

MAGNA3

Installation and operating instructions



English (GB) Installation and operating instructions

Original installation and operating instructions

These installation and operating instructions describe MAGNA3 model D.

Sections 1-5 give the information necessary to be able to unpack, install and start up the product in a safe way.

Sections 6-13 give important information about the product, as well as information on service, fault finding and disposal of the product.

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Read this document and the quick guide before installing the product. Installation and operation must comply with local regulations and accepted codes of good practice.



This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.

Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

1. General information

1.1 Hazard statements

The symbols and hazard statements below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious personal injury.



WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious personal injury.



CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate personal injury.

The hazard statements are structured in the following way:



SIGNAL WORD

Description of hazard

Consequence of ignoring the warning.
- Action to avoid the hazard.

1.2 Notes

The symbols and notes below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



Observe these instructions for explosion-proof products.



A blue or grey circle with a white graphical symbol indicates that an action must be taken.



A red or grey circle with a diagonal bar, possibly with a black graphical symbol, indicates that an action must not be taken or must be stopped.



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



Tips and advice that make the work easier.

1.3 Safety symbols on the pump



Check the position of the clamp before you tighten it. Incorrect position of the clamp will cause leakage from the pump and damage the hydraulic parts in the pump head.



Fit and tighten the screw that holds the clamp to $8 \text{ Nm} \pm 1 \text{ Nm}$.



Do not apply more torque than specified even though water is dripping from the clamp. The condensed water is most likely coming from the drain hole under the clamp.

2. Receiving the product

2.1 Inspecting the product

Check that the product received is in accordance with the order. Check that the voltage and frequency of the product match the voltage and frequency of the installation site. See section [6.4.1 Nameplate](#).



Pumps tested with water containing anticorrosive additives are taped on the inlet and outlet ports to prevent residual test water from leaking into the packaging. Remove the tape before installing the pump.

2.2 Scope of delivery

2.2.1 Plug-connected single-head pump



The box contains the following items:

- MAGNA3 pump
- insulating shells
- gaskets
- quick guide
- safety instructions
- one ALPHA plug.

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2.2.2 Plug-connected twin-head pump



The box contains the following items:

- MAGNA3 pump
- gaskets
- quick guide
- safety instructions
- two ALPHA plugs.

2.2.3 Terminal-connected single-head pump



The box contains the following items:

- MAGNA3 pump
- insulating shells
-
- quick guide
- safety instructions
- box with terminal and M20 cable gland.

2.2.4 Terminal-connected twin-head pump



The box contains the following items:

- MAGNA3 pump
-
- quick guide
- safety instructions
- two boxes with terminals and M 20 cable glands.

2.3 Lifting the pump



Observe local regulations concerning limits for manual lifting or handling.

Always lift directly on the pump head or the cooling fins when handling the pump. See fig. 1.

For large pumps, it may be necessary to use lifting equipment. Position the lifting straps as illustrated in fig. 1.

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Fig. 1 Correct lifting of pump

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Do not lift the pump head by the control box, i.e. the red area of the pump. See fig. 2.

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Fig. 2 Incorrect lifting of pump

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3. Installing the product

3.1 Location

The pump is designed for indoor installation.

Always install the pump in a dry environment where it will not be exposed to drops or splashes, for example water, from surrounding equipment or structures.

As the pump contains stainless-steel parts, it is important that it is not installed directly in environments, such as:

- Indoor swimming pools where the pump would be exposed to the ambient environment of the pool.
- Locations with direct and continuous exposure to a marine atmosphere.
- In rooms where hydrochloric acid (HCl) can form acidic aerosols escaping from, for example, open tanks or frequently opened or vented containers.

The above applications do not disqualify for installation of MAGNA3. However, it is important that the pump is not installed directly in these environments.

Stainless steel variants of MAGNA3 can be used to pump pool water. See section 6.2 Pumped liquids.

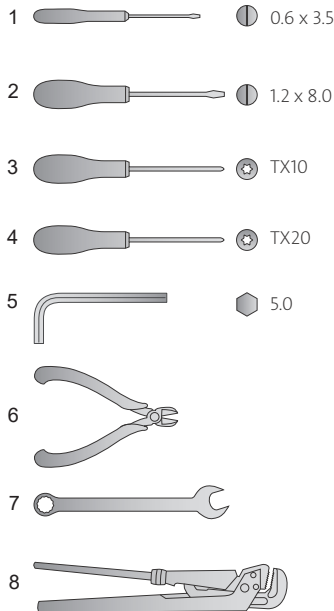
To ensure sufficient cooling of motor and electronics, observe the following requirements:

- Position the pump in such a way that sufficient cooling is ensured.
- The ambient temperature must not exceed 40 °C.

3.1.1 Cooling applications

In cooling applications condensation may occur on the surface of the pump. In certain cases it is necessary to mount a drip tray.

3.2 Tools



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Fig. 3 Recommended tools

Pos.	Tool	Size
1	Screwdriver, straight slot	0.6 x 3.5 mm
2	Screwdriver, straight slot	1.2 x 8.0 mm
3	Screwdriver, torx bit	TX10
4	Screwdriver, torx bit	TX20
5	Hexagon key	5.0 mm
6	Side cutter	
7	Open-end spanner	Depending on DN size
8	Pipe wrench	Only used for pumps with unions

3.3 Mechanical installation

The pump range includes both flanged and threaded versions. These installation and operating instructions apply to both versions, but give a general description of flanged versions. If the versions differ, the threaded version will be described separately. Install the pump so that it is not stressed by the pipes. For maximum permissible forces and moments for pipe connections acting on the pump flanges or threaded connections, see page 63.

You can suspend the pump directly in the pipes, provided that the pipes support the pump.


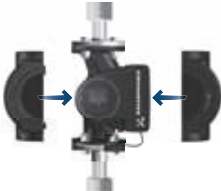
Twin-head pumps are prepared for installation on a mounting bracket or base plate. The pump housing has a M12 thread.

Step	Action	Illustration
1	Arrows on the pump housing indicate the flow direction through the pump. The flow direction can be horizontal or vertical, depending on the control box position.	
2	Close the isolating valves and make sure that the system is not pressurised during the installation of the pump.	
3	Mount the pump with gaskets in the pipes.	

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Step	Action	Illustration
4	<p>Flanged version: Fit bolts and nuts. Use the right size of bolts according to system pressure. For further information about torques, see page 63.</p> <p>Threaded version: Tighten the union nuts.</p>	
5	Fit the insulating shells.	

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As an alternative to insulating shells, you can insulate the pump housing and pipes as illustrated in fig. 4.



In heating systems, do not insulate the control box or cover the operating panel.



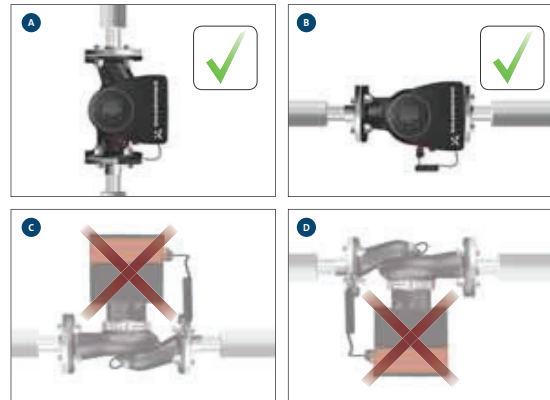
Fig. 4 Insulating the pump housing and pipe in a heating system

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3.4 Positioning the pump

Always install the pump with horizontal motor shaft.

- Pump installed correctly in a vertical pipe. See fig. 5 (A).
- Pump installed correctly in a horizontal pipe. See fig. 5 (B).
- Do not install the pump with vertical motor shaft. See fig. 5 (C and D).



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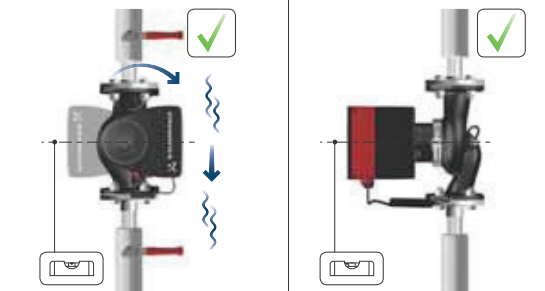
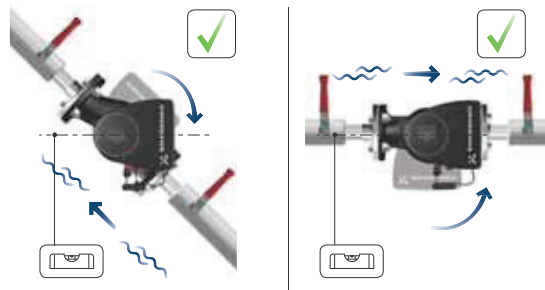
Fig. 5 Pump installed with horizontal motor shaft

3.5 Control box positions

To ensure adequate cooling, make sure that the control box is in horizontal position with the Grundfos logo in vertical position. See fig. 6.



Make sure that the isolating valves are closed before rotating the control box.



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Fig. 6 Pump with control box in horizontal position



For twin-head pumps installed in horizontal pipes, air may be trapped in the pump housing. Therefore, an automatic vent, Rp 1/4 thread, must be installed in the upper part of the pump housing. See fig. 7.



Fig. 7 Automatic vent

3.6 Pump head position

If you remove the pump head before installing the pump in the pipes, pay special attention when fitting the pump head to the pump housing:

1. Visually check that the floating ring in the sealing system is centred. See figs 8 and 9.
2. Gently lower the pump head with rotor shaft and impeller into the pump housing.
3. Make sure that the contact face of the pump housing and that of the pump head are in contact before you tighten the clamp. See fig. 10.



Fig. 8 Correctly centred sealing system



Fig. 9 Incorrectly centred sealing system

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Observe the position of the clamp before you tighten it. Incorrect position of the clamp will cause leakage from the pump and damage the hydraulic parts in the pump head. See fig. 10.



Fig. 10 Fitting the pump head to the pump housing

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3.7 Changing the control box position



The warning symbol on the clamp holding the pump head and pump housing together indicates that there is a risk of personal injury. See specific warnings below.

CAUTION

Pressurised system

Minor or moderate personal injury
- Pay special attention to any escaping vapour when loosening the clamp.



CAUTION

Crushing of feet

Minor or moderate personal injury
- Do not drop the pump head when loosening the clamp.



Fit and tighten the screw that holds the clamp to 8 Nm \pm 1 Nm. Do not apply more torque than specified even though water is dripping from the clamp. The condensed water is most likely coming from the drain hole under the clamp.



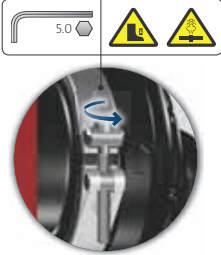

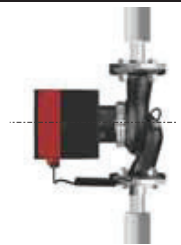
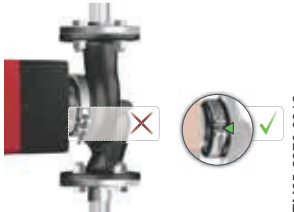
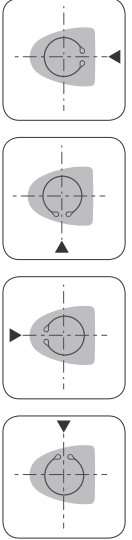
Check the position of the clamp before you tighten the clamp. Incorrect position of the clamp will cause leakage from the pump and damage the hydraulic parts in the pump head.



Make sure that the isolating valves are closed before rotating the control box.



The pump must be pressureless before the control box is rotated. Drain the system or relieve the pressure inside the pump housing by loosening the thread or flange.

Step	Action	Illustration
1	Loosen the screw in the clamp that holds the pump head and pump housing together. If you loosen the screw too much, the pump head will be completely disconnected from the pump housing.	
2	Carefully turn the pump head to the desired position. If the pump head is stuck, loosen it with a light blow of a rubber mallet.	
3	Place the control box in horizontal position so that the Grundfos logo is in vertical position. The motor shaft must be in horizontal position.	
4	Due to the drain hole in the stator housing, position the gap of the clamp as shown in step 4a or 4b.	
4a	Single-head pump. Position the clamp so that the gap points towards the arrow. It can be in position 3, 6, 9 or 12 o'clock.	

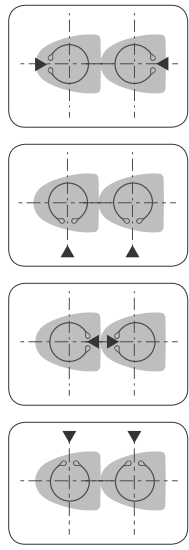
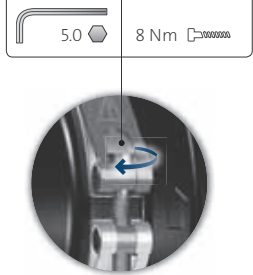
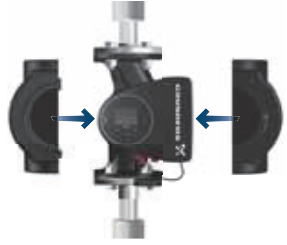
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Step	Action	Illustration
4b	Twin-head pump. Position the clamps so that the gaps point towards the arrows. They can be in position 3, 6, 9 or 12 o'clock.	
5	Fit and tighten the screw that holds the clamp to 8 Nm ± 1 Nm. Do not retighten the screw if condensed water is dripping from the clamp.	
6	Fit the insulating shells. The insulating shells for pumps in air-conditioning and cooling systems must be ordered separately.	

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TM05 2874 3216

3.8 Electrical installation

Carry out the electrical connection and protection according to local regulations.

Check that the supply voltage and frequency correspond to the values stated on the nameplate.

WARNING

Electric shock



- Death or serious personal injury
- Before starting any work on the product, make sure that the power supply has been switched off. Lock the main switch in position 0. Type and requirements as specified in EN 60204-1, 5.3.2.

WARNING

Electric shock



- Death or serious personal injury
- Connect the pump to an external main switch with a minimum contact gap of 3 mm in all poles.
 - Use earthing or neutralisation for protection against indirect contact.
 - **For plug-connected versions:** In case of an insulation fault, the fault current may be a pulsating DC. Observe national legislation about requirements for and selection of Residual Current Device (RCD) when installing the pump.
 - **For terminal-connected versions:** In case of an insulation fault, the fault current may be a DC or pulsating DC. Observe national legislation about requirements for and selection of Residual Current Device (RCD) when installing the pump.



Make sure that the fuse is dimensioned according to the nameplate and local legislation.



Connect all cables in accordance with local regulations.



Make sure that all cables are heat-resistant up to 70 °C.
Install all cables in accordance with EN 60204-1 and EN 50174-2.

- Make sure that the pump is connected to an external main switch.
- The pump requires no external motor protection.
- The motor incorporates thermal protection against slow overloading and blocking (TP 211 according to IEC 60034-11).
- When switched on via the power supply, the pump starts after approximately 5 seconds.

3.8.1 Supply voltage

1 x 230 V ± 10 %, 50/60 Hz, PE.

The voltage tolerances are intended for mains-voltage variations. Do not use the voltage tolerances for running pumps at other voltages than those stated on the nameplate.

3.9 Wiring diagrams

3.9.1 Connection to power supply, plug-connected versions

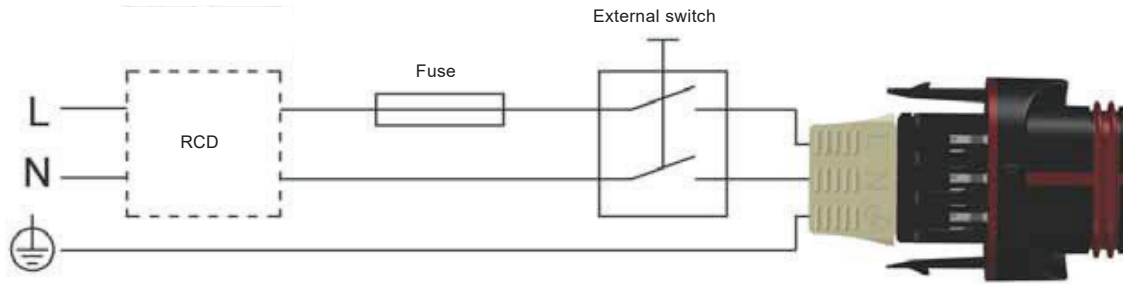


Fig. 11 Example of plug-connected motor with main switch, backup fuse and additional protection

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3.9.2 Connection to external controllers, plug-connected versions

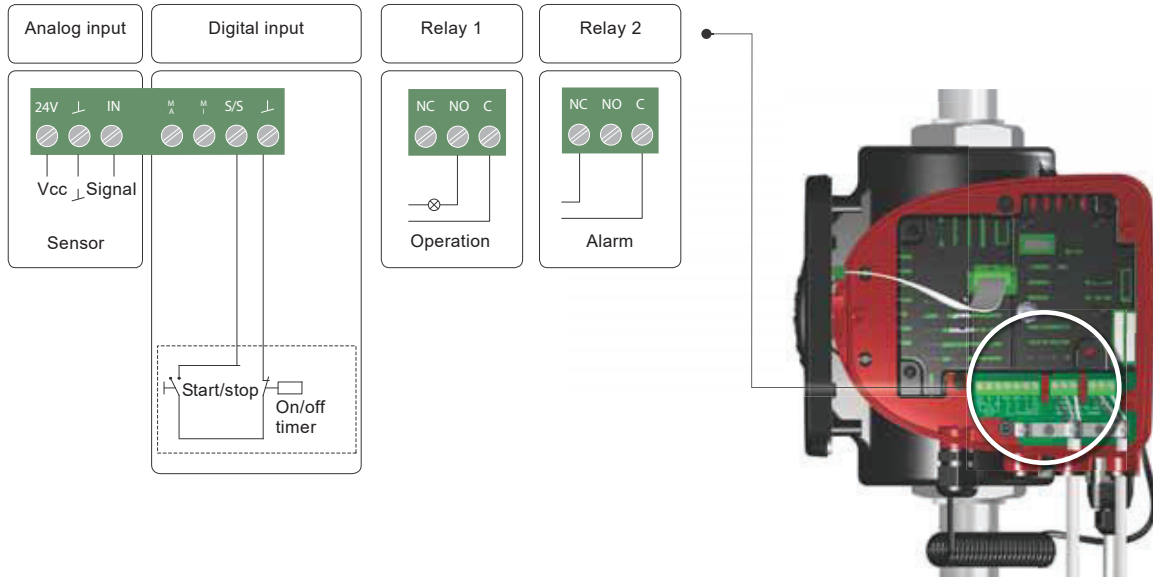


Fig. 12 Example of connections in the control box of plug-connected versions

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Use C and NC for fault signals as this enables serial connections of more relays and detection of signal cable defects.

The connection terminals of plug-connected versions (fig. 12) differ from those of terminal-connected versions (fig. 13), but they have the same function and connection options.

3.9.3 Connections in the control box, terminal-connected versions

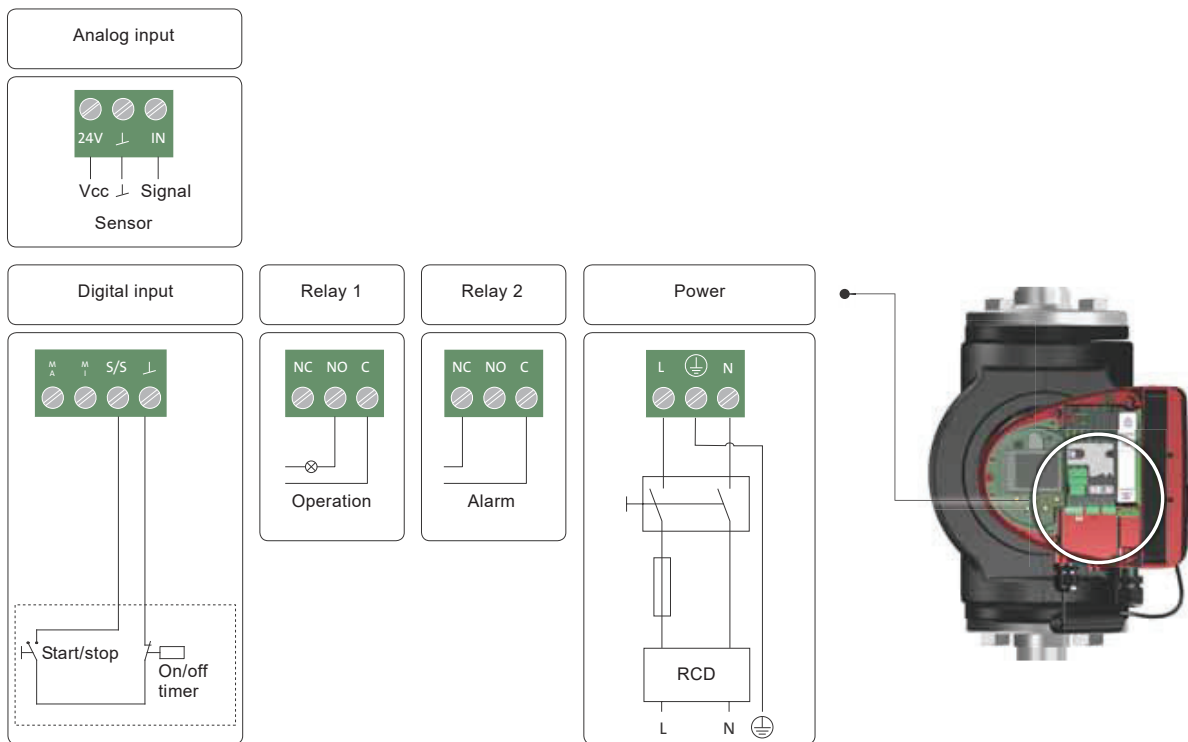


Fig. 13 Example of connections in the control box of terminal-connected versions



Use C and NC for fault signals as this enables serial connections of more relays and detection of signal cable defects.

For further information on digital and analog inputs, see sections [7.9.3 Digital inputs](#) and [7.9.4 Analog input](#).

For information on relay outputs, see section [7.9.2 Relay outputs](#).

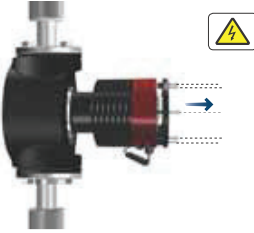
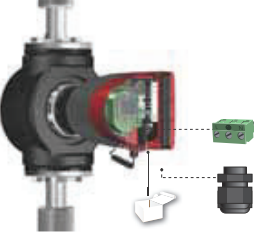
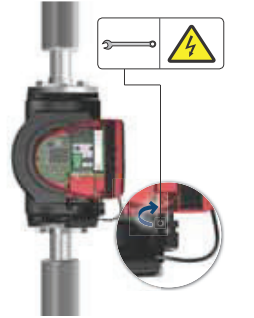
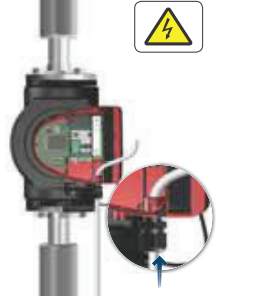
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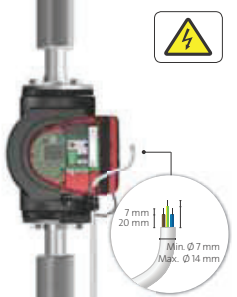
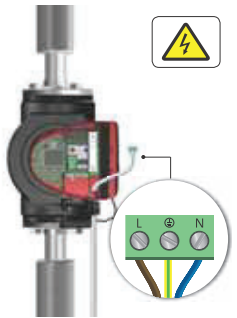
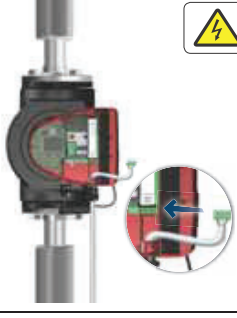
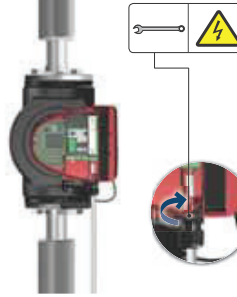
3.10 Connecting the power supply, plug-connected versions

Step	Action	Illustration
1	Fit the cable gland and plug cover to the cable. Strip the cable conductors as illustrated.	<p>7 mm 12 mm 17 mm 0.5-1.5 mm² Ø 5.5-10 mm</p> <p>TM05 5538 3216</p>
2	Connect the cable conductors to the power supply plug.	<p>TM05 5539 3812</p>
3	Bend the cable with the cable conductors pointing upwards.	<p>TM05 5540 3812</p>
4	Pull out the conductor guide plate and throw it away.	<p>TM05 5541 3812</p>
5	Click the plug cover onto the power supply plug.	<p>Click Click</p> <p>TM05 5542 3812</p>
6	Screw the cable gland onto the power supply plug.	<p>TM05 5543 3812</p>

Step	Action	Illustration
7	Insert the power supply plug into the male plug in the pump control box.	<p>TM05 8454 2313</p>

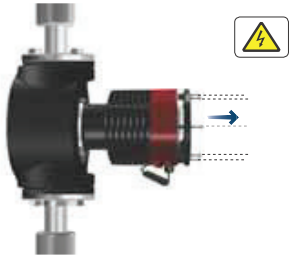
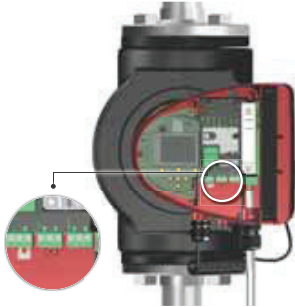
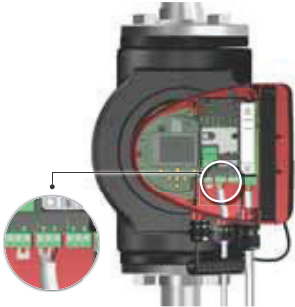
3.11 Connecting the power supply, terminal-connected versions

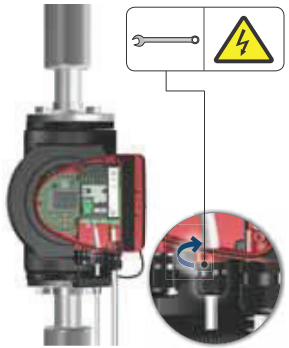
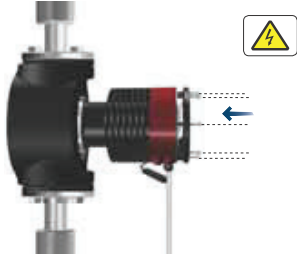
Step	Action	Illustration
1	Remove the front cover from the control box. Do not remove the screws from the cover.	 TM05 2875 3416
2	Locate the power supply plug and cable gland in the small cardboard box supplied with the pump.	 TM05 2876 3416
3	Connect the cable gland to the control box.	 TM05 2877 3416
4	Pull the power supply cable through the cable gland.	 TM05 2878 3416

Step	Action	Illustration
5	Strip the cable conductors as illustrated.	 TM05 2879 3416
6	Connect the cable conductors to the power supply plug.	 TM05 2880 3416
7	Insert the power supply plug into the male plug in the pump control box.	 TM05 2881 3416
8	Tighten the cable gland. Fit the front cover.	 TM05 2882 3416

3.12 Connecting the external control

The example is based on a MAGNA3 terminal-connected version. The connection terminals of plug-connected versions differ from those of terminal-connected versions, but they have the same function and connection options. See sections [3.9 Wiring diagrams](#) and [7.9 Input and output communication](#).

Step	Action	Illustration
1	Remove the front cover from the control box. Do not remove the screws from the cover.	
2	Locate the digital input terminal connector.	
3	Pull the cable through a M16 cable gland and one of the cable entries on the pump. Take out the desired terminal, connect the cable conductors and reinsert the terminal. See sections 7.7 External connections and 7.9 Input and output communication for instructions on how to connect the cable to the different terminals in the pump.	

Step	Action	Illustration
4	Tighten the cable gland.	
5	Refit the front cover to the control box.	

4. Starting up the product

4.1 Single-head pump







The number of starts and stops via the power supply must not exceed four times per hour.

Do not start the pump until the system has been filled with liquid and vented. Furthermore, the required minimum inlet pressure must be available at the pump inlet. See section [12. Technical data](#).

Flush the system with clean water to remove all impurities before you start the pump.

The pump is self-venting through the system, and the system must be vented at the highest point.

Step	Action	Illustration
1	Switch on the power supply to the pump. The pump has been factory set to "AUTO _{ADAPT} " mode, which starts after approximately 5 seconds.	
2	Operating panel at first startup. After a few seconds, the pump display changes to the startup guide.	
3	The startup guide guides you through the general settings of the pump, such as language, date and time. If you do not touch the buttons on the operating panel for 15 minutes, the display goes into sleep mode. When you touch a button, the "Home" display appears.	
4	When you have made the general settings, select the desired control mode or let the pump run in AUTO _{ADAPT} mode. For additional settings, see section 7. Control functions .	

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TM05 2886 3216

TM05 2887 3216

4.2 Twin-head pump



Fig. 14 MAGNA3 D

The pumps are paired from factory. When switching on the power supply, the heads will establish connection. Please allow approximately 5 seconds for this to happen.

Flush the system with clean water to remove all impurities before you start the pump.

4.2.1 Multipump pairing

Note: Available for pumps with production code from 1838.

After turning on the power supply, the pump's initial setup menu asks you whether or not you want to keep multipump system activated. Several scenarios can play out.

Keep multipump system

- **Only one pump head is connected to the power supply.**
If you have not connected both pump heads to the power supply and you choose to keep the multipump system, warning 77 appears in the display. See fig. 15. Connect the second pump head. Once both pumps are on, the pump heads will establish connection and the warning deactivates.
- **Both pump heads are connected to the power supply.**
Configuring is only necessary from one of the pump heads.

Dissolve multipump system

- **Only one pump head is connected to the power supply.**
If you have not connected both pump heads to the power supply and you choose to dissolve the multipump system, the second pump head, if connected to the power supply, will ask you whether or not you want to keep the multipump system. Choose to dissolve the multipump system.
- **Both pump heads are connected to the power supply.**
Configuring is only necessary from one of the pump heads.

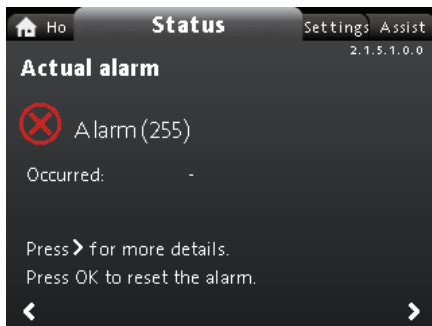


Fig. 15 Warning 77

See sections [7.9.3 Digital inputs](#), [7.9.2 Relay outputs](#) and [7.5 Multipump modes](#) for additional twin-head pump setup options.

4.2.2 Configuring twin-head pumps

If you replace a pump head of a twin-head pump, the twin-head pump will function as two single pumps until you have configured the pump heads and warning 77 is shown in the pump display. See fig. 15.

To establish communication between the pump heads, run the multipump setup via the "Assist" menu. The pump from which you run the setup will be the master pump. See section [8.8.3 "Multipump setup"](#).

5. Handling and storing the product

5.1 Frost protection



If the pump is not used during periods of frost, take the necessary steps to prevent frost bursts.

6. Product introduction

MAGNA3 is a complete range of circulator pumps with integrated controller enabling adjustment of pump performance to the actual system requirements. In many systems, this reduces the power consumption considerably, reduces noise from thermostatic radiator valves and similar fittings and improves the control of the system.

You can set the desired head on the operating panel.

6.1 Applications

The pump is designed for circulating liquids in the following systems:

- heating systems
- domestic hot-water systems
- air-conditioning and cooling systems.

You can also use the pump in the following systems:

- ground-source heat-pump systems
- solar-heating systems.

6.2 Pumped liquids

The pump is suitable for thin, clean, non-aggressive and non-explosive liquids, not containing solid particles or fibres that may attack the pump mechanically or chemically.

In heating and cooling systems, the water must meet the requirements of accepted standards, codes, and any authority having jurisdiction (AHJ) requirements.

In heating systems, the water must meet the requirements of accepted standards on water quality in heating systems, for example the German standard VDI 2035.

The pumps are also suitable for domestic hot-water systems.



Observe local legislation regarding pump housing material.

Stainless steel variants of MAGNA3 can be used to pump pool water with the one of the following properties:

- Chloride (Cl-) ≤ 150 mg/l and free chlorine ≤ 1.5 mg/l at temperatures ≤ 30 °C
- Chloride (Cl-) ≤ 100 mg/l and free chlorine ≤ 1.5 mg/l at temperatures from 30 to 40 °C.

We strongly recommend that you use stainless-steel pumps in domestic hot-water applications to avoid corrosion.

In domestic hot-water systems, we recommend that you use the pump only for water with a degree of hardness lower than approximately 14 °dH.

In domestic hot-water systems, we recommend that you keep the liquid temperature below 65 °C to eliminate the risk of lime precipitation.



Do not pump aggressive liquids.



Do not pump flammable, combustible or explosive liquids.

6.2.1 Glycol

You can use the pump for pumping water-ethylene-glycol mixtures up to 50 %.

Example of a water-ethylene-glycol mixture:

Maximum viscosity: 50 cSt ~ 50 % water / 50 % ethylene-glycol mixture at -10 °C.

The pump has a power-limiting function that protects it against overload.

The pumping of water-ethylene-glycol mixtures affects the maximum curve and reduces the performance, depending on the water-ethylene-glycol mixture and the liquid temperature.

To prevent the ethylene-glycol mixture from degrading, avoid temperatures exceeding the rated liquid temperature and minimise the operating time at high temperatures.

Clean and flush the system before you add the ethylene-glycol mixture.

To prevent corrosion or lime precipitation, check and maintain the ethylene-glycol mixture regularly. If further dilution of the supplied ethylene-glycol is required, follow the glycol supplier's instructions.



Additives with a density and/or kinematic viscosity higher than those/that of water reduce the hydraulic performance.



Fig. 16 Pumped liquids, threaded version

TM05 8457 2313

6.3 Pump heads in twin-head pumps

The twin-head pump housing has a flap valve on the outlet side. The flap valve seals off the port of the idle pump housing to prevent the pumped liquid from running back to the inlet side. See fig. 17. Due to the flap valve, there is a difference in the hydraulics between the two pump heads. See fig. 18.



Fig. 17 Twin-head pump housing with flap valve

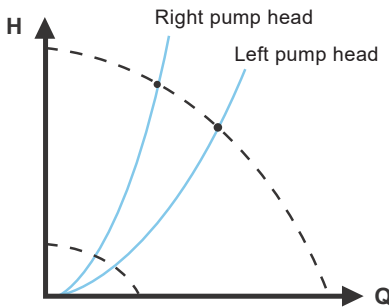


Fig. 18 Hydraulic difference between the two pump heads

TM06 1565 2514

TM06 1566 2514

6.4 Identification

6.4.1 Nameplate

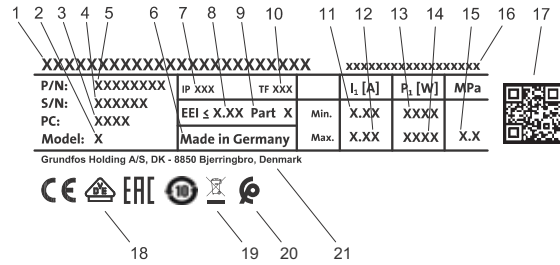


Fig. 19 Example of nameplate

Pos.	Description
1	Product name
2	Model
3	Production code, year and week ¹⁾
4	Serial number
5	Product number
6	Country of manufacture
7	Enclosure class
8	Energy Efficiency Index, EEI
9	Part, according to EEI
10	Temperature class
11	Minimum current [A]
12	Maximum current [A]
13	Minimum power [W]
14	Maximum power [W]
15	Maximum system pressure
16	Voltage [V] and frequency [Hz]
17	QR code
18	CE mark and approvals
19	Crossed-out wheeled bin according to EN 50419:2006
20	Moroccan conformity mark
21	Manufacturer's name and address

¹⁾ Example of production code: 1326. The pump was produced in week 26, 2013.



Fig. 20 Production code on packaging

TM05 5981 4312

TM06 6692 3216

6.5 Model type

These installation and operating instructions cover all models. The model version is stated on the nameplate. See fig. 21.



Fig. 21 Model type on the product

You can see the different model versions in the MAGNA3 data booklet.

6.6 Radio communication

The radio part of this product is a class 1 device and can be used anywhere in the EU member states without restrictions.

Intended use

This pump incorporates a radio for remote control.

The pump can communicate with Grundfos GO and with other MAGNA3 pumps of the same type via the built-in radio.

6.7 Closed valve operation

MAGNA3 pumps can operate at any speed against a closed valve for several days without damage to the pump. However, Grundfos recommends to operate at the lowest possible speed curve to minimise energy losses. There are no minimum flow requirements.



Do not close inlet and outlet valves simultaneously, always keep one valve open when the pump is running to avoid pressure buildup.

Media- and ambient temperatures must never exceed the specified temperature range.

6.8 Insulating shells

Insulating shells are available for single-head pumps only.



Limit the heat loss from the pump housing and pipes.

Reduce the heat loss by insulating the pump housing and the pipes. See figs 22 and 4.

- Insulating shells for pumps in heating systems are supplied with the pump.
- Insulating shells for applications with ice buildup are available as an accessory. See section 11.7 *Insulating kits for applications with ice buildup*.

The fitting of insulating shells increases the pump dimensions.



Fig. 22 Insulating shells

Pumps for heating systems are factory-fitted with insulating shells. Remove the insulating shells before installing the pump.

6.9 Non-return valve

If a non-return valve is fitted in the pipe system, make sure that the set minimum outlet pressure of the pump is always higher than the closing pressure of the valve. See fig. 23. This is especially important in proportional-pressure control mode with reduced head at low flow.

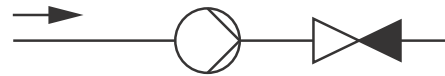


Fig. 23 Non-return valve

TM05 8798 5018

TM05 2859 3216

TM05 3055 0912