ALPHA1 L

Installation and operating instructions

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Original installation and operating instructions

These installation and operating instructions describe Grundfos ALPHA1 L.accepted

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

Sections 6-12 give important information about the product, as well as information on service, fault finding and disposal of the product.

CONTENTS

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

1. General information

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.

1.1 Symbols used in this document

1.1.1 Warnings against hazards involving risk of death or personal injury

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 text accompanying the three hazard symbols DANGER, WARNING and CAUTION is structured in the following way:

SIGNAL WORD

Description of hazard

Consequence of ignoring the warning.

- Action to avoid the hazard.

1.1.2 Other important notes

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.

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 voltage and frequency of the installation site. See section *6.4.1 Nameplate*.

2.2 Scope of delivery

The box contains the following items:

- ALPHA1 L pump
- installer plug
- two gaskets
- quick guide.

3. Installing the product

3.1 Mechanical installation

3.1.1 Mounting the product

1. The arrows on the pump housing indicate the flow direction through the pump. See fig. 1.
2. Fit the two gaskets when you mount the pump in the pipe. Install the pump with a horizontal motor shaft. See fig. 2. See also section *3.3 Control box positions*.
3. Tighten the fittings. See fig. 3.

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Fig. 1 Flow direction

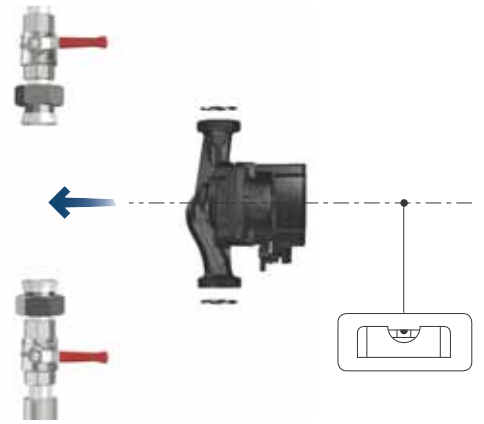

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Fig. 2 Pump installation

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Fig. 3 Tightening the fittings

3.2 Pump positions

Always install the pump with a horizontal motor shaft. Do not install the pump with a vertical motor shaft. See fig. 4, bottom row.

- Pump installed correctly in a vertical pipe. See fig. 4, top row, left.
- Pump installed correctly in a horizontal pipe. See fig. 4, top row, right.

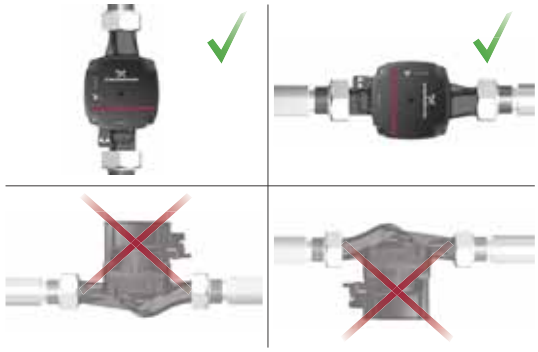

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Fig. 4 Pump positions

3.3 Control box positions

The control box can be mounted in all positions. See fig. 5.

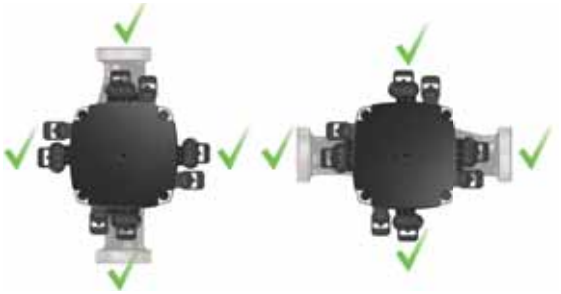

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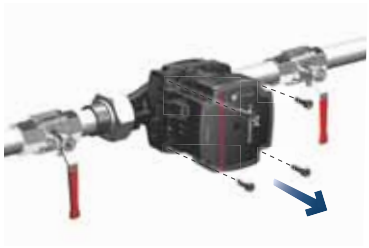
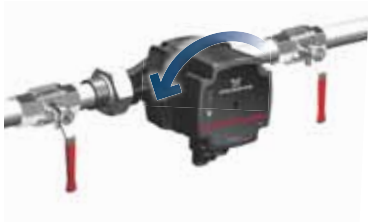
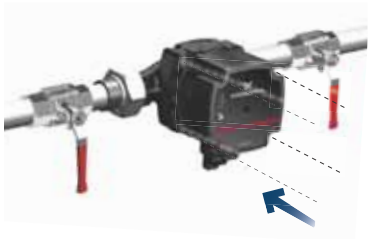
Fig. 5 Possible control box positions

3.3.1 Changing the control box position

Step	Action	Illustration
1	Make sure that the inlet and outlet valves are closed. Unscrew the screws on the pump head.	 TM06 8539 1317
2	Turn the pump head to the desired position.	 TM06 8540 1317
3	Refit the screws on the pump head.	 TM06 8541 1317

3.4 Insulating the pump housing

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Fig. 6 Insulating the pump housing

You can reduce the heat loss from the pump and pipe by insulating the pump housing and the pipe with insulating shells, which can be ordered as an accessory. See fig. 6.

Do not insulate the control box or cover the control panel.

4. Electrical installation

DANGER

Electric shock

Death or serious personal injury

- Switch off the power supply before starting any work on the product. Make sure that the power supply cannot be accidentally switched on.

DANGER

Electric shock

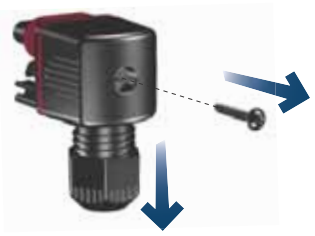
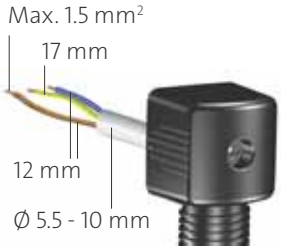
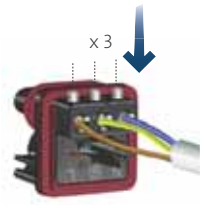
Death or serious personal injury

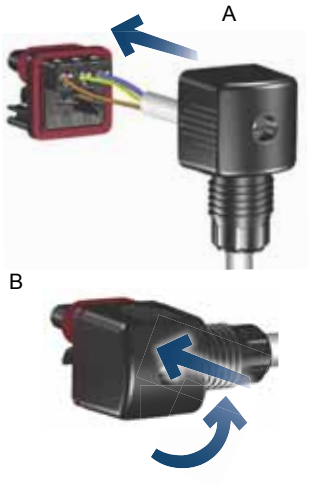
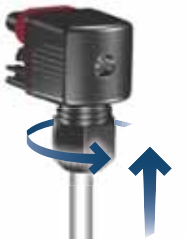
- Connect the pump to earth.
  Connect the pump to an external main switch with a minimum contact gap of 3 mm in all poles.

Carry out the electrical connection and protection in accordance with local regulations.

- The motor requires no external motor protection.
- Check that the supply voltage and frequency correspond to the values stated on the nameplate. See section *6.4.1 Nameplate*.
- Connect the pump to the power supply with the plug supplied with the pump. See steps 1 to 7.

4.1 Assembling the installer plug

Step	Action	Illustration
1	Loosen the cable gland and unscrew the union nut in the centre of the terminal cover.	 TM06 8542 1317
2	Detach the terminal cover.	 TM06 8543 1317
3	Pull the power cable through the cable gland and terminal cover.	 TM06 8544 1317
4	Strip the cable conductors as illustrated.	 TM06 8545 1317
5	Loosen the screws on the power supply plug and connect the cable conductors.	 TM06 8546 1317 - TM06 8547 1317
6	Tighten the screws on the power supply plug.	 TM06 8548 1317

Step	Action	Illustration
7	Refit the terminal cover. See A. Note: It is possible to turn the power supply plug on the side for a 90 ° cable entry. See B.	 TM06 8549 1317 - TM06 8550 1317
8	Tighten the union nut.	 TM06 8551 1317
9	Tighten the cable gland onto the power supply plug.	 TM06 8552 1317
10	Insert the power supply plug into the male plug on the pump.	 TM06 8553 1317

5. Starting up the product

5.1 Before startup

Do not start the pump until the system has been filled with liquid and vented. Make sure that the required minimum inlet pressure is available at the pump inlet. See section *10. Technical data*.

When using the pump for the first time, the system must be vented at the highest point. See section *5.3 Venting the system*. The pump is self-venting through the system.

5.2 Starting up the pump

Step	Action	Illustration
1	Open the inlet and outlet valves.	 TM06 8554 1317
		
2	Turn on the power supply.	 TM06 8555 1317
3	The lights in the control panel indicates that the power supply has been switched on and the pump is running.	 TM06 8556 1317

5.3 Venting the system

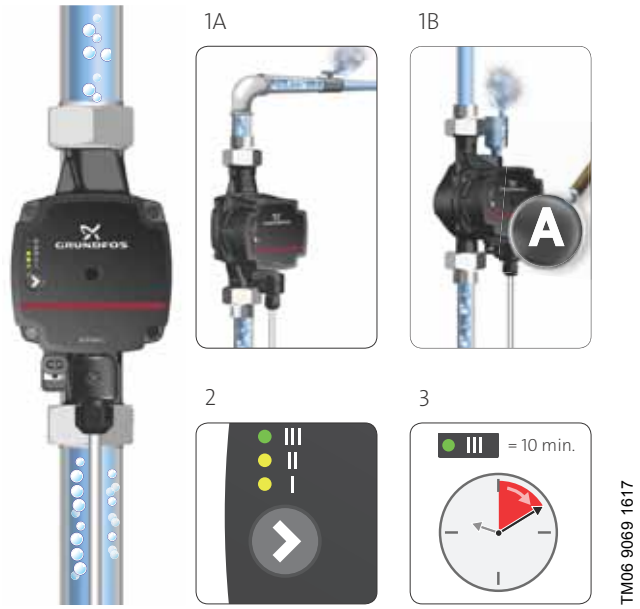


Fig. 7 Venting the system

When the system has been filled with liquid and the minimum inlet pressure is available at the pump inlet, do as follows:

1. If turned off, turn on the pump. See section *5.2 Starting up the pump*.
2. If the vent valve is installed in the system, open up the valve manually. See fig. 7, 1A. If the pump housing has an air separator installed (ALPHA1 L XX-XX A) and an automatic vent has been fitted, the air escapes automatically. See fig. 7, 1B.
3. Set the pump to speed III. See fig. 7, 2.
4. Let the pump run for approximately 10 minutes. See fig. 7, 3. Repeat step 1-3, if necessary.
5. Set the pump according to the recommendations. See section *7. Control functions*.

In heating systems that often contain much air, we recommend that you install pumps with pump housing with air separator, that is ALPHA1 L XX-XX A. The pump housing has an Rp 3/8 tapping for fitting of an automatic air vent. The vent is not supplied with the pump.

The pump must not run dry.

5.4 Venting the pump

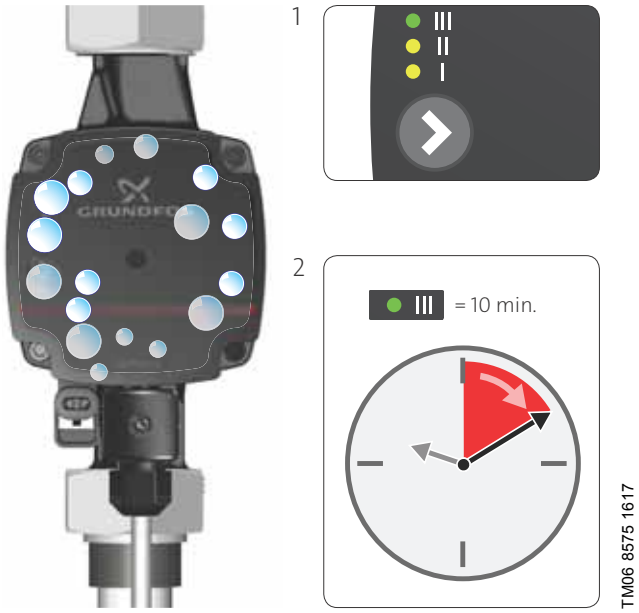


Fig. 8 Venting the pump

Small airlocks trapped inside the pump may cause noise when starting up the pump. However, because the pump is self-venting through the system, the noise ceases over a period of time.

To speed up the venting process, do as follows:

1. Set the pump to speed III for approximately 10 minutes. How fast the pump is vented depends on the system size and design.
2. When you have vented the pump, that is when the noise has ceased, set the pump according to the recommendations. See section *7. Control functions*.

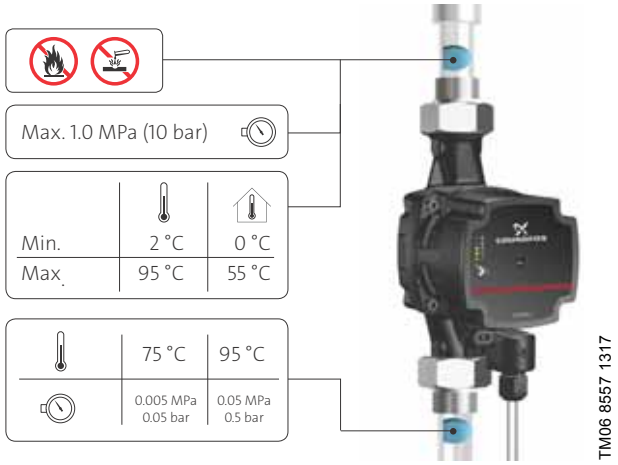
The pump must not run dry.

The pump is from factory set to radiator heating mode.

6. Product introduction

6.1 Product description

ALPHA1 L model C is a complete range of circulator pumps.



See section *10. Technical data* for further information.

6.1.1 Model type

These installation and operating instructions cover ALPHA1 L model C. The model type is stated on the packaging.

6.2 Applications

The ALPHA1 L is designed for circulating liquids in all kinds of heating applications. The pumps are suitable for the following systems:

- Systems with constant or variable flows where it is desirable to optimise the pump duty point.
- Systems with variable flow-pipe temperature.

ALPHA1 L is especially suitable for the following:

- Installation in existing systems where the differential pressure of the pump is too high during periods of reduced flow demand.
- Installation in new systems for automatic adjustment of the performance to flow demands without the use of bypass valves or similar expensive components.

High-efficiency ECM (Electronically Commutated Motor) pumps, such as ALPHA1 L, must not be speed-controlled by an external speed controller varying or pulsing the supply voltage.

The speed can be controlled by a low-voltage PWM (Pulse Width Modulation) signal.

6.3 Pumped liquids

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 pump is suitable for clean, thin, non-aggressive and non-explosive liquids, not containing solid particles, fibres or mineral oil. The pump must not be used for the transfer of flammable liquids, such as diesel oil, petrol and similar liquids.

- Maximum water/propylene glycol mixture is 50 %
- Maximum 10 mm^2/s viscosity

Note: The water/propylene glycol mixture reduces the performance due to higher viscosity.

See section *10. Technical data* for further information.

CAUTION

Flammable material

Minor or moderate personal injury

- Do not use the pump for flammable liquids, such as diesel oil and petrol.

WARNING

Biological hazard

Death or serious personal injury

- In domestic hot-water systems, the temperature of the pumped liquid must always be above 50 °C due to the risk of legionella.

WARNING

Biological hazard

Death or serious personal injury

- In domestic hot-water systems, the pump is permanently connected to the mains water. Therefore, do not connect the pump by a hose.

CAUTION

Corrosive substance

Minor or moderate personal injury

- Do not use the pump for aggressive liquids, such as acids and seawater.

6.4 Identification

6.4.1 Nameplate

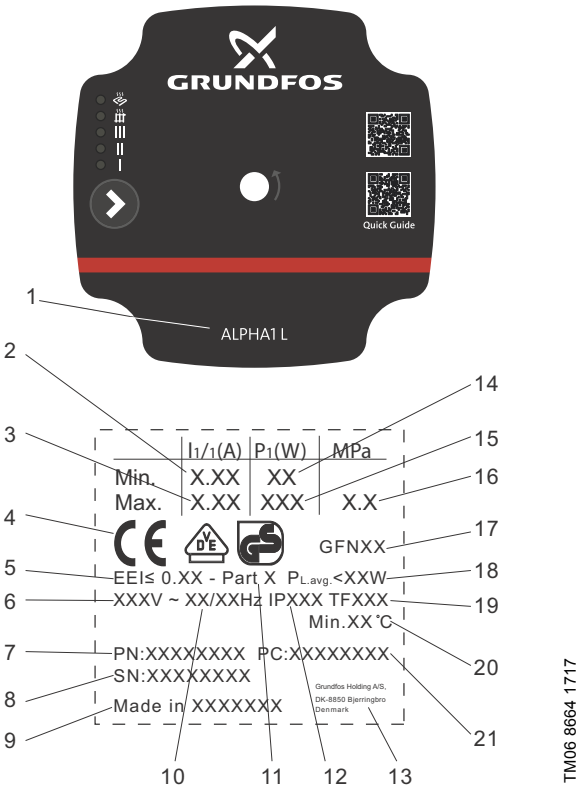


Fig. 9 Nameplate

Pos.	Description
1	Pump name
2	Minimum current [A]
3	Maximum current [A]
4	CE mark and approvals
5	Energy Efficiency Index, EEI
6	Voltage [V]
7	Product number
8	Serial number
9	Country of manufacture
10	Frequency [Hz]
11	Part, according to EEI
12	Enclosure class
13	Manufacturer's name and address
14	Minimum input power [W]
15	Maximum input power [W]
16	Maximum system pressure
17	VDE code
18	Average compensated power input PL, avg [W]
19	TF class
20	Minimum liquid temperature
21	Production code: • 1st and 2nd figures: year • 3rd and 4th figures: week

6.4.2 Type key

Example	ALPHA1 L	25	-40	180

- Pump type
- Nominal diameter (DN) of inlet and outlet ports [mm]
- Maximum head [dm]
- [ ]: Cast-iron pump housing
  A: Pump housing with air separator
  N: Stainless-steel pump housing
- Port-to-port length [mm]

7. Control functions

7.1 Elements on the control panel

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Fig. 10 Control panel

Symbol	Description
	Push-button
I, II, III	Constant-speed curve I, II and III
	Radiator heating mode (proportional pressure)
	Underfloor heating mode (constant pressure)

7.2 Control panel

The control panel shows the following:

- the settings, after pressing the button
- operating status
- alarm status.

7.2.1 Operating status

During operation, the control panel shows the actual operating status or the alarm status. See section *7.2.2 Alarm status*.

7.2.2 Alarm status

If the pump has detected one or more alarms, the first LED switches from green to red. When the fault has been resolved the control panel switches back to operating status.

See section *9. Fault finding the product*.

7.3 Pump settings

The pump has seven different control modes. The pump can be set to the following:

Setting	Description
I	Constant curve or constant speed I
II	Constant curve or constant speed II
III	Constant curve or constant speed III
	Factory setting: Radiator heating mode
	Underfloor heating control mode
3 s.	Fixed proportional curve
	Externally controlled: PWM profile A

Fig. 11 Pump setting table

To learn more about each control mode, see section *7.4 Control modes*.

7.4 Control modes

7.4.1 Radiator heating mode

The radiator heating mode adjusts both flow and pressure to the actual heat demand. The pump performance follows the selected performance curve.

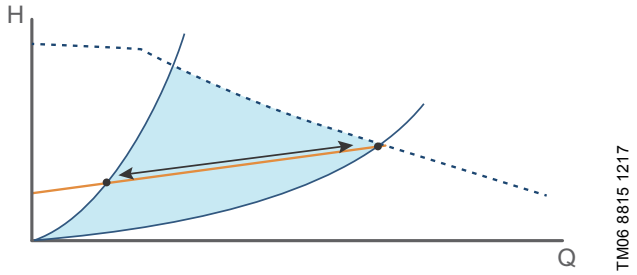

Fig. 12 Selection of pump setting for system type

Recommended and alternative pump settings according to fig. 12:

System type	Pump setting	
	Recommended	Alternative
Two-pipe system	Radiator heating mode	Constant curve or constant speed I, II, III, see section *7.4.4 Constant curve or constant speed, I, II or III*, and fixed control curve. See section *7.4.2 Fixed proportional-pressure curve*

See also section *10.2 Guide to performance curves*.

Factory setting: Radiator heating mode.

7.4.2 Fixed proportional-pressure curve

An option to the radiator heating mode is a fixed proportional-pressure curve. The pump performance follows the selected performance curve.

7.4.3 Underfloor heating mode

The underfloor heating mode adjusts the flow to the actual heat demand in the system while at the same time keeping a constant pressure. The pump performance follows the selected performance curve.

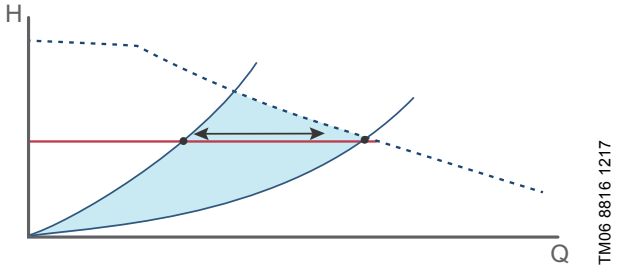

Fig. 13 Selection of pump setting for system type

Recommended and alternative pump settings according to fig. 13:

System type	Pump setting	
	Recommended	Alternative
Underfloor heating system	Underfloor heating mode	Constant curve or constant speed, I, II or III. See section *7.4.4 Constant curve or constant speed, I, II or III*

See also section *10.2 Guide to performance curves*.

Factory setting: Radiator heating mode. See section *7.4.1 Radiator heating mode*.

7.4.4 Constant curve or constant speed, I, II or III

At constant-curve or constant-speed operation, the pump runs at a constant curve. The pump performance follows the selected performance curve, I, II or III. See fig. 14 where II has been selected. For further information, see section *10.2 Guide to performance curves*.

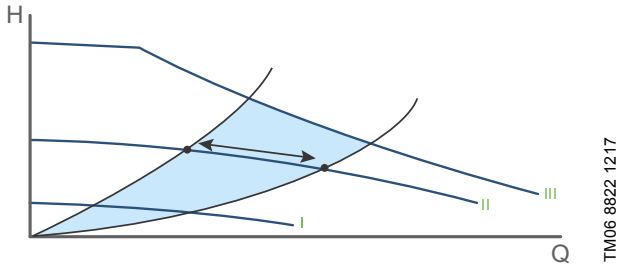

Fig. 14 Three constant-curve/constant-speed settings

The selection of the constant-curve or constant-speed setting depends on the characteristics of the heating system in question.

7.4.5 Pump setting for one-pipe heating systems

Recommended and alternative pump settings:

System type	Pump setting	
	Recommended	Alternative
One-pipe heating system	Constant curve or constant speed, I, II or III. See section *7.4.4 Constant curve or constant speed, I, II or III*	Underfloor heating mode. See section *7.4.3 Underfloor heating mode*

See also section *10.2 Guide to performance curves*.

Factory setting: Radiator heating mode. See section *7.4.1 Radiator heating mode*.

7.4.6 Pump setting for domestic hot-water systems

Recommended and alternative pump settings:

System type	Pump setting	
	Recommended	Alternative
Domestic hot-water system	Constant curve or constant speed, I, II or III. See section *7.4.4 Constant curve or constant speed, I, II or III*	No alternatives

See also section *10.2 Guide to performance curves*.

Factory setting: Radiator heating mode. See section *7.4.1 Radiator heating mode*.

7.4.7 Changing from recommended to alternative pump setting

Heating systems are relatively slow systems that cannot be set to the optimum operation within minutes or hours.

If the recommended pump setting does not give the desired distribution of heat in the rooms of the house, change the pump setting to the shown alternative.

7.4.8 Externally controlled signal connection: PWM input signal profile A (heating)

The ALPHA1 L can be controlled via a digital low-voltage pulse-width modulation (PWM) signal.

The circulator runs on constant speed curves depending on the PWM input signal. The speed decreases when the PWM value increases. If PWM equals 0, the circulator runs at maximum speed.

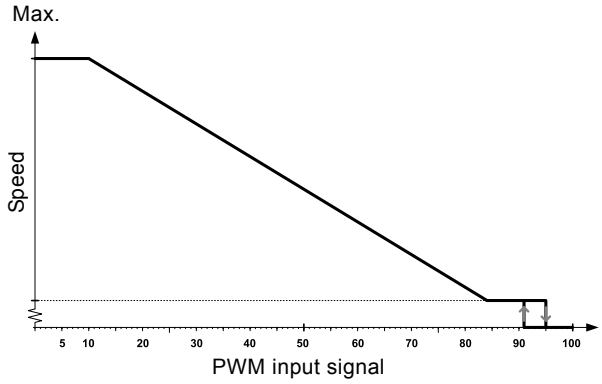

Fig. 15 PWM input signal profile A (heating)

PWM input signal [%]	Pump status
≤ 10	Maximum speed: max.
> 10 / ≤ 84	Variable speed: min. to max.
> 84 / ≤ 91	Minimum speed: IN
> 91/95	Hysteresis area: on/off
> 95 / ≤ 100	Standby mode: off

At high PWM signal percentages (duty cycles), a hysteresis prevents the circulator from starting and stopping if the input signal fluctuates around the shifting point.

At low PWM signal percentages, the circulator speed is high for safety reasons. In case of a cable breakage in a gas boiler system, the circulators will continue to run at maximum speed to transfer heat from the primary heat exchanger. This is also suitable for heat circulators to ensure that the circulators transfer heat in case of a cable breakage.

7.4.9 Setting up the PWM input signal

To enable the external control mode (PWM profile A), you need a signal cable connected to an external system. The cable can be supplied with the circulator as an accessory. See section *11. Accessories*,

The cable connection has three conductors: signal input, signal output and signal reference.

The cable must be connected to the control box via a mini superseal plug. See fig. 16.

Fig. 16 Mini superseal plug

To set the signal connection, do as follows:

1. Make sure that the pump is turned off.
2. The PWM signal connection is covered by a blind plug. Remove the plug.
3. Connect the signal cable with the mini superseal plug.
4. Turn on the power supply.
5. The pump automatically detects the PWM input signal and enables the control mode on the pump.

See fig. 17.

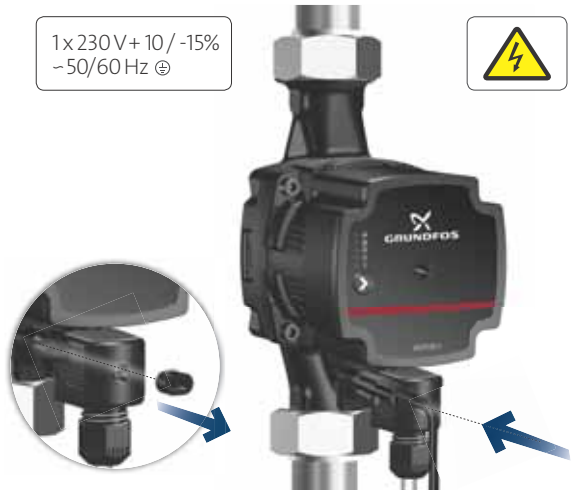

Fig. 17 Connecting the signal cable to the ALPHA1 L

7.5 Pump performance

7.5.1 Relation between pump setting and pump performance

Figure 18 shows the relation between pump setting and pump performance by means of curves.

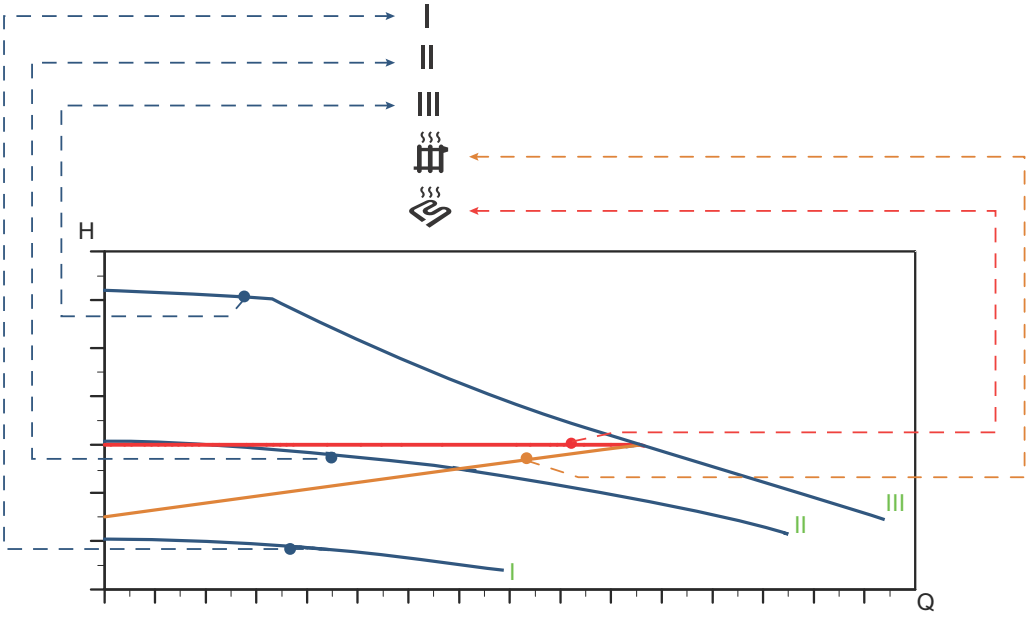

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Fig. 18 Pump setting in relation to pump performance

Setting	Pump curve	Function
I	Constant curve or constant speed I	The pump runs at a constant speed and consequently on a constant curve. At speed I, the pump is set to run on the minimum curve under all operating conditions. See fig. 18.
II	Constant curve or constant speed II	The pump runs at a constant speed and consequently on a constant curve. At speed II, the pump is set to run on the intermediate curve under all operating conditions. See fig. 18.
III	Constant curve or constant speed III	The pump runs at a constant speed and consequently on a constant curve. At speed III, the pump is set to run on the maximum curve under all operating conditions. See fig. 18. Quick venting of the pump can be obtained by setting the pump to speed III for a short period.
	Proportional-pressure curve	The duty point of the pump will move up or down on the proportional-pressure curve, depending on the heat demand in the system. See fig. 18. The head (pressure) is reduced at falling heat demand and increased at rising heat demand.
	Constant-pressure curve	The duty point of the pump will move out or in on the constant-pressure curve, depending on the heat demand in the system. See fig. 18. The head (pressure) is kept constant, irrespective of the heat demand.

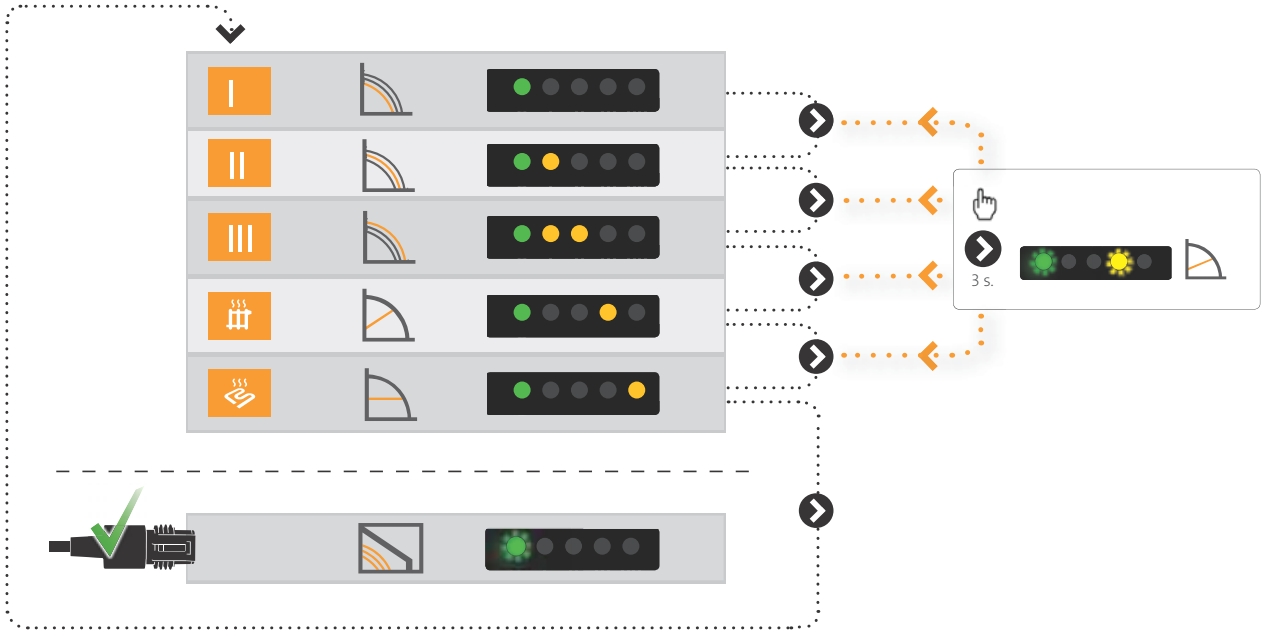
8. Setting the product

Every time you press the push-button, the pump setting is changed. A cycle is five button presses.

To select fixed proportional curve, press and hold the push button for 3 seconds.

The pump automatically enables the PWM input-signal control mode when the signal cable is plugged in. For details on setting up the PWM input signal. See section *7.4.9 Setting up the PWM input signal*.

To learn more about each control mode, see section *7.4 Control modes*.



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The pump has been factory-set to radiator heating mode.

9. Fault finding the product

If the pump has detected one or more alarms, the first LED switches from green to red. When an alarm is active, the LEDs indicate the alarm type as defined in fig. 19.

If multiple alarms are active at the same time, the LEDs only show the error with the highest priority. The priority is defined by the sequence of the table.

When there is no active alarm anymore, the control panel switches back to operating status and the first LED switches from red to green.

DANGER

Electric shock

Death or serious personal injury

- Switch off the power supply before starting any work on the product. Make sure that the power supply cannot be accidentally switched on.

CAUTION

Pressurised system

Minor or moderate personal injury

- Before dismantling the pump, drain the system or close the isolating valves on either side of the pump. The pumped liquid may be scalding hot and under high pressure.

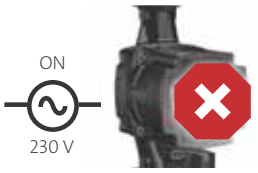
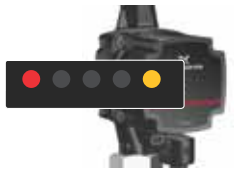
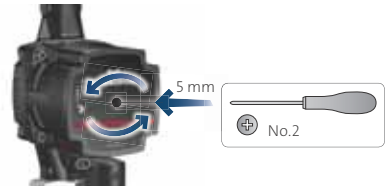
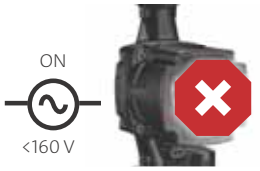
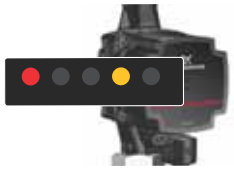
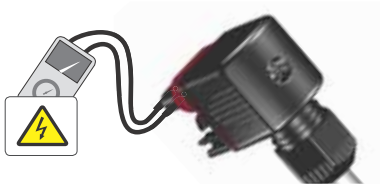
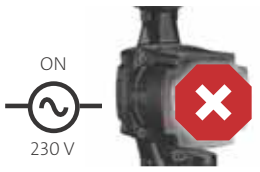
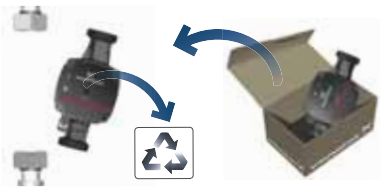
Alarm status	Fault	Display	Solution
The pump is blocked.			Deblock the shaft. See section *9.1 Deblocking the shaft*. 
Supply voltage is low.			Make sure that there is sufficient voltage supply to the pump. 
Electrical error.			Replace the pump and send the pump to the nearest Grundfos Service Center. 

Fig. 19 Fault finding table

9.1 Deblocking the shaft

If the pump is blocked it is necessary to deblock the shaft. The ALPHA1 L deblocking device is accessible from the front of the circulator without having to demount the control box. The force of the device is high enough to deblock circulators, which are seized by lime, e.g. if the pump has been turned off during summer.

Course of action:

1. Turn off the power supply.
2. Locate the deblocking screw in the centre of the control box.
3. Use a star screwdriver with a size 2 Phillips tip to push the deblocking screw inwards.
4. When the screw can be turned counterclockwise, the shaft has been deblocked. Repeat step 2, if necessary.
5. Turn on the power supply.

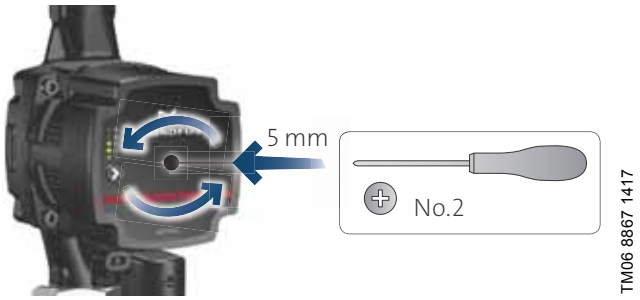


Fig. 20 Deblocking the shaft

Before, during and after the deblocking, the device is tight and must not release any water.

10. Technical data

Operating conditions		
Sound pressure level	The sound pressure level of the pump is lower than 43 dB(A)	
Relative humidity	Maximum 95 %, non-condensing environment	
System pressure	PN 10: Maximum 1.0 MPa (10 bar)	
Inlet pressure	**Liquid temperature**	**Minimum inlet pressure**
	75 °C	0.005 MPa, 0.05 bar, 0.5 m head
	95 °C	0.05 MPa, 0.5 bar, 5 m head
Ambient temperature	0-55 °C	
Liquid temperature	2-95 °C	
Liquid	Maximum water/propylene glycol mixture is 50 %	
Viscosity	Maximum 10 mm^2/s	
Electrical data		
Supply voltage	1 x 230 V - 15 %/+ 10 %, 50/60 Hz, PE	
Insulation class	F	
Miscellaneous data		
Motor protection	The pump requires no external motor protection.	
Enclosure class	IPX4D	
Temperature class (TF)	TF95	
Specific EEI values	ALPHA1 L XX-40: EEI ≤ 0.20	
	ALPHA1 L XX-60: EEI ≤ 0.20	
	ALPHA1 L XX-65: EEI ≤ 0.23	

To avoid condensation in the control box and stator, the liquid temperature must always be higher than the ambient temperature.

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

10.1 Dimensions, ALPHA1 L XX-40, XX-60, XX-65

Dimensional sketches and table of dimensions.

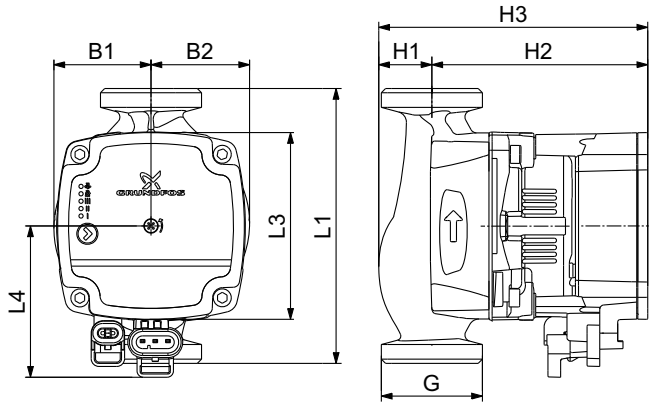


Fig. 21 ALPHA1 L XX-40, XX-60, XX-65

Pump type	Dimensions [mm]								
	L1	L3	L4	B1	B2	H1	H2	H3	G
ALPHA1 L 15-40	130	88.3	71.6	45.9	46.6	25.1	102.1	127.2	G 1
ALPHA1 L 15-60	130	88.3	71.6	45.9	46.6	25.1	102.1	127.2	G 1
ALPHA1 L 15-65	130	88.3	71.6	45.9	46.6	25.1	102.1	127.2	G 1
ALPHA1 L 20-40	130	88.3	71.6	45.9	46.6	25.1	102.1	127.2	G 1 1/4
ALPHA1 L 20-40 N	150	90	71.6	48.6	48.8	26.8	102.1	128.9	G 1 1/4
ALPHA1 L 20-60	130	88.3	71.6	45.9	46.6	25.1	102.1	127.2	G 1 1/4
ALPHA1 L 20-60 N	150	90	71.6	48.6	48.8	26.8	102.1	128.9	G 1 1/4
ALPHA1 L 25-40	130	88.3	71.6	45.9	46.6	25.1	102.1	127.2	G 1 1/2
ALPHA1 L 25-40	180	88.3	71.6	46.3	46.4	25.3	102.1	127.4	G 1 1/2
ALPHA1 L 25-40 A	180	88.3	71.6	31.7	64.7	49.7	112	161.7	G 1 1/2
ALPHA1 L 25-40 N	180	90	71.6	48.6	48.8	26.8	102.1	128.9	G 1 1/2
ALPHA1 L 25-60	130	88.3	71.6	45.9	46.6	25.1	102.1	127.2	G 1 1/2
ALPHA1 L 25-60	180	88.3	71.6	46.3	46.4	25.3	102.1	127.4	G 1 1/2
ALPHA1 L 25-40 A	180	88.3	71.6	31.7	64.7	49.7	112	161.7	G 1 1/2
ALPHA1 L 25-60 N	180	90	71.6	48.6	48.8	26.8	102.1	128.9	G 1 1/2
ALPHA1 L 32-40	180	88.3	71.6	46.3	47.7	26.3	102.1	128.4	G 2
ALPHA1 L 32-60	180	88.3	71.6	46.3	47.7	26.3	102.1	128.4	G 2

10.2 Guide to performance curves

Each pump setting has its own performance curve. See fig. 22.

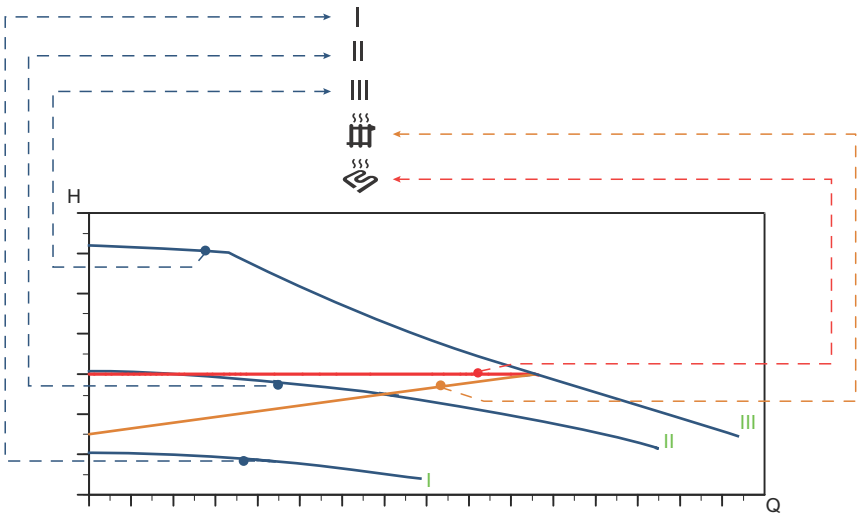


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Fig. 22 Performance curves in relation to pump setting

Settling	Pump curve
I	Constant curve or constant speed I
II	Constant curve or constant speed II
III	Constant curve or constant speed III
	Proportional-pressure curve
	Constant-pressure curve

For further information about pump settings, see sections *7. Control functions* and *8. Setting the product*.

10.3 Curve conditions

The guidelines below apply to the performance curves on the following pages:

- Test liquid: airless water.
- The curves apply to a density of ρ = 998.2 kg/m^3 and a liquid temperature of 20 °C.
- All curves show average values and must not be used as guarantee curves. If a specific minimum performance is required, individual measurements must be made.
- The curves for speeds I, II and III are marked.
- The curves apply to a kinematic viscosity of υ = 1.004 mm^2/s (1.004 cSt).
- The conversion between head H [m] and differential pressure ρ [kPa] has been made for water with a temperature of 60 °C, ρ = 983.2 kg/m^3.
- Curves obtained according to EN 16297.

10.4 Performance curves, ALPHA1 L XX-40 (N)

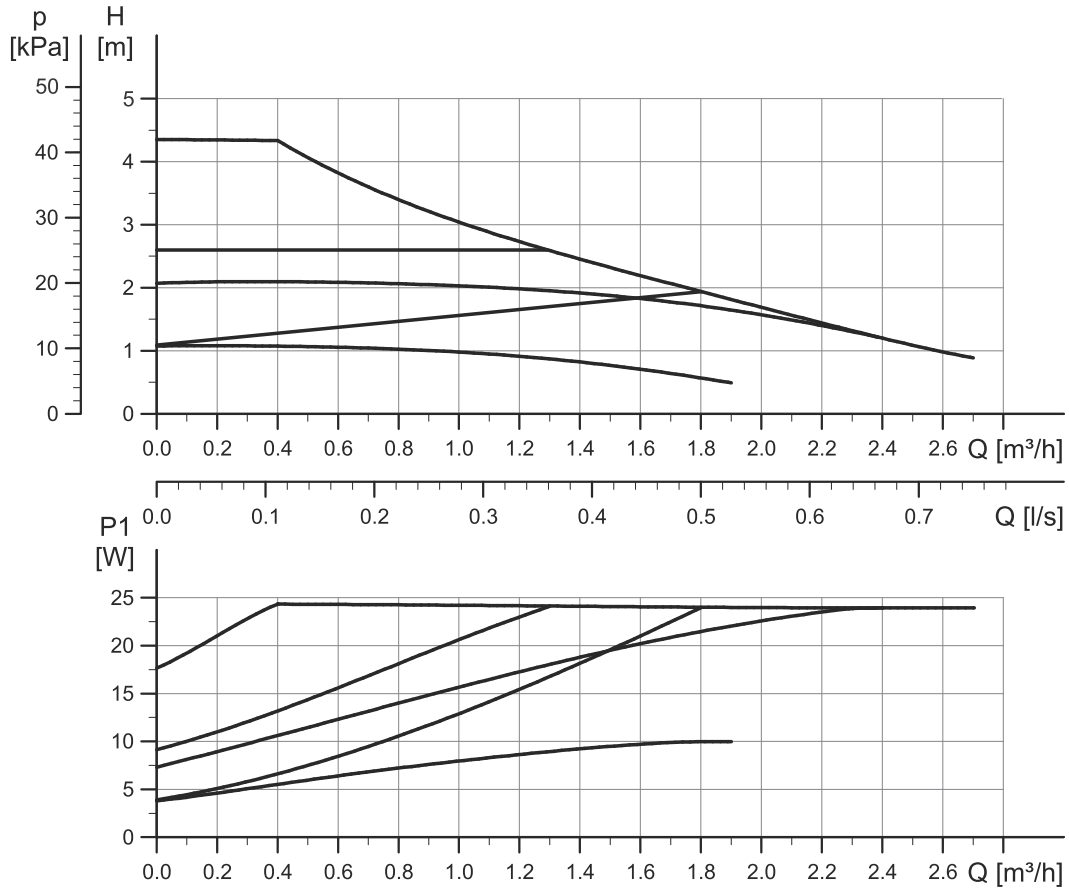

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Fig. 23 ALPHA1 L XX-40

Setting	P1 [W]	I_1 [A]
Min.	3.4	0.05
Max.	25	0.26

10.5 Performance curves, ALPHA1 L XX-60 (N)

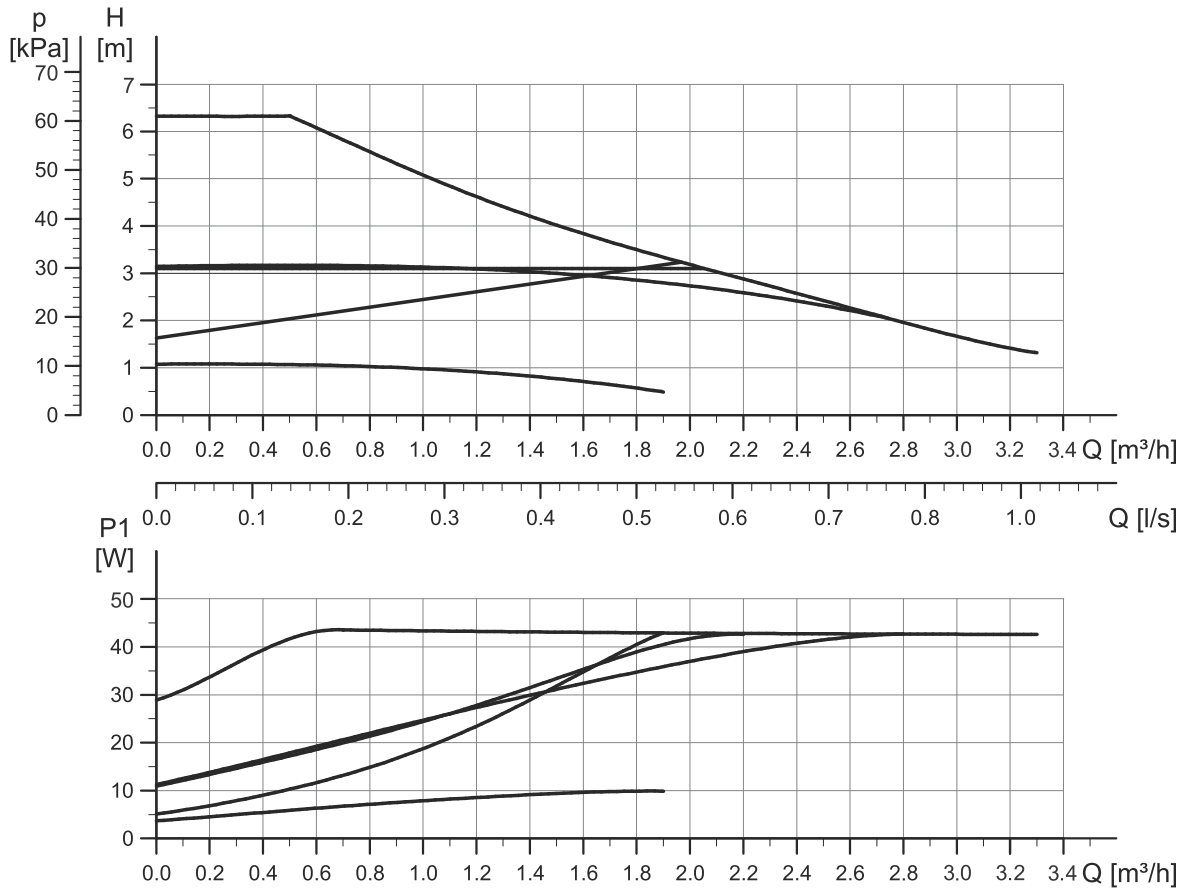

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Fig. 24 ALPHA1 L XX-60

Setting	P1 [W]	I_1 [A]
Min.	3.4	0.05
Max.	45	0.42

10.6 Performance curves, ALPHA1 L XX-65 (N)

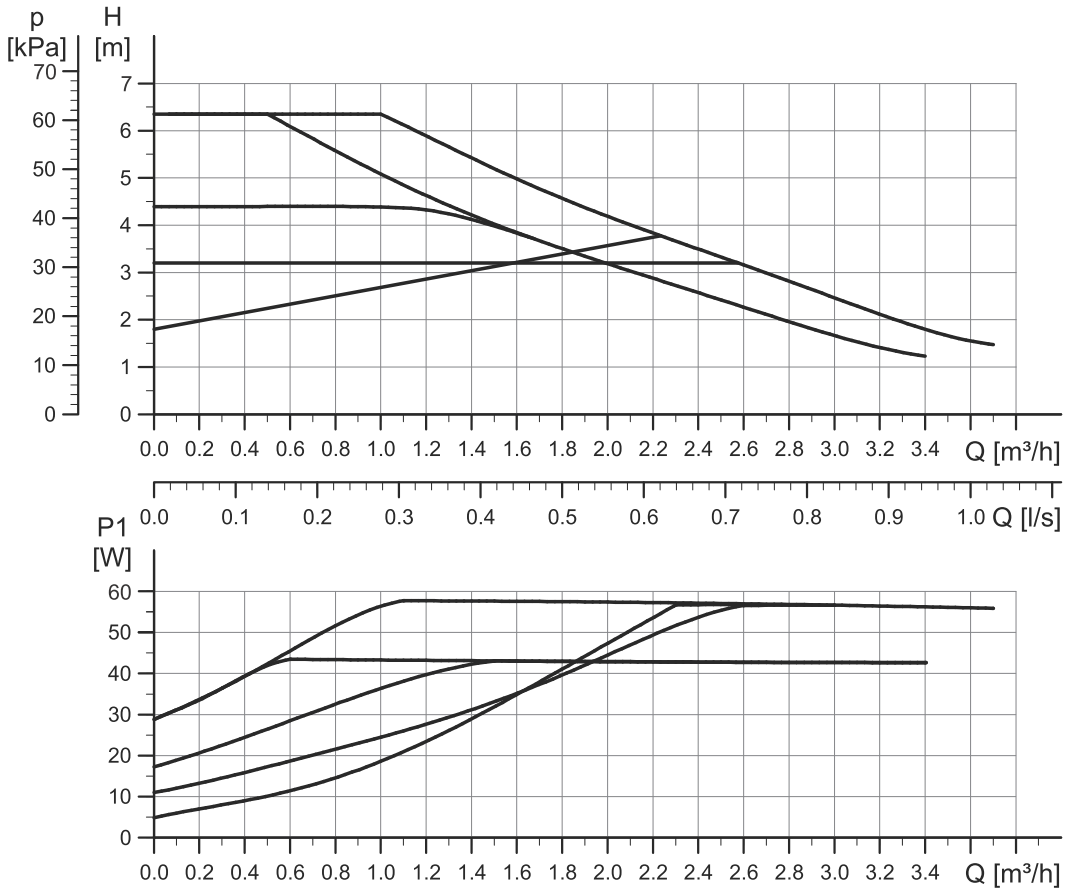

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Fig. 25 ALPHA1 L XX-65

Setting	P1 [W]	I_1 [A]
Min.	4	0.05
Max.	60	0.52

11. Accessories

11.1 Unions and valve kits

ALPHA1 L	Connection	Product numbers, unions														
		Rp			R		Rp			mm		mm				
		3/4	1	1 1/4	1	1 1/4	3/4	1	1 1/4	∅22	∅28	∅15	∅18	∅22	∅28	∅42
25-xx	G 1 1/2	529921	529922	529821	529925	529924										
25-xx N	G 1 1/2	529971	529972				519805	519806	519807	519808	519809		529977	529978	529979	
32-xx	G 2		509921	509922												

G-threads have a cylindrical form in accordance with the EN-ISO 228-1 standard. R-threads have a conical form in accordance with the ISO 7-1 standard. In the case of a thread of size 1 1/2", the threads are specified as G 1 1/2 or R 1 1/2. You can only screw male G-threads (cylindrical) into female G-threads. You can screw male R-threads (conical) into female G- or R-threads. See fig. 26.

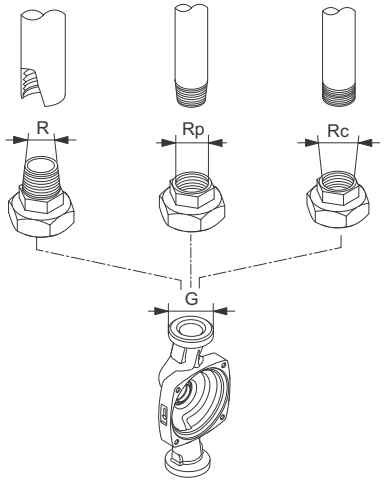

Fig. 26 G-threads and R-threads

11.2 Insulating shells

You can order insulating shells as an accessory. See table below.

The insulating shells enclose the entire pump housing and are easy to fit around the pump. See fig. 27.

Pump type	Product number
ALPHA1 L (N)	99270706

Fig. 27 Fitting the insulating shells

11.3 Power supply

The installer plug is supplied with the pump, but is also available as a spare part. Power cable adapters are available as accessories as well. See fig. 28.

11.4 Control signal connection (PWM profile A)

To control the pump externally (PWM input signal) a signal cable with a mini superseal plug can be supplied with the circulator as an accessory. See fig. 28.

Accessory	Product description	Length [mm]	Product number
	Installer plug		99165345
	Signal cable with mini superseal	2000	99165309
	Superseal Molex cable adapter, overmoulded	150	99165311
	Superseal Volex cable adapter, overmoulded	150	99165312

Fig. 28 Accessories: Installer plug and cables

12. Disposing of the product

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

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

See also end-of-life information on www.grundfos.com.

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