ALPHA2 / ALPHA3
ALPHA SOLAR

Installation and operating instructions

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GRUNDFOS

Original installation and operating instructions

These installation and operating instructions describe ALPHA2, ALPHA3 and ALPHA SOLAR.

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

Sections 6-17 give important information about the product, as well as information on service, fault finding and disposal of the product.

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1. General information

1.1 Target group

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.

1.2 Symbols used in this document

1.2.1 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.

1.2.2 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:

- ALPHA2, ALPHA3 or ALPHA SOLAR pump
- ALPHA plug
- insulating shells
- two gaskets
- quick guide.

ALPHA SOLAR is delivered without insulating shells but with a plug designed for ALPHA SOLAR.

3. Installing the product

3.1 Mechanical installation

3.1.1 Mounting the product

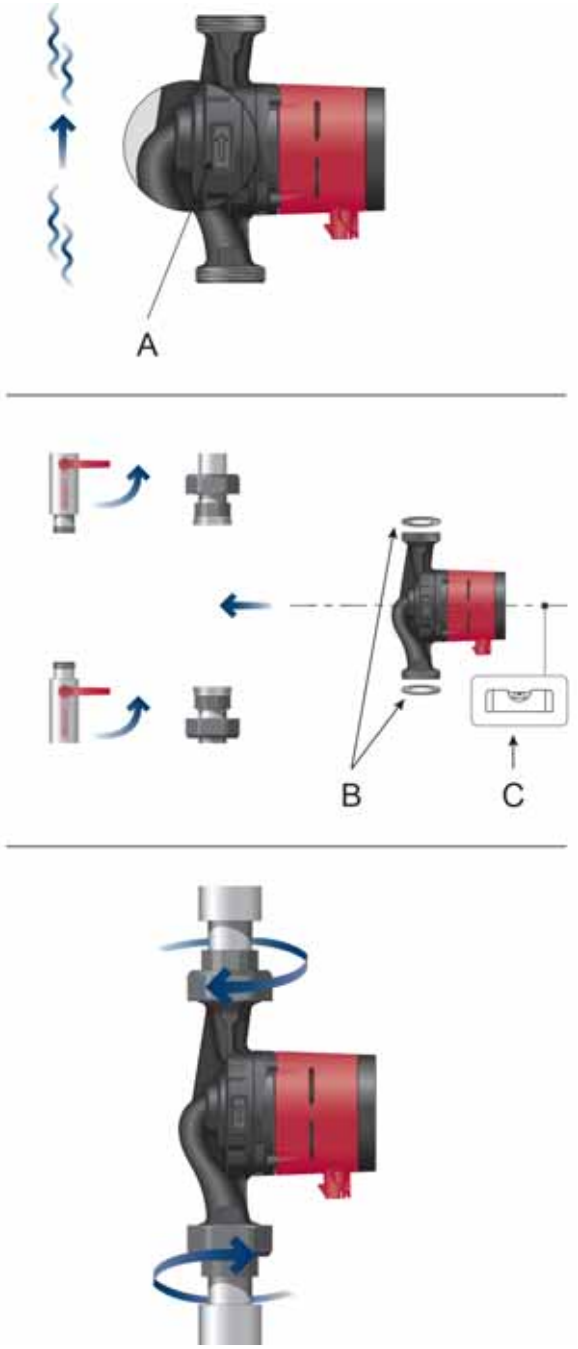

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Fig. 1 Mounting ALPHA2 or ALPHA3

The arrows on the pump housing indicate the flow direction through the pump. See fig. 1, pos. A.

See section *10.2 Dimensions, ALPHA2 and ALPHA3, XX-40, XX-50, XX-60, XX-80* or section *10.3 Dimensions, ALPHA2 and ALPHA3, 25-40 A, 25-60 A*.

1. Fit the two gaskets when you mount the pump in the pipe. See fig. 1, pos. B.
2. Install the pump with a horizontal motor shaft. See fig. 1, pos. C. See also section *3.2 Control box positions, ALPHA2, ALPHA3*.
3. Tighten the fittings.

3.2 Control box positions, ALPHA2, ALPHA3

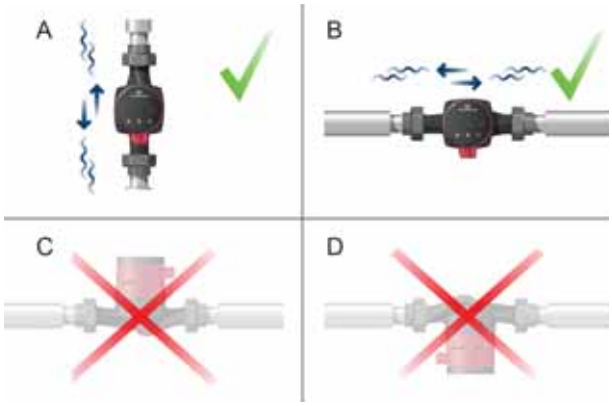

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Fig. 2 Control box positions

Always install the pump with a horizontal motor shaft.

- Pump installed correctly in a vertical pipe. See fig. 2, pos. A.
- Pump installed correctly in a horizontal pipe. See fig. 2, pos. B.
- Do not install the pump with a vertical motor shaft. See fig. 2, pos. C and D.

3.2.1 Positioning of the control box in heating and domestic hot-water systems

You can position the control box in position 3, 6 and 9 o'clock. See fig. 3.

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Fig. 3 Control box positions, heating and domestic hot-water systems

3.2.2 Positioning the control box in air-conditioning and cold-water systems

Position the control box with the plug pointing downwards. See fig. 4.

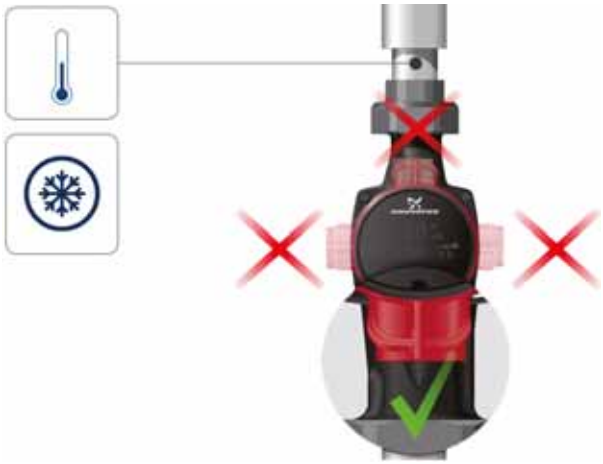


Fig. 4 Control box position, air-conditioning and cold-water systems

3.2.3 Changing the control box position

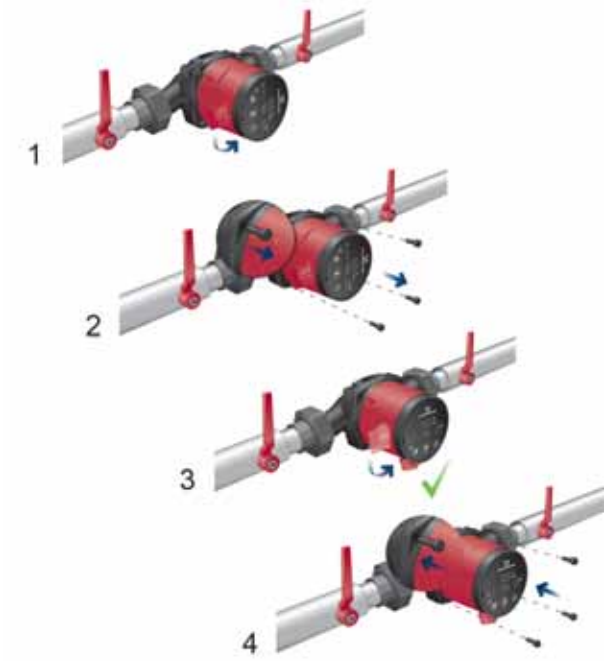


Fig. 5 Changing the control box position

You can turn the control box in steps of 90 °.

CAUTION

Hot surface

Minor or moderate personal injury.

- Position the pump so that persons cannot accidentally come into contact with hot surfaces.

CAUTION

Pressurised system

Minor or moderate personal injury.

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

If you change the position of the control box, fill the system with the liquid to be pumped or open the isolating valves.

1. Remove the four screws.
2. Turn the pump head to the desired position.
3. Insert and cross-tighten the screws.

3.3 Control box positions, ALPHA SOLAR

Fig. 6 Control box positions, ALPHA SOLAR

Always install the pump with horizontal motor shaft. Position the control box in position 9 o'clock. See fig. 7.

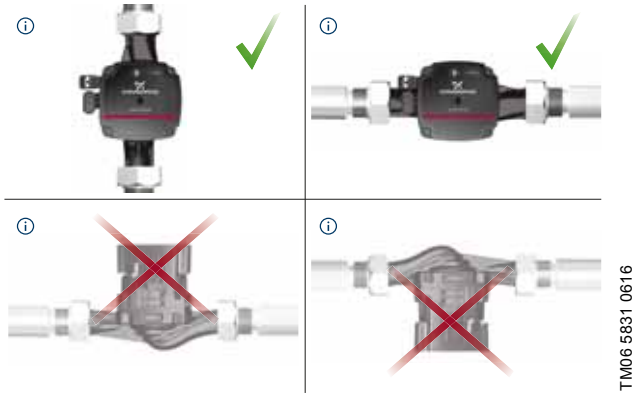


Fig. 7 Position of the ALPHA SOLAR control box

You can turn the control box in steps of 90 °.

3.4 Insulating the pump housing

Fig. 8 Insulating the pump housing

You can reduce the heat loss from the ALPHA2 or ALPHA3 pump by insulating the pump housing with the insulating shells supplied with the pump. See fig. 8.

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.

DANGER

Electric shock

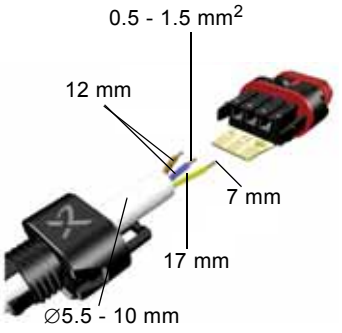
Death or serious personal injury

- If national legislation requires a Residual Current Device (RCD) or equivalent in the electrical installation, or if the pump is connected to an electric installation where an RCD is used as an additional protection, this must be type A or better, due to the nature of the pulsating DC leakage current. The RCD must be marked with the symbol shown below;

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 plug

Step	Action	Illustration
1	Fit the cable gland and plug cover to the cable. Strip the cable conductors as illustrated.	 TM05 5538 3812
2	Connect the cable conductors to the power supply plug.	 TM05 5539 3812
3	Bend the cable with the cable conductors pointing upwards.	 TM05 5540 3812
4	Pull out the conductor guide plate and throw it away.	 TM05 5541 3812
5	Click the plug cover onto the power supply plug.	 TM05 5542 3812

Step	Action	Illustration
6	Screw the cable gland onto the power supply plug.	 TM05 5543 3812
7	Insert the power supply plug into the male plug in the pump control box.	 TM05 3058 0912

4.2 Dismantling the plug

Step	Action	Illustration
1	Loosen the cable gland and remove it from the plug.	 TM05 5545 3812
2	Pull off the plug cover while pressing on both sides.	 TM05 5546 3812
3	Add the conductor guide plate to loosen all three cable conductors at the same time. If the guide plate is missing, then loosen the cable conductors one by one by pressing a screwdriver gently into the terminal clip.	 TM05 5547 3812
4	The plug has now been removed from the power supply plug.	 TM05 5548 3812

4.3 Electrical installation, ALPHA SOLAR

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Fig. 9 Control box connections

4.4 Power supply connection, ALPHA SOLAR

Connect the pump to the power supply with the Superseal power connector.

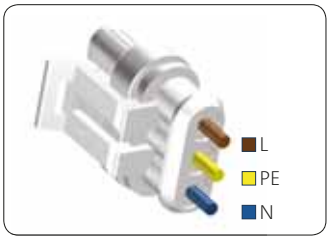

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Fig. 10 Superseal power connector

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.

DANGER

Electric shock

Death or serious personal injury

- If national legislation requires a Residual Current Device (RCD) or equivalent in the electrical installation, or if the pump is connected to an electric installation where an RCD is used as an additional protection, this must be type A or better, due to the nature of the pulsating DC leakage current. The RCD must be marked with the symbol shown below;

4.5 Control signal connection, ALPHA SOLAR

If you do not need the signal connection, cover it with a blanking plug. See fig. 9.

You can control the pump with a low-voltage PWM (pulse-width modulation) signal.

The PWM signal is a method for generating an analog signal using a digital source.

The control signal connection has three conductors: signal input, signal output and signal reference. See fig. 11. Connect the cable to the control box with a Mini Superseal plug. The signal cable can be supplied with the pump as an accessory.

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Fig. 11 Mini Superseal plug

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*. For instructions on how to vent the system, see sections *5.3 Venting the pump* and *5.4 Venting the heating system*.

5.2 First startup

After installing the product, see section *3. Installing the product*, turn on the power supply. The light in the control panel shows that the power supply has been switched on. See fig. 12.

The pump is factory set to $AUTO_{ADAPT}$.

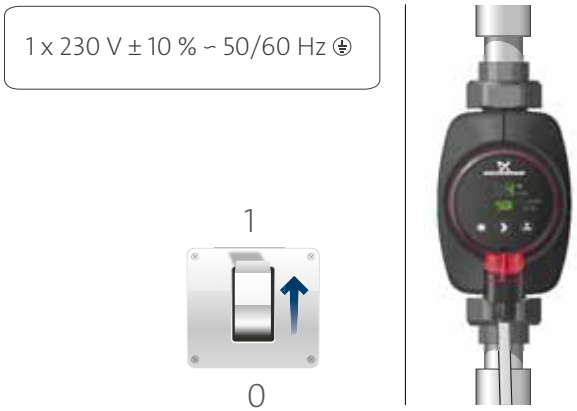

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Fig. 12 Starting up the pump

5.3 Venting the pump

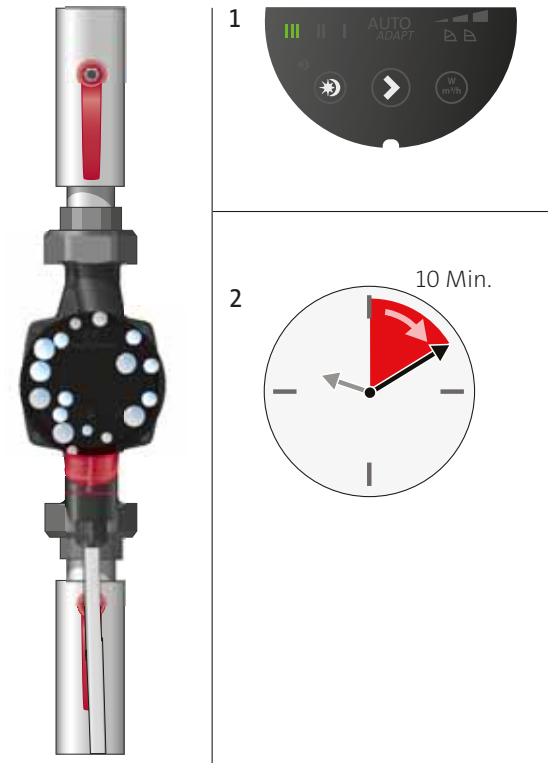

Fig. 13 Venting the pump

The pump is self-venting through the system. You do not have to vent the pump before startup.

Air in the pump may cause noise. This noise ceases when the pump has run for a few minutes.

You obtain quick venting of the pump by setting the pump to speed III for a short period. How fast the pump is vented depends on the system size and design.

When you have vented the pump, i.e. when the noise has ceased, set the pump according to the recommendations. See section *7. Control functions*.

The pump must not run dry.

You cannot vent the system through the pump. See section *5.4 Venting the heating system*.

5.4 Venting the heating system

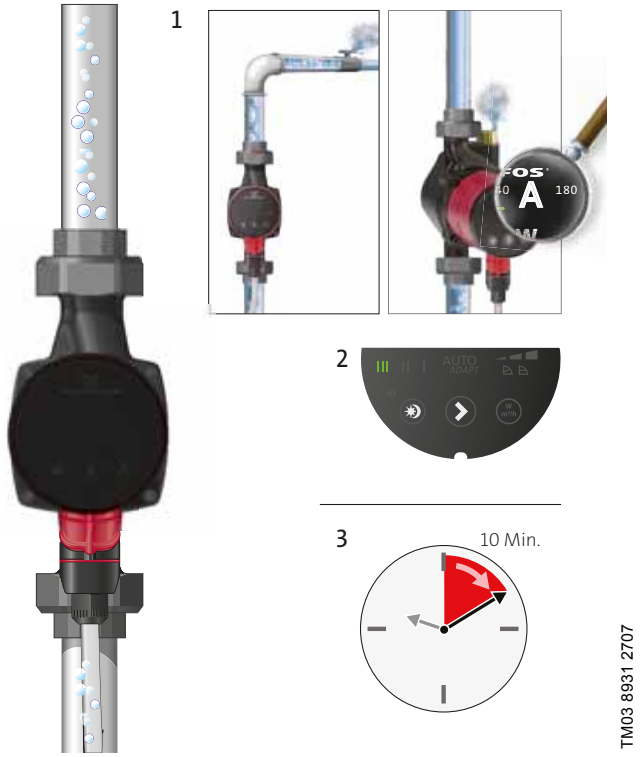

Fig. 14 Venting of the heating system

Vent the heating system as follows:

- via a vent valve installed above the pump (1)
- via a pump housing with air separator (2).

In heating systems that often contain much air, we recommend that you install pumps with pump housing with air separator, i.e. ALPHA2 or ALPHA3 XX-XX A.

When the heating system has been filled with liquid, do as follows:

1. Open the vent valve.
2. Set the pump to speed III.
3. Let the pump run for a short period
4. Set the pump according to the recommendations. See section *7. Control functions*.

Repeat the procedure, if necessary.

The pump must not run dry.

6. Product introduction

6.1 Product description

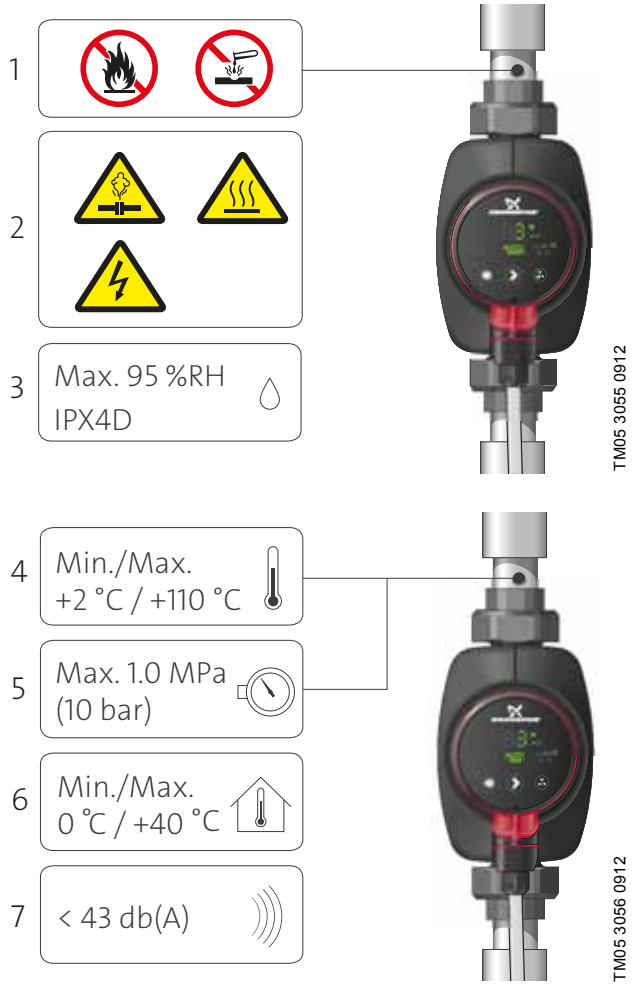

Fig. 15 Pumped liquids, warnings and operating conditions

ALPHA2 and ALPHA3 are a complete range of circulator pumps.

6.1.1 Model type

These installation and operating instructions cover ALPHA2 model B, C, D and E, and ALPHA3 model A. The model type is stated on the packaging and nameplate. See figs 16 and 17.

Fig. 16 Model type on the packaging

Fig. 17 Model type on the nameplate

The table below shows the ALPHA2 and APLHA3 models with built-in functions and features.

Functions/features	ALPHA2 model B	ALPHA2 model C	ALPHA2 model D	ALPHA2 model E	ALPHA3 model A
Starts from	PC 12xx*	PC 14xx*	PC 15xx*	PC 17xx*	PC 15xx*
$AUTO_{ADAPT}$	●	●	●	●	●
Proportional pressure	●	●	●	●	●
Constant pressure	●	●	●	●	●
Constant curve	●	●	●	●	●
Automatic night setback	●	●	●	●	●
Manual summer mode		●	●	●	●
Dry-running protection			●	●	●
ALPHA Reader compatible				●	●
High-torque start			●	●	●
ALPHA2/3XX-40	●	●	●	●	●
ALPHA2/3XX-50**	●	●	●	●	●
ALPHA2/3XX-60	●	●	●	●	●
ALPHA2/3XX-80		●	●	●	●

* Production code (Year-Week).

** Not available in all countries.

6.2 Applications

The ALPHA2 and ALPHA3 circulator pumps are designed for the circulation of water in heating systems, domestic hot-water systems as well as air-conditioning and cold-water systems.

Cold-water systems are defined as systems where the ambient temperature is higher than the temperature of the pumped liquid.

ALPHA2 and ALPHA3 are the best choices for the following systems:

- underfloor heating systems
- one-pipe systems
- two-pipe systems.

ALPHA2 and ALPHA3 are suitable for the following:

- Systems with constant or variable flow rates where you want to optimise the setting of the pump duty point.
- Systems with variable flow-pipe temperature.
- Systems where you want automatic night setback.
- Balancing of domestic heating systems.

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 the following liquids:

- Thin, clean, non-aggressive and non-explosive liquids, not containing solid particles or fibres.
- Cooling liquids, not containing mineral oil.
- Domestic hot water
  Maximum: 14 °dH
  Maximum: 65 °C
  Maximum peak: 70 °C.
  For water with a higher degree of hardness, we recommend that you use a direct-coupled TPE pump.
- Softened water.

The kinematic viscosity of water is 1 mm^2/s (1 cSt) at 20 °C. If the pump is used for a liquid with a higher viscosity, the hydraulic performance of the pump will be reduced.

Example: 50 % glycol at 20 °C means a viscosity of approx. 10 mm^2/s (10 cSt) and a reduction of the pump performance by approx. 15 %.

Do not use additives that can or will disturb the functionality of the pump.

When selecting a pump, take the viscosity of the pumped liquid into consideration.

For more information about the pumped liquids, warnings and operating conditions, see fig. 15.

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

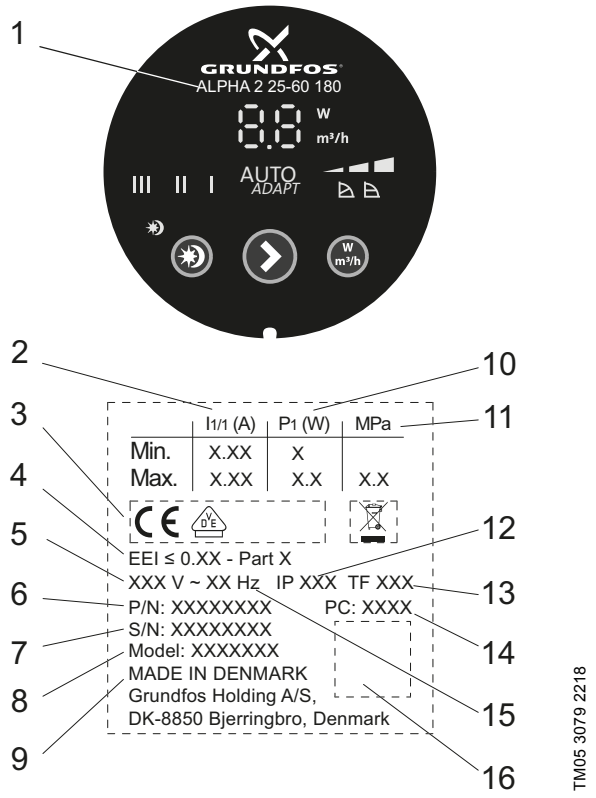

Fig. 18 Nameplate

Pos.	Description
1	Pump type
2	Rated current [A]: • Min.: Minimum current [A] • Max.: Maximum current [A]
3	CE mark and approvals
4	EEI: Energy Efficiency Index Part, according to EEI
5	Voltage [V]
6	Product number
7	Serial number
8	Model
9	Country of origin
10	Input power P1 [W]: • Min.: Minimum input power P1 [W] • Max.: Maximum input power P1 [W]
11	Maximum system pressure [MPa]
12	Enclosure class
13	Temperature class
14	Production code: • 1st and 2nd figures: year • 3rd and 4th figures: week
15	Frequency [Hz]
16	Data matrix code

6.4.2 Type key

Example	ALPHA2/3	25	-40	N	180

Pump type
[ ]: Standard version

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

Fig. 19 Control panel

Pos.	Description
1	Display showing the actual power consumption in watt or the actual flow rate in m^3/h.
2	Nine light fields indicating the pump setting. See section *7.3 Light fields indicating the pump setting*.
3	Light field indicating the status of automatic night setback.
4	Button for enabling or disabling of automatic night setback and manual summer mode.
5	Button for selection of pump setting.
6	Button for selection of parameter to be shown in the display, i.e. actual power consumption in watt or actual flow rate in m^3/h.
7	Connectivity symbol.

7.2 Display

The display (1) is on when you have switched on the power supply.

The display shows the actual pump power consumption in watt or the actual flow rate in m^3/h in steps of 0.1 m^3/h during operation.

Faults preventing the pump from operating properly, for example a blocked rotor, are indicated in the display by fault codes. See section *9. Fault finding the product*.

If a fault is indicated, correct the fault and reset the pump by switching the power supply off and on.

If the pump impeller is rotated, for example when filling the pump with water, sufficient energy can be generated to light up the display even if the power supply has been switched off.

7.3 Light fields indicating the pump setting

The pump has ten performance settings which you can select with the button (5). See fig. 19.

The pump setting is indicated by nine light fields in the display. See fig. 20.

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Fig. 20 Nine light fields

Button presses	Active light fields	Description
0	factory setting AUTO ADAPT	AUTO$_{ADAPT}$
1		Lowest proportional-pressure curve, PP1
2		Intermediate proportional-pressure curve, PP2
3		Highest proportional-pressure curve, PP3
4		Lowest constant-pressure curve, CP1
5		Intermediate constant-pressure curve, CP2
6		Highest constant-pressure curve, CP3
7	III	Constant curve/constant speed III
8	II	Constant curve/constant speed II
9	I	Constant curve/constant speed I
10	AUTO ADAPT	AUTO$_{ADAPT}$

For information about the function of the settings, see section *7.7 Control modes*.

7.4 Light field indicating the status of automatic night setback

Light in shows that automatic night setback is active. See fig. 19, pos. 3. See also section *7.5 Button for enabling or disabling of automatic night setback*.

7.5 Button for enabling or disabling of automatic night setback

The button enables and disables automatic night setback. See fig. 19, pos. 4.

Automatic night setback is only relevant for heating systems prepared for this function. See section *9. Fault finding the product*.

The light field is on when automatic night setback is active. See fig. 19, pos. 3.

Factory setting: automatic night setback is not active.

If you have set the pump to speed I, II or III, you cannot select automatic night setback.

7.6 Button for selection of pump setting

Every time you press the button , the pump setting is changed. See fig. 19, pos. 5.

A cycle is ten button presses. See section *7.3 Light fields indicating the pump setting*.

7.7 Control modes

7.7.1 Pump setting for two-pipe heating systems

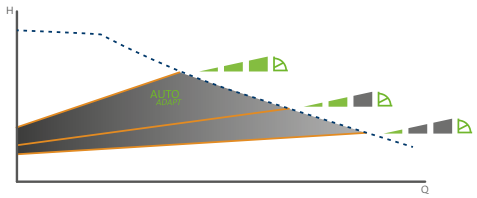

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Fig. 21 Selection of pump setting for system type

Factory setting: AUTO$_{ADAPT}$.

Recommended and alternative pump settings according to fig. 21:

Heating system	Pump setting	
	Recommended	Alternative
Two-pipe system	AUTO$_{ADAPT}$*	Proportional-pressure curve, PP1, PP2 or PP3*

* See section *11.1 Guide to performance curves*.

AUTO$_{ADAPT}$

The AUTO$_{ADAPT}$ function adjusts the pump performance to the actual heat demand in the system. As the performance is adjusted gradually, we recommend that you leave the pump in the AUTO$_{ADAPT}$ mode at least one week before changing the pump setting.

If the power supply fails or is disconnected, the pump stores the AUTO$_{ADAPT}$ setting in an internal memory and resumes the automatic adjustment when the power supply has been restored.

Proportional-pressure curve, PP1, PP2 or PP3

Proportional-pressure control adjusts the pump performance to the actual heat demand in the system, but the pump performance follows the selected performance curve, PP1, PP2 or PP3. See fig. 22 where PP2 has been selected. For further information, see section *11.1 Guide to performance curves*.

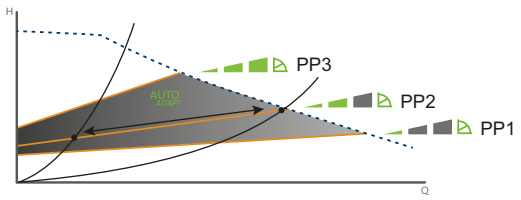

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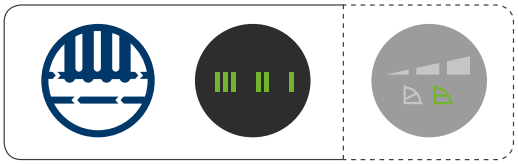
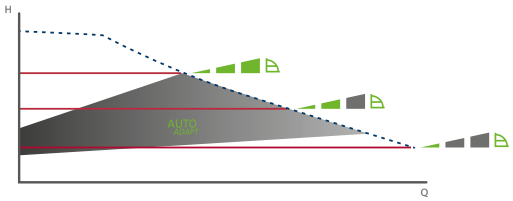
Fig. 22 Three proportional-pressure curves/settings

The selection of the proportional-pressure setting depends on the characteristics of the heating system and the actual heat demand.

7.7.2 Pump setting for one-pipe heating systems





TM05 3065 0912

Fig. 23 Selection of pump setting for system type

Factory setting: AUTO$_{ADAPT}$.

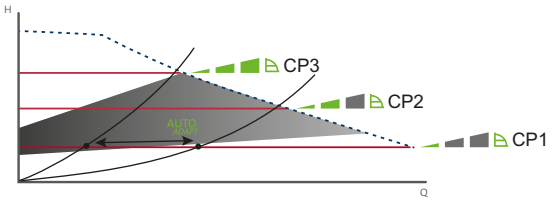
Recommended and alternative pump settings according to fig. 23:

Heating system	Pump setting	
	Recommended	Alternative
One-pipe system	Constant curve/constant speed, I, II or III*	Constant-pressure curve CP1, CP2 or CP3*

* See section *11.1 Guide to performance curves*.

Constant-pressure curve, CP1, CP2 or CP3

Constant-pressure control adjusts the pump performance to the actual heat demand in the system, but the pump performance follows the selected performance curve, CP1, CP2 or CP3. See fig. 24 where CP1 has been selected. For further information, see section *11.1 Guide to performance curves*.

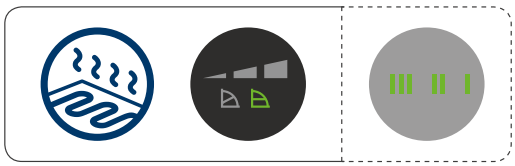


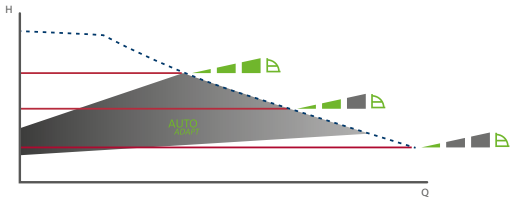
TM05 3066 0912

Fig. 24 Three constant-pressure curves and settings

The selection of the constant-pressure setting depends on the characteristics of the heating system and the actual heat demand.

7.7.3 Pump setting for underfloor heating systems





TM05 3067 0912

Fig. 25 Selection of pump setting for system type

Factory setting: $AUTO_{ADAPT}$.

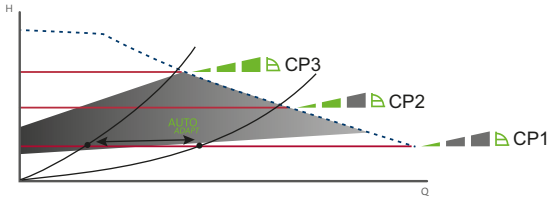
Recommended and alternative pump settings according to fig. 25:

System type	Pump setting	
	Recommended	Alternative
Underfloor heating	Constant-pressure curve, CP1, CP2 or CP3*	Constant curve/constant speed, I, II or III

* See section *11.1 Guide to performance curves*.

Constant-pressure curve, CP1, CP2 or CP3

The constant-pressure control adjusts the flow rate to the actual heat demand in the system keeping a constant pressure at the same time. The pump performance follows the selected performance curve, CP1, CP2 or CP3. See fig. 26 where CP1 has been selected. For further information, see section *11.1 Guide to performance curves*.

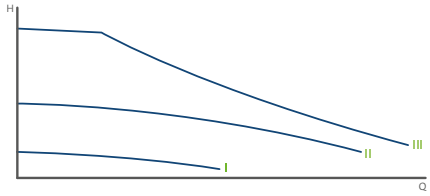


TM05 3066 0912

Fig. 26 Three constant-pressure curves or settings

The selection of the constant-pressure setting depends on the characteristics of the heating system and the actual heat demand.

7.7.4 Pump setting for domestic hot-water systems



TM05 3068 0912

Fig. 27 Selection of pump setting for system type

Factory setting: $AUTO_{ADAPT}$.

Recommended and alternative pump settings according to fig. 27:

System type	Pump setting	
	Recommended	Alternative
Domestic hot water	Constant curve/constant speed, I, II or III	Constant-pressure curve, CP1, CP2 or CP3*

* See section *11.1 Guide to performance curves*.

Constant curve/constant speed, I, II or III

At constant-curve/constant-speed operation, the pump runs at a constant speed, independently of the actual flow rate demand in the system. The pump performance follows the selected performance curve, I, II or III. See fig. 28 where II has been selected. For further information, see section *11.1 Guide to performance curves*.

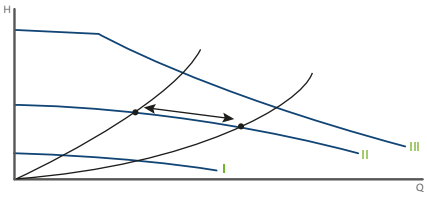


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Fig. 28 Three constant curve/constant speed settings

The selection of the constant-curve/constant-speed setting depends on the characteristics of the heating system and the number of taps likely to be opened at the same time.

7.7.5 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.

7.8 Pump performance

Relation between pump setting and pump performance.

Figure 29 shows the relation between pump setting and pump performance by means of curves. See also section *11. Performance curves*.

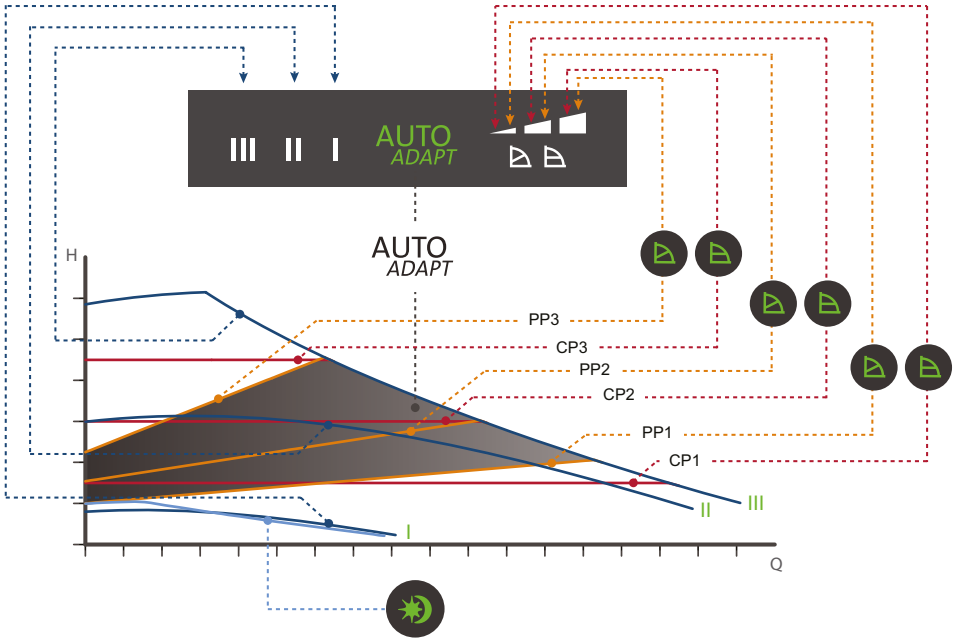

Fig. 29 Pump setting in relation to pump performance

Setting	Pump curve	Function
AUTO$_{ADAPT}$ factory setting	Highest to lowest proportional-pressure curve	The AUTO$_{ADAPT}$ function enables the pump to control the pump performance automatically within a defined performance range. See fig. 29. • Adjusting the pump performance to the size of the system. • Adjusting the pump performance to the variations in load over time. In AUTO$_{ADAPT}$, the pump is set to proportional-pressure control.
PP1	Lowest proportional-pressure curve	The duty point of the pump will move up or down on the lowest proportional-pressure curve, depending on the heat demand. See fig. 29. The head is reduced at falling heat demand and increased at rising heat demand.
PP2	Intermediate proportional-pressure curve	The duty point of the pump will move up or down on the intermediate proportional-pressure curve, depending on the heat demand. See fig. 29. The head is reduced at falling heat demand and increased at rising heat demand.
PP3	Highest proportional-pressure curve	The duty point of the pump will move up or down on the highest proportional-pressure curve, depending on the heat demand. See fig. 29. The head is reduced at falling heat demand and increased at rising heat demand.
CP1	Lowest constant-pressure curve	The duty point of the pump will move out or in on the lowest constant-pressure curve, depending on the heat demand in the system. See fig. 29. The head is kept constant, irrespective of the heat demand.
CP2	Intermediate constant-pressure curve	The duty point of the pump will move out or in on the intermediate constant-pressure curve, depending on the heat demand in the system. See fig. 29. The head is kept constant, irrespective of the heat demand.
CP3	Highest constant-pressure curve	The duty point of the pump will move out or in on the highest constant-pressure curve, depending on the heat demand in the system. See fig. 29. The head is kept constant, irrespective of the heat demand.
III	Speed III	The pump runs on a constant curve which means that it runs at a constant speed. In speed III, the pump is set to run on the maximum curve under all operating conditions. See fig. 29. You obtain quick venting of the pump by setting the pump to speed III for a short period. See section *5.3 Venting the pump*.
II	Speed II	The pump runs on a constant curve which means that it runs at a constant speed. In speed II, the pump is set to run on the intermediate curve under all operating conditions. See fig. 29.
I	Speed I	The pump runs on a constant curve which means that it runs at a constant speed. In speed I, the pump is set to run on the minimum curve under all operating conditions. See fig. 29.
	Automatic night setback or manual summer mode	The pump changes to the curve for automatic night setback, i.e. absolute minimum performance and power consumption, provided that certain conditions are met. In manual summer mode, the pump is stopped to save energy and only the electronics are running. To avoid lime precipitation and blocking of the pump, the pump is started frequently in a short period. See section *9. Fault finding the product*.

7.9 Bypass valve

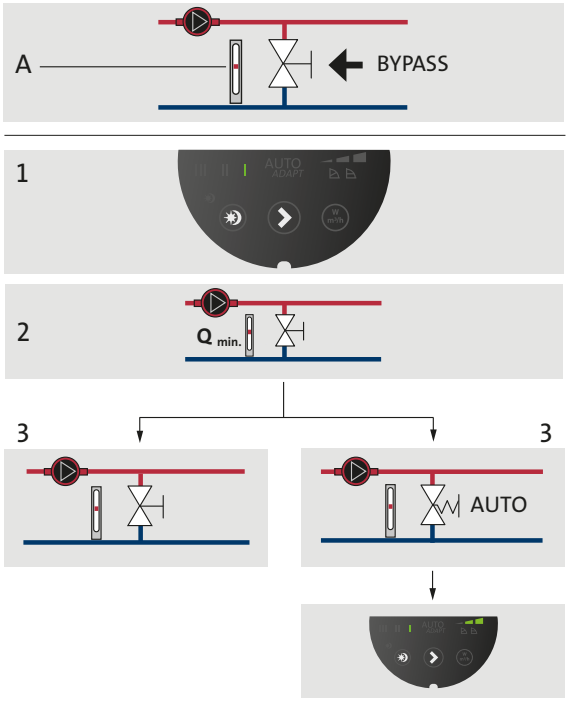

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Fig. 30 Systems with bypass valve

The purpose of the bypass valve is to ensure that the heat from the boiler can be distributed when all valves in the underfloor-heating circuits and/or thermostatic radiator valves are closed.

System elements:

- bypass valve
- flowmeter, pos. A.

The minimum flow must be available when all valves are closed.

The pump setting depends on the type of bypass valve used, i.e. manually operated or thermostatically controlled.

7.9.1 Setting the bypass valve

Manually operated

1. Adjust the bypass valve with the pump in setting I (speed I).
2. Observe the minimum flow rate of the system. See the manufacturer's instructions.
3. After setting the bypass valve, set the pump according to *7. Control functions*.

Automatically operated, thermostatically controlled

1. Adjust the bypass valve with the pump in setting I (speed I).
2. Observe the minimum flow rate for the system. Consult the manufacturer's instructions.

After adjusting the bypass valve, set the pump to the lowest or highest constant-pressure curve. For further information about pump settings in relation to performance curves, see section *9. Fault finding the product*.

8. Operating the product

8.1 Using automatic night setback

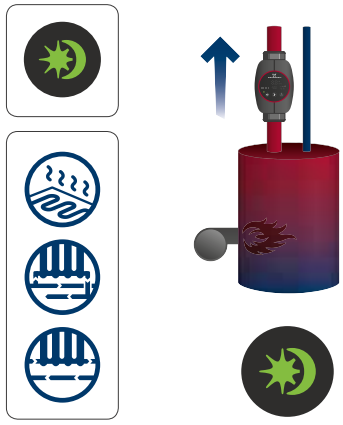

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Fig. 31 Automatic night setback activated

Do not use automatic night setback when the pump is installed in the return pipe of the heating system.

If you select speed I, II or III, automatic night setback is disabled.

You do not have to re-enable automatic night setback if the power supply has been switched off.

If the power supply is switched off when the pump is running on the curve for automatic night setback, the pump starts in normal operation. See section *9. Fault finding the product*.

The pump changes back to the curve for automatic night setback when the condition for automatic night setback is fulfilled again. See section *8.2 Function of automatic night setback*.

If there is insufficient heat in the heating system, check whether automatic night setback has been enabled. If yes, disable the function.

To ensure the optimum function of automatic night setback, the following conditions must be fulfilled:

- The pump must be installed in the flow pipe. See fig. 31.
- The boiler must incorporate automatic control of the liquid temperature.

Enable automatic night setback by pressing . See section *7.5 Button for enabling or disabling of automatic night setback*.

Light in means that automatic night setback is active.

8.2 Function of automatic night setback

Once you have enabled automatic night setback, the pump automatically changes between normal duty and automatic night setback. See section *9. Fault finding the product*.

Changeover between normal duty and automatic night setback depends on the flow-pipe temperature.

The pump automatically changes over to automatic night setback when a flow-pipe temperature drop of more than 10 to 15 °C within approx. two hours is registered. The temperature drop must be at least 0.1 °C/min.

Changeover to normal duty takes place without a time lag when the flow-pipe temperature has increased by approx. 10 °C.

8.3 Setting manual summer mode

Manual summer mode is available as from ALPHA2 model C and ALPHA3 model A.

In manual summer mode, the pump is stopped to save energy. To avoid lime precipitation and blocking of the pump, the pump is started frequently in a short period. This is an alternative to shutting down the pump if there is a risk of lime deposit.

There is a risk of lime deposit in case of a long standstill period.

In manual summer mode, the pump starts frequently at low speed to avoid blocking the rotor. The display is turned off.

If any alarms occur during manual summer mode, no alarms will be shown. When manual summer mode is deactivated again, only the actual alarms will be displayed.

If the automatic night setback mode is enabled before setting the manual summer mode, the pump will return to automatic night setback mode after manual summer mode.

8.3.1 Activating manual summer mode

Activate the manual summer mode by pressing the automatic night setback button 3 to 10 seconds. See fig. 31. The green light field flashes quickly. After a short while the display turns off and the green light field flashes slowly.

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Fig. 32 Automatic night setback button

8.3.2 Deactivating manual summer mode

Deactivate the manual summer mode by pressing any of the buttons. Then the pump returns to the previous mode and setting.

8.4 Dry-running protection

The dry-running protection protects the pump against dry running during start and normal operation. See section *9. Fault finding the product*.

During first startup and in case of dry-run, the pump will operate for 30 minutes before stopping. During this period the pump displays the error code "E4 - "- -"".

Dry-running protection is available as from ALPHA2 model D and ALPHA3 model A.

8.5 ALPHA Reader

The ALPHA Reader is compatible as from ALPHA2 model E and ALPHA3 model A only. A connectivity symbol on the pump indicates compatibility with the ALPHA Reader. See fig. 33.

The ALPHA Reader provides safe readout of internal data from the pump to an Android or iOS-based mobile device via Bluetooth. Together with the Grundfos GO Balance app the ALPHA Reader allows you to balance two-pipe radiators and underfloor heating systems in a fast and safe way. For further information, see section *12.4 ALPHA Reader*.

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Fig. 33 ALPHA Reader

8.5.1 Activating and deactivating the ALPHA Reader mode on the pump

1. Press [W/m^3/h] and hold it for 3 seconds.
2. ALPHA Reader is either activated or deactivated, depending on the previous state. When ALPHA Reader is active, the unit indicator in the display [W/m^3/h] flashes rapidly.

You can activate and deactivate the ALPHA Reader mode in all pump modes.

For further information on how to set the ALPHA Reader and perform hydronic balancing, see the ALPHA Reader documentation in Grundfos Product Center on www.grundfos.com.

8.6 High-torque start

If the shaft is blocked and you cannot start the pump, the display indicates the alarm "E1 - "- -"", with a delay of 20 minutes.

The pump attempts to restart until the pump is powered off.

During the start attempts, the pump vibrates due to the high-torque load.

High-torque start is available as from ALPHA2 model D and ALPHA3 model A.

9. Fault finding 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

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.

Fault	Control panel	Cause	Remedy
1. The pump does not run.	Light off.	a) A fuse in the installation is blown.	Replace the fuse.
		b) The current-operated or voltage-operated circuit breaker has tripped.	Cut in the circuit breaker.
		c) The pump is defective.	Replace the pump.
	Changes between "- -" and "E 1".	a) The rotor is blocked.	Remove the impurities.
	Changes between "- -" and "E 2".	a) Insufficient supply voltage.	Make sure that the supply voltage falls within the specified range.
	Changes between "- -" and "E 3".	a) Electrical fault.	Replace the pump.
	Changes between "- -" and "E 4".	a) Dry-running protection.	Make sure that there is sufficient liquid in the pipe system. Reset the warning by pressing any button or switch off the power supply.
2. Noise in the system.	No warning is indicated on the display.	a) Air in the system.	Vent the system. See section *5.4 Venting the heating system*.
		b) The flow rate is too high.	Reduce the suction head.
3. Noise in the pump.	No warning is indicated on the display.	a) Air in the pump.	Let the pump run. The pump vents itself over time. See section *5.3 Venting the pump*.
		b) The inlet pressure is too low.	Increase the inlet pressure, or make sure that the air volume in the expansion tank is sufficient, if installed.
4. Insufficient heat.	No warning is indicated on the display.	a) The pump performance is too low.	Increase the suction head.

10. Technical data

10.1 Data and operating conditions

Supply voltage	1 x 230 V ± 10 %, 50/60 Hz, PE	
Motor protection	The pump requires no external motor protection.	
Enclosure class	IPX4D	
Insulation class	F	
Relative humidity	Maximum 95 % RH	
System pressure	Maximum 1.0 MPa, 10 bar, 102 m head	
Inlet pressure	**Liquid temperature**	**Minimum inlet pressure**
	≤ 75 °C	0.005 MPa, 0.05 bar, 0.5 m head
	90 °C	0.028 MPa, 0.28 bar, 2.8 m head
	110 °C	0.108 MPa, 1.08 bar, 10.8 m head
EMC (electromagnetic compatibility)	EMC Directive (2014/30/EU). Standards used: EN 55014-1:2006/A1:2009/A2:2011, EN 55014-2:2015, EN 61000-3-2:2014 and EN 61000-3-3:2013.	
Sound pressure level	The sound pressure level of the pump is lower than 43 dB(A).	
Ambient temperature	0-40 °C	
Temperature class	TF110 to CEN 335-2-51	
Surface temperature	The maximum surface temperature will not exceed 125 °C.	
Liquid temperature	2-110 °C	
Power consumption in manual summer mode	< 0.8 watt	
Specific EEI values	ALPHA2/3 XX-40: EEI ≤ 0.15	
	ALPHA2/3 XX-50: EEI ≤ 0.16	
	ALPHA2/3 XX-60: EEI ≤ 0.17	
	ALPHA2/3 XX-80: EEI ≤ 0.18	
	ALPHA2/3 XX-40 A: EEI ≤ 0.18	
	ALPHA2/3 XX-60 A: EEI ≤ 0.20	

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

Ambient temperature [°C]	Liquid temperature	
	Min. [°C]	Max. [°C]
0	2	110
10	10	110
20	20	110
30	30	110
35	35	90
40	40	70

WARNING

Biological hazard

Death or serious personal injury.

- In domestic hot-water systems, we recommend that you keep the liquid temperature below 65 °C to eliminate the risk of lime precipitation. The temperature of the pumped liquid must always be above 50 °C due to the risk of legionella. Recommended boiler temperature: 60 °C.

If the temperature of the pumped liquid is lower than the ambient temperature, make sure that the pump is installed with the pump head and plug in position 6 o'clock.

10.2 Dimensions, ALPHA2 and ALPHA3, XX-40, XX-50, XX-60, XX-80

Dimensional sketches and table of dimensions.

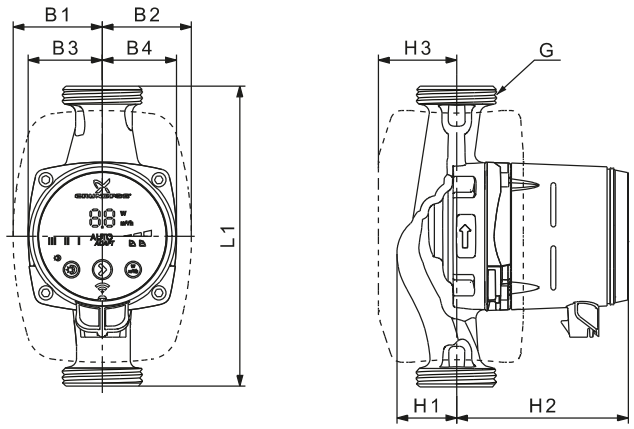

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Fig. 34 ALPHA2 and ALPHA3, XX-40, XX-50, XX-60, XX-80

Pump type	Dimensions								
	L1	B1	B2	B3	B4	H1	H2	H3	G
ALPHA2/3 15-40 130	130	54	54	44.5	44.5	35.8	103.5	47	G 1
ALPHA2/3 15-50 130	130	54	54	44.5	44.5	35.8	103.5	47	G 1*
ALPHA2/3 15-60 130	130	54	54	44.5	44.5	35.8	103.5	47	G 1*
ALPHA2/3 15-80 130	130	54	54	44.5	44.5	35.8	103.5	47	G 1
ALPHA2/3 25-40 130	130	54	54	44.5	44.5	35.8	103.5	47	G 1 1/2
ALPHA2/3 25-40 N 130	130	54	54	44.5	44.5	36.8	103.5	47	G 1 1/2
ALPHA2/3 25-50 130	130	54	54	44.5	44.5	35.8	103.5	47	G 1 1/2
ALPHA2/3 25-50 N 130	130	54	54	44.5	44.5	36.8	103.5	47	G 1 1/2
ALPHA2/3 25-60 130	130	54	54	44.5	44.5	35.8	103.5	47	G 1 1/2
ALPHA2/3 25-60 N 130	130	54	54	44.5	44.5	36.8	103.5	47	G 1 1/2
ALPHA2/3 25-80 130	130	54	54	44.5	44.5	35.8	103.5	47	G 1 1/2
ALPHA2/3 25-80 N 130	130	54	54	44.5	44.5	36.8	103.5	47	G 1 1/2
ALPHA2/3 25-40 180	180	54	54	44.5	44.5	35.9	103.5	47	G 1 1/2
ALPHA2/3 25-40 N 180	180	54	54	44.5	44.5	36.9	103.5	47	G 1 1/2
ALPHA2/3 25-50 180	180	54	54	44.5	44.5	35.9	103.5	47	G 1 1/2
ALPHA2/3 25-50 N 180	180	54	54	44.5	44.5	36.9	103.5	47	G 1 1/2
ALPHA2/3 25-60 180	180	54	54	44.5	44.5	35.9	103.5	47	G 1 1/2
ALPHA2/3 25-60 N 180	180	54	54	44.5	44.5	36.9	103.5	47	G 1 1/2
ALPHA2/3 25-80 180	180	54	54	44.5	44.5	35.9	103.5	47	G 1 1/2
ALPHA2/3 25-80 N 180	180	54	54	44.5	44.5	36.9	103.5	47	G 1 1/2
ALPHA2/3 32-40 180	180	54	54	44.5	44.5	35.9	103.5	47	G 2
ALPHA2/3 32-40 N 180	180	54	54	44.5	44.5	36.9	103.5	47	G 2
ALPHA2/3 32-50 180	180	54	54	44.5	44.5	35.9	103.5	47	G 2
ALPHA2/3 32-50 N 180	180	54	54	44.5	44.5	36.9	103.5	47	G 2
ALPHA2/3 32-60 180	180	54	54	44.5	44.5	35.9	103.5	47	G 2
ALPHA2/3 32-60 N 180	180	54	54	44.5	44.5	36.9	103.5	47	G 2
ALPHA2/3 32-80 180	180	54	54	44.5	44.5	35.9	103.5	47	G 2
ALPHA2/3 32-80 N 180	180	54	54	44.5	44.5	36.9	103.5	47	G 2

* UK version: ALPHA2 and ALPHA3, 15-50/60 G 1 1/2.

10.3 Dimensions, ALPHA2 and ALPHA3, 25-40 A, 25-60 A

Dimensional sketches and table of dimensions.

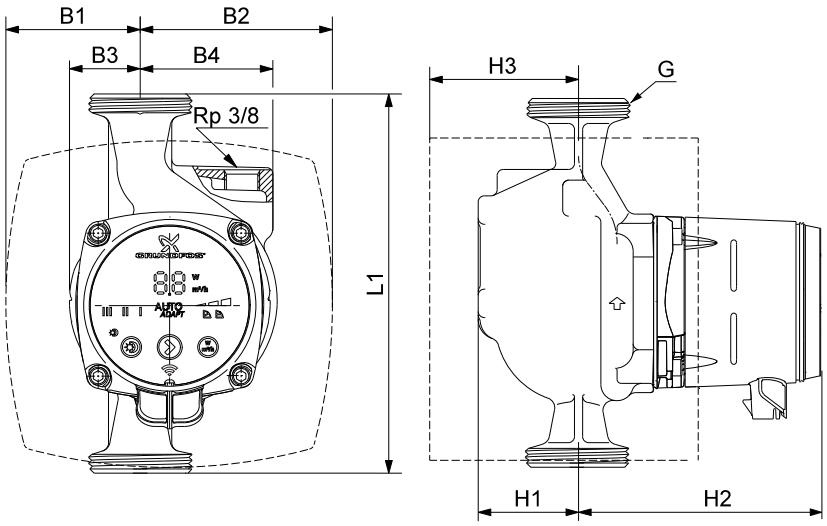

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Fig. 35 ALPHA2 and ALPHA3, 25-40 A, 25-60 A

Pump type	Dimensions								
	L1	B1	B2	B3	B4	H1	H2	H3	G
ALPHA2/3 25-40 A 180	180	63.5	98	32	63	50	124	81	G 1 1/2
ALPHA2/3 25-60 A 180	180	63.5	98	32	63	50	124	81	G 1 1/2

11. Performance curves

11.1 Guide to performance curves

Each pump setting has its own performance curve. However, AUTO$_{ADAPT}$ covers a performance range.

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

The P1 value corresponds to the value that you can read from the pump display. See fig. 36.

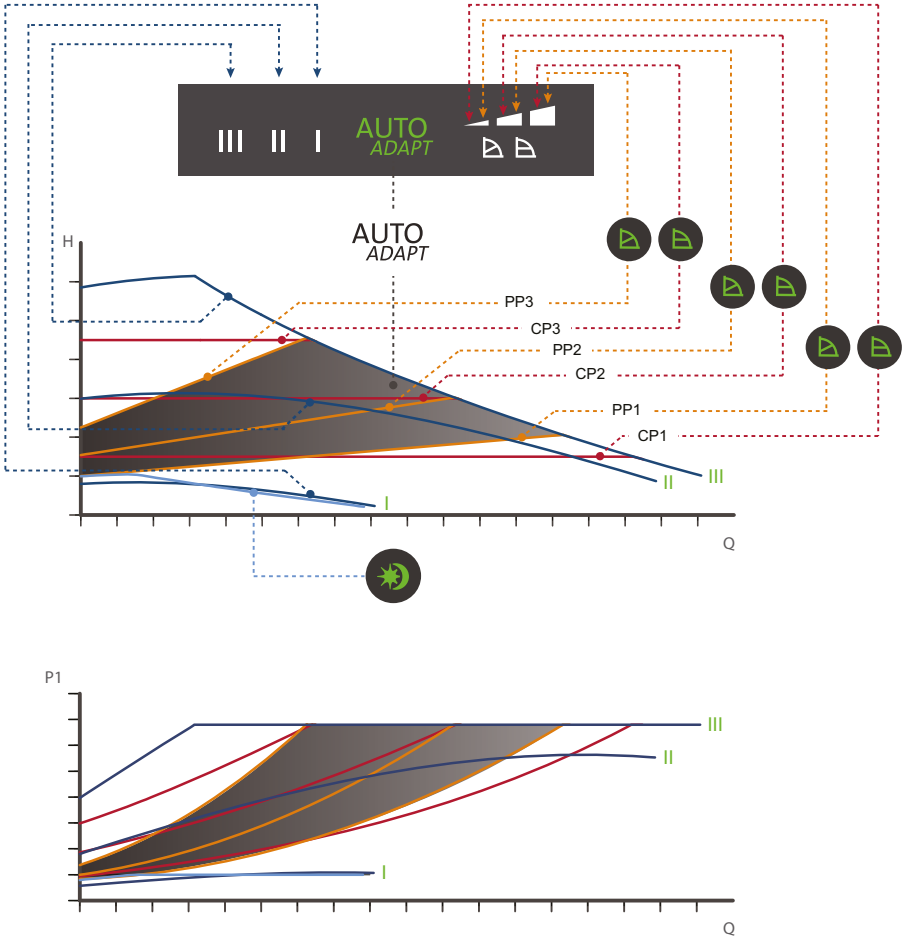


Fig. 36 Performance curves in relation to pump setting

Setting	Pump curve
AUTO$_{ADAPT}$ factory setting	Setpoint within the marked area
PP1	Lowest proportional-pressure curve
PP2	Intermediate proportional-pressure curve
PP3	Highest proportional-pressure curve
CP1	Lowest constant-pressure curve
CP2	Intermediate constant-pressure curve
CP3	Highest constant-pressure curve
III	Constant curve/constant speed III
II	Constant curve/constant speed II
I	Constant curve/constant speed I
	Curve for automatic night setback/manual summer mode

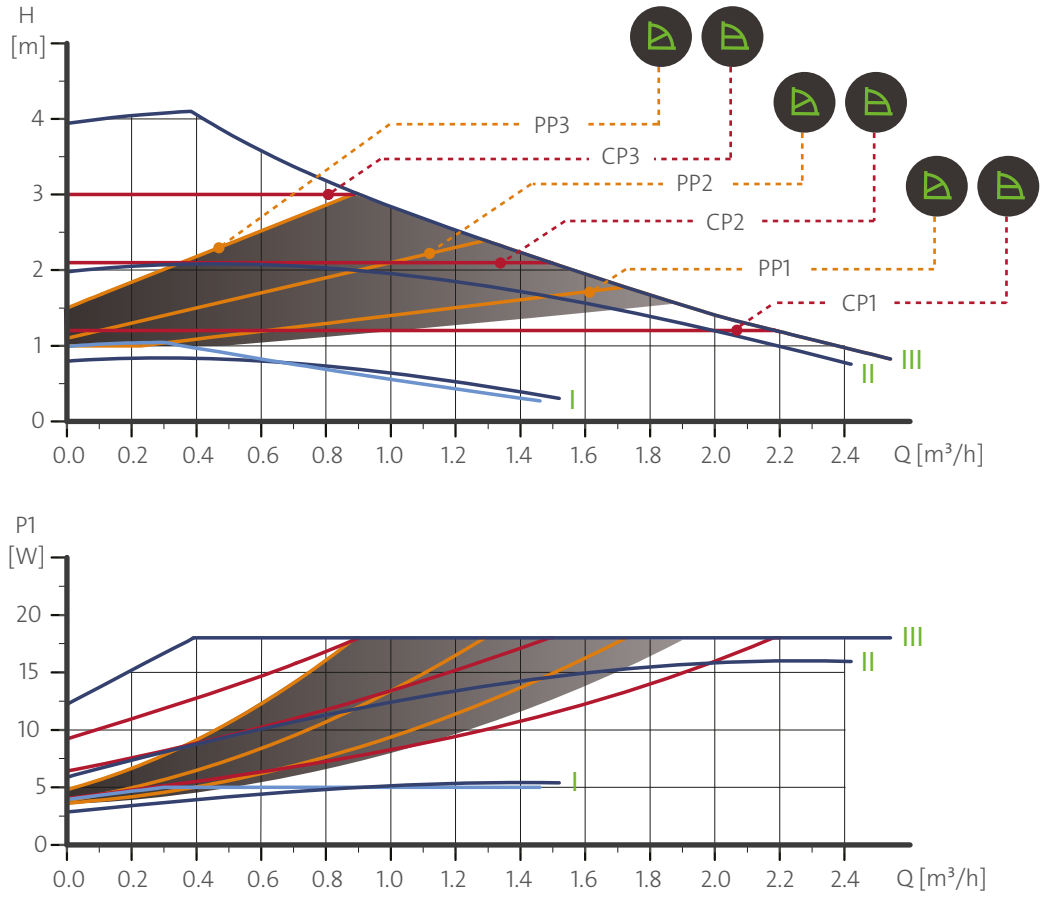
For further information about pump settings, see this section:
7. Control functions

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 83.2 kg/m^3 and a liquid temperature of 60 °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 0.474 mm^2/s (0.474 cSt).
- The conversion between head H [m] and pressure p [kPa] has been made for water with a density of 1000 kg/m^3. For liquids with other densities, for example hot water, the outlet pressure is proportional to the density.
- Curves are obtained according to EN 16297.

11.3 Performance curves, ALPHA2 and ALPHA3, XX-40 (N)

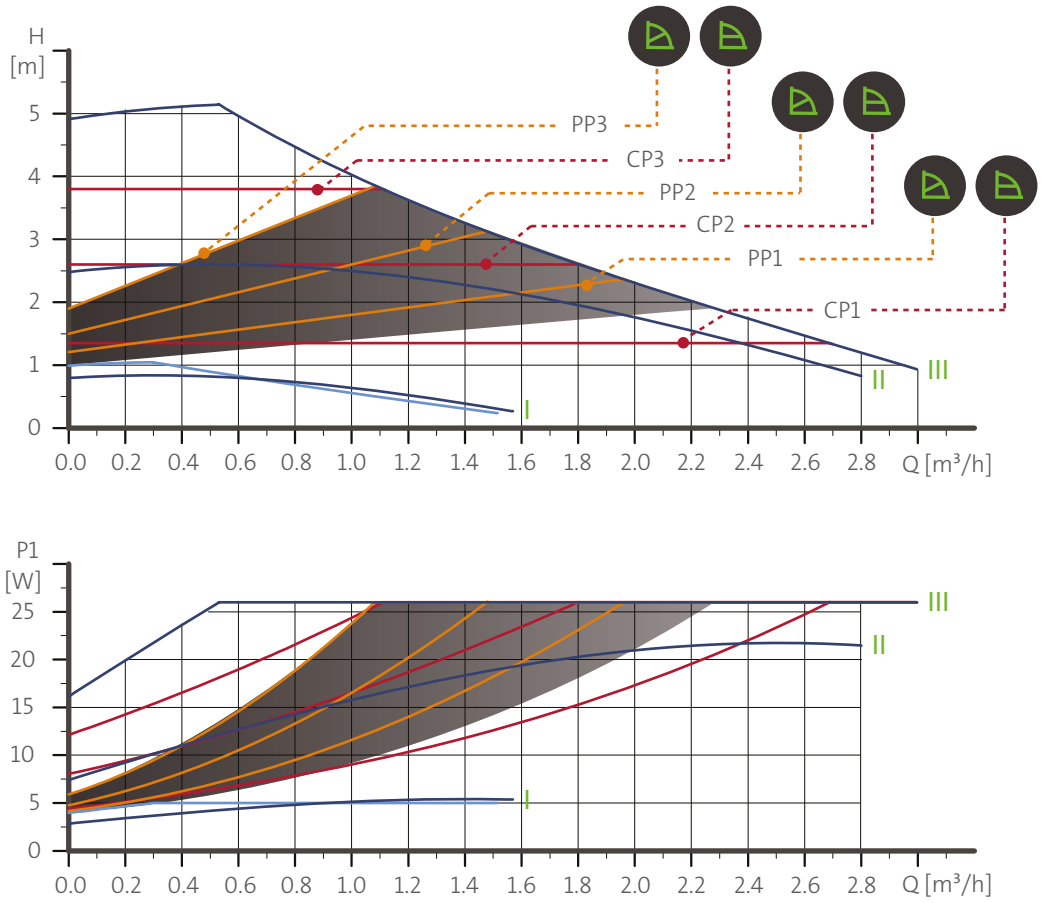


TM05 1672 4111

Fig. 37 ALPHA2 and ALPHA3, XX-40

Setting	P1 [W]	$I_{1/1}$ [A]
$AUTO_{ADAPT}$	3-18	0.04 - 0.18
Min.	3	0.04
Max.	18	0.18

11.4 Performance curves, ALPHA2 and ALPHA3, XX-50 (N)

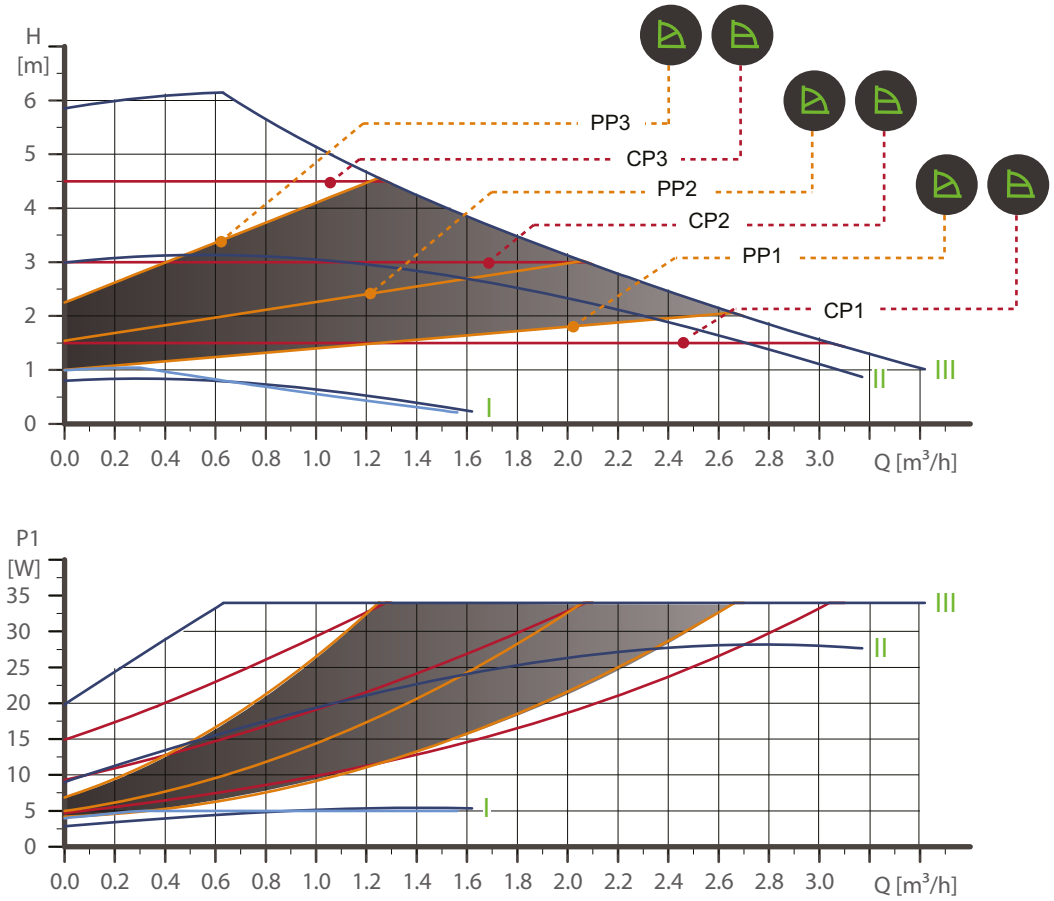


TM05 1673 4111

Fig. 38 ALPHA2 and ALPHA3, XX-50

Setting	P1 [W]	$I_{1/1}$ [A]
$AUTO_{ADAPT}$	3-26	0.04 - 0.24
Min.	3	0.04
Max.	26	0.24

11.5 Performance curves, ALPHA2 and ALPHA3, XX-60 (N)

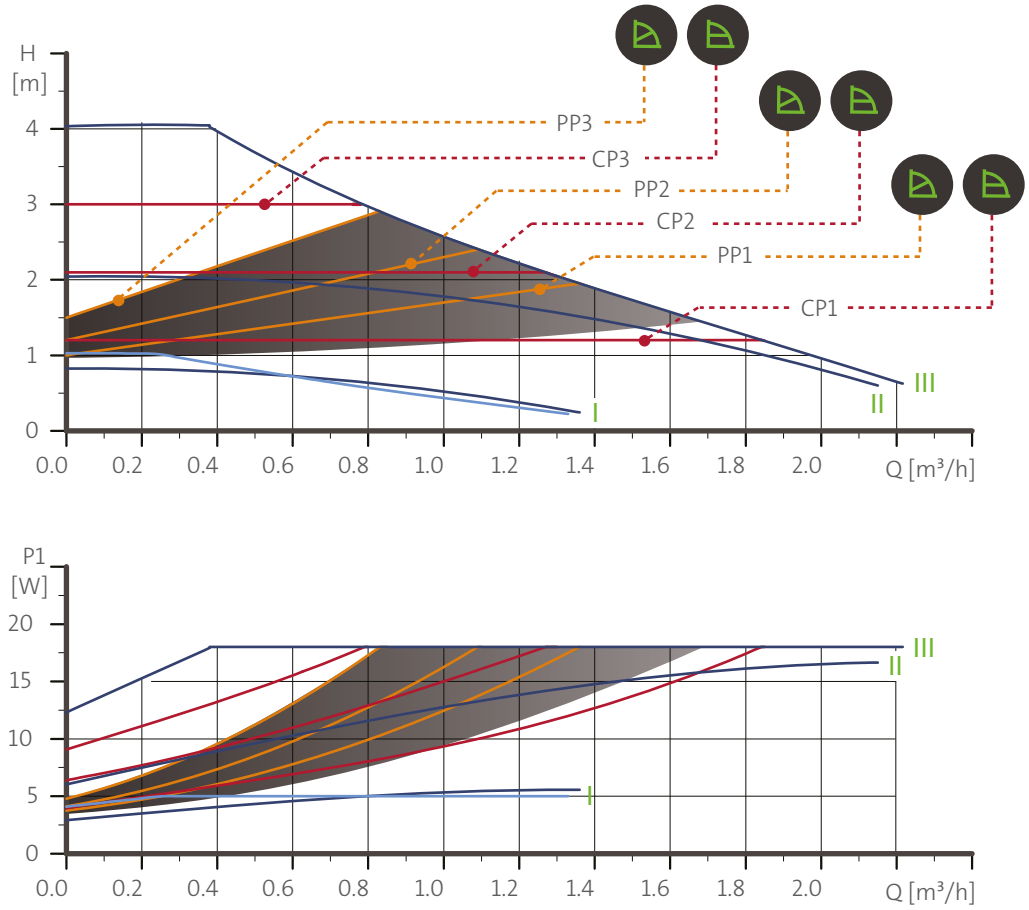


TM05 1674 4111

Fig. 39 ALPHA2 and ALPHA3, XX-60

Setting	P1 [W]	$I_{1/1}$ [A]
AUTO$_{ADAPT}$	3-34	0.04 - 0.32
Min.	3	0.04
Max.	34	0.32

11.6 Performance curves, ALPHA2 and ALPHA3, 25-40 A



TM05 2016 4211

Fig. 40 ALPHA2 and ALPHA3, 25-40 A

Setting	P1 [W]	$I_{1/1}$ [A]
AUTO$_{ADAPT}$	3-18	0.04 - 0.18
Min.	3	0.04
Max.	18	0.18

11.7 Performance curves, ALPHA2 and ALPHA3, 25-60 A

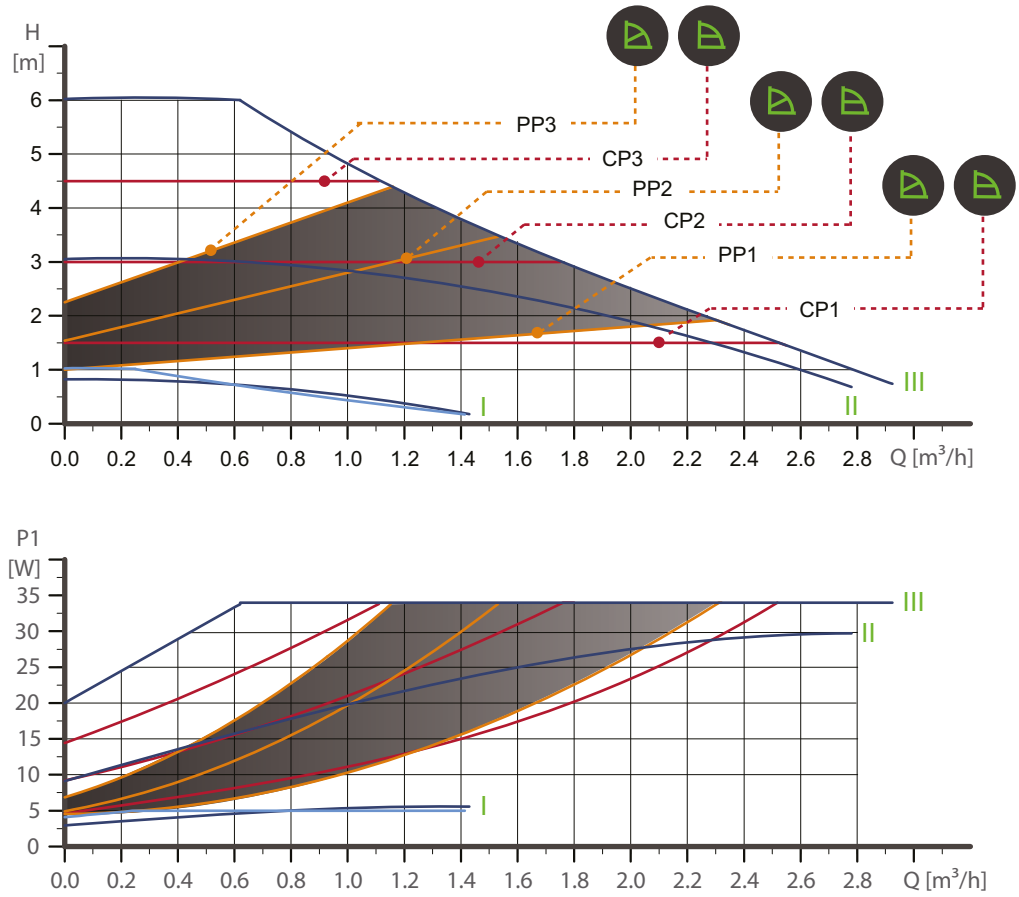
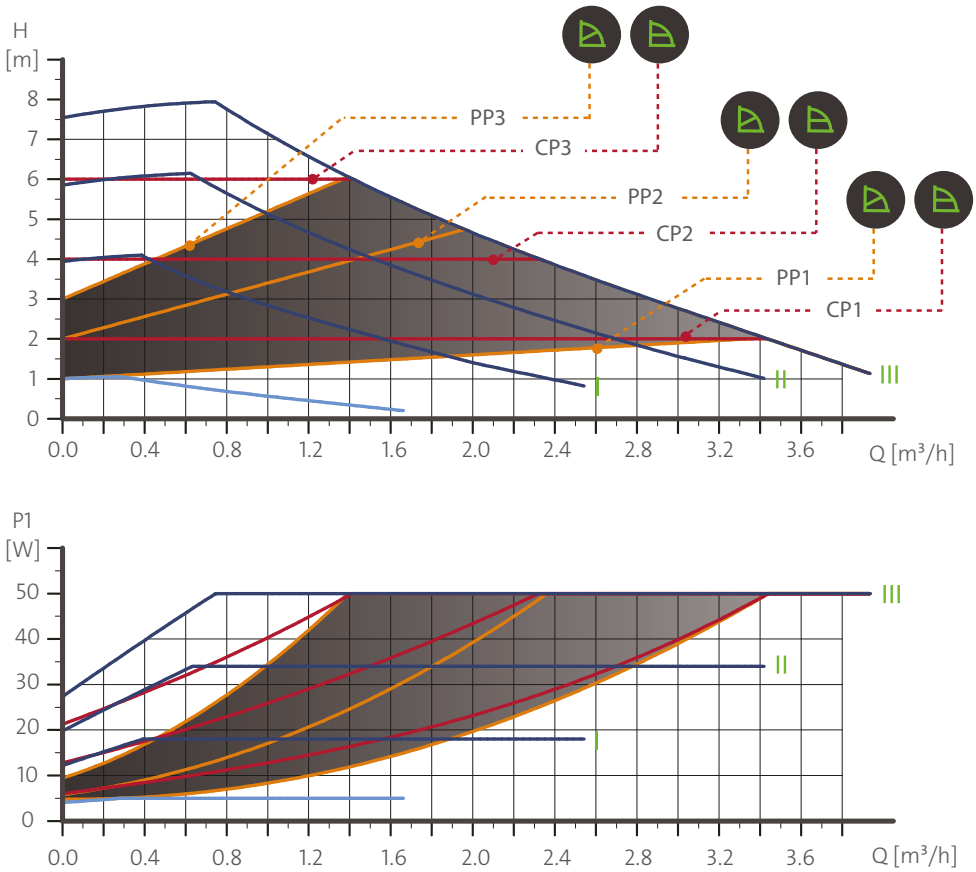


Fig. 41 ALPHA2 and ALPHA3, 25-60 A

Setting	P1 [W]	$I_{1/1}$ [A]
AUTO$_{ADAPT}$	3-34	0.04 - 0.32
Min.	3	0.04
Max.	34	0.32

TM05 2017 4211

11.8 Performance curves, ALPHA2 and ALPHA3, XX-80 (N)



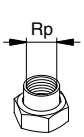
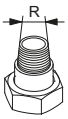
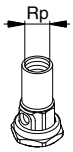
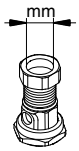
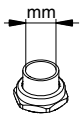
TM06 1285 2114

Fig. 42 ALPHA2 and ALPHA3, 25-60 A

Setting	P1 [W]	$I_{1/1}$ [A]
AUTO$_{ADAPT}$	3-50	0.04 - 0.44
Min.	3	0.04
Max.	50	0.44

12. Accessories

12.1 Unions and valve kits

Product numbers, unions														
		Union nut with internal threads			Union nut with external threads		Ball valve with internal threads			Ball valve with compression fitting		Union nut with soldering fitting			
ALPHA2/3	Connection														
		3/4	1	1 1/4	1	1 1/4	3/4	1	1 1/4	∅22	∅28	∅18	∅22	∅28	∅42
15-xx*	G 1														
15-xx N*															
25-xx	G 1 1/2	529921	**529922**	529821	529925	529924									
25-xx N		529971	**529972**				519805	519806	519807	519808	519809	529977	529978	529979	
32-xx	G 2		509921	**509922**											
32-xx N				**509971**											529995

Note: The product numbers are always for one complete set, incl. gaskets.

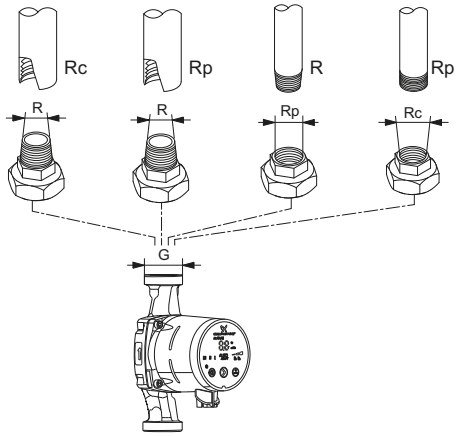
The product numbers for the very standard sizes are printed in bold.

* When ordering for UK 15-xx versions, use product numbers for 25-xx (G 1 1/2).

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 male G-threads (cylindrical) 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 (parallel) threads. You can screw male R-threads (conical) into female Rc- or Rp-threads. See fig. 43.



TM06 9235 2017

Fig. 43 G-threads and R-threads

12.2 Insulating shells, ALPHA2, ALPHA3

The pump is supplied with two insulating shells. Type A pumps with air-separating chamber are not supplied with insulating shells. However, you can order insulating shells as an accessory. See table below.

The insulation thickness of the insulating shells corresponds to the nominal diameter of the pump.

The insulating shells, which are tailored to the individual pump type, enclose the entire pump housing. The insulating shells are easy to fit around the pump. See fig. 44.

Pump type	Product number	Available
ALPHA2/3 XX-XX 130	98091786	spare part
ALPHA2/3 XX-XX 180	98091787	spare part
ALPHA2/3 XX-XX A	505822	accessory

TM06 5822 0216

Fig. 44 Insulating shells

12.3 ALPHA plugs

TM06 5823 0216

Pos.	Description	Product number	Available
1	ALPHA straight plug, standard plug connector, complete	98284561	spare part
2	ALPHA angle plug, standard angle plug connection, complete	98610291	accessory
3	ALPHA plug, 90 ° bend to the left, including 4 m cable	96884669	accessory
*	ALPHA plug, 90 ° bend to the left, including 1 m cable and integrated NTC protection resistor	97844632	accessory

* This special cable with an active built-in NTC protection circuit, reduces possible inrush currents. To be used in case of for instance poor quality of relay components that are sensitive to inrush current.

ALPHA SOLAR cables and plugs can be delivered on request.

12.4 ALPHA Reader

TM06 8574 1517

The ALPHA Reader unit MI401 is the receiver and transmitter of pump performance data. The unit broadcasts the measured data from the pump to an Android or iOS-based mobile device via Bluetooth. The unit uses a small lithium battery.

The unit is together with the Grundfos GO Balance app used for balancing heating system primarily in one- and two-family houses. The app guides you through a number of steps where information on installation and measurements from the pump is being collected. In a two-pipe system or an underfloor heating system, the app calculates the balancing values for each of the valves. On the basis of these values, the app guides you through the adjustment of each presetting valve in the system.

The app is available for both Android and iOS devices, and you can download it free of charge from Google Play and App Store.

Description	Product number
ALPHA reader MI401	98916967

13. ALPHA SOLAR

13.1 Product introduction

TM06 5816 0216

Fig. 45 ALPHA SOLAR pump

The ALPHA SOLAR is designed to be integrated in all kinds of thermal solar systems with either variable or constant flow rate. High-efficiency ECM (Electronically Commutated Motor) pumps, such as ALPHA SOLAR, 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 from a solar controller to optimise the solar harvesting and temperature of the system. As a result, the power consumption of the pump will be reduced considerably.

If no PWM signal is available, you can set ALPHA SOLAR to operate at constant speed / constant curve, only switched on and off by the controller.

13.2 Operating the product

13.3 Setting by means of the control panel

The user interface is designed with a single push button, one red and green LED and four yellow LEDs.

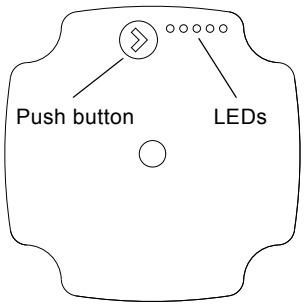


Fig. 46 User interface with one push button and five LEDs

The user interface shows the following:

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

13.4 Operating and alarm status

During operation, the display shows the actual operating status or the alarm status.

If the circulator has detected one or more alarms, the LED switches from green to red. When an alarm is active, the LEDs indicate the alarm type as defined in the table in section *13.5 Fault finding the product*. 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 user interface switches back to operating status.

The LEDs indicate the actual operating status or alarm status. See section *13.3 Setting by means of the control panel*.

This circulator pump is either for internal control with constant-curve control or external PWM-signal control with profile C. See fig. 47.

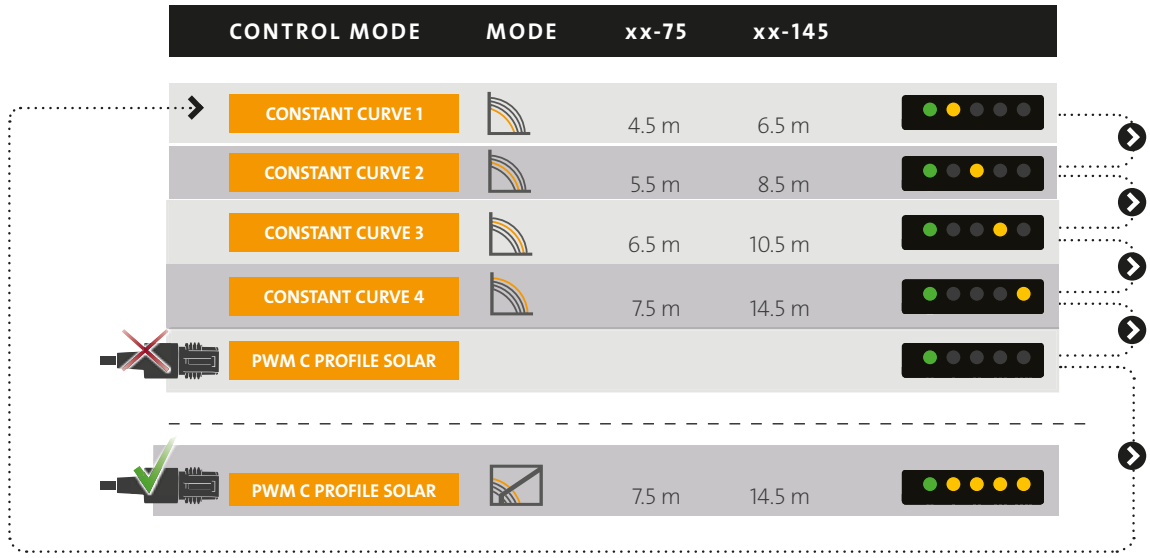
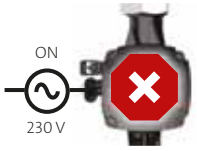
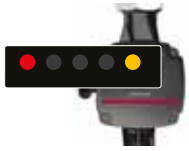
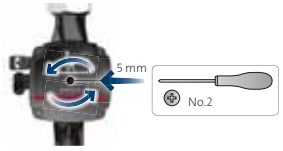
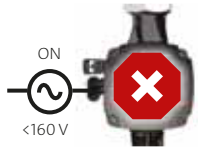
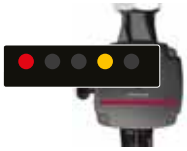
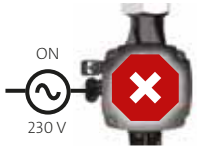
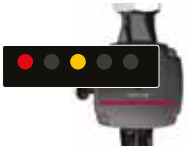
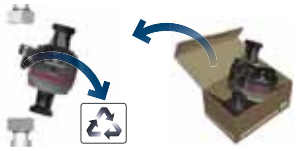


Fig. 47 Operating mode

PWM can only operate if you have set the pump to PWM mode. Press the button five times until only the green LED is on. When you connect the PWM cable, the yellow LEDs are on and you can control the pump via the PWM signal. See fig. 47.

13.5 Fault finding the product

The alarm status is indicated by the LEDs.

Fault			Description
			The rotor is blocked. Deblock the rotor.
			The 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 centre.

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 valve on either side of the pump. The pumped liquid may be scalding hot and under high pressure.

14. External PWM control mode and signals

PWM can only operate if you have set the pump to PWM mode. See section *13.4 Operating and alarm status*.

PWM profile C input signal (solar)

At low PWM signal percentages (duty cycles), a hysteresis prevents the circulator from starting and stopping if the input signal fluctuates around the shifting point. Without PWM signal percentages, the circulator will stop for safety reasons. If a signal is missing, for example due to a cable breakage, the circulator will stop to avoid overheating of the solar thermal system.

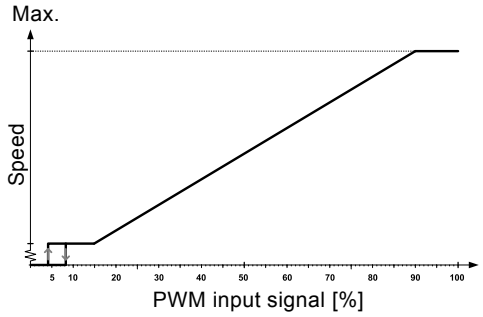


Fig. 48 PWM input profile C

PWM input signal [%]	Pump status
≤ 5	Standby mode: off
> 5 / ≤ 8	Hysteresis area: on/off.
> 8 / ≤ 15	Minimum speed: IN
> 15/90	Variable speed: min. to max.
> 90 / ≤ 100	Maximum speed: max.

Digital low-voltage 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 circulator.

Duty cycle

d % = 100 x t/T

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

Example

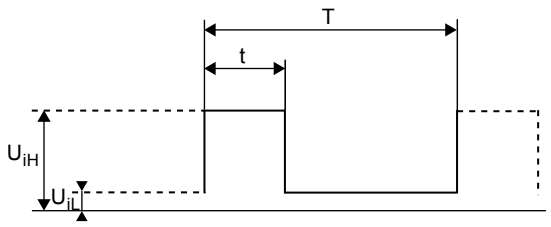


Fig. 49 PWM signal

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

15. Digital signal converter

To replace UPS SOLAR with a new ALPHA SOLAR pump which fulfils the ErP requirements, we offer two solutions:

- Exchange the existing SOLAR controller to a controller suitable for high-efficiency pumps.
- Keep the old controller, and use the phase control. Use a signal converter, SIKON HE, which can convert the existing phase control to a PWM signal for the ALPHA SOLAR.

When you use SIKON HE, you can replace the conventional 230 V UPS SOLAR pump with a Grundfos ALPHA SOLAR pump without having to change the controller. The function of the performance control of the pump is maintained.

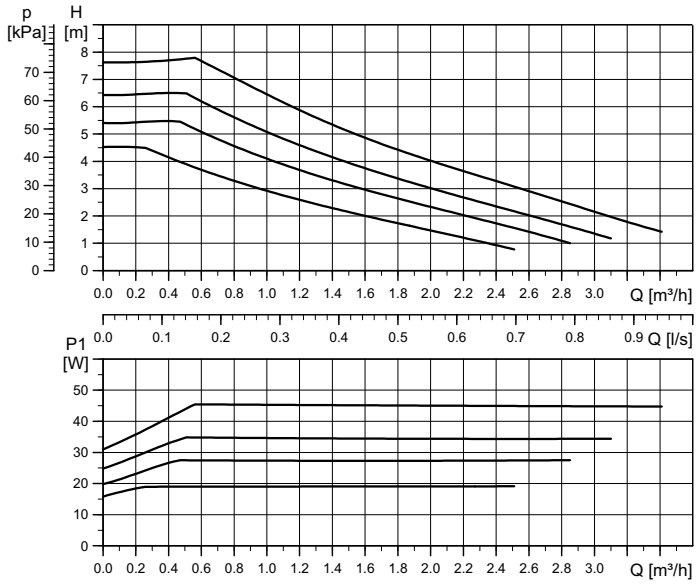
Fig. 50 Digital signal converter (SIKON HE)

For further information about the controller, see www.prozeda.de.

16. Technical data

System pressure	Maximum 1.0 MPa (10 bar)
Minimum inlet pressure	0.05 MPa (0.50 bar) at a liquid temperature of 95 °C
Maximum liquid temperature	2-110 °C at an ambient temperature of 70 °C
	2-130 °C at an ambient temperature of 60 °C
Enclosure class	IPX4D
Motor protection	No external protection needed
Approvals and markings	VDE, CE
Water-propylene glycol mixture	Maximum water-propylene glycol mixture is 50 %. Note: The water-propylene glycol mixture reduces the performance due to higher viscosity.

ALPHA SOLAR xx-75 130/180



Setting	Max. head $_{nom}$
Curve 1	4.5 m
Curve 2	5.5 m
Curve 3	6.5 m
Curve 4	7.5 m

Setting	Max. $P_{1\ nom}$
Curve 1	19 W
Curve 2	28 W
Curve 3	35 W
Curve 4	45 W

EEI ≤ 0.20 Part 3

$P_{L,avg}$ ≤ 20 W

TM06 3658 0815

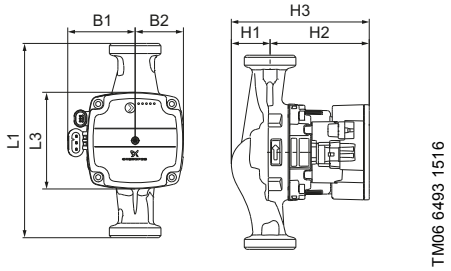
Fig. 51 Performance curve

Note: PWM speed curves on request.

Electrical data, 1 x 230 V, 50 Hz		
Speed	**P_1 [W]**	**$I_{1/1}$ [A]**
Min.	2*	0.04
Max.	45	0.48

Settings			
PWM C	**PP**	**CP**	**CC**
1	-	-	4

* Only in minimum PWM speed operation



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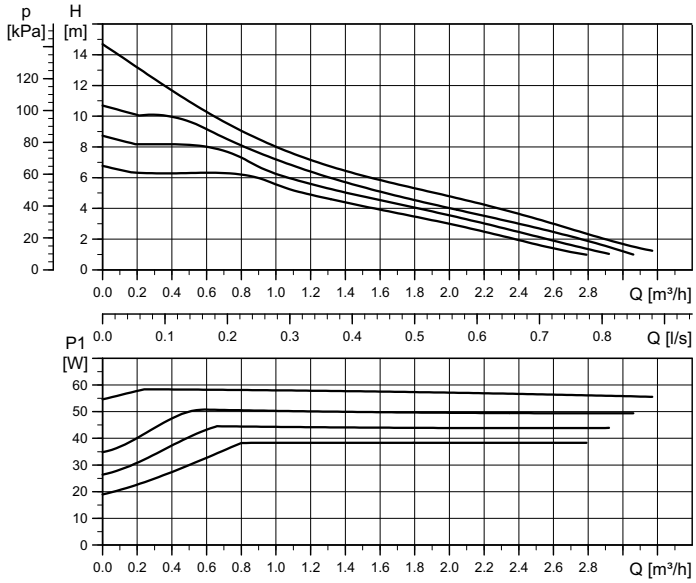
TM06 5636 5115

Pump type	Dimensions [mm]							Connections	Weight [kg]
	L1	L3	B1	B2	H1	H2	H3		
ALPHA SOLAR 15-75 130	130	90	72	45	36	92	128	G 1	1.8
ALPHA SOLAR 25-75 130	130	90	72	45	36	92	128	G 1 1/2	1.9
ALPHA SOLAR 25-75 180	180	90	72	45	36	92	128	G 1 1/2	2.0

ALPHA SOLAR xx-145/180



Setting	Max. head $_{nom}$
Curve 1	6.5 m
Curve 2	8.5 m
Curve 3	10.5 m
Curve 4	14.5 m

Setting	Max. $P_{1\ nom}$
Curve 1	39 W
Curve 2	45 W
Curve 3	52 W
Curve 4	60 W

EEI ≤ 0.20 Part 3

$P_{L,avg}$ ≤ 25 W

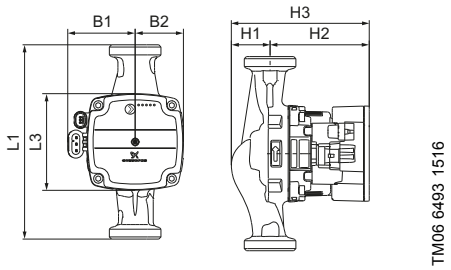
TM06 3652 0815

Note: PWM speed curves on request.

Electrical data, 1 x 230 V, 50 Hz		
Speed	**P_1 [W]**	**$I_{1/1}$ [A]**
Min.	2*	0.04
Max.	60	0.58

Settings			
PWM C	**PP**	**CP**	**CC**
1	-	-	4

* Only in minimum PWM speed operation



TM06 6493 1516

TM06 5636 5115

Pump type	Dimensions [mm]							Connections	Weight [kg]
	L1	L3	B1	B2	H1	H2	H3		
ALPHA SOLAR 25-145 180	180	90	72	45	25	103	128	G 1 1/2	2.0

17. Disposing of the product

This product has been designed with focus on the disposal and recycling of materials. The following average disposal values apply to all variants of ALPHA2, ALPHA3 and ALPHA SOLAR pumps:

- 92 % recycling
- 3 % incineration
- 5 % depositing.

Dispose of this product or parts of it in an environmentally sound way according to local regulations.

For further information, see the end-of-life information at www.grundfos.com.

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1619 Garín Pcia. de B.A.
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