



BOILER PUMP KIT INSTRUCTIONS

IMAX XTRA EL

When replacing any part on this appliance, use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by Ideal Heating.

For the very latest copy of literature for specification and maintenance practices visit our website idealheating.com where you can download the relevant information in PDF format.



This Boiler Pump Kit is suitable for the following boilers listed:

IMAX XTRA EL RANGE

These instructions must be read in conjunction with the Installation & Servicing Instructions supplied with the boiler.

The Boiler Pump Kit should be fitted onto the return flange of the boiler. Ideally it would be fitted in conjunction with a low loss header or heat exchanger, to provide hydraulic separation of the boiler to the system.

1. KIT CONTENTS

- A. Stratos Maxo 80/0.5 -12 PN6 - 1 off (c/w flange gaskets & insulation)
- B. M16 x 65 Bolts - 8 off
- C. M16 Nuts - 8 off
- D. Pump Control Lead Set - 1 off
- E. 230V Relay - 1 off
- F. M3 Nuts - 2 off
- G. M3 Washer - 2 off
- H. Installation Instructions - 1 off

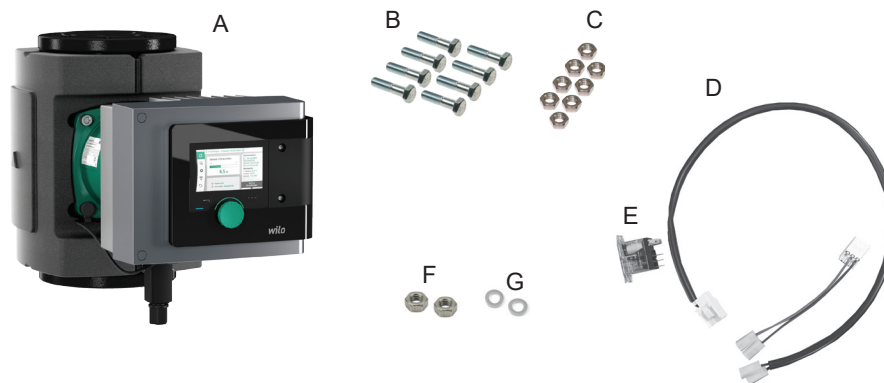


Fig. 1 Kit Contents

The hydraulic resistance and nominal flows for the boiler range are given in the Installation Manual and should be looked at when specifying a pump. A table showing the available head at nominal flow are shown below for each boiler in the range.

Table 1 Hydronic Parameters

	Boiler Size				
	320	395	470	545	620
Available pressure difference (kPa)	108	108	106	100	94
Available head (m)	11.0	11.0	10.8	10.2	10.6
Nominal flow (m ³ /h)	13.8	17.0	20.2	23.5	26.7

The manufacturer's instructions are provided and should be read fully to understand the operation of the pump. The pump should be fitted to the return manifold using the flange gaskets, bolts and nuts provided.



WILO Stratos MAXO

Scan to view the pump manufacturer's literature online

2. ELECTRICAL INSTALLATION

2.1 Installing

To ensure immunity in industrial environments (EN 61000-6-2) the data and control cables must be shielded cables and must be used with an EMC compliant cable gland.

⚠ WARNING:! Danger of electric shock!

The pump should be electrically isolated and secured against unauthorised switch-on before beginning installation.

2.2 Electrical Connection

⚠ WARNING: Danger of electric shock!

Electrical connection must be carried out by an electrician authorised by the local electricity supply company and in accordance with the applicable Wiring Regulations, BS7671.

Table 2 Technical data for heating/air conditioning/cooling

Technical data	
Permissible fluid temperature -10 ... +110 °C	-10 ... +90 °C -10 ... +90 °C
Permissible ambient temperature	-10 ... +40 °C
Protection class	IPX4D
Maximum relative humidity	95 % (non-condensing)
Mains voltage	1~ 230 V +/-10 % 50/60 Hz
Residual current ΔI	≤ 3.5 mA
Electromagnetic compatibility	Interference emission in accordance with: EN 61800-3:2018 / residential environment (C1) Interference immunity in accordance with: EN 61800-3:2018 / industrial environment (C2)
Emissions sound-pressure level	$P_2 \leq 160$ W: ≤ 29 dB(A) $P_2 > 160$ W ... 890 W: ≤ 41 dB(A) $P_2 > 890$ W ... 1520 W: ≤ 50 dB(A)
Energy efficiency index (EEI)**	≤ 0.17 ... ≤ 0.19 (depending on type)
Temperature class	TF110 (see IEC 60335-2-51)
Pollution degree	2 (IEC 60664-1)
Max. permitted operating pressure	PN 6/10 ¹⁾ , PN 16 ²⁾

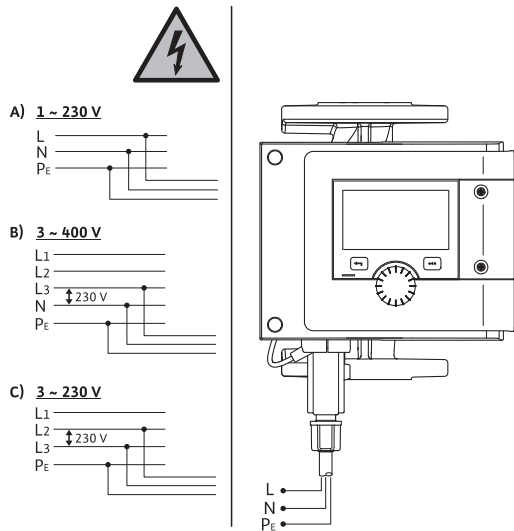


Fig. 2 Power supply option

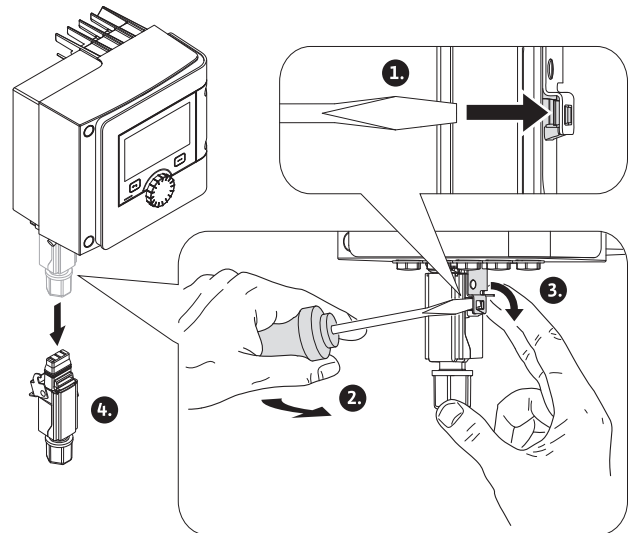


Fig. 3 Accessing the power connection

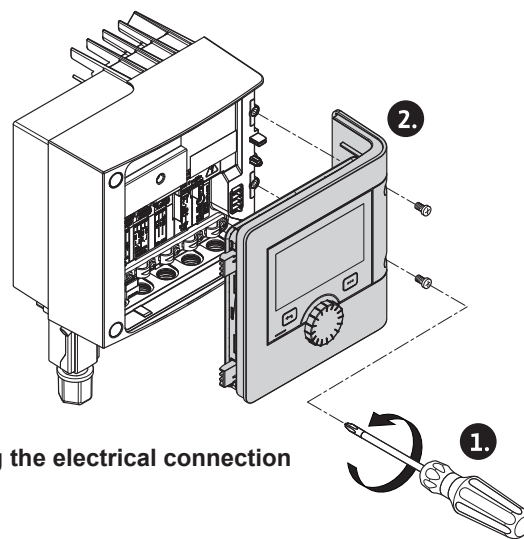


Fig. 4 Accessing the electrical connection

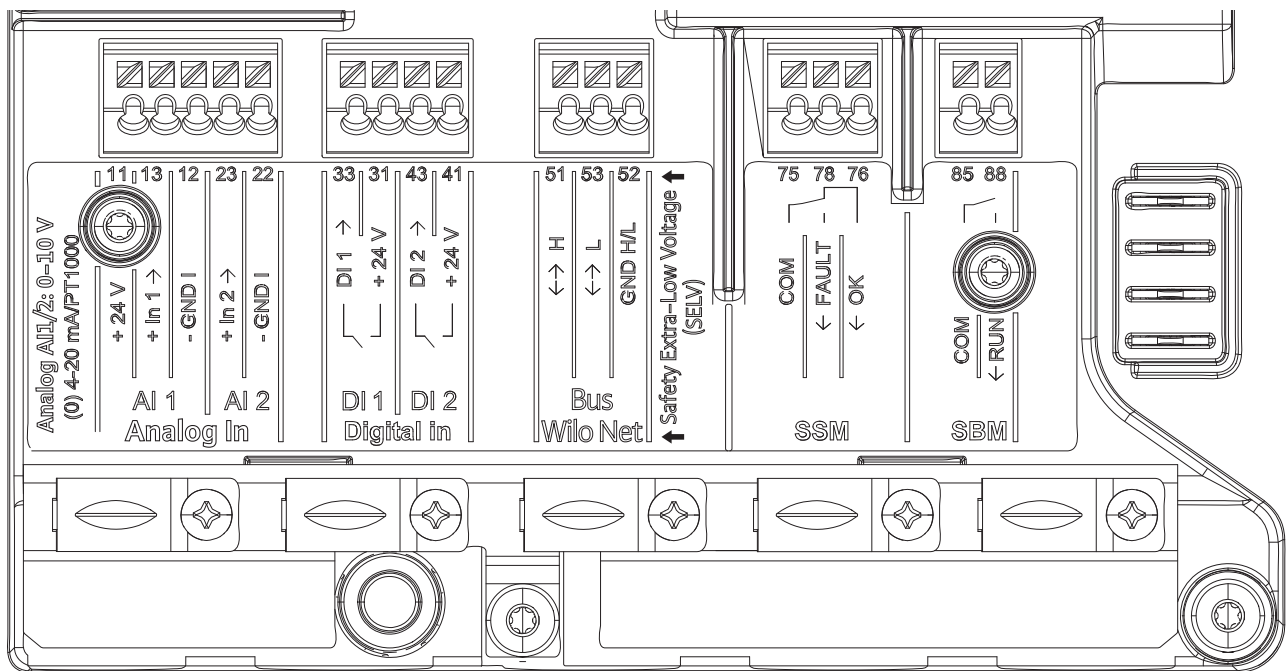


Fig. 5 Electrical connections

⚠ DANGER: Risk of fatal electrical shock!

Immediate danger of death if live components are touched!

In particular, persons with medical aids, such as cardiac pacemakers, insulin pumps, hearing aids, implants or similar are at risk.

Death, severe injury and damage to property may be the result.

A professional medical assessment is always necessary for such persons!

- Before commencing work, switch off the power supply and secure it against being switched on again.
 - Due to the presence of dangerous contact voltage, work on the electronic module must not be started until 5 minutes have elapsed!
- Check whether all connections (including potential-free contacts) are voltage-free.
- Only connect or operate the pump with the electronic module installed.
- Never remove configuration and operating elements.
- Never put the pump into operation if the electronic module/Wilo-Connector is damaged!
- Never apply incorrect voltage.
- Applying an incorrect voltage to SELV lines will result in incorrect voltage in all pumps and on-site building automation devices that are connected to SELV lines.

⚠ CAUTION: Property damage caused by improper electrical connection!

An inadequate mains design can lead to system failures and cable fires due to mains over-load!

If the wrong voltage is applied, the pump can be damaged!

Applying incorrect voltage to SELV lines will result in incorrect voltage in all pumps and on-site building automation devices, which are connected to the SELV line, and can damage them!

- When designing the mains supply with regard to the used cable cross-sections and fuses, pay special attention to the fact that, in multi-pump operation, it is possible that all pumps operate at the same time for short periods.
- When switching the pump on or off using an external control device, deactivate any mains voltage pulse (e.g. burst-fired control).
- Check switching the pump via triacs/solid-state relays on a case-by-case basis! Make sure that the SELV lines have a maximum voltage of 24 V.

2.3 Requirements

① **NOTE: Nationally applicable guidelines, standards and regulations as well as the requirements of local energy supply companies must be observed.**

DANGER: Risk of fatal electrical shock!

Even if the LED is not illuminated, voltage may be present inside the electronic module! Failure to install protection devices (e.g. module cover of electronic module) can cause electric shock, potentially resulting in life-threatening injuries!

- Always deactivate the power supply from the pump and if necessary SSM and SBM!
- Never operate the pump without having closed the module cover!

CAUTION: Danger of material damage caused by improper electrical connection!

Ensure that the current type and voltage of the mains connection correspond to the specifications on the pump rating plate.

- Observe the current type and voltage on the rating plate.
- In the case of twin-head pumps, individually connect and secure both motors.
- If a residual-current device (RCD) is used, it is recommended to use an RCD type A (pulse current sensitive). Check that the rules for the coordination of electrical operating fluid in the electrical installation are observed and, if necessary, adjust the RCD accordingly.
- Consider the leakage current per pump $I_{\text{leff}} \leq 3.5 \text{ mA}$.
- Connect to 230 V low-voltage networks. When connecting to IT networks (Isolé Terre electrical system), always make sure that the voltage between the live wires (L1-L2, L2-L3, L3-L1 Fig. 2) does not exceed 230 V.
- In case of error (earth fault), the voltage between the live wire and PE must not exceed 230 V. Establish electrical connection via a fixed connection cable equipped with a connector device or an all-pole switch with a contact opening width of at least 3 mm (VDE 0700/Part 1).
- The pump can be operated on an uninterruptible power supply.
- During external connection of the pump, deactivate a pulse of the voltage (for example phase angle control).
- Switching the pump via triacs/solid-state relays must be examined on a case-by-case basis. During deactivation with on-site power relay: Rated current $\geq 10 \text{ A}$, rated voltage 250 V AC.
- Irrespective of the rated current of the pump, peak currents of up to 10 A may occur every time the power supply is switched on!
- Observe the switching frequency:
 - Switch-on/off procedures via mains voltage $\leq 100/24 \text{ h}$
- Increased number of switch-on/off procedures $\leq 20/\text{h}$ ($\leq 480/24 \text{ h}$) permissible with:
 - Digital input with ext. OFF function
 - Analogue setpoint input (0 ... 10 V) with switch-off function
 - Switch signals using communication interfaces (e.g. CIF module, Wilo Net or Bluetooth)

- To protect against leakage and for strain relief to the threaded cable gland, use a connection cable with sufficient outer diameter.
- Bent the cables near the screwed connection to form a drain loop to drain any accumulated drips. Use a heat-resistant connection cable if fluid temperatures exceed 90 °C.
- Lay the connection cable in such a way that it touches neither the pipes nor the pump.

Table 3 Cable Requirements

Terminals are intended for rigid and flexible conductors with or without ferrules

Connection	Cable cross-section in mm ² Min.	Cable cross-section in mm ² Max.	Cable
Mains plug	3 x 1.5	3 x 2.5	
SSM	2 x 0.2	2 x 1.5 (1.0")	*
SBM	2 x 0.2	2 x 1.5 (1.0")	*
Digital input 1 (DI 1)	2 x 0.2	2 x 1.5 (1.0")	*
Digital input 2 (DI 2)	2 x 0.2	2 x 1.5 (1.0")	*
24 V output	1 x 0.2	1 x 1.5 (1.0")	*
Analogue input 1 (AI 1)	2 x 0.2	2 x 1.5 (1.0")	*
Analogue input 2 (AI 2)	2 x 0.2	2 x 1.5 (1.0")	*
Bus Wilo Net	3 x 0.2	3 x 1.5 (1.0")	shielded

Cable length ≥ 2 m: use shielded cables.

When using ferrules, the maximum cross-section for communication interfaces is reduced to 1 mm². All combinations up to 2.5 mm² are permissible in the Wilo-connector.

⚠ DANGER: Electric shock.

When connecting SSM/SBM lines, care should be taken to separate the SELV section, thus ensuring SELV protection is maintained.

① NOTICE:

- **Tighten the threaded cable gland M16x1.5 on the electronic module with a torque of 2.5 Nm.**
- **Tighten nuts with a torque of 2.5 Nm to ensure strain relief.**
- **Remove the inner seal ring of the threaded cable gland when installing cables with a diameter ≥ 5 mm.**

2.4 Connection Options

CAUTION: Risk of property damage!

Never connect the power supply to two phases with 400 V. This may destroy the electronic system.

- **Exclusively connect the power supply to 230 V (phase to neutral conductor)**

The pump can be connected to power supplies with the following voltage ratings refer to Fig. 2, on page 4:

- 1~ 230 V
- 3~ 400 V with neutral conductor
- 3~ 230 V

All communication interfaces in the terminal room (analogue inputs, digital inputs, Wilo Net, SSM and SBM) comply with the SELV standard.

2.5 Connecting and Removing the Wilo-Connector

⚠ WARNING: Risk of fatal electrical shock.

Never connect or remove the Wilo-Connector under mains voltage.

⚠ CAUTION: Property damage due to improper fixation of the Wilo-Connector

Improper fixation of the Wilo-Connector may cause contact problems and electrical damage

- **Exclusively operate the pump when the metal clamp of the Wilo-Connector is locked.**
- **Disconnection of the Wilo-Connector under voltage is not permitted.**

Connecting

1. Prepare the cable.
 2. Unscrew the cable bushing of the supplied Wilo-Connector.
 3. Remove the upper part of the Wilo-Connector.
 4. Open WAGO "Cage Clamp" by pressing.
 5. Guide the cable through the cable duct to the connection sockets.
 6. Connect the wires in the correct position.
- ① IMPORTANT: For cables without ferrules, make sure that no cores protrude from the terminal.**
7. Close WAGO "Cage Clamp".
 8. Push the upper part of the Wilo-Connector into the lower part by using position bars and close the socket.
 9. Screw on cable bushing with a torque of 0.8 Nm.
 10. Insert the Wilo-Connector and lock the metal clamp over the retaining pins.
- ① IMPORTANT: The metal clamp on the side of the Wilo-Connector housing can only be unlocked using tools.**
11. Restore the power supply.

Disconnecting

1. Disconnect mains voltage.
 2. Undo the metal clamp from the mechanical lock on the housing using suitable tools. For this purpose, move the tools towards the outside and simultaneously open the metal clamp towards the housing.
 3. Pull off the Wilo-Connector.
- ① IMPORTANT: For confined installation situations (e.g. shut-off valves directly below the electrical connection), an angle plug is available as an alternative. Angle plug to be ordered separately.**

2.6 Connecting the communication interfaces

Observe all warnings in the “Electrical Connection” section!

Make sure that all power supplies of the pump and connected communication interfaces, especially that of SSM and SBM, are switched off.

1. Loosen the screws of the module cover (Fig. 4, on page 4).
2. Remove the module cover and carefully put it to one side.
3. Unscrew the required number of screw plugs (M16x1.5) with the tool.
4. Undo the required number of shield clamps (see notice).
5. Screw in the threaded cable gland M16x1.5 and tighten with a torque of 2.5 Nm.
6. Strip communication cables to the required length.
7. Push the nut of the threaded cable gland over the cable and insert the cable into the inner seal ring of the threaded cable gland and under the shield clamp.
8. Spring clips: Open WAGO “Cage Clamp” by pressing it with a screwdriver and guide the stripped lead into the terminal.
9. Fasten communication cables using shield clamps (see notice).
10. To ensure strain relief, tighten the nut of the threaded cable gland with a torque of 2.5 Nm.
11. Push the module cover forward into the grooves using the guide bars, close cover and fasten with screws.

ⓘ **NOTICE:** Remove the inner seal ring of the M16x1.5 threaded cable gland when installing cables with a diameter ≥ 5 mm.

Position the cable shielding on only one end of the cable to prevent circulating current in the event of potential difference via the communication cable!

To loosen the leads: Open the WAGO “Cage Clamp” spring clip! Then pull out leads!

External interfaces (Fig. 5, on page 4)

- Analogue IN (purple terminal block) Digital IN (grey terminal block)
- Bus Wilo Net (green terminal block) SSM (red terminal block)
- SBM (orange terminal block)

All communication interfaces in the terminal room (analogue inputs, digital inputs, Bus Wilo Net, SSM and SBM) comply with the SELV standard.

SSM and SBM can also be operated with/at non-SELV compliant connections/voltage ratings (up to 250 V AC) without this negatively influencing the SELV compliance of the remaining communication connections in the terminal room.

Make sure to install cables correctly and ensure separation in the terminal room to maintain SELV conformity for all other cables.

3. REQUIREMENTS

ⓘ **NOTICE:** Nationally applicable guidelines, standards and regulations as well as the requirements of local energy supply companies must be observed.

⚠ **DANGER:** Risk of fatal electrical shock

Even if the LED is not illuminated, voltage may be present inside the electronic module.

Failure to install protection devices (e.g. module cover of electronic module) can cause electric shock, potentially resulting in life-threatening injuries.

• Always deactivate the power supply from the pump and if necessary SSM and SBM!

• Never operate the pump without having closed the module cover.

⚠ **CAUTION:** Danger of material damage caused by improper electrical connection

Make sure that the current type and voltage of the mains connection correspond to the specifications on the pump rating plate.

- Observe the current type and voltage on the rating plate.
- In the case of twin-head pumps, individually connect and secure both motors.
- If a residual-current device (RCD) is used, it is recommended to use an RCD type A (pulse current sensitive). Check that the rules for the coordination of electrical operating fluid in the electrical installation are observed and, if necessary, adjust the RCD accordingly.
- Consider the leakage current per pump $I_{\text{leff}} \leq 3.5$ mA.
- Connect to 230 V low-voltage networks. When connecting to IT networks (Isolé Terre electrical system), always make sure that the voltage between the live wires (L1-L2, L2-L3, L3-L1 → Fig. 2) does not exceed 230 V. In case of error (earth fault), the voltage between the live wire and PE must not exceed 230 V.
- Establish electrical connection via a fixed connection cable equipped with a connector device or an all pole switch with a contact opening width of at least 3 mm (VDE 0700/Part 1).
- The pump can be operated on an uninterruptible power supply.
- During external connection of the pump, deactivate a pulse of the voltage (for example phase angle control).
- Switching the pump via triacs/solid-state relays must be examined on a case-by-case basis.
- During deactivation with on-site power relay: Rated current ≥ 10 A, rated voltage 250 V AC. Irrespective of the rated current of the pump, peak currents of up to 10 A may occur every time the power supply is switched on!
- Observe the switching frequency:
 - Switch-on/off procedures via mains voltage $\leq 100/24$ h
- Increased number of switch-on/off procedures $\leq 20/h$ ($\leq 480/24$ h) permissible with:
 - Digital input with ext. OFF function
 - Analogue setpoint input (0 ... 10 V) with switch-off function
 - Switch signals using communication interfaces (e.g. CIF module, Wilo Net or Bluetooth)

- To protect against leakage and for strain relief to the threaded cable gland, use a connection cable with sufficient outer diameter.
- Bent the cables near the screwed connection to form a drain loop to drain any accumulated drips.
- Use a heat-resistant connection cable if fluid temperatures exceed 90 °C.
- Lay the connection cable in such a way that it touches neither the pipes nor the pump.

Table 4 Cable Requirements

Terminals are intended for rigid and flexible conductors with or without ferrules.

Connections	Cable cross-section in mm ²		Cable
	Min.	Max.	
Mains plug	3x1.5	3x2.5	
SSM	2x0.2	2x1.5 (1.0 ^{**})	*
SBM	2x0.2	2x1.5 (1.0 ^{**})	*
Digital input 1 (DI 1)	2x0.2	2x1.5 (1.0 ^{**})	*
Digital input 2 (DI 2)	2x0.2	2x1.5 (1.0 ^{**})	*
24 V output	1x0.2	1x1.5 (1.0 ^{**})	*
Analogue input 1 (AI 1)	2x0.2	2x1.5 (1.0 ^{**})	*
Analogue input 2 (AI 2)	2x0.2	2x1.5 (1.0 ^{**})	*
Bus Wilo Net	3x0.2	3x1.5 (1.0 ^{**})	shielded

*Cable length ≥ 2 m: use shielded cables.

** When using ferrules, the maximum cross-section for communication interfaces is reduced to 1 mm². All combinations up to 2.5mm² are permissible in the Wilo-Connector.

⚠ DANGER: Electric Shock

When connecting SSM / SBM lines, care should be taken to separate the SELV section, thus ensuring SELV protection is maintained.

At cable cross sections of 5 - 10 mm, remove the inner seal ring from the threaded cable gland before installing the cable.

① NOTICE:

- Tighten the threaded cable gland M16x1.5 on the electronic module with a torque of 2.5 Nm.
- Tighten nuts with a torque of 2.5 Nm to ensure strain relief.
- Remove the inner seal ring of the threaded cable gland when installing cables with a diameter ≥ 5 mm.

4. FINAL WORK

- Check the terminal box seal for any visible damage.
- Close the terminal box lid with the screws provided so that the seal is tight all around.
- Carry out commissioning / functional test in accordance with the following section.

5. COMMISSIONING

The following section describes testing the functioning of the inputs/ outputs. It is recommended to test together with the connected system. The pump's installation and operating instructions are needed for some settings.

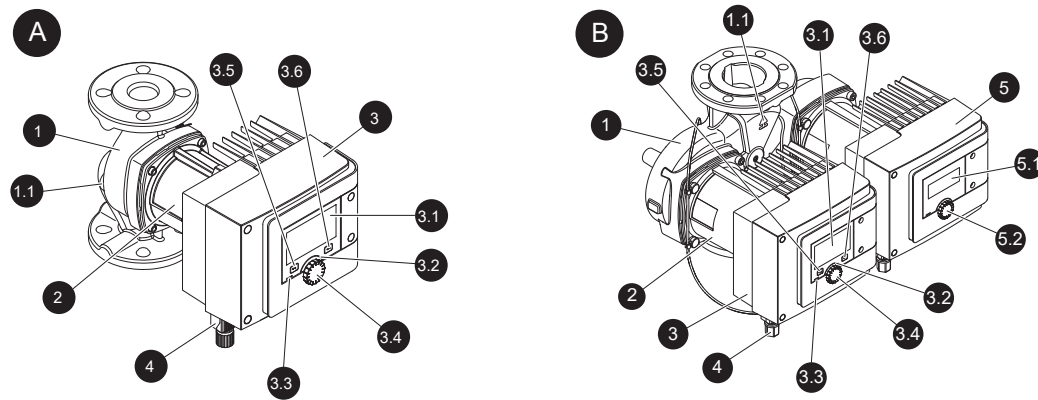


Fig. 6 Motor housing

Table 5 Pump and operating element Description (Refer to Fig. 6 A & B)

Item	Name	Explanation
1	Pump Housing	
1.1	Direction of flow symbol	The fluid should flow in this direction
2	Motor	Drive unit
3	Electronic module	Electronic unit with graphic display
3.1	Graphic display	Provides information about settings and pump status Self-explanatory user interface for setting the pump. The display screen cannot be rotated
3.2	Green LED indicator	LED lights up, pump supplied with power There are no warnings and no faults
3.3	Blue LED indicator	LE lights up, pump is externally controlled via an interface, e.g. by: <ul style="list-style-type: none"> • Bluetooth remote control • Setpoint specification via analogue input AI1 or AI2 • Intervention of building automation via control input DI1, DI2 or bus communication. - Flashes with active twin-head pump connection
3.4	Operating button	Navigate menus and edit content by turning and pressing
3.5	Back button	Menu navigation: <ul style="list-style-type: none"> • To go back to the previous menu level (briefly press once). • To go back to the previous setting (briefly press once). • To go back to the main menu (press once and hold for > 1 s once). Turns key lock on or off in combination with the context button > 5 s
3.6	Context button	Opens the context menu with additional options and functions. Turns key lock on or off in combination with the back button > 5 s
4	Wilo-Connector	Electrical plug for mains connection
5	Base module	Electronic unit with LED display
5.1	LED display	Indicates error code and Bluetooth PIN
5.2	LED display operating button	Triggers the pump venting function when pressed. Turning is NOT possible

6. PROCEDURE AFTER SWITCHING ON THE POWER SUPPLY DURING INITIAL COMMISSIONING

As soon as the power supply is switched on, the display starts. This process can take up to one minute. After the start-up process has been completed, settings can be configured (refer to manufacturer instructions see QR code on page 2.).

At the same time, the motor starts running.

*Separate user manual (refer to manufacturer instructions see QR code on page 2).


7. SETTING THE BASIC CONTROL FUNCTIONS

Depending on the application, basic control functions are available.

The control functions can be selected with the setting assistant:

- Differential pressure Δp -c
- Differential pressure Δp -v
- Index circuit Δp -c
- Dynamic Adapt plus (factory setting of single and twin-head pump)
- Volume flow constant (Q-const.)
- Multi-Flow Adaptation
- Temperature constant (T-const.) (factory setting for drinking water pump)
- Differential temperature (ΔT -const.)
- Speed constant (n-const.)
- PID control

8. COMMUNICATION INTERFACES: SETTING AND FUNCTION

In the "Settings" menu , select

1. "External interfaces".

Possible selection:


External Interface

- ▶ Function SSM relay
- ▶ Function SBM relay
- ▶ Function control input (DI1)
- ▶ Function control input (DI2)
- ▶ Function analogue input (AI1)
- ▶ Function analogue input (AI2)
- ▶ Setting Wilo Net

8.1 Application and function of the digital control inputs DI1 and DI2

The pump can be controlled through external potential-free contacts at the digital inputs DI1 and DI2. The pump can be

- switched on or switched off,
- controlled to maximum or minimum speed,
- set manually into an operating mode,
- protected against changes of settings through control or remote control or
- switched between heating and cooling.

In the "Settings" menu , select



1. "External interfaces"
2. Select "Function control input DI1" or "Function control input DI2".
3. Select option External OFF for "Function Control DI1". (refer to manufacturer instructions see QR code on page 2).

Possible settings: (Refer to Table 5).

Table 6 Function Control Input DI1 or DI2

Selection option	Function control input DI1 or DI2
Not used	The control input does not have a function
External OFF	Contact open: Pump is switched off. Contact closed: Pump is switch on.
External MAX	Contact open: Pump is running in the mode set on the pump. Contact closed: Pump is running with maximum speed.
External MIN	Contact open: Pump is running in the mode set on the pump. Contact closed: Pump is running with minimum speed.
External MANUAL	Contact open: Pump is running in the mode set on the pump or in mode requested via bus communication. Contact closed: Pump is set to MANUAL.
External key lock	Contact open: Key lock is deactivated. Contact closed: Key lock is activated.
Heating/cooling switchover	Contact open: "Heating" active. Contact closed: "Cooling" active.

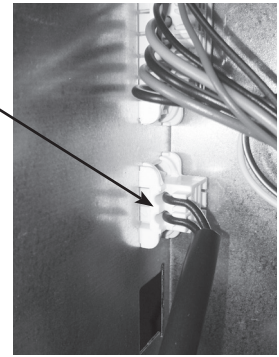
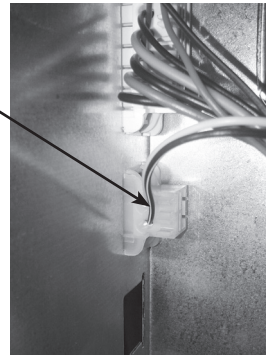
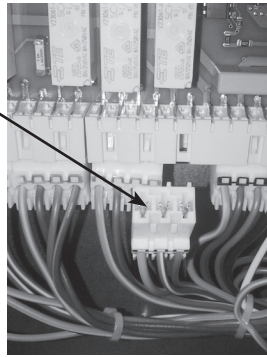
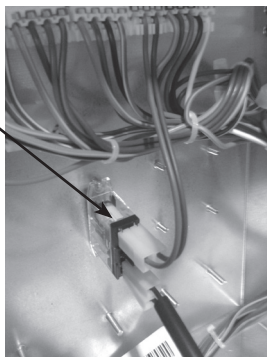
To guarantee the heating/cooling switchover function operates correctly at the digital input:

1. Select the "Heating & cooling" application in the "Settings" menu , "Set control mode", "Setting assistant", and
2. Select the "Binary input" option in the "Settings" menu , "Set control mode", "Heating/cooling switchover" as switchover criterion.

9. PUMP KIT INSTALLATION

On completion of installing the pump, take the Pump Control Lead and install into the control box on the RH, front upper side of the boiler.

1. To access controls box on RH side, remove boiler panels. (refer to manufacturer instructions see QR code on page 2.)
2. Mount the relay onto the left most M3 studs and secure using the two washers and nuts provided.
3. Remove the pump connection from the burner control PCB and replace with the connector on the pump control lead.
4. Remove the plug located in the PWM installer connection. Place this to one side as it will be used later. Unclip the PWM installer connector from the front panel installer connection area.
5. Replace with the connector on the pump control lead.
6. Using a suitable 2 core cable, as specified for the pump, connect the pump control cable between the pump and the pump control plug, routing the cable connector through the SELV conduit from the back of the boiler and securing at the boiler with the cable clamps.
7. Power up the pump and follow the commissioning instructions.
8. Finally plug in the pump control plug into the installer pump control connection, labelled "Pump PWM".
9. Check that the pump starts when the boiler pump signal is on.
10. Replace and secure all boiler panels in reverse order.



Technical Training

The Ideal Boilers Technical Training Centre offers a series of first class training courses for domestic, commercial and industrial heating installers, engineers and system specifiers. For details of courses please ring:...01482 498 432

Ideal Boilers Ltd., P.O. Box 103, National Ave, Kingston upon Hull, HU5 4JN. Telephone: 01482 492 251 Fax: 01482 448 858. Registration No. London 322 137.

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