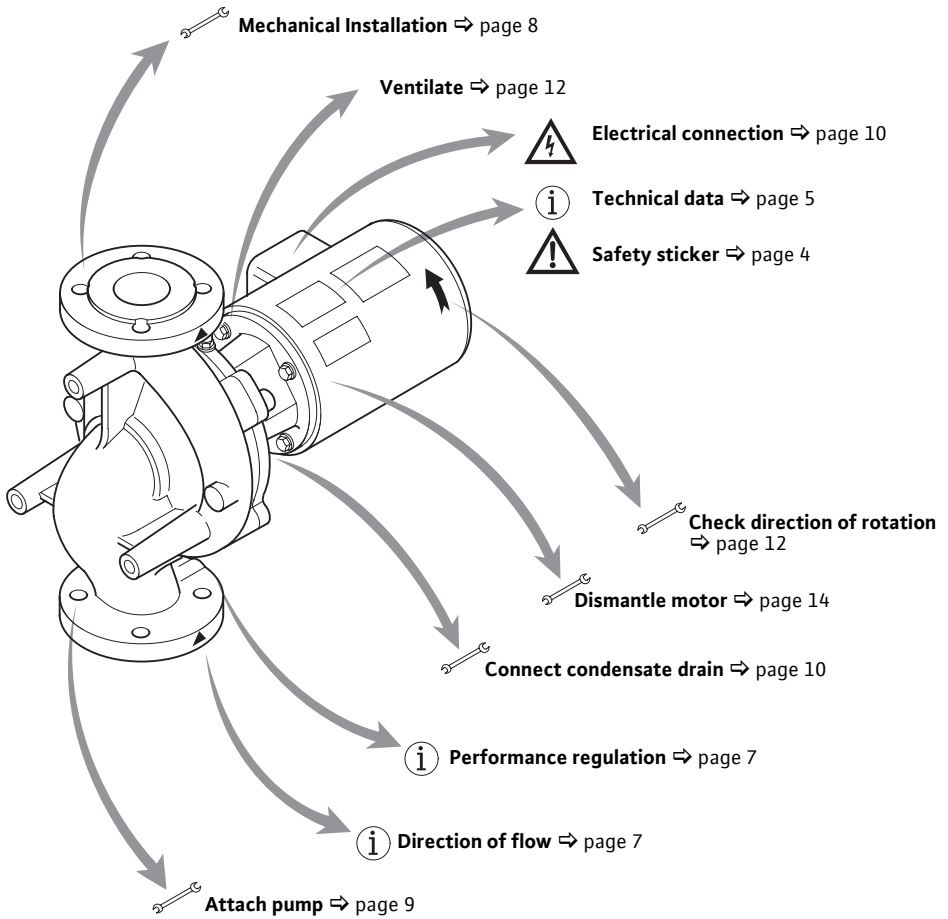


Wilo-Cronoline

Installation and operating instructions



Safety ⇨ page 4



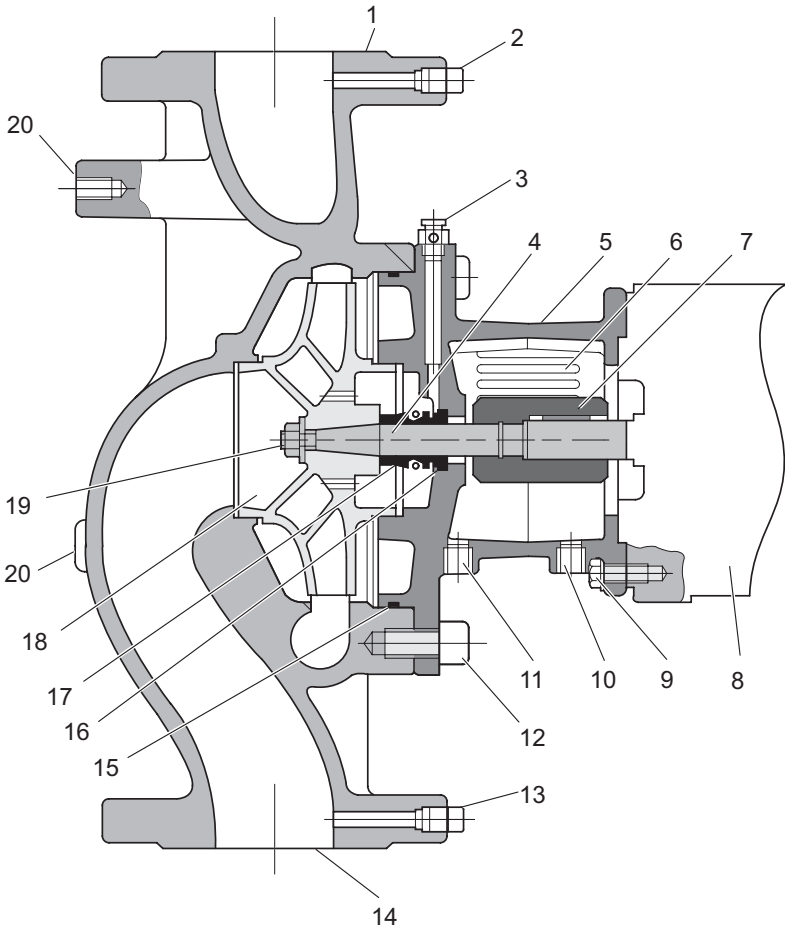
Functionality ⇨ page 7



Transport and Storage ⇨ page 8
Installation ⇨ page 8
Maintenance and Repair ⇨ page 13
Screw torques ⇨ page 18



Troubleshooting guide ⇨ page 19





- | | |
|---|---|
| 1 Discharge Flange | 11 Condensate drain connection |
| 2 Discharge Pressure Gauge Tapping – ¼” NPT | 12 Volute Bolt |
| 3 Mechanical Seal Air Vent | 13 Suction Pressure Gauge Tapping – ¼” NPT |
| 4 Shaft | 14 Suction Flange |
| 5 Lantern | 15 Lantern O-ring |
| 6 Coupling guard | 16 Stationary seal ring of mechanical seal |
| 7 Coupling | 17 Mechanical seal |
| 8 Motor | 18 Impeller |
| 9 Motor bolt | 19 Impeller fastening nut and washer |
| 10 Condensate drain connection (only in some models) | 20 Pump Feet |


2 Safety


- About these instructions*
- These instructions must be read in full prior to installation. Failure to comply with these instructions may lead to serious injury or damage to the pump.
 - Once the pump is installed, give these instructions to the operator.
 - These instructions should be kept in the vicinity of the pump. They serve as a reference in case of later problems.
 - Wilo is not liable for damage arising from non-compliance with these instructions.

Warning notices Important safety notices are categorized as follows:

 **Danger:** Indicates life threatening due to electrical current.

 **Warning:** Indicates possible life threatening or risk of injury.

 **Caution:** Indicates possible threats to pump or other objects.

 **Note:** Highlights tips and information.

Safety sticker Safety stickers are located on the motor giving important instructions on how to handle the pump. The instructions on the safety sticker must be strictly obeyed.

Qualifications The pump may only be installed by qualified personnel. The electrical systems may only be connected by qualified electricians. Additionally, national regulations concerning the Qualifications of personnel must be obeyed.

Modification, spare parts No technical alterations or modifications may be made to the pump. Use only original spare parts.

Electrical power supply Working with electrical current could cause serious risk of bodily injury, therefore:

- Before starting work on the pump, switch off the power and secure it against reconnection.
- Do not bend or clamp power cable or expose it to heat sources.
- Do not immerse the pump in water or other liquids or expose it to spray water or moisture.

Rotating components The pump contains rotating components that are exposed if the pump housing is open or the coupling guard is missing. Touching the rotating components can cause serious injury, therefore:

- Before opening the pump housing, switch off the motor and secure against reconnection.
- Never switch on the motor when the pump housing is open or the coupling guard is missing.
- Never operate the pump without the coupling guard.

High Deadweight The pump has a very high deadweight, depending on the model. If the pump is dropped or it falls, there is a risk of death by crushing if pump falls, therefore:

- Exercise caution when lifting or transporting.
- Never walk under suspended loads.
- Always put the pump and pump parts down ensuring they cannot tip over.
- Only use the transportation methods described in these operating instructions ⇒ Page 8.
- Before loosening screws, secure the pump parts to be loosened to prevent them from falling.

3 Technical data

3.1 Type plate

IL	Series: Inline pump with flange connection
2.5	Nominal diameter of pipe connection (inches)
-50	Maximum pump height (ft)
/260	Maximum capacity (GPM)
-2	Number of poles
115/208-230	Voltage (V)

3.2 Data

Description	Information	Option
Mains voltage	1 ~ 115 / 208-230 V, 60 Hz (\leq 2HP) 3 ~ 208 - 230 / 460V, 60 Hz (\geq 1 HP) 3 ~ 575V, 60 Hz (\geq 1 HP)	
Degree of motor protection	ODP TEFC	●
Protection against overheating	Integrated protection PTC / PTO ^a	●
Flange connection	Flanges acc. ASME Class 125	
Motor flange design	acc. NEMA MG1 Type C face Mounting	
Special motor design	Special voltage/frequency	●
Max. working pressure	175 psi [12 bar] 250 psi [17 bar]	●
Max. permissible liquid temperature range	water only: from 32 °F to 200 °F [0 °C to +90 °C] water/glycol up to 50 %: from -4 °F to 250 °F [-20 °C to +120 °C]	
Max. permissible liquid temperature range with high temperature seal	at 175 psi [12 bar]: from -4 °F to 250 °F [-20 °C to +120 °C] at 165 psi [11 bar]: from -4 °F to 285 °F [-20 °C to +140 °C]	
Max. ambient temperature	104 °F [40 °C]	
Approved liquids	Heating water Chilled/Cold water Water/glycol mixtures ^b Heat transfer oil Other liquids on request ^c	● ●

Legend:

● Special design or accessories (at added cost on request)

a. On-site trip unit required

b. Hydraulic corrections necessary depending on liquid's density and viscosity. Only approved additives with corrosion inhibitors may be used. Observe manufacturer's instructions.

c. Contact WILO before using any liquids other than above-listed liquids, different mixture ratios and higher temperatures.



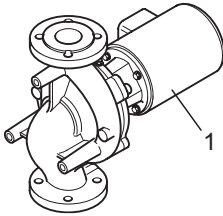
Note: For additional data, see type plate, product information sheet or Wilo catalog.

3.3 Materials

Pump housing and lantern	Cast iron ASTM A126 Class B
Impeller	Bronze (Standard), Cast Iron Optional
Pump shaft	Stainless steel 1.4122

3.4 Scope of delivery

- 1 Pump complete
- 2 Installation and operating instructions (not displayed)



4 Functionality

4.1 Application

The purpose of the pump is to pump the liquids specified in the technical data for the building services industry and for industrial plants.

Pumping different liquids and exceeding the limit values specified in the technical data may destroy the pump.

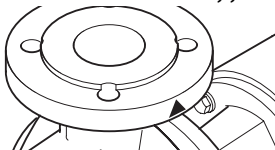
4.2 Functions

Design The pump is a single-stage circulating pump with an inline design. It is driven by an electric motor according to the NEMA standard.

Assembly For pumps up to an output of 20 HP, the flanges are designed such that the pump can be mounted without additional support. For pumps with an output of over 20 HP, the pump must be screwed onto the three feet → Page 9.

Performance regulation External pressure sensors and an external control unit can be connected to the suction side and the discharge side by means of a pressure gauge tapping for each side. The motor speed can be controlled using an external frequency converter.

Direction of flow The arrows on the flanges indicate the direction of flow.



5 Transport and Storage

5.1 Shipping

Shipping The pump is delivered packaged in cardboard or lashed down on a pallet and is protected against dust and moisture.

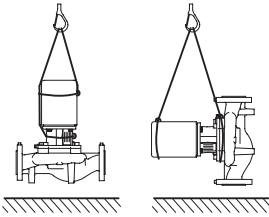
Transport inspection Upon receipt, unpack and check pump and all accessories. Report transit damage immediately.

Storage Until the pump is installed, the pump must be stored in a dry, frost-free place where it is also protected against mechanical damage.

Caution: Damage due to incorrect packaging!

If the pump needs to be transported again at a later date, it must be securely packaged for transit. Use the original packaging or equivalent packaging.

5.2 Impacts



Warning: Risk of injury due to high deadweight!

The pump is heavy and can cause considerable injury if dropped or if it falls. Only transport the pump using a suitable hoist. Wear work shoes and a helmet. Never stand under hanging loads.

To lift the pump using a crane, the pump has to be tied down as illustrated using suitable straps. Place the pump in the hanger which will tighten itself due to the pump's deadweight.

6 Installation

6.1 Mechanical Installation

Danger: Risk to life due to electric shock!

Before starting work, make sure that the pump is disconnected from the power supply.

Warning: Danger due to high deadweight!

The pump itself and pump components may have a very high deadweight. There is a risk of potentially fatal impact and crushing caused by falling parts.

Always use suitable lifting equipment and secure parts from falling.

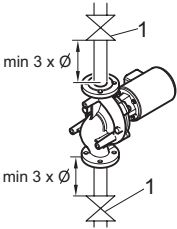
Installation site The installation site should be a weather-resistant, frost-free and dust-free area that has good air circulation. Select an easily accessible installation site. Keep a minimum distance of 8 inches [20 cm] between the motor cover and surrounding surfaces.

⚠ Caution: Dirt causes damage!

Dirt can render the pump inoperative. Before installing the pump, complete all welding and soldering work and thoroughly clean the piping system.

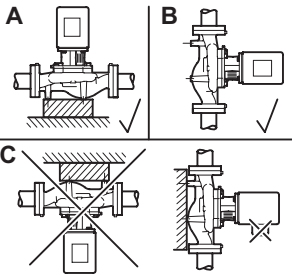
1. Insure the pump is installed in a way that no piping stresses are transferred to the pump.

ⓘ Note: Install an isolation valve (1) on the suction and discharge sides of the pump so that the pump can be replaced without having to empty the entire piping system.



A straight piece of piping of 3 pipe diameters in length is required on both sides to insure laminar flow.

Attach pump



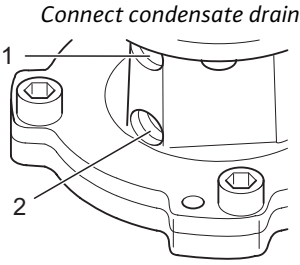
2. Install only as shown (Figs. A/B):
 - Installation with a horizontal motor (Fig. B) is permissible only for pumps with an output of up to 20 HP.
 - The motor may not point downwards (Fig. C).
 - In the case of installation with horizontal motor (B), the air vent valve must point upwards.

ⓘ Note: The arrows on the flanges indicate the direction of flow.

3. If necessary, disassemble the motor and rotate ⇒ Page 14. The electrical terminal box may not point downwards (Fig. C).
4. The feet of the pump are drilled and tapped for floor or wall mounting. Insure the volute is not stressed by the piping.

ⓘ Note: With motor output of 7.5 HP or more, a housekeeping pad is recommended.

- Connect flangeconnection** 5. Screw flange connection onto suction and discharge piping.



6. If desired, a condensate drain can be connected.
 - (1) Condensate drain for vertical installation position of the motor
 - (2) Condensate drain for horizontal motor installation position (only available in some models)
7. Seal up unused condensate drain.

⚠ Caution: Damage due to overheating!

For insulated piping systems, only the pump volute may be insulated, not the lantern and the motor. These could be damaged by heat build-up.

6.2 Electrical connection

⚡ Danger: life threatening due to electrical shock!

Touching live parts can be fatal. Work on the electrical connection may only be performed by a trained electrician. Prior to connecting, ensure that the connecting line is voltage-free.

⚠ Warning: Danger due to a damaged cable!

For pumps that pump hot liquids or that are used in proximity to hot surfaces with temperatures above 194 °F [90 °C], a heat-resistant cable must be used.



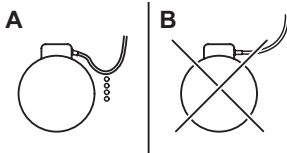
Note: For the correct cable size, refer to local wiring restrictions.

Electrical connection

1. Connect the connecting cable with power switched off and secure against reconnection.
2. Lay the connecting cable such that it doesn't come into contact with the pump, the pump housing or the piping.
3. Check whether the voltage and amperage in the mains match the specifications on the type plate of the pump.

⚠ Caution: Damage due to incorrect voltage!

Never operate the pump with incorrect voltage. This could damage the motor.



4. Open the terminal box.
5. Lay the cable such that no condensation or spray water can run into the cable screws (Fig. A).
6. Connect grounding cable.

7. Install motor control, cabling, overload protection, mains circuit breaker and accessories in accordance with the locally applicable safety regulations.



Note: The connection diagram is located on an exterior label or inside the terminal box.

8. To protect the motor, overheating protection should also be installed.



Note: Special motors can be supplied with a PTC thermal sensor that must be connected to the PTC trip relay.

9. Low temperature applications (below normal temperature ranges) may require external motor and mechanical seal heaters – contact WILO for additional details.

10. Tighten cable screws

11. Close terminal box and ensure that no spraying water can enter it.

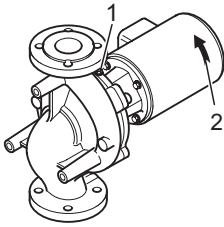
Caution when connecting to an automatic pump control device

Comply with respective installation and operating instructions when wiring to automatic pump control device (DDC or Building Management Systems). Be sure the following guidelines are met:

- AC power is within $\pm 10\%$ of rated voltage with rated frequency (see motor name plate for ratings)
or
- AC power is within $\pm 5\%$ of rated frequency with rated voltage
or
- Combined variation in voltage and frequency of $\pm 10\%$ (sum of absolute values) of rated values, provided the frequency variation does not exceed $\pm 5\%$ of rated frequency

6.3 Fill and ventilate

Ventilate



⚠ Caution: Damage due to dry running!

The pump may never be allowed to run dry. Dry running destroys the mechanical seal.

1. Open air vent valve (1) 1/2 turn, do not remove.

⚠ Warning: Danger due to hot liquid under pressure!

Extreme caution must be used when venting systems that have elevated temperatures and/or dangerous fluids. Maintain sufficient distance from the air vent opening, wear suitable clothing including protective glasses/facial protection and gloves.

2. Completely open suction side and discharge side isolation valves.
3. Wait until the liquid has exited the ventilation opening and until bubbles no longer form.
4. Tightly close the ventilation opening.

Avoid cavitation

5. Ensure that the minimum pressure stipulated in the product catalog is present on the suction side.


⚠ Caution: Damage due to cavitation!

Failing to maintain minimum pressure on the suction side can lead to cavitation accompanied by noise. This can damage the pump. This minimum inlet pressure depends on the operating conditions and the duty point of the pump and must be calculated accordingly. Please contact WILO or your WILO distributor if this further information is required.

Check direction of rotation

6. Check the motor's direction of rotation by briefly turning it on. The direction of rotation is correct if the fan or other visibly rotating parts of the pump are rotating in the direction of the arrow (2).
On three phase only, if the direction of rotation is incorrect, have an electrician correct it by swapping two phases.
For single phase applications, to change direction of the motor please follow the directions supplied with the motor. If there is not arrow on the motor run the pump, note pressure, reverse rotation and recheck pressure. The rotation that produces a higher pressure is the correct rotation (for clarification contact WILO).
7. Turn on the pump for test operation and observe whether it is pumping correctly. If necessary, ventilate again until a sufficient pumping result is achieved.

7 Operation

 **Warning: Risk of burning or freezing on if the pump is touched!**


Depending on the operating conditions of the pump or installation (liquid temperature), the entire pump can become very hot or very cold. Keep your distance during pump operation!

 **Caution: Damage to the pump through overheating!**

The pump may not be operated longer than 1 minute without flow. An accumulation of energy creates heat that can damage the pump shaft, impeller and mechanical seal.

A minimum flow rate of approx. 10% of maximum flow rate must always be guaranteed.

8 Maintenance and Repair


 **Danger: life threatening due to electrical shock!**

Touching live components can be fatal. Only qualified electricians may work on the electrical system. Prior to any maintenance work, disconnect the pump from the power supply and secure against reconnection.


 **Warning: Damage due to incorrectly tightened screws!**

Overtightened screws can break off. Subsequently, separate parts and fragments may chip off and / or the hot liquid may spray.

Observe screw tightening torque specifications ⇒ Page 18.

 **Warning: Danger due to hot liquid under pressure!**

During dismantling of motor or pump, hot liquids may escape under high pressure. Allow the pump to cool down first. Close isolation valve prior to dismantling pump.

 **Caution: Damage due to incorrectly performed maintenance!**

Incorrectly performed maintenance work can damage the pump. The maintenance work described below may therefore only be performed by trained personnel.

8.1 Cleaning

Clean the exterior of the pump using only a lightly dampened cloth without detergents.

8.2 Checks

Under normal operating conditions, the pump does not require regular maintenance work.

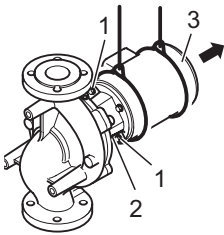
The following points, however, must be checked at regular intervals.

Check	Solution
Leakages	If the leakage rate increases (> 5 ml/h [0.2 oz/hr]), replace the mechanical seal ⇒ Page 15.
Motor noise and vibrations	Check whether the pump is being operated within the permitted characteristic curve range (see product catalog). If level of noise increases due to motor mounting or increased vibrations, replace motor ⇒ Page 14, or replace the motor mounting (see instructions from motor manufacturer).

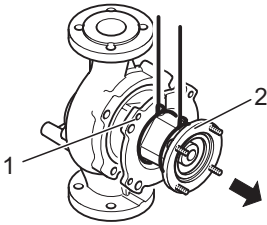
8.3 Disassemble pump

Dismantle motor

1. Disconnect pump from power supply and secure against reconnection.
2. Close shut-off device to front and rear of pump.
3. If the connection cable is too short for disassembly, have an electrician disconnect it.
4. Remove all other connections (e.g. condensate drain).
5. If motor is in horizontal installation position, support the motor or secure it from falling with a crane and a suitable hoist.
6. Remove screws (1) and remove coupling guard (2) on both sides.
7. Loosen all coupling screws by a few turns. Do not, however, remove the screws entirely.
8. Remove other screws on motor flange.
9. Pull out the motor (3) using a suitable hoist and remove.

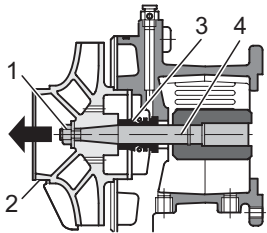


Dismantle lanterns



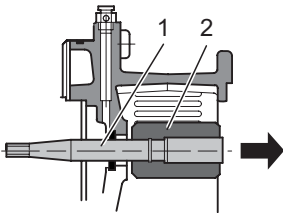
- 10.** If motor is in horizontal installation position, support lanterns or secure against falling using a crane or a suitable hoist.
- 11.** Remove screws on lantern flange.
- 12.** Screw in the screws into threaded extraction holes (1) next to drill holes on lantern flange in order to press lantern out from pump housing.
- 13.** Take out lantern unit (2) with coupling, shaft, mechanical seal and impeller using suitable lifting equipment and remove from pump housing.

Remove impeller



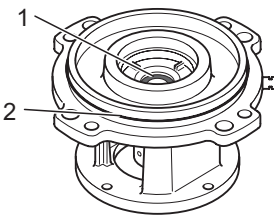
- 14.** Loosen impeller fastening nut (1) counter-clockwise.
- 15.** Loosen impeller (2) from pump shaft using an extractor. In doing so, place extractor hook under impeller near blade.
- 16.** Remove nut and impeller from shaft.
- 17.** Remove mechanical seal (3) from shaft (4).

Remove shaft



- 18.** Pull coupling (2) and shaft (1) out of lantern.
- 19.** Carefully clean surfaces. If shaft is damaged, it must be replaced.

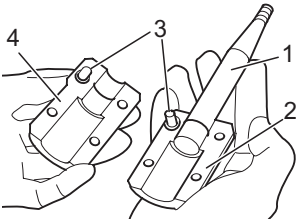
Remove seals



- 20.** Remove stationary seal and seal elastomer (1).
- 21.** Remove O-ring (2).

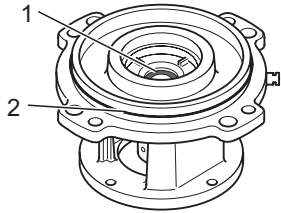
8.4 Assemble pump

Assemble coupling and shaft

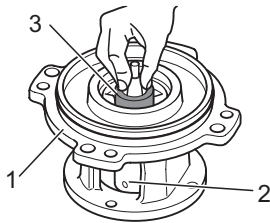


1. Check machined surfaces and clean if necessary.
2. Place shaft (1) in a coupling shell (2).
3. Insert two spacer disks in opposition (3). The shaft must not slip through.
4. Place second coupling shell (4) on top, then screw hand-tight.

Assemble seals

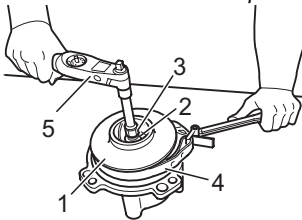


5. Carefully clean seal locations. They must not be damaged.
6. Press new mechanical seal with sealing collar into seal location (1). Water with commercial dishwashing detergent can be used as a lubricant.
7. Insert a new O-ring (2) in lantern groove



8. Carefully insert pre-assembled unit consisting of coupling and shaft (2) into lantern (1).
9. Hold coupling and shaft in place (2) in lantern.
10. Press a new mechanical seal (3) onto shaft. Water with commercial dishwashing detergent can be used as a lubricant.

Assemble impeller



11. Check machined surfaces and clean if necessary.
12. Place impeller (1) onto shaft.
13. Slide on washer (2) then screw on impeller fastening nut (3).

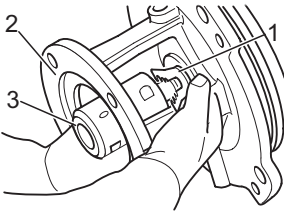


Caution: Damage to mechanical seal!

Too much pressure and twisting can damage the mechanical seal. Proceed with caution.

14. Fit impeller with strap wrench to secure (4).
15. Screw nut tightly using a torque wrench (5). Torque
⇒ Page 18

Assemble lantern unit



16. Place tool (1) on pump shaft and let it snap in. It serves as a bar spacer between pump coupling and lantern (2).
17. Hold shaft unit firm (3) to avoid damage to the mechanical seal.

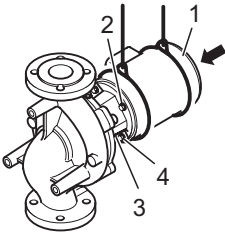


Caution: Damage to mechanical seal!

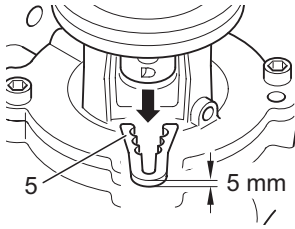
Twisting shaft unit (3) can damage the mechanical seal. Proceed with caution.

18. Insert pre-assembled lantern unit (2) carefully into pump housing using suitable lifting equipment. Tighten screws on lantern flange using a torque wrench. Torque ⇨ Page 18.

Assemble motor



19. Slightly loosen the coupling screws, and open the pre-assembled coupling slightly.
20. Insert key into motor shaft.
21. Instal motor (1) using a suitable hoist.
22. Tighten both opposing screws (2) equally crosswise.
23. Tighten coupling screws slightly at first, until half coupling shells are lying on spacer disks.



24. Then screw coupling together equally. Torque ⇨ Page 18. Specified distance of 0.197 inches [5 mm] between lantern and coupling is correctly set if tool (5) sits between lantern and coupling free of play.
25. Remove tool (5).
26. Insert coupling guard (3) on both sides and screw in both motor fastening screws (4).
27. Tighten all screws on motor flange (2 and 4) using torque wrench. Torque ⇨ Page 18.
28. Prior to turning on the power, check whether shaft unit is easy to rotate and doesn't grind. If necessary, dismantle components again, check fits and repeat assembly process.



Caution: Damage to the pump!

Never operate a pump that is not correctly assembled. This can damage the pump.

8.5 Screw torques

Location Material/SAE Grade	Diameter (inches)	Torque ($\pm 10\%$)	
		ft lb	Nm
Impeller-Shaft Stainless steel	3/8	22	30
	1/2	44	60
	5/8	74	100
Pump housing – lantern SAE Grade 5	5/8	75	100
Adapter flange – lantern SAE Grade 5	5/16	18	25
	1/2	44	60
Lantern – motor SAE Grade 5	3/8	26	35
	1/2	44	60
	5/8	74	100
Coupling SAE Grade 8	1/4	9	12
	5/16	22	30
	3/8	44	60
	1/2	74	100
Pressure taps – plug screw	1/4–18 NPT	15	20

9 Spare parts

In order to avoid returns and incorrect orders, please specify the name plate data for all orders.



Caution: Damage due to incorrect spare parts!

Only original Wilo spare parts are to be used to insure fault-free pump operation.

10 Troubleshooting guide

Faults	Possible cause	Remedy
Pump does not start or fails to run	Pump seized	Switch off power supply, take off pump head, remove obstruction; if motor blocked, overhaul/exchange motor/pump head
	Loose terminals	tighten all terminals
	Blown fuses/breakers	Check fuses, replace/reset as necessary
	Faulty motor	Call service
	Tripped overload relay (excessive amp draw)	throttle hydraulic flow rate down to nominal on discharge side of pump
	Incorrectly set trip relay (heaters)	Reset thermal overloads to full load current value specified on name plate
	Thermal overload is influenced by excessive ambient temperature	Prevent overloads caused by high ambient temperatures
	Tripped PTC relay	Check motor and fan cover for dirt/dust accumulation and clean if necessary; Check ambient temperature and if necessary, ensure an ambient temperature $\leq 105\text{ °F}$ [40 °C] by forced ventilation.
Pump runs at reduced capacity	Incorrect rotation	Check direction of rotation, reverse if necessary
	Discharge valve throttled too far	Slowly open isolating valve
	Speed too low	Adjust incorrect terminal bridging (Y in lieu Δ)
	Air in suction pipe	Check and correct all possible suction leaks
Pump makes noise	Insufficient inlet pressure	Raise inlet pressure, ensure minimum required inlet pressure at suction port, check and if necessary clean suction-side isolating valve and strainer
	Faulty motor bearings	Arrange for pump to be inspected and, if necessary, to be repaired by Wilo or other authorized service.
	Impeller rubs on volute	Test the gap between lantern and pump housing. Clean it, if necessary. Check that distance from coupling to lantern is 5 mm \Rightarrow Page 17.



Note: If you cannot fix the problem, contact service engineer or a Wilo branch office.

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