

# ALPHA1 L

Installation and operating instructions





# ALPHA1 L

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## English (GB) Installation and operating instructions

### Original installation and operating instructions

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## 1. General information



Read this document before you install 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.

## 1.1 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 the 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.

## 2. Receiving the product

### 2.1 Inspecting the product



#### CAUTION Crushing of feet

Minor or moderate personal injury

- Wear safety shoes when opening the box and handling 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 Nameplate.

#### Related information

[5.4.1 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

### 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 Crushing of feet

Minor or moderate personal injury



- Wear safety shoes when opening the box and handling the product.



Installation must be carried out by trained persons in accordance with local regulations.



The pump must always be installed with a horizontal motor shaft within  $\pm 5^\circ$ .

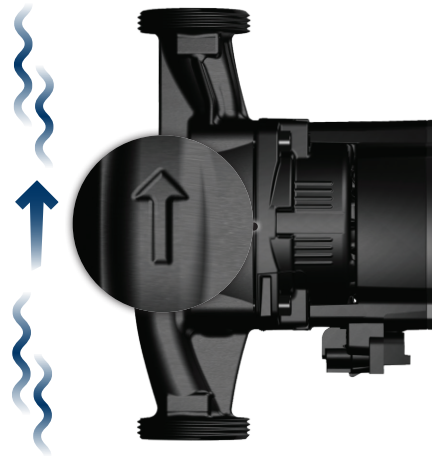
### 3.1 Mechanical installation



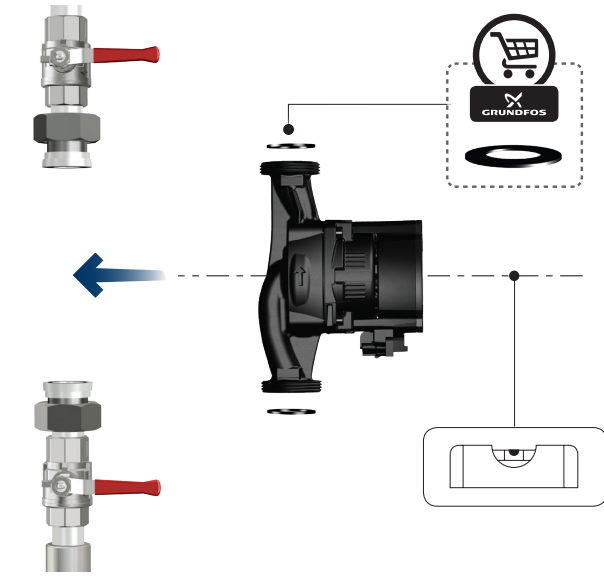
The mechanical installation must be carried out by trained persons in accordance with local regulations.

#### 3.1.1 Mounting the product

1. The arrows on the pump housing indicate the flow direction through the pump. See fig. Flow direction.
2. Fit the two gaskets supplied with the pump when you mount the pump in the pipe. Install the pump with a horizontal motor shaft within  $\pm 5^\circ$ . See fig. Pump installation. See also section Control box positions.
3. Tighten the fittings. See fig. Tightening the fittings.



Flow direction



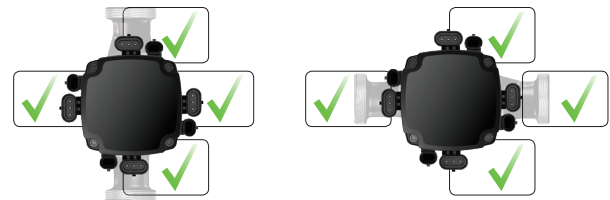
Pump installation

TM068536

### 3.3 Control box positions

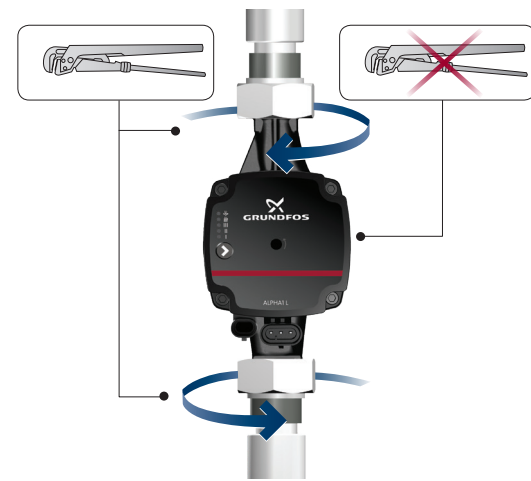
- DANGER**  
**Electric shock**  
 Death or serious personal injury
- Switch off the power supply before starting any work on the product. Make sure that the power supply cannot be accidentally switched on.
- CAUTION**  
**Hot surface**  
 Minor or moderate personal injury
- The pump housing may be hot due to the pumped liquid being scalding hot. Close the isolating valves on both sides of the pump and wait for the pump housing to cool down.
- CAUTION**  
**Pressurised system**  
 Minor or moderate personal injury
- Before dismantling the pump, drain the system or close the isolating valves on both sides of the pump. The pumped liquid may be scalding hot and under high pressure.

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



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Possible control box positions



Tightening the fittings

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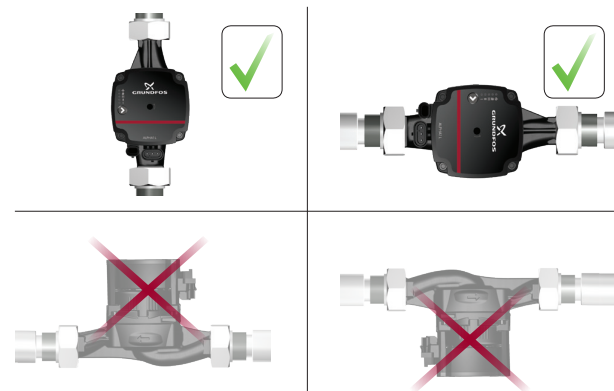
#### Related information

[3.3 Control box positions](#)

### 3.2 Pump positions

Always install the pump with a horizontal motor shaft within  $\pm 5^\circ$ . Do not install the pump with a vertical motor shaft. See fig. Pump positions, bottom row.

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



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Pump 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.	TM068539
2	Turn the pump head to the desired position.	TM068540
3	Refit the screws on the pump head.	TM068541

### 3.4 Electrical connection

**DANGER**  
**Electric shock**



Death or serious personal injury

- All electrical connections must be carried out by a qualified electrician in accordance with local regulations.

**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 protective earth.

**DANGER**  
**Electric shock**



Death or serious personal injury

- 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.



The pump is not a safety component and cannot be used to ensure functional safety in the final appliance.

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

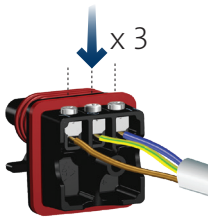




**Related information**

[5.4.1 Nameplate](#)

### 3.4.1 Assembling the installer plug

Step	Action	Illustration	
1	Loosen the cable gland and unscrew the union nut in the centre of the terminal cover.		TM068542
			TM070366
2	Detach the terminal cover.		TM068543
3	Pull the power cable through the cable gland and terminal cover.		TM068544
4	Strip the cable conductors as illustrated.		TM068545
5	Loosen the screws on the power supply plug and connect the cable conductors.		TM068546
			TM068547



Step	Action	Illustration
6	Tighten the screws on the power supply plug.	
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.	
8	Tighten the union nut.	
9	Tighten the cable gland onto the power supply plug.	
10	Insert the power supply plug into the male plug on the pump.	

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### 3.5 Insulating the pump housing



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#### 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 section Insulating shells.

**!** Do not insulate the control box or cover the operating panel.

#### Related information

[5.5.2 Insulating shells](#)

## 4. Starting up the product




### 4.1 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 Technical data. When using the pump for the first time, the system must be vented. See section Venting the pump. The pump is self-venting through the system.

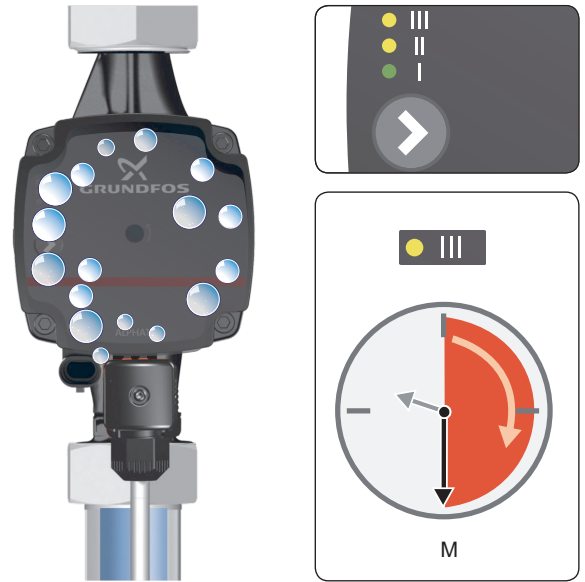
#### Related information

- [4.3 Venting the pump](#)
- [10. Technical data](#)

### 4.2 Starting up the pump

Step	Action	Illustration
1	Open the inlet and outlet valves.	
2	Switch on the power supply.	
3	The lights in the operating panel indicate that the power supply has been switched on and the pump is running.	

### 4.3 Venting the pump



#### Venting the pump


Pos.	Description
M	Minimum 30 min


Small air pockets 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 using the button on the operating panel.
2. Let the pump run for minimum 30 minutes. How fast the pump is vented depends on the system size and design.

When you have vented the pump, that is when the noise has ceased, set the pump according to the recommendations. See section Control modes.

 The pump must not run dry.

 The pump is from factory set to radiator heating mode.

#### Related information

- [6.2 Control modes](#)

## 5. Product introduction

### 5.1 Product description

ALPHA1 L can be used as stand-alone or integrated circulator pump in existing systems as replacement or in new systems with either variable or constant flow rate.

The pump automatically controls the differential pressure by adjusting the pump performance to the actual heating demand without the use of external components, thus avoiding:

- too high energy consumption
- irregular control of the system
- noise in thermostatic valves and similar fittings.

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

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.

### 5.1.1 Model type

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

### 5.2 Applications

The pump is designed for circulating liquids in heating systems. The pumps are suitable for the following systems:

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

### 5.3 Pumped liquids



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



#### CAUTION

##### Flammable material

Minor or moderate personal injury

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



#### CAUTION

##### Corrosive substance

Minor or moderate personal injury

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

The pump is suitable for clean, thin, non-aggressive and non-explosive liquids, not containing solid particles, fibres or mineral oil.

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

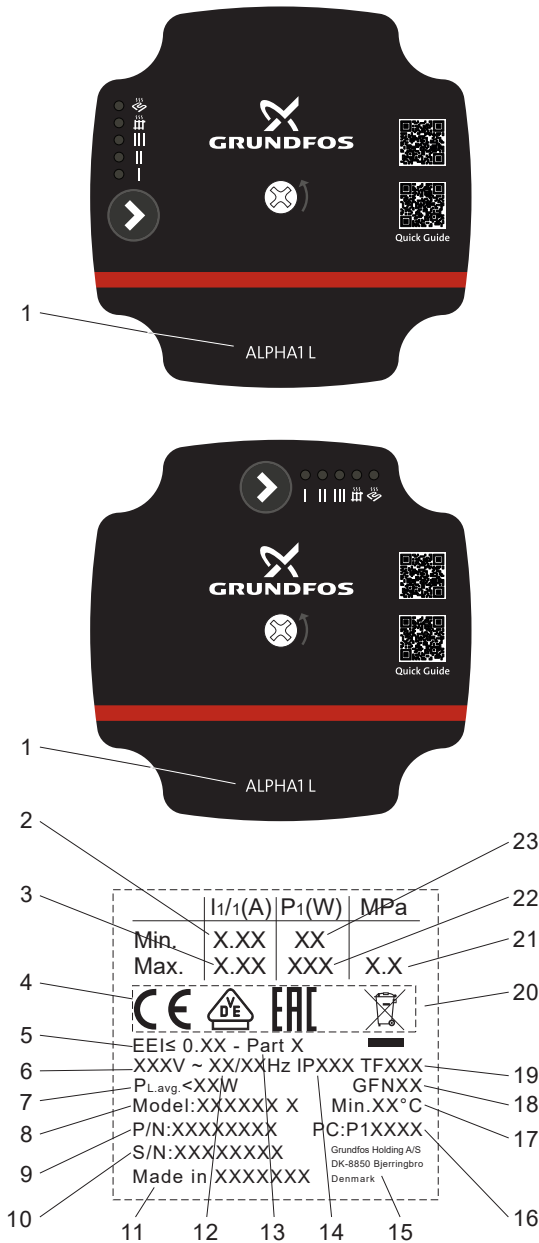
Mixtures of water with antifreeze media such as glycol with a kinematic viscosity lower than 10 mm<sup>2</sup>/s (10 cSt). When selecting a pump, the viscosity of the pumped liquid must be taken into consideration. If the pump is used for a liquid with a higher viscosity, the hydraulic performance of the pump is reduced. See section Technical data for further information.

#### Related information

[10. Technical data](#)

## 5.4 Identification

### 5.4.1 Nameplate



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	Average power input PL, avg (Ecodesign regulation)
8	Model designation
9	Product number
10	Serial number
11	Country of origin
12	Frequency [Hz]
13	Part, according to EEI
14	Enclosure class
15	Manufacturer's name and address

Pos.	Description
16	Production code: 1st and 2nd figures: production site code 3rd and 4th figures: year 5th and 6th figures: week
17	Minimum liquid temperature
18	Product mark (legal product code)
19	TF class
20	Crossed-out wheeled bin according to EN 50419
21	Maximum system pressure
22	Maximum input power [W]
23	Minimum input power [W]

### 5.4.2 Type key

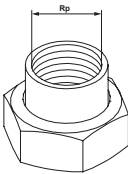
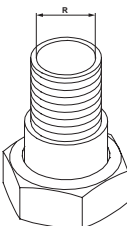
#### Example

Code	Explanation
ALPHA1 L	Pump type
25	Nominal diameter (DN) of inlet and outlet ports [mm]
-40	Maximum head [dm] [ ]: Cast-iron pump housing
180	Port-to-port length [mm]

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## 5.5 Accessories

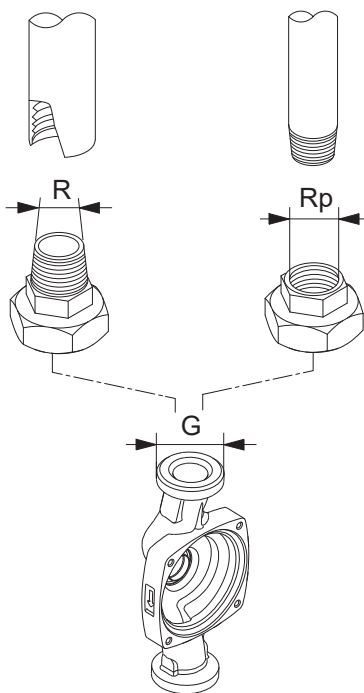
### 5.5.1 Unions and valve kits

Product numbers, unions						
ALPHAX	Connection					
		3/4	1	1 1/4	1	1 1/4
25-xx	G 1 1/2	529921	99672022	529821	529925	529924
32-xx	G 2		509921	99672033		

G-threads have a cylindrical form in accordance with the EN ISO 228-1 standard and are not sealing the thread. It requires a flat gasket. You can only screw cylindrical male G-threads, into female G-threads. The G-threads are standard thread on the pump housing.

R-threads are tapered external threads in accordance with the EN 10226-1 standard.

Rc- or Rp-threads are internal threads with either tapered or cylindrical threads. You can screw conical male R-threads into female Rc- or Rp-threads. See fig. G-threads and R-threads.



TM077425

G-threads and R-threads

### 5.5.2 Insulating shells

The accessory set is tailored to the individual pump type. The insulating shells enclose the entire pump housing and are easy to fit around the pump.

Pump type	Product number
ALPHA1 L XX-XX	99270706

### 5.5.3 Cables and plugs

The pump has two electrical connections: the power supply and the control signal connection.

#### Power supply connection

The installer plug is both supplied with the pump and available as an accessory.

Power cable adapters are also available as accessories.

#### Control signal connection

The control signal cable connection has three conductors: the signal input, the signal output and the signal reference. Connect the cable to the control box by a mini superseal plug. See section Setting the PWM input signal. The optional signal cable is available as an accessory. The cable length must not exceed 3 metres.



Mini superseal plug

Conductor	Colour
Signal input	Brown
Signal reference	Blue
Signal output	Black

Product	Product description	Length [mm]	Product number
	Installer plug		99439948
	Mini superseal signal cable (PWM input signal)	2000	99165309
	Superseal power cable	2000	99198990
	Power cable adapter: Superseal Molex cable adapter, overmoulded	150	99165311
	Power cable adapter: Superseal Volex cable adapter, overmoulded	150	99165312

#### Related information

[7.1 Setting the PWM input signal](#)

## 6. Control functions

### 6.1 Operating panel



TM067286

Operating panel

Symbol	Description
	Button
I, II, III	Constant curve or constant speed curve I, II and III
	Radiator heating mode (proportional pressure)
	Underfloor heating mode (constant pressure)

The operating panel shows the following:

- The control mode, after pressing the button
- Alarm status.

#### 6.1.1 Alarm or warning

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

See section Fault finding the product.

#### Related information

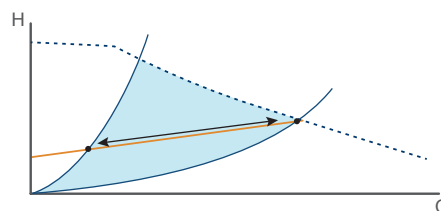
[9. Fault finding the product](#)

### 6.2 Control modes

The pump has seven different control modes. Learn more about them in the following sections.

#### 6.2.1 Radiator heating mode (factory setting)

The radiator heating mode adjusts the pumps performance to the actual heat demand in the system following a proportional-pressure curve.



TM068815

Proportional-pressure curve

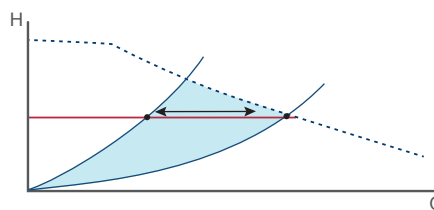
System type	Recommended control mode	Alternative control mode
Two-pipe system	Radiator heating mode	Constant curve or constant speed, I, II or III. See section Constant curve or constant speed, I, II or III.

#### Related information

[6.2.3 Constant curve or constant speed, I, II or III](#)

#### 6.2.2 Underfloor heating mode

The underfloor heating mode adjusts the pump performance to the actual heat demand in the system following a constant-pressure curve.



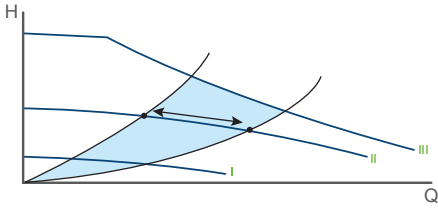
TM068816

Constant-pressure curve

System type	Recommended control mode	Alternative control mode
Underfloor heating system	Underfloor heating mode	No alternatives

**6.2.3 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. Constant-curve/-speed curve where II has been selected.



TM068822

Constant-curve/-speed curve

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

**6.2.4 Pump setting for one-pipe heating systems**

Recommended and alternative pump settings:

System type	Recommended control mode	Alternative control mode
One-pipe heating system	Constant curve or constant speed, I, II or III. See section Constant curve or constant speed, I, II or III.	No alternatives

**Related information**

[6.2.3 Constant curve or constant speed, I, II or III](#)

**6.2.5 Pump setting for domestic hot-water systems**

Recommended and alternative pump settings:

System type	Recommended control mode	Alternative control mode
Domestic hot-water system	Constant curve or constant speed, I, II or III. See section Constant curve or constant speed, I, II or III.	No alternatives

**Related information**

[6.2.3 Constant curve or constant speed, I, II or III](#)

**6.2.6 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.

**6.3 Control signal**

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

The square-wave PWM signal is designed for a 100 to 4,000 Hz frequency range. The PWM signal is used to select the speed (speed command) and as feedback signal. The PWM frequency on the feedback signal is fixed at 75 Hz in the pump.

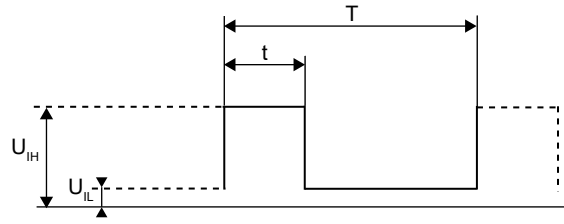
For instructions on how to set the connection, see section Setting the PWM input signal.

**Duty cycle**

$d \% = 100 \times t/T$

Example	Rating
T = 2 ms (500 Hz)	$U_{iH} = 4-24 \text{ V}$
t = 0.6 ms	$U_{iL} \leq 1 \text{ V}$
$d \% = 100 \times 0.6 / 2 = 30 \%$	$I_{iH} \leq 10 \text{ mA}$ (depending on $U_{iH}$ )

**Example**



TM049911

PWM signal

Abbreviation	Description
T	Period of time [sec.]
d	Duty cycle [t/T]
$U_{iH}$	High-level input voltage
$U_{iL}$	Low-level input voltage
$I_{iH}$	High-level input current

**Related information**

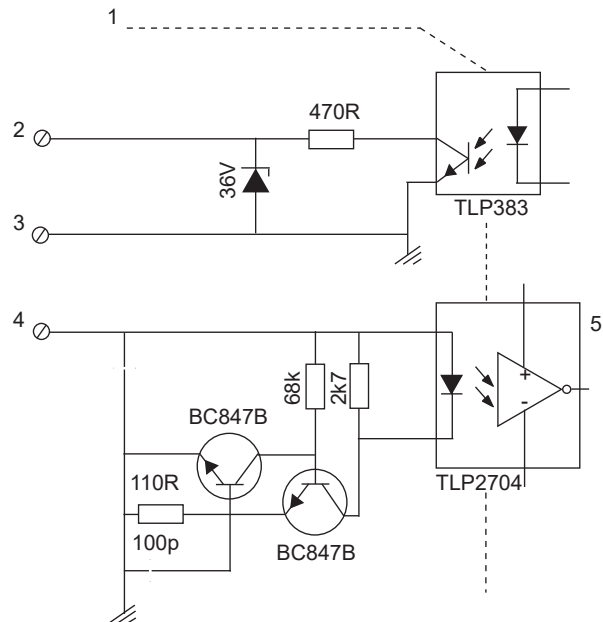
[7.1 Setting the PWM input signal](#)

**6.3.1 Interface**

The pump's interface consists of an electronic part connecting the external control signal to the pump. The interface translates the external signal into a signal type that the microprocessor can understand.

In addition, the interface ensures that the user cannot get into contact with dangerous voltage if touching the signal wires when power is connected to the pump.

**Note:** "Signal ref." is a signal reference with no connection to protective earth.



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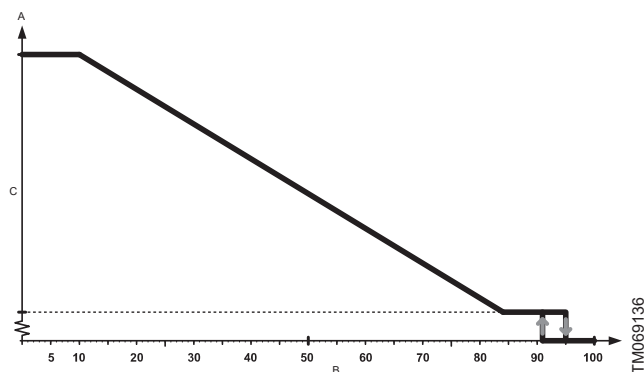
Schematic drawing, interface

Pos.	Description
1	Galvanic isolation
2	PWM output
3	Signal ref.
4	PWM input
5	Pump electronics



### 6.3.2 PWM input signal profile A (heating)

The pump runs on constant-speed curves depending on the PWM input signal. The speed decreases when the PWM value increases. If the PWM signal equals zero (0 VDC), the pump will switch to the control mode selected before connecting to a PWM signal.



PWM input signal profile A (heating)

Pos.	Description
A	Max.
B	PWM input signal
C	Speed

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

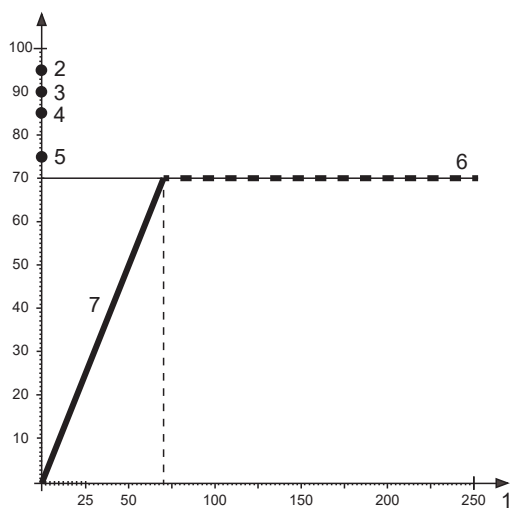
### 6.3.3 PWM feedback signal

The PWM feedback signal offers pump information like in bus systems:

- current power consumption (accuracy  $\pm 2\%$  of PWM signal)
- warning
- alarm.

#### Alarms

Alarm output signals are available because some PWM output signals are dedicated to alarm information. If a supply voltage is measured below the specified supply voltage range, the output signal is set to 75 %. If the rotor is locked due to deposits in the hydraulics, the output signal is set to 90 % because this alarm has a higher priority. See fig. PWM feedback signal - power consumption.



PWM feedback signal - power consumption

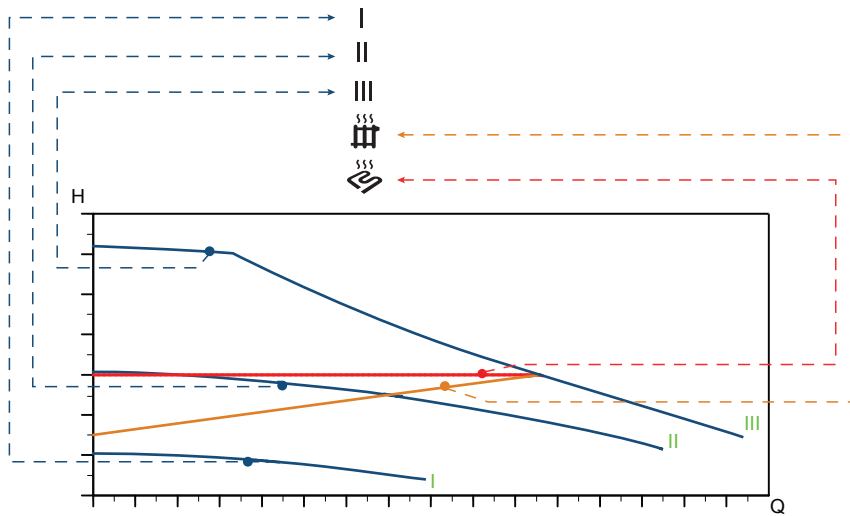
Pos.	Description
1	Power [W]
2	Standby (stop)
3	Alarm stop: fault, blocked pump
4	Alarm stop: electrical fault
5	Warning
6	Saturation at 70 Watt
7	Slope: 1 W / % PWM

#### Data

Maximum rating	Symbol	Value
PWM frequency input with high-speed optocoupler	f	100-4000 Hz
Guaranteed standby power consumption		< 1 W
Rated input voltage - high level	$U_{iH}$	4-24 V
Rated input voltage - low level	$U_{iL}$	< 1 V
High-level input current	$I_{iH}$	< 10 mA
Input duty cycle	PWM	0-100 %
PWM frequency output, open collector	f	75 Hz $\pm 5\%$
Accuracy of output signal regarding power consumption	-	$\pm 2\%$ (of PWM signal)
Output duty cycle	PWM	0-100 %
Collector emitter breakdown voltage on output transistor	$U_c$	< 70 V
Collector current on output transistor	$I_c$	< 50 mA
Maximum power dissipation on output resistor	$P_R$	125 mW
Zener diode working voltage	$U_z$	36 V
Maximum power dissipation in Zener diode	$P_z$	300 mW



### 6.4 Pump performance

Figure Pump setting in relation to pump performance shows the relation between pump setting and pump performance by means of curves.










TM068818

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.
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.
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. Quick venting of the pump can be obtained by setting the pump to speed III for a short period.
	Radiator heating mode (proportional-pressure curve)	The duty point of the pump will move up or down on a proportional-pressure curve, depending on the heat demand in the system. The head (pressure) is reduced at falling heat demand and increased at rising heat demand.
	Underfloor heating mode (constant-pressure curve)	The duty point of the pump will move out or in on a constant-pressure curve, depending on the heat demand in the system. The head (pressure) is kept constant, irrespective of the heat demand.

## 7. Setting the product

To set the product use the button on the operating panel. Every time you press the button, the pump setting is changed. The LEDs will indicate the chosen control mode. A cycle is five button presses.

Display	Control mode
	Constant curve 1
	Constant curve 2
	Constant curve 3
	Radiator mode
	Underfloor mode
	PWM profile A The LED flashes.
	Fixed control curve The LEDs flash.

The pump automatically enables the PWM input-signal control mode when the signal cable is plugged in and the PWM signal is detected by the pump. If the pump does not detect a PWM signal or if the signal equals 0, the pump will switch to the control mode selected before connecting to a PWM signal. For details on setting the PWM input signal, see section [Setting the PWM input signal](#).

To select the fixed proportional-pressure curve, press and hold the button for 3 seconds. To disable this control mode, press and hold the button for 3 seconds.

To learn more about each control mode, see section [Control modes](#).



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

### Related information

[6.2 Control modes](#)

[7.1 Setting the PWM input signal](#)

## 7.1 Setting 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 connection has three conductors: the signal input, the signal output and the signal reference.

Conductor	Colour
Signal input	Brown
Signal reference	Blue
Signal output	Black

The cable is not supplied with the pump but can be ordered as an accessory. The cable length must not exceed 3 metres.



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



Mini superseal plug

### Set the signal connection

1. Make sure that the pump is turned off.
2. Locate the PWM signal connection on the pump. The three pins inside the signal connection are not energised.
3. Connect the signal cable with the mini superseal plug.
4. Switch on the power supply.
5. The pump automatically detects if a valid PWM signal is available after which it enables the control mode on the pump. See fig. Connecting the signal cable to ALPHA1 L. If the pump does not detect a PWM signal or if the signal equals 0, the pump will switch to the control mode selected before connecting to a PWM signal.



1 x 230 V - 15% / + 10 %  
~ 50/60 Hz Ⓢ



Connecting the signal cable to ALPHA1 L

TMD067633

## 8. Servicing the product

### DANGER Electric shock

Death or serious personal injury



- All electrical connections must be carried out by a qualified electrician in accordance with local regulations.

### 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 Hot surface

Minor or moderate personal injury



- The pump housing may be hot due to the pumped liquid being scalding hot. Close the isolating valves on both sides of the pump and wait for the pump housing to cool down.

### CAUTION Pressurised system

Minor or moderate personal injury



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



All service must be carried out by an instructed service technician.

### 8.1 Dismantling the product

1. Switch off the power supply.
2. Pull out the plug. For instructions on how to dismantle the plug, see section Dismantling the plug.
3. Close the two isolating valves on both sides of the pump.
4. Loosen the fittings.
5. Remove the pump from the system.

### Related information

#### [8.2 Dismantling the plug](#)

### 8.2 Dismantling the plug

1. Loosen the cable gland and unscrew the union nut in the centre of the terminal cover.
2. Detach the terminal cover.
3. Loosen the screws on the power supply plug and disconnect the cable conductors.
4. Pull the power cable back through the cable gland and terminal cover.

## 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. Fault finding table.



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 operating 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 Hot surface

Minor or moderate personal injury



- The pump housing may be hot due to the pumped liquid being scalding hot. Close the isolating valves on both sides of the pump and wait for the pump housing to cool down.

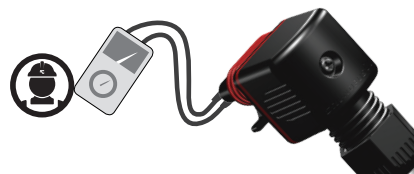
### CAUTION Pressurised system

Minor or moderate personal injury



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

Display	Status	Solution
	TM068566 Alarm The pump stops. The pump is blocked.	Deblock the shaft. See section Deblocking the shaft.
	TM068569 Alarm The pump stops. The supply voltage is low.	Make sure that there is sufficient voltage supply to the pump.
	TM068572 Alarm The pump stops. Electrical error.	Replace the pump and send the pump to the nearest Grundfos Service Center.



### Fault finding table

### Related information

#### 9.1 Deblocking the shaft

### 9.1 Deblocking the shaft

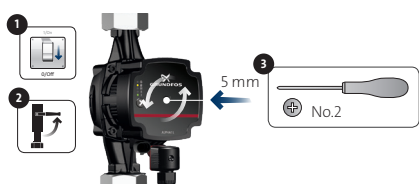
If the pump is blocked it is necessary to deblock the shaft. The pump deblocking device is accessible from the front of the pump without having to demount the control box. The force of the device is high enough to deblock pumps, which are seized by lime, for example if the pump has been turned off during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

#### Course of action:

1. Switch off the power supply.
2. Close the valves.
3. Locate the deblocking screw in the centre of the control box. 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 3, if necessary.
5. Switch on the power supply.



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



TM071414

### Deblocking the shaft

## 10. Technical data

Operating conditions		
Sound pressure level	The sound pressure level of the pump is lower than 32 dB(A).	
Relative humidity	Maximum 95 %, non-condensing environment	
System pressure	PN 10: Maximum 1.0 MPa (10 bar)	
	<b>Liquid temperature</b>	<b>Minimum inlet pressure</b>
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
Maximum inlet pressure	1 MPa (10 bar)	
Ambient temperature	0-55 °C	
Liquid temperature	2-95 °C	
Liquid	Maximum water/propylene glycol mixture is 50 %	
Viscosity	Maximum 10 mm <sup>2</sup> /s	
Maximum altitude of installation	2000 m above sea level	
Electrical data		
Supply voltage	1 x 230 V - 15 %/+ 10 %, 50/60 Hz, PE	
Insulation class	F	
Standby power consumption	< 1 W	
Inrush current	< 4 A	
Minimum switching time power on/off	No specific requirements	
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 ≤ 0.20	
	ALPHA1 L XX-80: EEI ≤ 0.20	

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

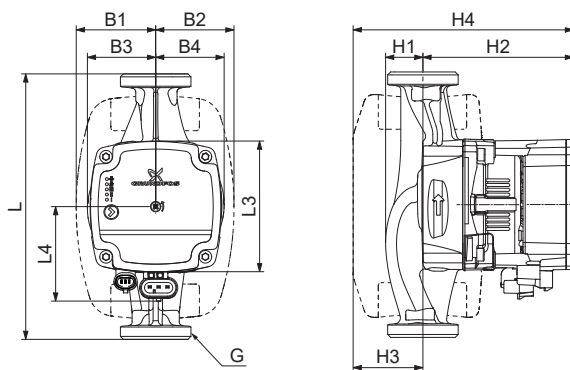
### 10.1 Reduced supply voltage

The pump operation is ensured above 160 VAC with reduced performance.

If the voltage falls below 190 VAC, a low-voltage warning is sent via the PWM signal.

If the voltage falls below 150 VAC, the pump stops and shows an alarm.

10.2 Dimensions, ALPHA1 L XX-40, XX-60, 15-65

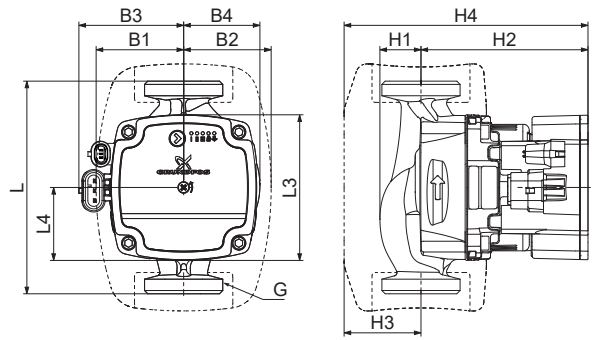


TM071242

ALPHA1 L XX-40, XX-60, XX80, 15-65

Pump type	Dimensions [mm]											
	L	L3	L4	B1	B2	B3	B4	H1	H2	H3	H4	G
ALPHA1 L 15-40	130	88	72	54	54	46	47	25	102	47	149	G 1
ALPHA1 L 15-60	130	88	72	54	54	46	47	25	102	47	149	G 1
ALPHA1 L 15-65	130	88	72	54	54	46	47	25	102	47	149	G 1
ALPHA1 L 20-40	130	88	72	54	54	46	47	25	102	47	149	G 1 1/4
ALPHA1 L 20-60	130	88	72	54	54	46	47	25	102	47	149	G 1 1/4
ALPHA1 L 25-40	130	88	72	54	54	46	47	25	102	47	149	G 1 1/2
ALPHA1 L 25-40	180	88	72	54	54	46	46	25	102	47	149	G 1 1/2
ALPHA1 L 25-60	130	88	72	54	54	46	47	25	102	47	149	G 1 1/2
ALPHA1 L 25-60	180	88	72	54	54	46	46	25	102	47	149	G 1 1/2
ALPHA1 L 25-80	180	88	72	54	54	46	46	25	102	47	149	G 1 1/2
ALPHA1 L 32-40	180	88	72	54	54	46	48	26	102	47	149	G 2
ALPHA1 L 32-60	180	88	72	54	54	46	48	26	102	47	149	G 2
ALPHA1 L 32-80	180	88	72	54	54	46	48	26	102	47	149	G 2

### 10.3 Dimensions, ALPHA1 L 25-65



ALPHA1 L 25-65

Pump type	Dimensions [mm]											
	L	L3	L4	B1	B2	B3	B4	H1	H2	H3	H4	G
ALPHA1 L 25-65	130	89	45	54	54	72	47	25	102	47	149	G 1 1/2

## 11. Performance curves

### 11.1 Guide to performance curves

Each pump has its own performance curve.

A power curve, P1, belongs to each performance curve. The power curve shows the pump power consumption in watt at a given performance.

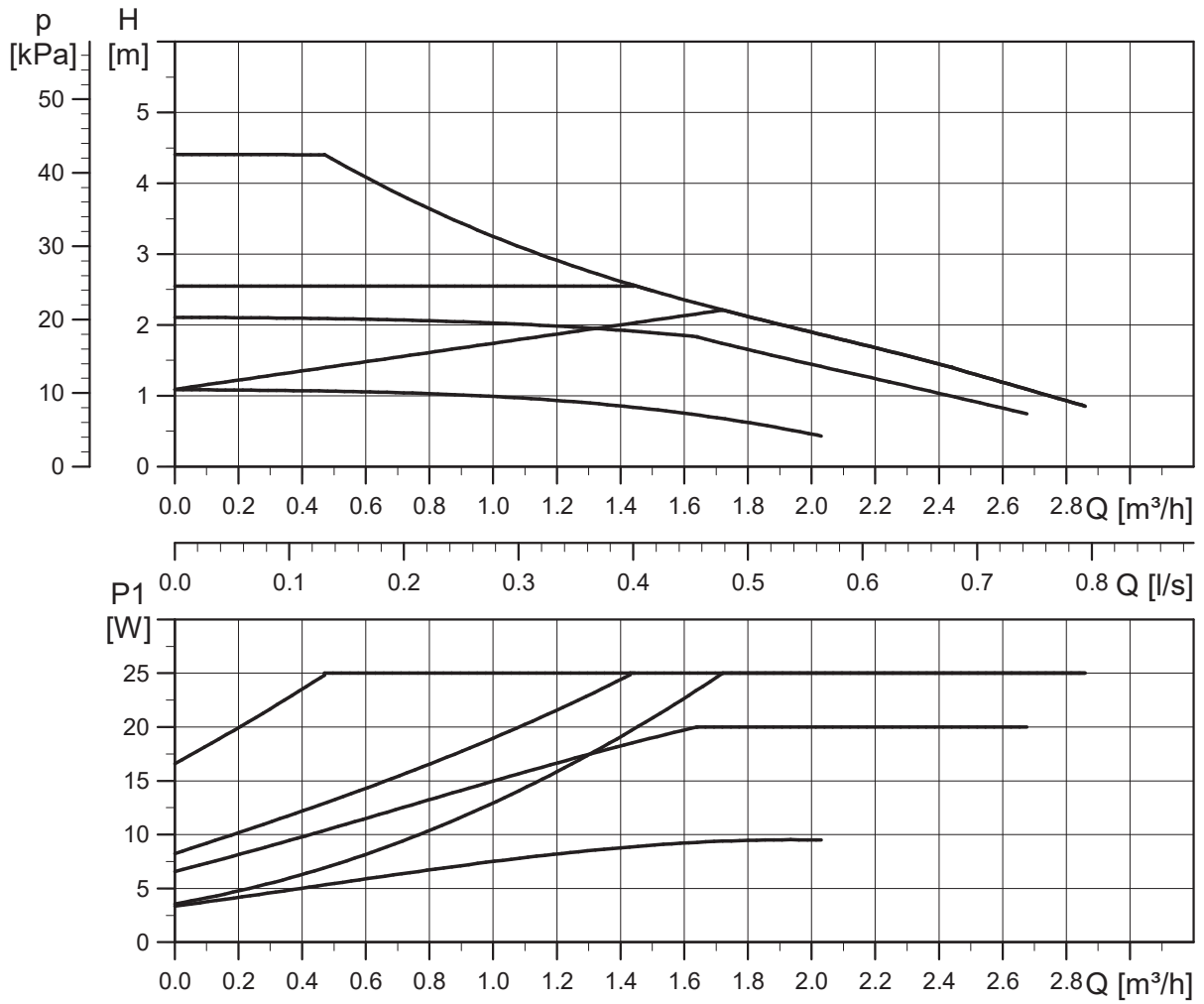
### 11.2 Curve conditions

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

- Test liquid: airless water.
- The curves apply to a density of  $\rho = 983.2 \text{ kg/m}^3$  and a liquid temperature of  $60 \text{ }^\circ\text{C}$ .
- 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 apply to a kinematic viscosity of  $\nu = 0.474 \text{ mm}^2/\text{s}$  (0.474 cSt).
- The EEI values obtained according to EN 16297 part 3.



11.3 Performance curves, ALPHA1 L XX-40

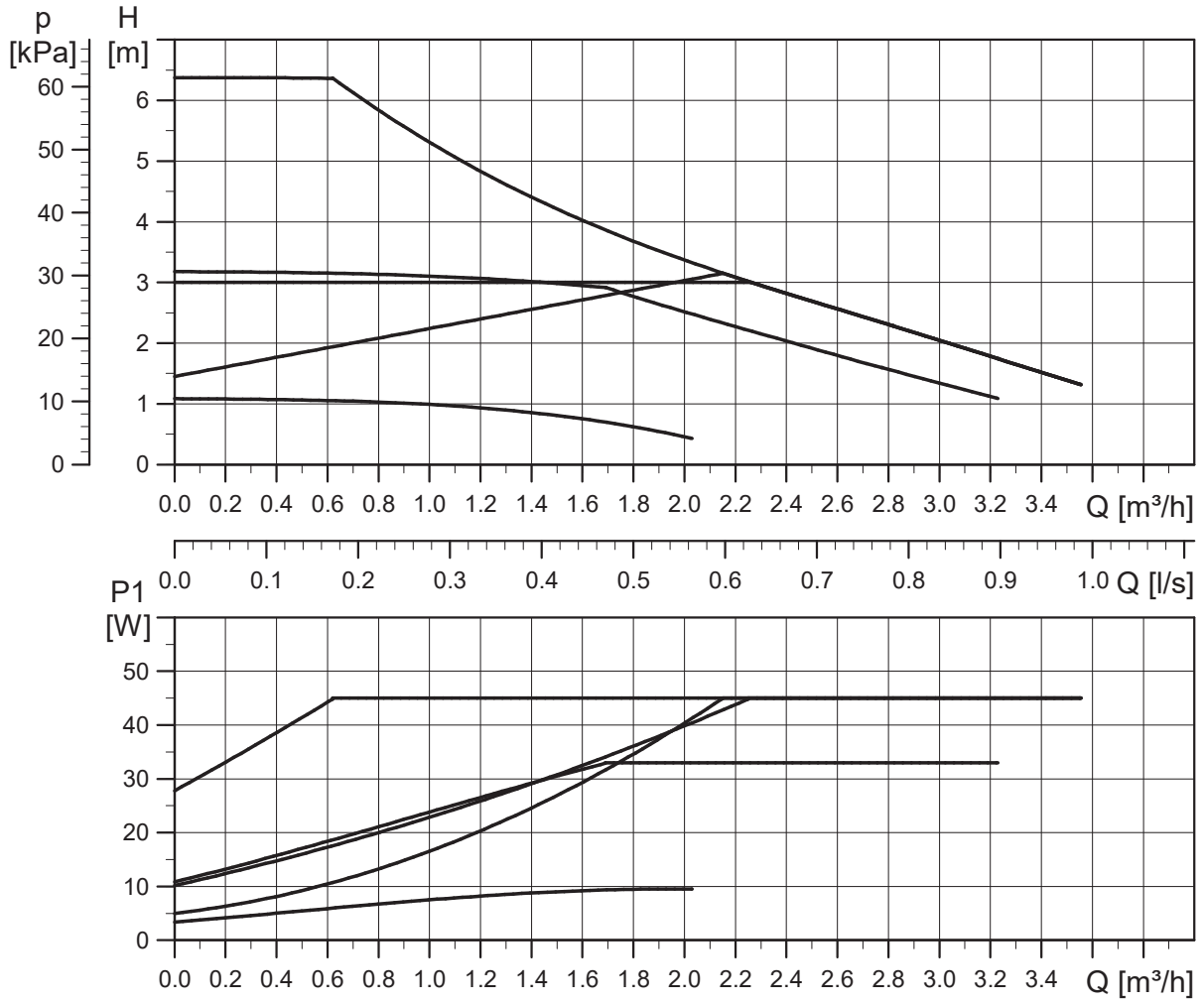


TM070797

ALPHA1 L XX-40

Setting	P1 [W]	I <sub>1</sub> [A]
Min.	4	0.05
Max.	25	0.26

11.4 Performance curves, ALPHA1 L XX-60

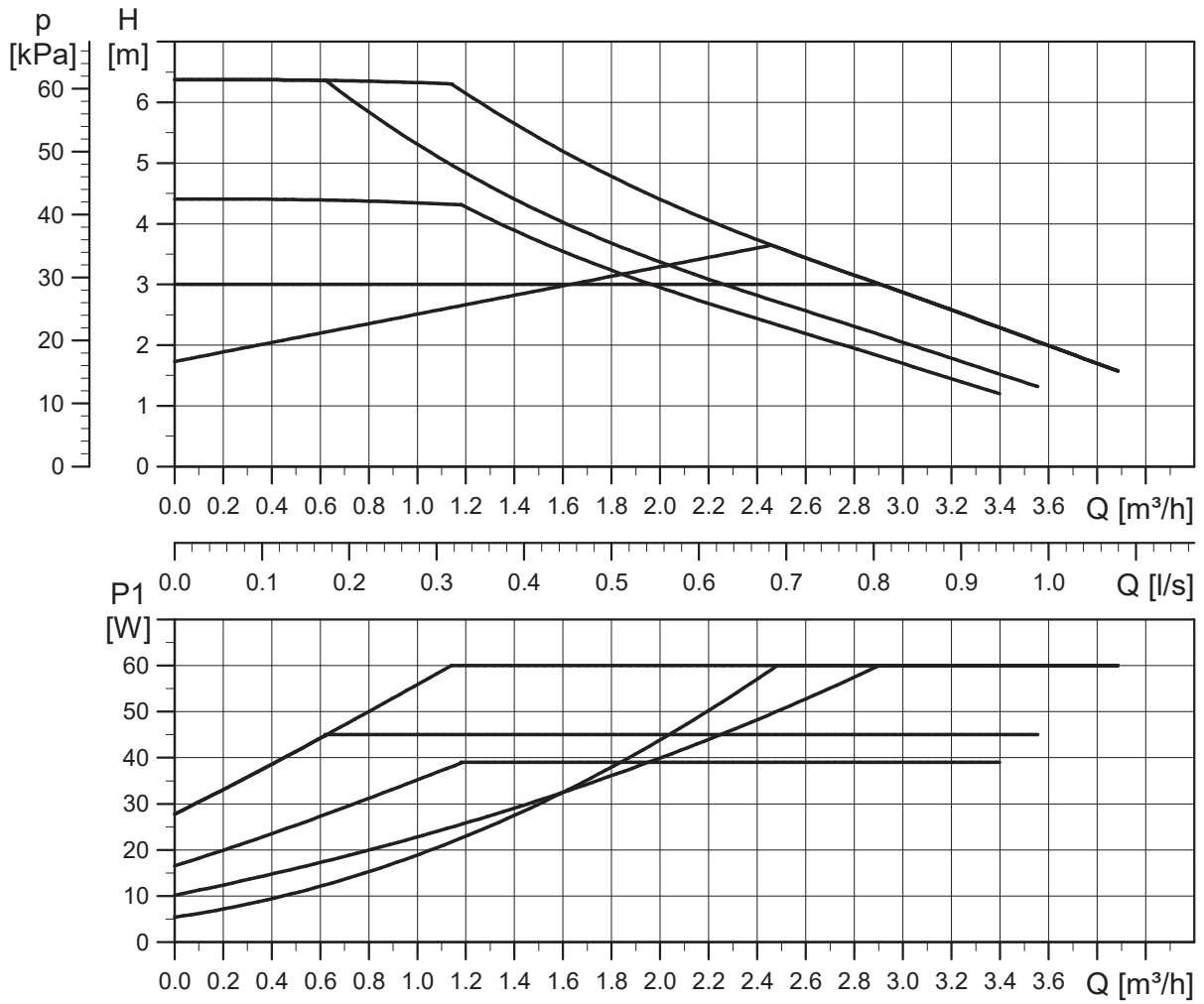


TM070798

ALPHA1 L XX-60

Setting	P1 [W]	I <sub>1</sub> [A]
Min.	4	0.05
Max.	45	0.42

11.5 Performance curves, ALPHA1 L XX-65

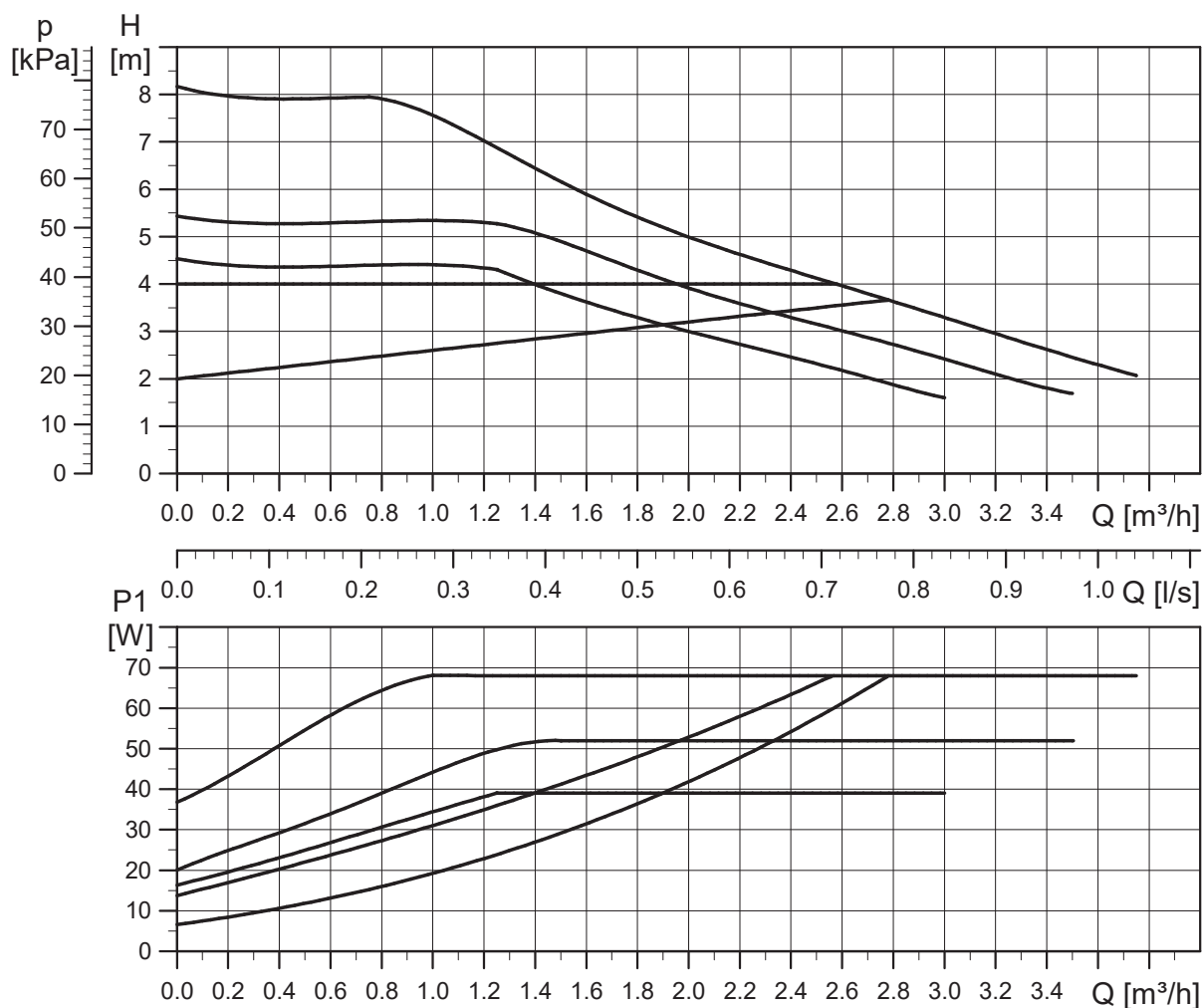


TM070799

ALPHA1 L XX-65

Setting	P1 [W]	I <sub>1</sub> [A]
Min.	4	0.05
Max.	60	0.52

## 11.6 Performance curves, ALPHA1 L XX-80



TM080226

ALPHA1 L XX-80

Setting	P1 [W]	I <sub>1</sub> [A]
Min.	4	0.05
Max.	68	0.61

## 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.



The crossed-out wheellie bin symbol on a product means that it must be disposed of separately from household waste. When a product marked with this symbol reaches its end of life, take it to a collection point designated by the local waste disposal authorities. The separate collection and recycling of such products will help protect the environment and human health.

See also end-of-life information at [www.grundfos.com/product-recycling](http://www.grundfos.com/product-recycling).

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