



Wilo-IPL

- GB** Installation and operating instructions
- F** Notice de montage et de mise en service
- E** Instrucciones de instalación y funcionamiento

Fig.1:

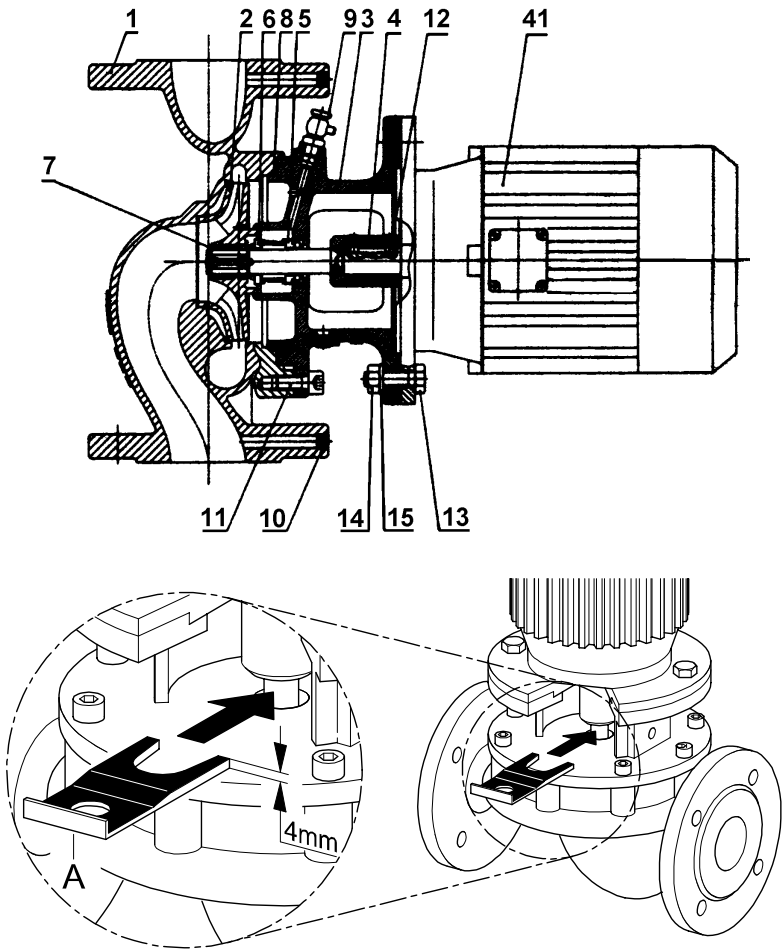


Fig.2:

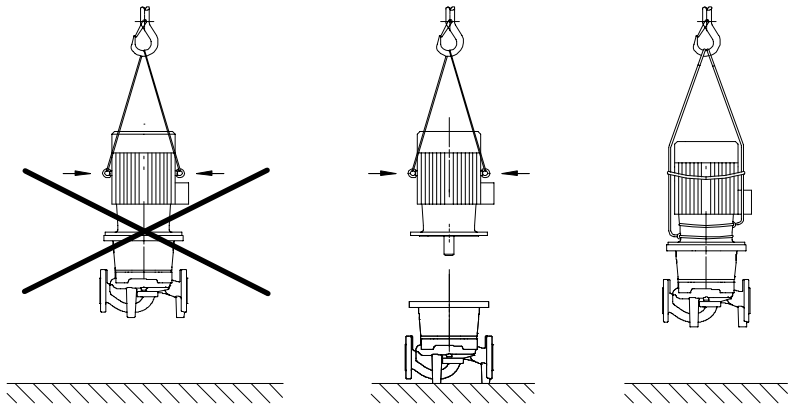


Fig.3:

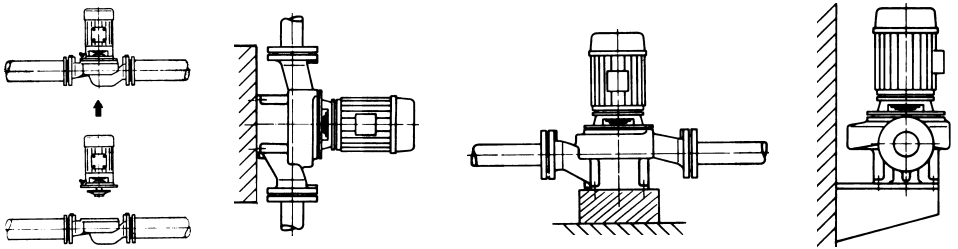


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1 General

1.1 About this document

These Installation and Operating Instructions form an integral part of the unit. They must be kept close to the unit and in readiness whenever required. Precise observance of these instructions is a pre-condition for use of the unit for the intended purpose and for its correct operation.

These Installation and Operating Instructions conform to the relevant version of the equipment and the underlying safety standards valid at the time of going to press.

2 Safety

These instructions contain important information which must be followed when installing and operating the pump. These operating instructions must therefore be read before assembly and commissioning by the installer and the responsible operator.

Both the general safety instructions in the "Safety precautions" section and those in subsequent sections indicated by danger symbols should be carefully observed.

2.1 Symbols and signal words used in these operating instructions

Symbols:

General Safety symbol



Hazards from electrical causes



NOTE: ...



Signal words:

DANGER!

Imminently hazardous situation.

Will result in death or serious injury if not avoided.

WARNING!

The user can be exposed to (severe) injury. 'Warning' refers that harm to the user when the user is neglecting the procedure.

CAUTION!

The product is at risk of damage. 'Caution' refers to the product when the user is neglecting the procedures.

NOTE:

A notice with useful information for the user in relation to the product. It attends the user to possible problems.

2.2 Qualified Personnel

The personnel installing the pump must have the appropriate qualifications for this work.

2.3 Risks incurred by failure to comply with the safety precautions

Failure to comply with the safety precautions could result in personal injury or damage to the pump or installation. Failure to comply with the safety precautions could also invalidate any claim for damages.

In particular, lack of care may lead to problems such as:

- Failure of important pump or machinery functions,
- Injury resulting from electrical or mechanical factors.

2.4 Safety precautions for the operator

Existing regulations for the prevention of accidents must be observed. National Electrical Codes, local codes and regulations must be followed.

2.5 Safety information for inspection and assembly

The operator must ensure that all inspection and installation work is carried out by authorized and qualified specialists who have carefully reviewed these instructions.

Work on the pump/unit must be carried out only with the pump switched off and at complete standstill.

2.6 Unauthorized modification and manufacture of spare parts

Alterations to the pump or installation may only be carried out with the manufacturer's consent. The use of original spare parts and accessories authorised by the manufacturer will ensure safety. The use of any other parts may invalidate claims invoking the liability of the manufacturer for any consequences.

2.7 Unauthorised operating methods

The operating safety of the pump or installation supplied can only be guaranteed if it is used in accordance with paragraph 1 of the operating instructions. The limiting values given in the catalogue or data sheet must neither be exceeded nor allowed to fall below those specified.

3 Transport and storage



CAUTION! Outside influences may cause damages!

The pump must be protected from moisture and mechanical damage at all times during transport and intermediate storage. It must be carefully handled by means of authorized lifting gear using the lifting points provided (see fig. 2).

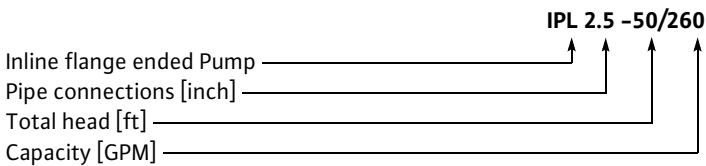
4 Intended use (Application)

The glanded design series IPL are preferable suited for light industrial duties in:

- Hot water heating systems
- Chilled water circulation systems
- Industrial heat transfer systems
- Process engineering

5 Technical data

5.1 Serial code



5.2 Data table

Approved fluids	Heating water	●
	Chilled/ Cold water	●
	Water/glycol mixtures ¹⁾	●
	Heat transfer oil	○
	Other fluids on request	○
Permissible fluid temperature range	from 15 °F to 250 °F [-10°C to +120°C]	●
max. ambient temperature	104 °F [40 °C]	●
max. working pressure	145 psi [10 bar]	●
Installation method	Inline	●
Construction materials pump housing	Cast iron	●
Impeller	Fibre reinforced plastic (polypropylene or noryl)	●
Stub shaft	Stainless steel AISI 420	●
Pipe and gauge connections	Flanges acc. ASME Class 125	●
	Flange with tappings 1/4" NPT	●
Mains power supply	1~115 / 208 - 230 V, 60 Hz (≤ 2 HP)	●
	3~208 - 230 / 460V, 60 Hz (≥ 1 HP)	●
	3~575V, 60 Hz (≥ 1 HP)	●
Degree of motor protection	ODP	●
	TEFC	○
	Integrated protection PTC / PTO ²⁾	○
Special design motor	Special voltage/frequency	○

Legend:

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

¹⁾ Allow for hydraulic corrections for glycol. Only approved makes of additives with corrosion inhibitors must be used. Observe manufacturers' instructions. Contact WILO before using other than above listed fluids other ratio of mixtures and higher temperatures.

²⁾ On-site trip unit required

When ordering spare parts, all data of pump and motor name plate must be stated.

5.3 Scope of supply

- Pump complete
- For pumps with flanges up to 2": flange gaskets
- Installation and maintenance instructions.

5.4 Accessories

Companion Flange Sets must be ordered separately. Please contact your local WILO distributor.

6 Description and function

6.1 Product description (see Fig. 1)

All pumps dealt with herein are single-stage, low-pressure inline direct coupled centrifugal pumps, with NEMA standard motor (Fig. 1). The pumps can be installed either pipe-supported in sufficiently anchored pipework or base-mounted.

Its capacity can be infinitely varied if used in conjunction with the respective control devices. This will enable an optimum adaptation of pump performance to actual load demands and an economical pump operation.

The pump housing is of the inline design with suction and discharge connection axially in line (Fig. 1).

7 Installation and electrical connection

Installation and electrical work in compliance with any local codes and by qualified personnel only!



WARNING! Bodily injury!

Existing regulations for the prevention of accidents must be observed.



WARNING! Electrical shock hazard!

Dangers caused by electrical energy must be excluded.

National Electrical Codes, local codes and regulations must be followed.



CAUTION! Product may get damaged!

The pump must never be exposed to the weather.

7.1 Installation

Siting in a dry, well ventilated and frost-protected environment.

Pump to be placed in an easily accessible position in order to facilitate inspections and repair.

- Minimum space of 15 cm (6 in) between a surface and the motor fan cover.
- Maximum ambient temperature 40 °C (104 °F).

Before pump installation, all welding/soldering on the pipe system must be completed and the pipe system be flushed out thoroughly to be clear of all foreign matter and impurities.

Ensure that the pump is not stressed by the pipework

The pump can be installed in any pipe run course, horizontal or vertical, as long as the motor does not face downwards. Three pipe diameters of straight pipe is recommended on the inlet side of the pump.

Arrows at the pump indicate water flow direction through the pump.

It is recommended to provide and install isolating valves at suction and discharge ports of the pump in order to avoid draining to the whole pipe system in the case of pump inspections or exchange.

The motor stool is equipped with a plugged tapping for a possible drain connection for condensation.

Any mounting position except „motor downwards“ is allowed.

Mounting positions see Fig. 3

The motor terminal box must not face downwards. If necessary, the motor or the motor impeller unit can be turned after removing the screws.



CAUTION! Product may get damaged!

- **When turning, take care not to damage the housing o-ring.**
- **When lifting water from tank make sure that the level of liquid is always above the pump suction port to avoid dry-running of the pump. The minimum inlet pressure must be maintained.**
- **For units which are to be insulated, only the pump housing may be insulated, not the lantern and the motor.**

7.2 Electrical wiring



WARNING! Electrical shock hazard!

Dangers caused by electrical energy must be excluded.

- **Electrical work by a qualified electrician only!**
- **Motor and control wiring, overload protection, disconnects, accessories and grounding must conform to the National Electrical Code and local codes and practises.**
- **All electrical connections must be performed after the electrical supply has been switched off and secured against unauthorized switching.**
- **For safe installation and operation a proper grounding of the pump to the power supply's grounding terminals is required.**



WARNING! Electrical overload hazard!

If there is a risk of freezing the motor must have properly sized heaters to provide overload and under voltage protection.

Protect the motor with a motor-protection or thermal relays..

Special motors can be supplied with PTC thermal sensor, which must be connected to the PTC trip relay.

The position of the cable entrance in electrical connection box of the motor or the cable position has to protect the electrical connection box against external water contamination.

Heat-resistant power cable must be used for pumps in systems with water temperatures above 90 °C (194 °F).

The power cable must be routed in such a way to avoid any contact with pipe-work and/or pump/motor housings.

- Check available mains power supply and voltage.
- Observe motor name plate data.

Mains power supply fuses: depending on motor full-load current.

The pump/installation must be grounded in compliance with the applicable regulations.



CAUTION! Possible damage of the motor!

Always connect the motor in accordance to the wiring diagram inside the terminal box cover or on the motor housing.

Terminals must not be connected to a voltage higher than the one given on the type plate.

- Comply with respective installation and operating instructions when wiring to automatic pump control device (DDC or Building Management Systems). Connect the motor leads as shown on the connection diagram located on the name plate or inside the cover of the conduit box. Be sure the following guidelines are met:
 1. AC power is within $\pm 10\%$ of rated voltage with rated frequency (see motor name plate for ratings)
or
 2. AC power is within $\pm 5\%$ of rated frequency with rated voltage
or
 3. 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

8 Start up

8.1 Filling and venting

Pump, suction and inlet piping must be filled and properly vented.



CAUTION! Possible damage of the pump!

Never operate the pump dry.

Dry-running will damage the mechanical seal!

In order to avoid noise and damage due to cavitation a minimum inlet pressure must be ensured at the pump suction port. This minimum inlet pressure depends on the operating conditions and the duty point of the pump and must be accordingly calculated. Please contact WILO or your WILO distributor if this further information is required.

- Vent pumps by unscrewing its air vent plugs (Fig. 1, pos. 9).



WARNING! Risk of scalding!

Depending on the fluid temperature and the system pressure, if the vent screw is completely loosened hot liquid or vapour can escape or even shoot out at high pressure.

- Check the direction of rotation by briefly switching on the pump and make sure that rotation corresponds with the arrow on the motor (fan cover or flange). If rotation is backwards, please contact your local electrician to correct the rotation.
- Ensure a minimum flow of at least 10 % of the maximum flow of the pump.

- Check that the current input does not exceed the value indicated on the motor data plate.



CAUTION! Possible damage of the pump!

The pump must not run for longer than 10 minutes with no flow (dead head).



WARNING! Risk of burning or freezing on if the pump is touched!

Depending on the operating conditions of the pump or installation (fluid temperature), the entire pump can become very hot or very cold.

Keep distance during pump operation!

9 Maintenance / Service

All servicing should be performed by an authorized service representative!



WARNING! Electrical shock hazard!

Dangers caused by electrical energy must be excluded.

All electrical work must be performed after the electrical supply has been switched off and secured against unauthorized switching.



WARNING! Risk of scalding!

At high water temperatures and system pressure close isolating valves before and after the pump.

First, allow pump to cool down.



WARNING! Risk of injury!

Screws which have been tightened too hard can break off. Subsequently separate parts and fragments can chip off and /or hot medium can spray.

Observe screw tightening torque specifications (see 9.3).

9.1 Mechanical seal



CAUTION! Possible damage of the pump!

Observe screw tightening torque specifications (see 9.3).

Slight dripping is likely to occur during the initial run-in period. A visual leakage check should, however, be carried out from time to time in order to anticipate a catastrophic seal failure and ensure in-time exchange of the seal. WIL0 offers a repair kit containing all parts required for a repair.

9.1.1 Exchange of mechanical seal, Version with NEMA-motor (Fig. 1)

Removal:

- Switch off power supply to pump motor and secure against unauthorized switching on.
- Close isolating valves at both pump ports,

- Lower the pressure of the pump by opening the air vent plugs (pos. 9).



WARNING! Risk of scalding!

In the event of hot liquids.

- Remove terminal wiring, if cable too short,
- Remove setscrews of shaft coupling (pos.12),
- Remove motor flange bolts (pos. 13/14) and lift off motor,
- Remove adapter flange bolts (pos. 11) and remove adapter with stub shaft and seal,
- Remove circlip (pos. 7) at impeller shaft end,
- Remove impeller (pos. 2) from stub shaft,
- Remove distance ring (pos. 6) from stub shaft,
- Remove rotating seal parts (pos. 5) from stub shaft,
- Remove stub shaft from adaptor
- Remove stationary seal ring from its seat in the adapter and thoroughly clean seat face,
- Thoroughly clean seating part of stub shaft. If the shaft is damaged it must also be replaced.

Re- Assembly:

- Refit new stationary ring,
- Refit stub shaft into adaptor,
- Refit new rotating seal parts (pos. 5) onto stub shaft,
- Refit distance ring (pos.6) onto stub shaft,
- Refit impeller (pos.2) to stub shaft,
- Fit new circlip (pos.7) at impeller shaft end,
- Fit new O-ring gasket (pos.8),
- Fit adapter complete with impeller and rotating seal into pump housing and secure with holding- down bolts,
- Re-mount the motor and secure it with flange bolts (pos. 13/14),
- Slide assembly fork (pos.. A) between lantern and stub shaft. The assembly fork must fit tightly.
- Fit shaft coupling to shaft ends and secure with setscrews (pos. 12), lock the setscrew with Loctite.
- Remove assembly fork
- Rewire power leads to motor terminals,
- Open isolating valves at both pump ports and bleed air with air vent plugs (pos. 9).
- Turn shaft by hand to insure no binding of any rotating parts.
- Restore power supply,
- Repeat measures as for commissioning.

9.2 Motor

Increasing bearing noise and undue vibrations indicate a worn bearing. The bearing or the complete motor then needs replacing.

Exchange of the motor:

- Switch off power supply and secure against unauthorized switching.
- Close isolating valves at both pump ports.
- Lower the pressure of the pump by opening the air vent plug (fig. 1, pos. 9).



WARNING! Risk of scalding!
In the event of hot liquids.

- Disconnect wires from motor terminals
- Unscrew the motor fixing-screws at motorflange and screws in coupling.
- Lift the motor off pumphousing by means of suitable lifting gear.
- Assemble the new motor by means of suitable lifting gear and secure the motorflange connection with bolts.



CAUTION! Possible damage of the pump!
Observe screw tightening torque specifications (see 9.3).

- Fix the coupling screws considering the axial positioning of the coupling (see Fig. 1).



CAUTION! Possible damage of the pump!
Observe screw tightening torque specifications (see 9.3).

- Rewire power leads to motor terminals.

9.3 Screw tightening torque

Screw Type: UNC SAE Grade 5		Torque ($\pm 10\%$)	
Location	Diameter	ft lb	Nm
Pump Housing – Lantern	1/4	7	9.5
	3/8	25	33
Lantern – Motor	3/8	25	33
Shaft Coupling	1/4	7	9.5

10 Faults, causes and remedies



WARNING! Electrical shock hazard!
Dangers caused by electrical energy must be excluded.
All electrical work must be performed after the electrical supply has been switched off and secured against unauthorized switching.



WARNING! Risk of scalding!
At high water temperatures and system pressure close isolating valves before and after the pump.
First, allow pump to cool down.

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 at discharge side of pump
	Incorrectly set trip relay (heaters)	reset thermal overloads to name plate full load current-value
	Thermal overload are influenced by excessive ambient temperature	Protect overloads from 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 $\leq 105\text{ }^{\circ}\text{F}$ [$40\text{ }^{\circ}\text{C}$] 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	correct wrong 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 contact between lantern and pumphousing. Clean it, if necessary.

If the fault cannot be remedied, please contact your local plumbing and heating specialist or WILO customer services.

11 Spare parts

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



CAUTION! Possible damage of the pump!

Only original Wilo spare parts are to be used to ensure the fault-free operation of the pump.

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