps marked with the minimum efficiency index MEI. See the pump nameplate.

These Directives and standards apply from 20th April 2016 and onwards:

— Machinery Directive (2006/42/EC).
  Standard used: EN 809:1998, A1:2009.

— Ecodesign Directive (2009/125/EC).
  Electric motors:
  Commission Regulation No 640/2009.
  Applies only to three-phase Grundfos motors marked IE2 or IE3. See the motor nameplate.
  Standard used: EN 60034-30:2009.

— Ecodesign Directive (2009/125/EC).
  Water pumps:
  Commission Regulation No 547/2012.
  Applies only to water pumps marked with the minimum efficiency index MEI. See the pump nameplate.

This EC/EU declaration of conformity is only valid when published as part of the Grundfos installation and operating instructions (publication number 96462123 0316 and 97688538 1112).

Bjerringbro, 23 September 2015

Svend Aage Kaae
Director
Grundfos Holding A/S
Poul Due Jensens Vej 7
8850 Bjerringbro, Denmark

Person authorised to compile the technical file and empowered to sign the EC/EU declaration of conformity.

# CR, CRI, CRN

## Руководство по эксплуатации

Руководство по эксплуатации на данное изделие является составным и включает в себя несколько частей:

Часть 1: настоящее "Руководство по эксплуатации".

Часть 2: электронная часть "Паспорт. Руководство по монтажу и эксплуатации" размещенная на сайте компании Грундфос:

http://net.grundfos.com/qr/i/98763042

Часть 3: информация о сроке изготовления, размещенная на фирменной табличке изделия.

Декларация о соответствии

Насосы типов CR, CRI, CRN сертифицированы на соответствие требованиям Технических регламентов Таможенного союза: ТР ТС 004/2011 "О безопасности низковольтного оборудования"; ТР ТС 010/2011 "О безопасности машин и оборудования"; ТР ТС 020/2011 "Электромагнитная совместимость технических средств".

Сертификат соответствия:

№ ТС RU C-DK.АИ30.В.01172, срок действия до 08.12.2019 г.

№ ТС RU C-RU.АИ30.В.01071, срок действия до 09.11.2019 г.

Выдан:

Органом по сертификации продукции "ИВАНОВО-СЕРТИФИКАТ" ООО "Ивановский Фонд Сертификации". Адрес: 153032, Российская Федерация, г. Иваново, ул. Станкостроителей, д.1.

Изделия, произведенные в России, изготавливаются в соответствии с ТУ 3631-001-59379130-2005.

# CR, CRI, CRN

## Пайдалану бойынша нұсқаулық

Атаулы өнімге арналған пайдалану бойынша нұсқаулық құрамалы болып келеді және келесі бөлімдерден тұрады:

1 бөлім: атаулы "Пайдалану бойынша нұсқаулық"

2 бөлім: Грундфос компаниясының сайтында орналасқан электронды бөлім "Төлқұжат, Құрастыру және пайдалану бойынша нұсқаулық":

http://net.grundfos.com/qr/i/98763042

3 бөлім: өнімнің фирмалық тақташасында орналасқан шығарылған уақыты жөніндегі мәлімет

## Сәйкестік туралы декларация

CR, CRI, CRN типті сорғылары "Төмен вольтты жабдықтардың қауіпсіздігі туралы" (ТР ТС 004/2011), "Машиналар және жабдықтар қауіпсіздігі туралы" (ТР ТС 010/2011) "Техникалық заттардың электрлі магниттік сәйкестілігі" (ТР ТС 020/2011) Кеден Одағының техникалық регламенттерінің талаптарына сәйкес сертификатталды.

Сәйкестік сертификаты:

№ ТС RU C-DK.АИ30.В.01172, жарамдылық мерзімі 08.12.2019 жылға дейін.

№ ТС RU C-RU.АИ30.В.01071, жарамдылық мерзімі 09.11.2019 жылға дейін.

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