GRUNDFOS ALPHA2

Installation and operating instructions

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GRUNDFOS

Declaration of conformity

GB: EC declaration of conformity

We, Grundfos, declare under our sole responsibility that the product GRUNDFOS ALPHA2, to which this declaration relates, is in conformity with these Council directives on the approximation of the laws of the EC member states:

— Low Voltage Directive (2006/95/EC).
Standard used: EN 60335-2-51:2003.

— EMC Directive (2004/108/EC).
Standards used: EN 55014-1:2006 and EN 55014-2:1997.

— Ecodesign Directive (2009/125/EC).
Circulators:
Commission Regulation Nos 641/2009 and 622/2012.
Applies only to circulators marked with the energy efficiency index EEI. See the pump nameplate.
Standards used: EN 16297-1:2012 and EN 16297-2:2012.

This EC declaration of conformity is only valid when published as part of the Grundfos installation and operating instructions (publication number 95047457 0813).

PL: Deklaracja zgodności WE

My, Grundfos, oświadczamy z pełną odpowiedzialnością, że nasze wyroby GRUNDFOS ALPHA2, których deklaracja niniejsza dotyczy, są zgodne z następującymi wytycznymi Rady d/s ujednolicenia przepisów prawnych krajów członkowskich WE:

— Dyrektywa Niskonapięciowa (LVD) (2006/95/WE).
Zastosowana norma: EN 60335-2-51:2003.

— Dyrektywa EMC (2004/108/WE).
Zastosowana norma: EN 55014-1:2006 oraz EN 55014-2:1997.

— Dyrektywa Ekoprojektowa (2009/125/WE).
Pompy obiegowe:
Rozporządzenie Komisji (WE) Nr 641/2009 oraz 622/2012.
Dotyczy tylko pomp obiegowych oznaczonych sprawnością energetyczną EEI. Patrz tabliczka znamionowa na pompie.
Zastosowane normy: EN 16297-1:2012 oraz EN 16297-2:2012.

Deklaracja zgodności WE jest ważna tylko i wyłącznie wtedy kiedy jest opublikowana przez firmę Grundfos i umieszczona w instrukcji montażu i eksploatacji (numer publikacji 95047457 0813).

Bjerringbro, 1st August 2013

Svend Aage Kaae
Technical Director
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Person authorised to compile technical file and empowered to sign the EC declaration of conformity.

Original installation and operating instructions.

CONTENTS

Warning

Prior to installation, read these installation and operating instructions. Installation and operation must comply with local regulations and accepted codes of good practice.

Warning

The use of this product requires experience with and knowledge of the product.
Persons with reduced physical, sensory or mental capabilities must not use this product, unless they are under supervision or have been instructed in the use of the product by a person responsible for their safety.
Children must not use or play with this product.

1. Symbols used in this document

Warning

If these safety instructions are not observed, it may result in personal injury.

Warning

If these instructions are not observed, it may lead to electric shock with consequent risk of serious personal injury or death.

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

Note ***Notes or instructions that make the job easier and ensure safe operation.***

2. General description

The GRUNDFOS ALPHA2 circulator pump is designed for the circulation of water in heating systems and domestic hot-water systems.

The pump is suitable for the following systems:

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

The pump incorporates a permanent-magnet motor and differential-pressure control enabling continuous adjustment of the pump performance to the actual system requirements.

The pump has a user-friendly front-mounted control panel.
See sections *3. Identification* and *7. Control panel*.

2.1 Advantages of installing a GRUNDFOS ALPHA2

The installation of a GRUNDFOS ALPHA2 means

easy installation and start-up

- The pump is easy to install.
  Thanks to the $AUTO_{ADAPT}$ function (factory setting), the pump can, in most cases, be started without making any settings.

high degree of comfort

- Minimum noise from valves, etc.

low energy consumption

- Low energy consumption compared to conventional circulator pumps.

Energy efficiency index (EEI)

- The Ecodesign directive for energy-using (EuP) and energy-related (ErP) products is EU legislation requiring manufacturers to reduce the overall environmental impact of their products.
- Circulator pumps will be EuP-ready and comply with the requirements as from 2015.

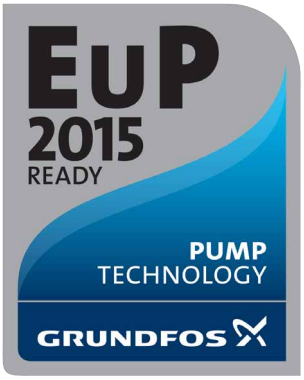

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Fig. 1 EuP-ready label

3. Identification

3.1 Nameplate

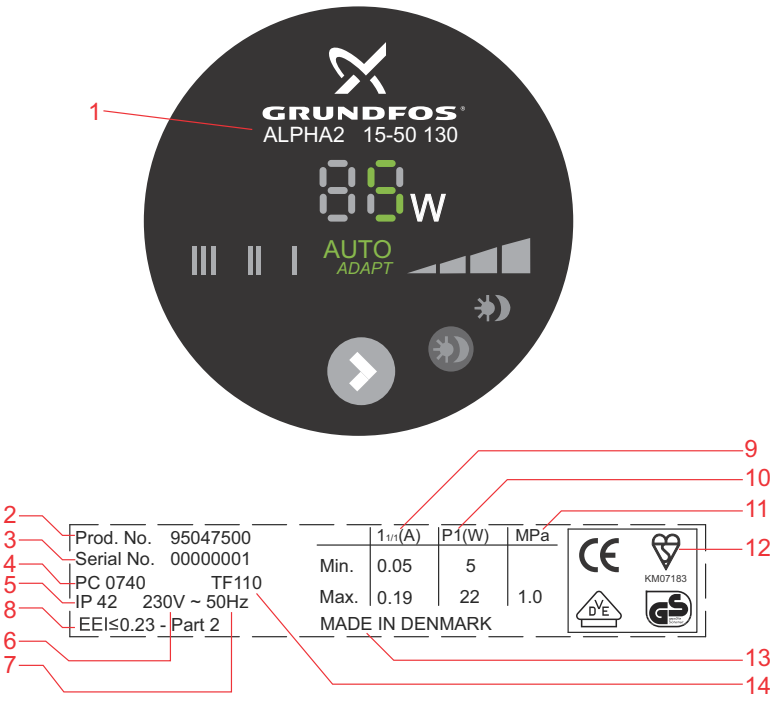

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Fig. 2 Example of nameplate

Pos.	Description	Pos.	Description
1	Pump type	8	Energy efficiency index [EEI]
2	Product number	9	Rated current [A]: • Min.: Minimum current [A] • Max.: Maximum current [A]
3	Serial number	10	Input power P1 [W]: • Min.: Minimum input power P1 [W] • Max.: Maximum input power P1 [W]
4	Production code: • 1st and 2nd digits = year • 3rd and 4th digits = week	11	Maximum system pressure [MPa]
5	Enclosure class	12	CE mark and approvals
6	Voltage [V]	13	Country of manufacture
7	Frequency [Hz]	14	Temperature class

3.2 Type key

Example	ALPHA2	15	-50	-	130
Pump type					
Nominal diameter (DN) of suction and discharge ports [mm]					
Maximum head [dm]					
: Cast-iron pump housing N: Stainless-steel pump housing A: Pump housing with air separator					
Port-to-port length [mm]					

4. Applications

4.1 System types

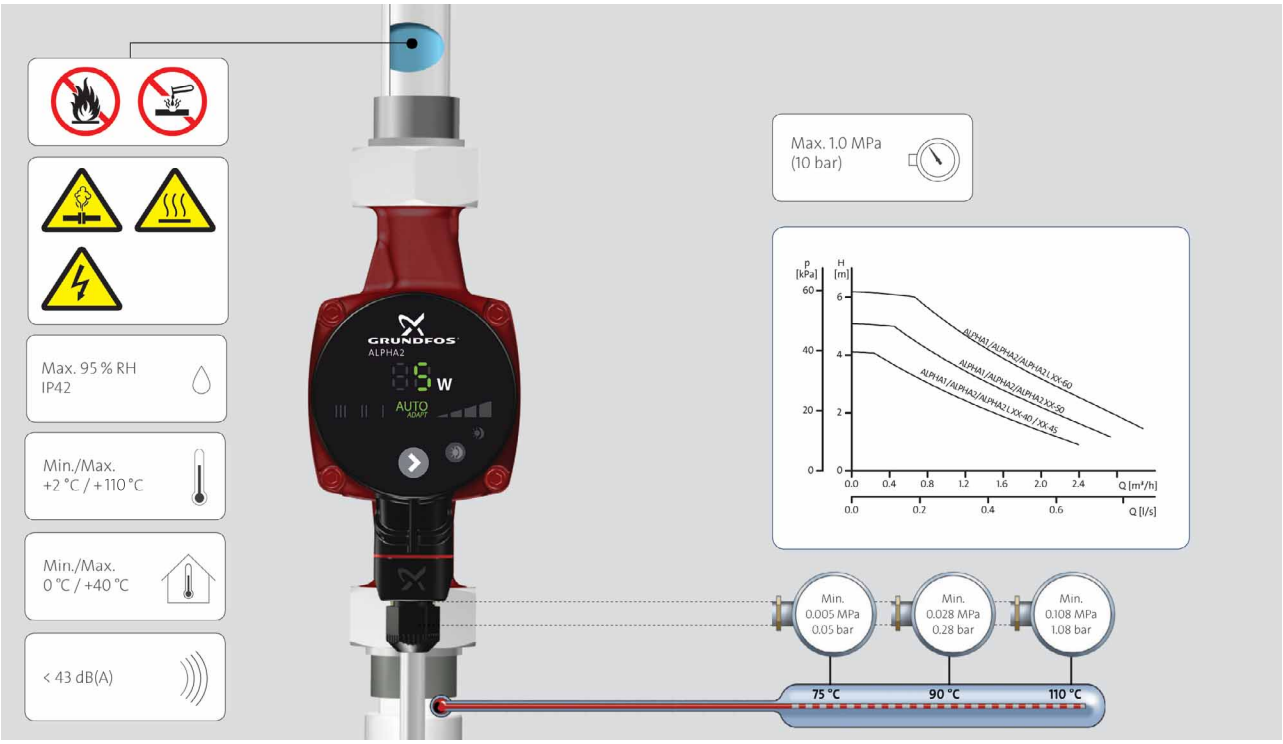

Fig. 3 Pumped liquids and operating conditions

GRUNDFOS ALPHA2 is suitable for

- systems with constant or variable flows where it is desirable to optimise the setting of the pump duty point.
- systems with variable flow-pipe temperature
- systems where night setback is desired.

4.2 Pumped liquids

Clean, thin, non-aggressive and non-explosive liquids, not containing solid particles, fibres or mineral oil. See fig. 3.

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

In domestic hot-water systems, it is advisable to use GRUNDFOS ALPHA2 pumps only for water with a degree of hardness lower than approx. 14 °dH. For water with a higher degree of hardness, we recommend a direct-coupled TPE pump.

Warning

The pump must not be used for the transfer of flammable liquids such as diesel oil, petrol and similar liquids.

4.3 System pressure

Maximum 1.0 MPa (10 bar). See fig. 3.

4.4 Relative air humidity (RH)

Maximum 95 %. See fig. 3.

4.5 Enclosure class

IP42. See fig. 3.

4.6 Inlet pressure

Minimum inlet pressure in relation to liquid temperature. See fig. 3.

Liquid temperature	Minimum inlet pressure	
	[MPa]	[bar]
≤ 75 °C	0.005	0.05
90 °C	0.028	0.28
110 °C	0.108	1.08

5. Mechanical installation

5.1 Mounting

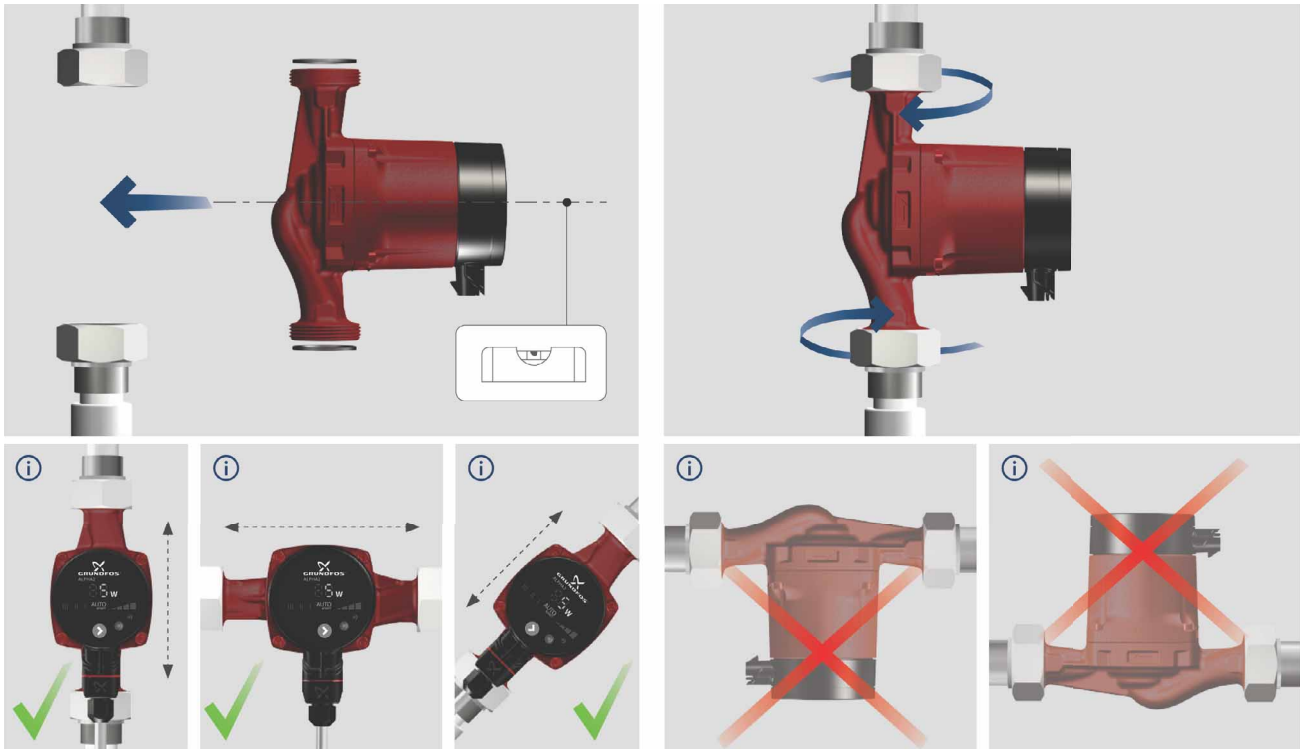

Fig. 4 Mounting the GRUNDFOS ALPHA2

Arrows on the pump housing indicate the liquid flow direction through the pump.

See section *14.2 Installation dimensions, GRUNDFOS ALPHA2 XX-50, XX-60*.

- Fit the two gaskets supplied when the pump is mounted in the pipe.
- Install the pump with horizontal motor shaft. See fig. 4.

5.2 Control box positions

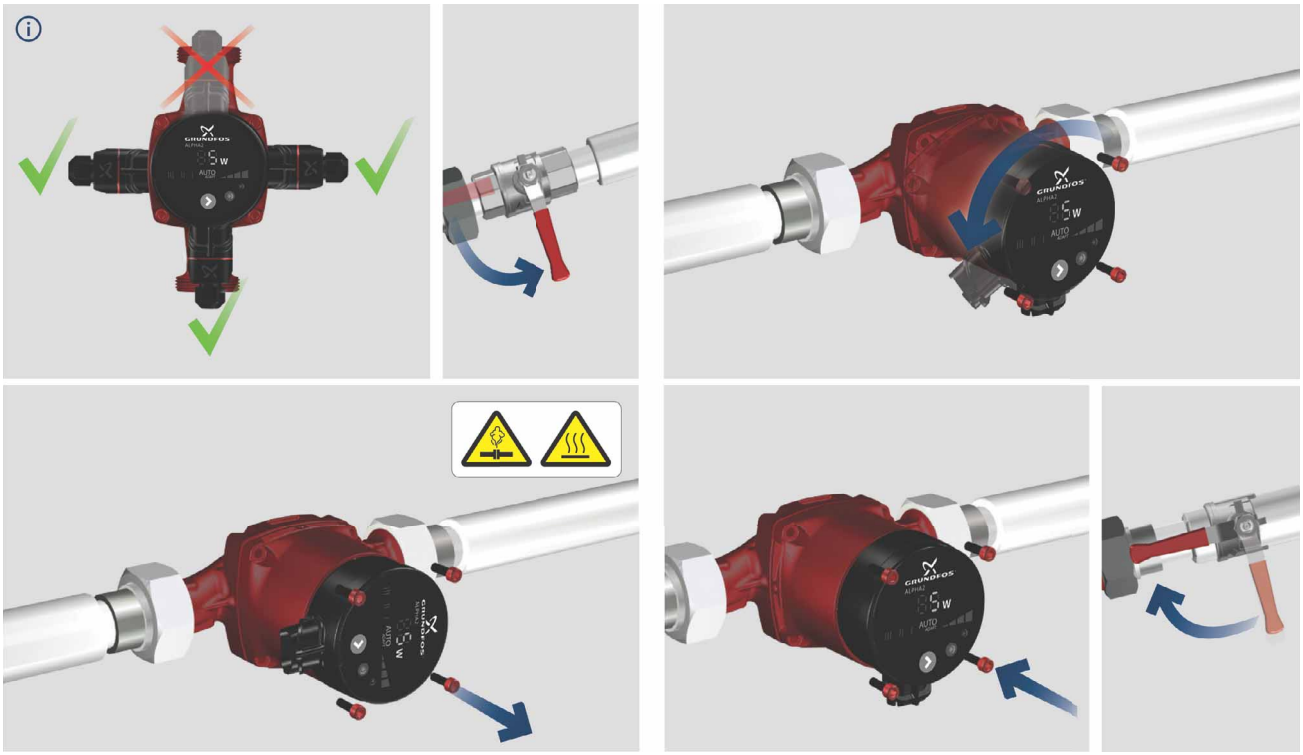

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Fig. 5 Control box positions

Warning

The pumped liquid may be scalding hot and under high pressure.

Drain the system or close the isolating valves on either side of the pump before the screws are removed.

Caution

Fill the system with the liquid to be pumped or open the isolating valves when the position of the control box has been changed.

5.3 Changing the control box position

The control box position can be changed in steps of 90 °.

Possible/permissible positions and the procedure of changing the position of the control box are illustrated in fig. 5.

Procedure:

1. Slacken and remove the four hexagon-socket head screws holding the pump head with a tee key (M4).
2. Turn the pump head to the desired position.
3. Insert and cross-tighten the screws.

5.4 Insulation of pump housing

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Fig. 6 Insulation of pump housing

Note ***Limit the heat loss from the pump housing and pipework.***

The heat loss from the pump and pipework can be reduced by insulating the pump housing and the pipe. See fig. 6.

As an alternative, polystyrene insulating shells can be fitted to the pump. See section *16. Accessories*.

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

6. Electrical installation

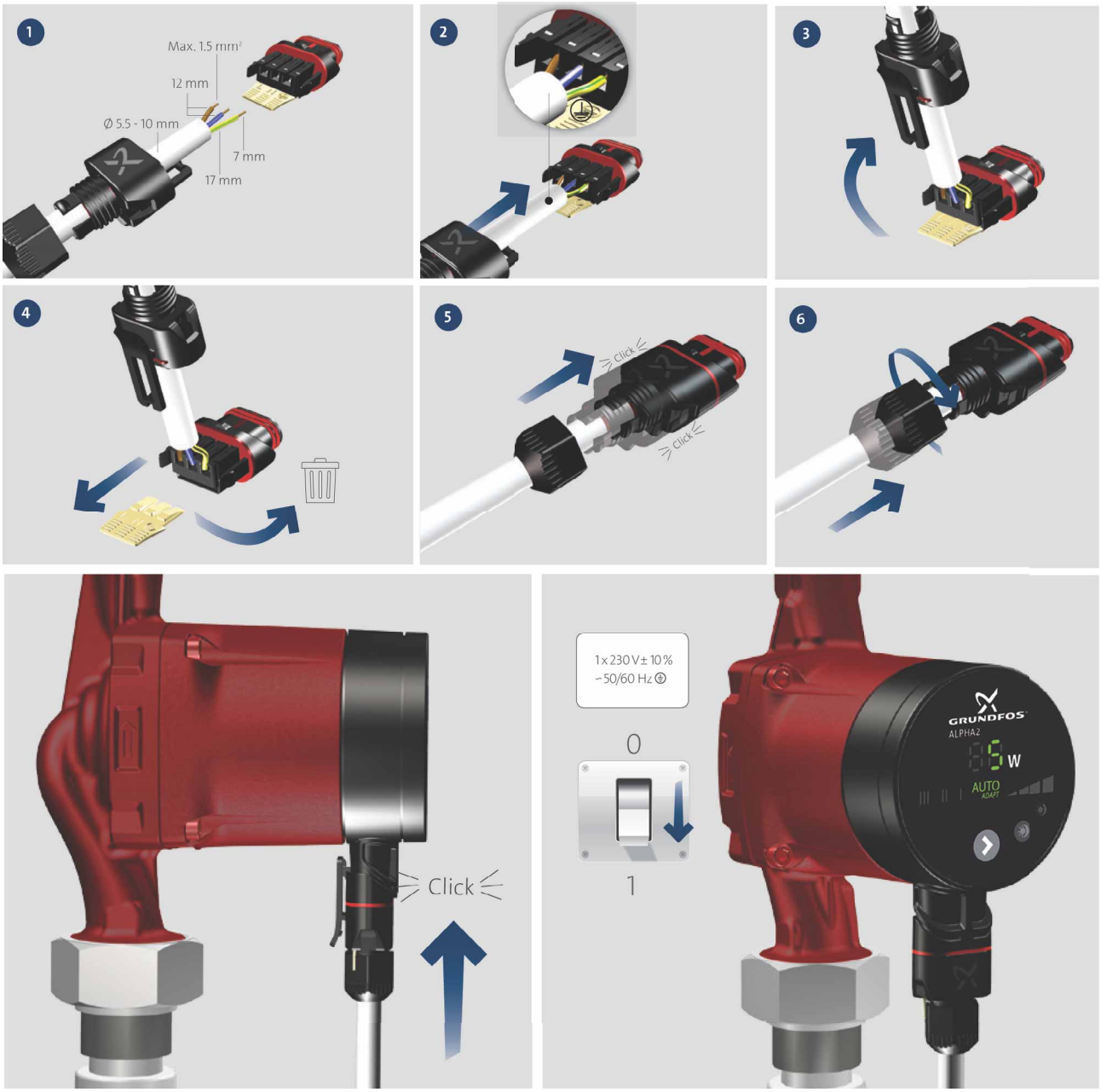

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Fig. 7 Electrical connection

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

Warning

The pump must be connected to earth ⏚.

The pump must be connected to an external mains switch with a minimum contact gap of 3 mm in all poles.

- The pump requires no external motor protection.
- Check that the supply voltage and frequency correspond to the values stated on the nameplate. See section *3.1 Nameplate*.
- Connect the pump to the power supply with the plug supplied with the pump as shown in fig. 7.
- Light in the control panel shows that the power supply has been switched on.

7. Control panel

7.1 Elements on the control panel

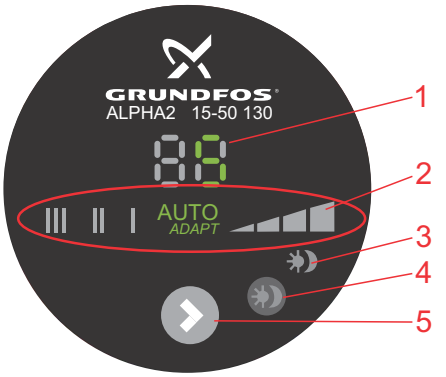

Fig. 8 GRUNDFOS ALPHA2 control panel

The control panel comprises:

Pos.	Description
1	Display showing the actual pump power consumption in Watt
2	Eight light fields indicating the pump setting
3	Light field indicating the status of Automatic Night SetBack
4	Push-button for activation of Automatic Night SetBack
5	Push-button for selection of pump setting

7.2 Display

The display (fig. 8, pos. 1) is on when the power supply has been switched on.

The display shows the actual pump power consumption in Watt (integer) during operation.

Note ***Faults preventing the pump from operating properly (for example seizing-up) are indicated in the display by "- -". See section 13. Fault finding.***

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

Note ***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 eight optional settings which can be selected with the push-button. See fig. 8, pos. 5.

The pump setting is indicated by eight different light fields. See fig. 9.

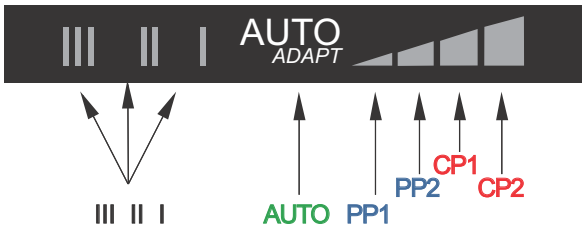

Fig. 9 Eight light fields

Number of button presses	Light field	Description
0	$AUTO_{ADAPT}$ (factory setting)	$AUTO_{ADAPT}$
1	PP1	Lowest proportional-pressure curve
2	PP2	Highest proportional-pressure curve
3	CP1	Lowest constant-pressure curve
4	CP2	Highest constant-pressure curve
5	III	Constant curve, speed III
6	II	Constant curve, speed II
7	I	Constant curve, speed I
8	$AUTO_{ADAPT}$	$AUTO_{ADAPT}$

See section *12. Pump settings and pump performance* for information about the function of the settings.

7.4 Light field indicating the status of Automatic Night SetBack

Light in (fig. 8, pos. 3) shows that Automatic Night SetBack is active. See section *7.5 Push-button for activation of Automatic Night SetBack*.

7.5 Push-button for activation of Automatic Night SetBack

The push-button (fig. 8, pos. 4) activates/deactivates Automatic Night SetBack.

Automatic Night SetBack is only relevant for heating systems prepared for this function. See section *9. Automatic Night SetBack*.

The light field (fig. 8, pos. 3) is on when Automatic Night SetBack is active.

Factory setting: Automatic Night SetBack = not active.

Note ***If the pump has been set to speed I, II or III, it is not possible to select Automatic Night SetBack.***

7.6 Push-button for selection of pump setting

Every time the push-button (fig. 8, pos. 5) is pressed, the pump setting is changed.

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

8. Setting the pump

8.1 Pump setting for system type

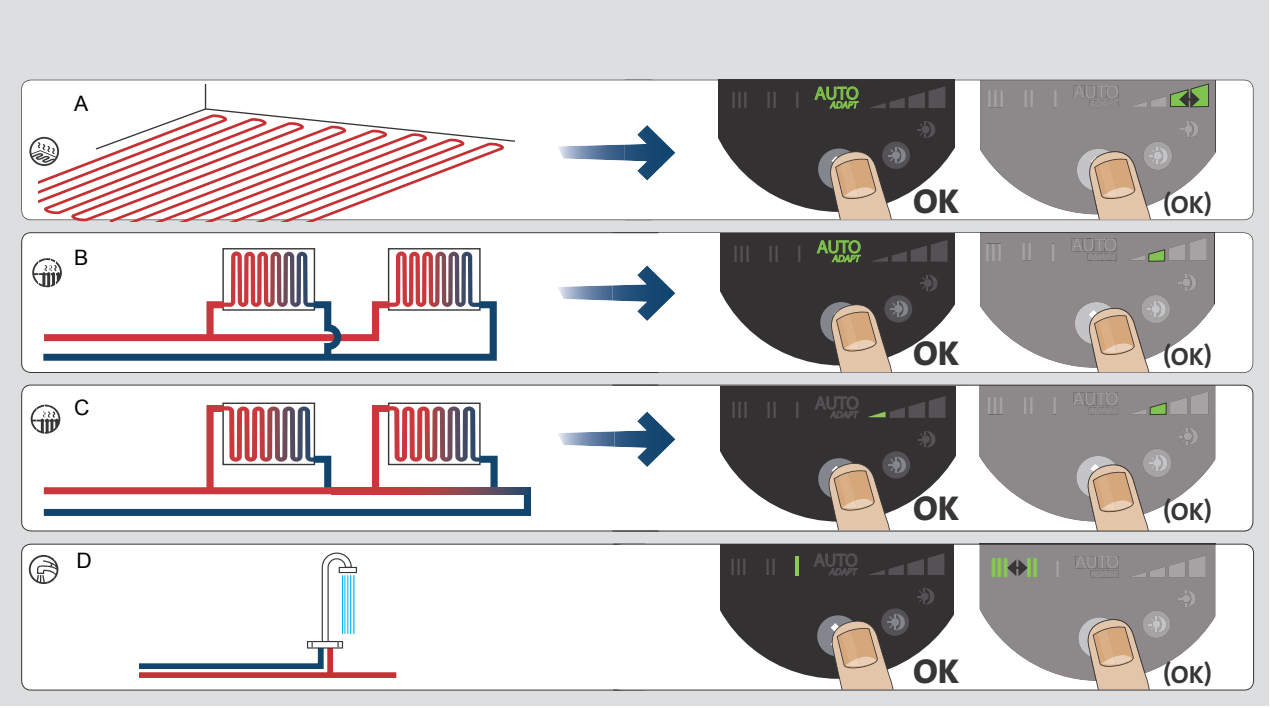

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Fig. 10 Selection of pump setting for system type

Factory setting = AUTO$_{ADAPT}$.

Recommended and alternative pump settings according to fig. 10:

Pos.	System type	Pump setting	
		Recommended	Alternative
A	Underfloor heating	AUTO$_{ADAPT}$*	Highest constant-pressure curve (CP2)* or lowest constant-pressure curve (CP1)*
B	Two-pipe systems	AUTO$_{ADAPT}$*	Highest proportional-pressure curve (PP2)*
C	One-pipe systems	Lowest proportional-pressure curve (PP1)*	Highest proportional-pressure curve (PP2)*
D	Domestic water	Constant speed, speed I*	Constant speed, speed II or III*

* See section *15.1 Guide to performance curves*.

AUTO$_{ADAPT}$ (underfloor heating and two-pipe systems)

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

If you choose to change back to AUTO$_{ADAPT}$, the pump remembers its last setpoint in AUTO$_{ADAPT}$ and resumes the automatic adjustment of the performance.

Changing from recommended to alternative pump setting

Heating systems are "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.

Explanation to pump settings in relation to performance curves, see section *12. Pump settings and pump performance*.

8.2 Pump control

During operation, the pump head will be controlled according to the principle "proportional-pressure control" (PP) or "constant-pressure control" (CP).

In these control modes, the pump performance and consequently the power consumption are adjusted according to the heat demand in the system.

Proportional-pressure control

In this control mode, the differential pressure across the pump is controlled according to the flow.

The proportional-pressure curves are indicated by PP1 and PP2 in the Q/H diagrams. See section *12. Pump settings and pump performance*.

Constant-pressure control

In this control mode, a constant differential pressure across the pump is maintained, irrespective of the flow.

The constant-pressure curves are indicated by CP1 and CP2 and are the horizontal performance curves in the Q/H diagrams. See section *12. Pump settings and pump performance*.

9. Automatic Night SetBack

9.1 Basis for Automatic Night SetBack

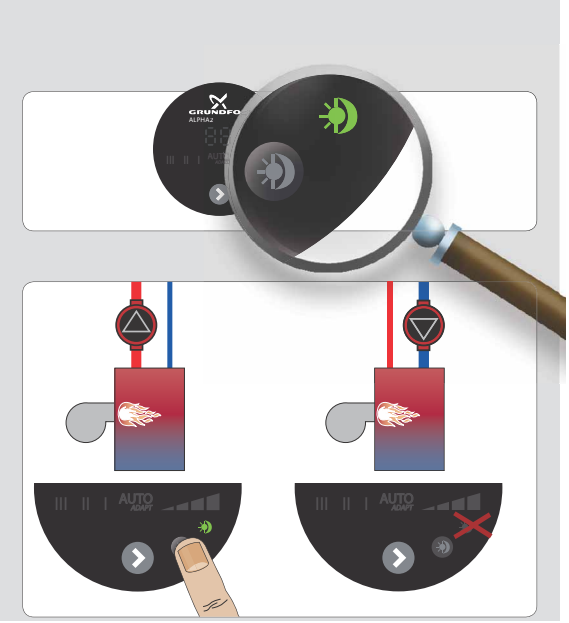

Fig. 11 Automatic Night SetBack

Warning

Pumps built into gas boilers with a small water content must never be set to Automatic Night SetBack.

Note

If speed I, II or III is selected, the Automatic Night SetBack is deactivated.

It is not necessary to reactivate Automatic Night SetBack if the power supply has been switched off.

Note

If the power supply is switched off when the pump is running on the curve for Automatic Night SetBack, the pump will start in normal operation. See section 12. Pump settings and pump performance.
The pump changes back to the curve for Automatic Night SetBack when the condition for Automatic Night SetBack is fulfilled again. See section 9.2 Function of Automatic Night SetBack.

Note

If the heating system is "undersupplied" (insufficient heat), check whether Automatic Night SetBack is activated. If yes, deactivate this 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.
  The Automatic Night SetBack function does not work if the pump is installed in the return pipe.
- The system (boiler) must incorporate automatic control of the liquid temperature.

Activate Automatic Night SetBack by pressing .
See section *7.5 Push-button for activation of Automatic Night SetBack*.

Light in shows that Automatic Night SetBack is active.

9.2 Function of Automatic Night SetBack

Once Automatic Night SetBack has been activated, the pump changes automatically between normal duty and night setback. See section *12. Pump settings and pump performance*.

Changeover between normal duty and night setback is dependent on the flow-pipe temperature.

The pump automatically changes over to night setback when a flow-pipe temperature drop of more than 10-15 °C within approx. 2 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.

10. Systems with bypass valve between flow and return pipes

10.1 Purpose of bypass valve

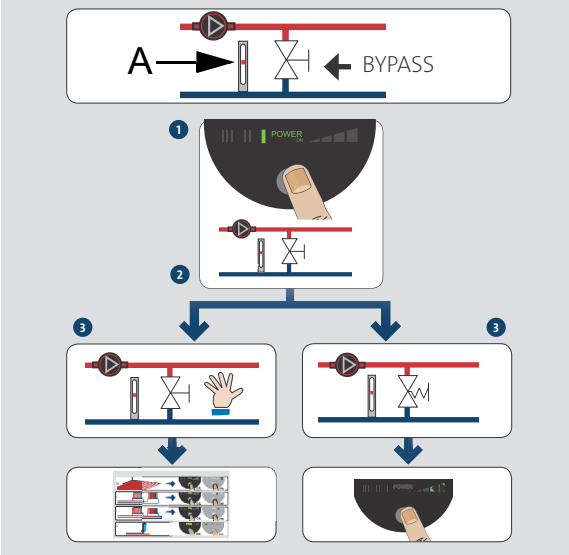

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Fig. 12 Systems with bypass valve

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 present when all valves are closed.

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

10.2 Manually operated bypass valve

Follow this procedure:

1. Adjust the bypass valve with the pump in setting I (speed I). The minimum flow ($Q_{min.}$) for the system must always be observed. Consult the manufacturer's instructions.
2. When the bypass valve has been adjusted, set the pump according to section *8. Setting the pump*.

10.3 Automatic bypass valve (thermostatically controlled)

Follow this procedure:

1. Adjust the bypass valve with the pump in setting I (speed I). The minimum flow ($Q_{min.}$) for the system must always be observed. Consult the manufacturer's instructions.
2. When the bypass valve has been adjusted, set the pump to the lowest or highest constant-pressure curve.
   Explanation to pump settings in relation to performance curves, see section *12. Pump settings and pump performance*.

11. Startup

11.1 Before start-up

Do not start the pump until the system has been filled with liquid and vented. The required minimum inlet pressure must be available at the pump inlet. See sections *4. Applications* and *14. Technical data and installation dimensions*.

11.2 Venting the pump

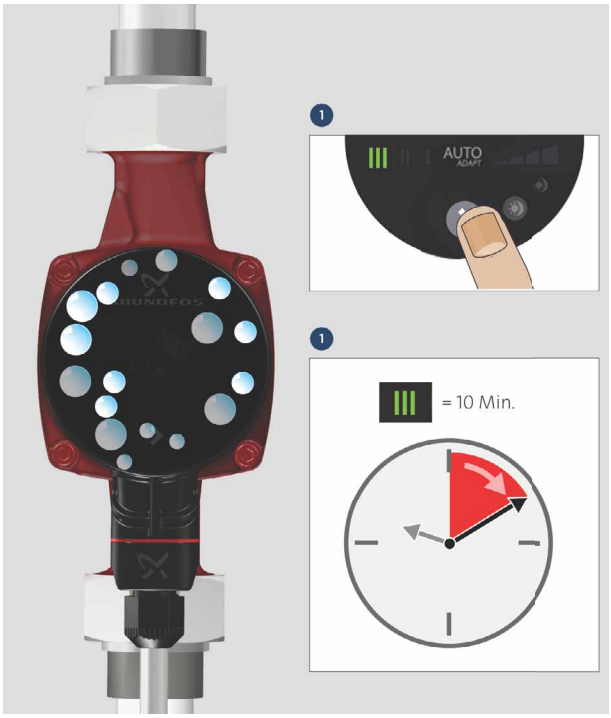

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Fig. 13 Venting the pump

The pump is self-venting. It need not be vented before start-up.

Air in the pump may cause noise. This noise will cease after a few minutes running.

Quick venting of the pump can be obtained by setting the pump to speed III for a short period, depending on system size and design.

When the pump has been vented, i.e. when the noise has ceased, set the pump according to the recommendations. See section *8. Setting the pump*.

Caution ***The pump must not run dry.***

The system cannot be vented through the pump. See section *11.3 Venting of heating systems*.

11.3 Venting of heating systems

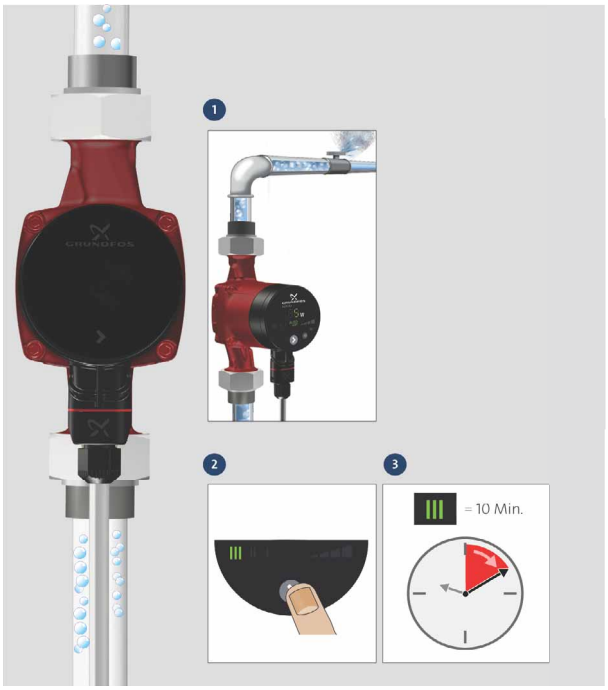

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Fig. 14 Venting of heating systems

The heating system can be vented via an air escape valve installed above the pump. When the heating system has been filled with liquid, follow this procedure:

1. Open the air escape valve.
2. Set the pump to speed III.
3. Let the pump run for a short period, depending on system size and design.
4. When the system has been vented, i.e. when the possible noise has ceased, set the pump according to the recommendations. See section *8. Setting the pump*.

Repeat the procedure, if necessary.

Caution ***The pump must not run dry.***

12. Pump settings and pump performance

12.1 Relation between pump setting and pump performance

Figure 15 shows the relation between pump setting and pump performance by means of curves. See also section *15. Performance curves*.

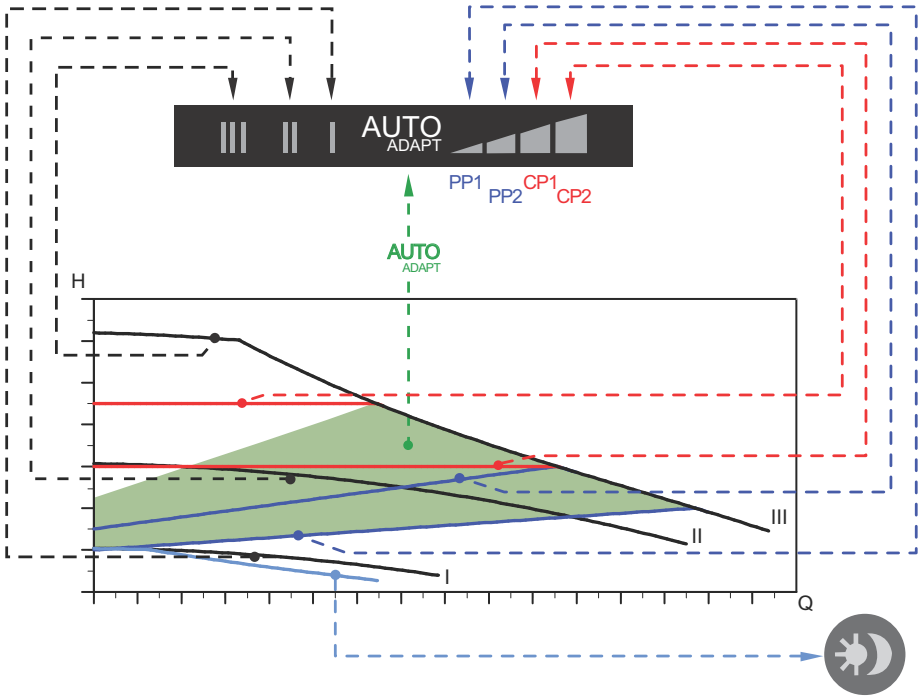

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Fig. 15 Pump setting in relation to pump performance

Setting	Pump curve	Function
AUTO$_{ADAPT}$ (factory setting)	Highest to lowest proportional-pressure curve	The AUTO$_{ADAPT}$ function enables ALPHA2 to control the pump performance automatically within a defined performance range. See fig. 15: • 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 in the system. See fig. 15. The head (pressure) is reduced at falling heat demand and increased at rising heat demand.
PP2	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 in the system. See fig. 15. The head (pressure) 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. 15. The head (pressure) is kept constant, irrespective of the heat demand.
CP2	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. 15. The head (pressure) is kept constant, irrespective of the heat demand.
III	Speed III	The pump runs at a constant speed and consequently on a constant curve. In speed III, the pump is set to run on the maximum curve under all operating conditions. See fig. 15. Quick venting of the pump can be obtained by setting the pump to speed III for a short period. See section *11.2 Venting the pump*.
II	Speed II	The pump runs at a constant speed and consequently on a constant curve. In speed II, the pump is set to run on the intermediate curve under all operating conditions. See fig. 15.
I	Speed I	The pump runs at a constant speed and consequently on a constant curve. In speed I, the pump is set to run on the minimum curve under all operating conditions. See fig. 15.
		The pump changes to the curve for Automatic Night SetBack, i.e. absolute minimum performance and power consumption, provided certain conditions are met. See section *9. Automatic Night SetBack*.

13. Fault finding

Warning

Before starting work on the pump, switch off the power supply. Make sure that the power supply cannot be accidentally switched on.

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 out.	Cut in the circuit breaker.
		c) The pump is defective.	Replace the pump.
	Display shows "- -".	a) Power supply failure. The power supply might be too low.	Check that the power supply falls within the specified range.
		b) The pump is blocked.	Remove the impurities.
2. Noise in the system.	Shows normal operating status.	a) Air in the system.	Vent the system. See section *11.3 Venting of heating systems*.
		b) The flow is too high.	Reduce the suction head. See section *12. Pump settings and pump performance*.
3. Noise in the pump.	Shows normal operating status.	a) Air in the pump.	Let the pump run. It vents itself over time. See section *11.2 Venting the pump*.
		b) The inlet pressure is too low.	Increase the inlet pressure or check the air volume in the expansion tank, if installed.
4. Insufficient heat.	Shows normal operating status.	a) The pump performance is too low.	Increase the suction head. See section *12. Pump settings and pump performance*.

14. Technical data and installation dimensions

14.1 Technical data

Supply voltage	1 x 230 V - 10 %/+ 10%, 50/60 Hz, PE.	
Motor protection	The pump requires no external motor protection.	
Enclosure class	IP42.	
Insulation class	F.	
Relative air humidity	Maximum 95 %.	
System pressure	Maximum 1.0 MPa, 10 bar, 102 m head.	
Inlet pressure	Liquid temperature	**Minimum inlet pressure**
	≤ +75 °C	0.05 bar, 0.005 MPa, 0.5 m head
	+90 °C	0.28 bar, 0.028 MPa, 2.8 m head
	+110 °C	1.08 bar, 0.108 MPa, 10.8 m head
EMC	EN 55014-1:2006 and EN 55014-2:1997.	
Sound pressure level	The sound pressure level of the pump is lower than 43 dB(A).	
Ambient temperature	0 to +40 °C.	
Temperature class	TF110 to CEN 335-2-51.	
Surface temperature	The maximum surface temperature will not exceed +125 °C.	
Liquid temperature	+2 to +110 °C.	

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

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

14.2 Installation dimensions, GRUNDFOS ALPHA2 XX-50, XX-60

Dimensional sketches and table of dimensions

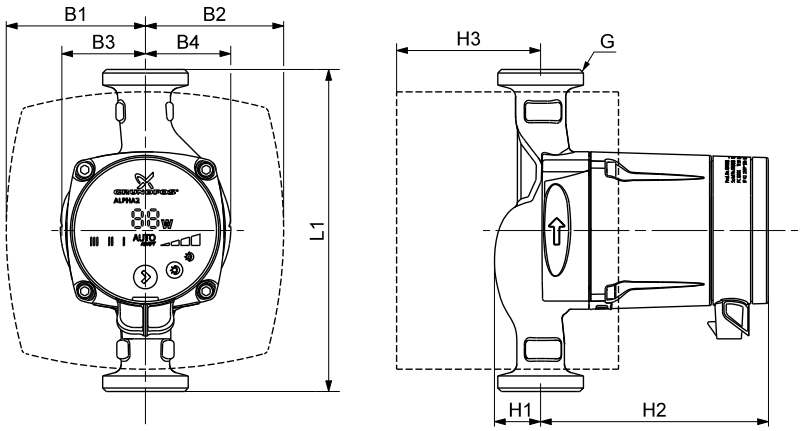

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Fig. 16 Dimensional sketches, ALPHA2 XX-50, XX-60

Pump type	Dimensions								
	L1	B1	B2	B3	B4	H1	H2	H3	G
ALPHA2 15-50 130*	130	78	78	46	49	27	129	58	1 1/2
ALPHA2 15-60 130*	130	78	78	46	49	27	129	58	1 1/2
ALPHA2 15-50 N 130*	130	-	-	47	48	26	127	-	1 1/2
ALPHA2 20-50 N 150*	150	-	-	49	49	28	127	-	1 1/4

* For UK only.

15. Performance curves

15.1 Guide to performance curves

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

A power curve (P1 curve) belongs to each Q/H curve. The power curve shows the pump power consumption (P1) in Watt at a given Q/H curve.

The P1 value corresponds to the value that can be read from the pump display. See fig. 17:

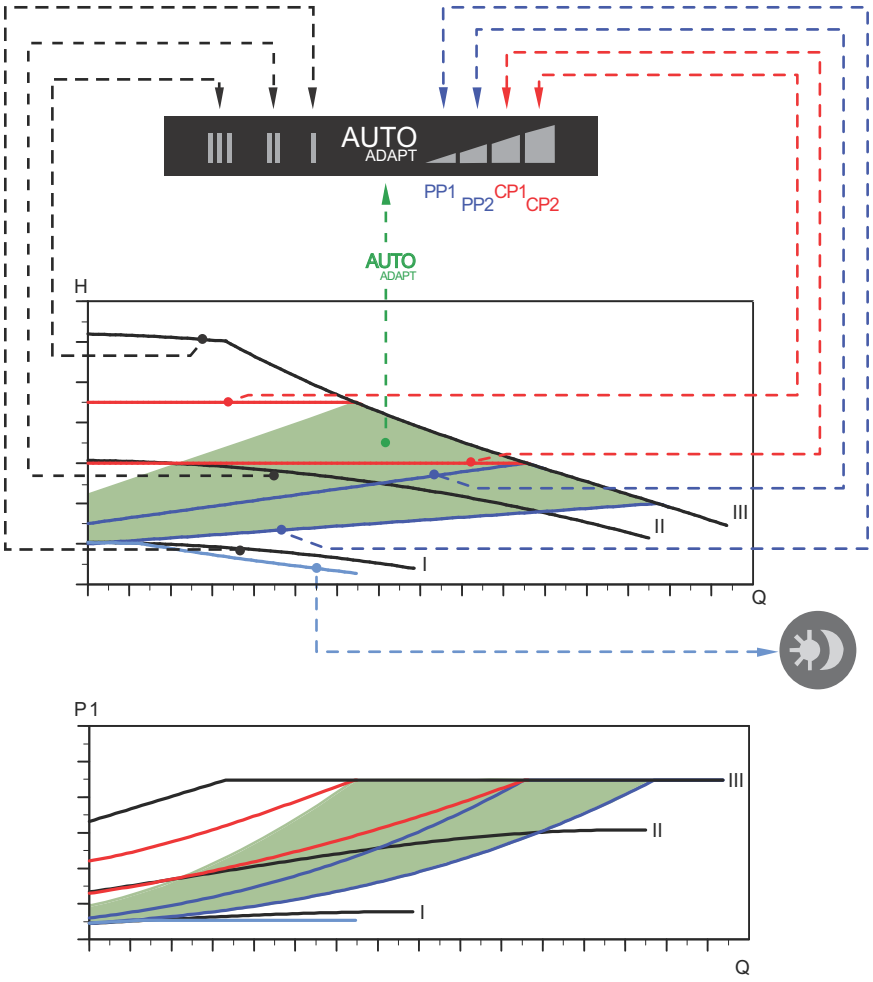

Fig. 17 Performance curves in relation to pump setting

Setting	Pump curve
AUTO$_{ADAPT}$ (factory setting)	Setpoint within the green marked area
PP1	Lowest proportional-pressure curve
PP2	Highest proportional-pressure curve
CP1	Lowest constant-pressure curve
CP2	Highest constant-pressure curve
III	Constant speed, speed III
II	Constant speed, speed II
I	Constant speed, speed I
	Curve for Automatic Night SetBack

For further information about pump settings, see sections

7.3 Light fields indicating the pump setting

8. Setting the pump

12. Pump settings and pump performance.

15.2 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 ρ = 983.2 kg/m^3 and a liquid temperature of +60 °C.
- All curves show average values and should not be used as guarantee curves. If a specific minimum performance is required, individual measurements must be made.
- The curves for speeds I, II and III are marked.
- The curves apply to a kinematic viscosity of υ = 0.474 mm^2/s (0.474 cSt).

15.3 Performance curves, ALPHA2 XX-50

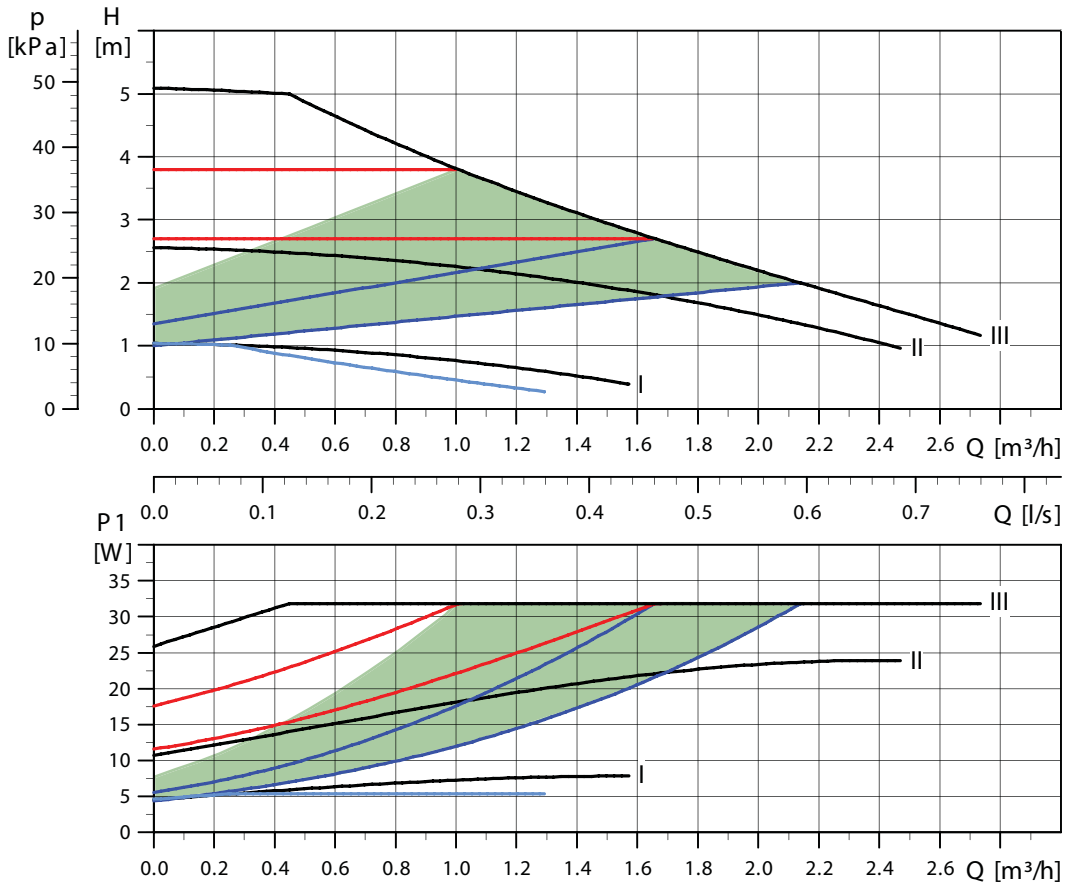

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Fig. 18 ALPHA2 XX-50

15.4 Performance curves, ALPHA2 XX-60

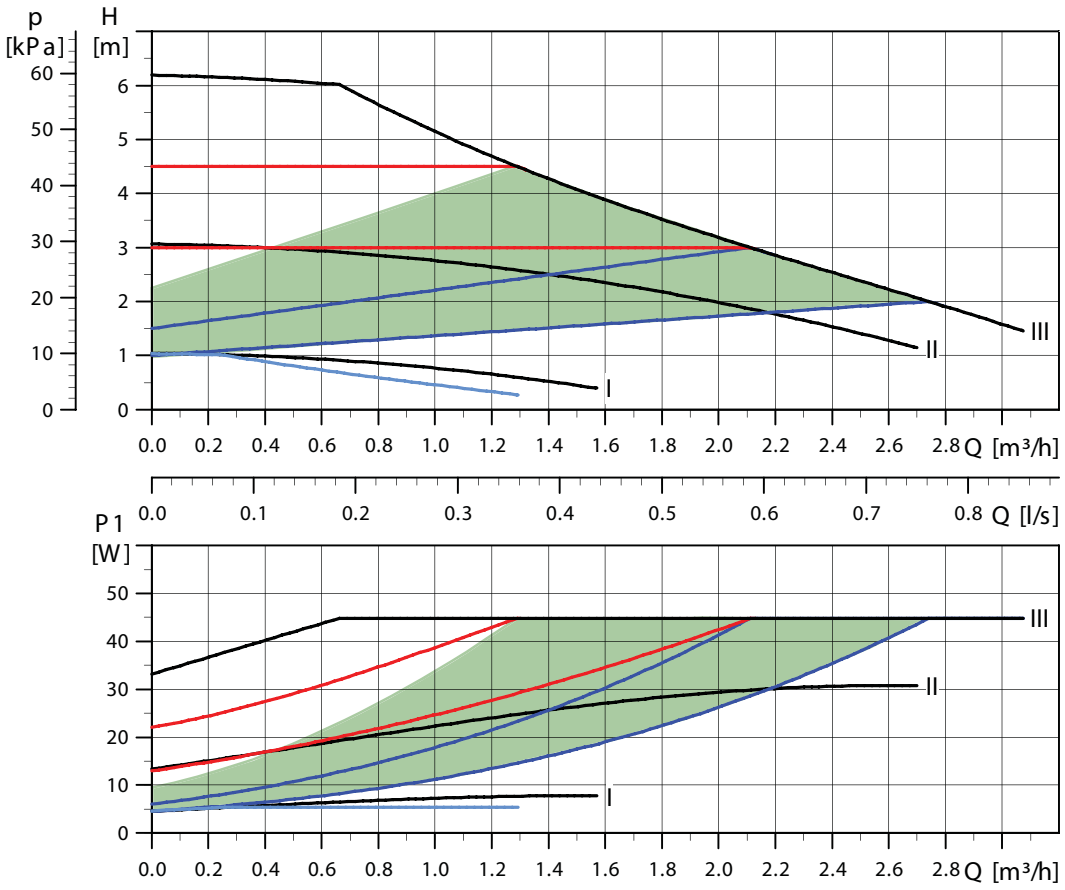

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Fig. 19 ALPHA2 XX-60

16. Accessories

Accessories for GRUNDFOS ALPHA2. See fig. 20.

Accessories include

- fittings (unions and valves)
- insulating kits (insulating shells)
- plug.

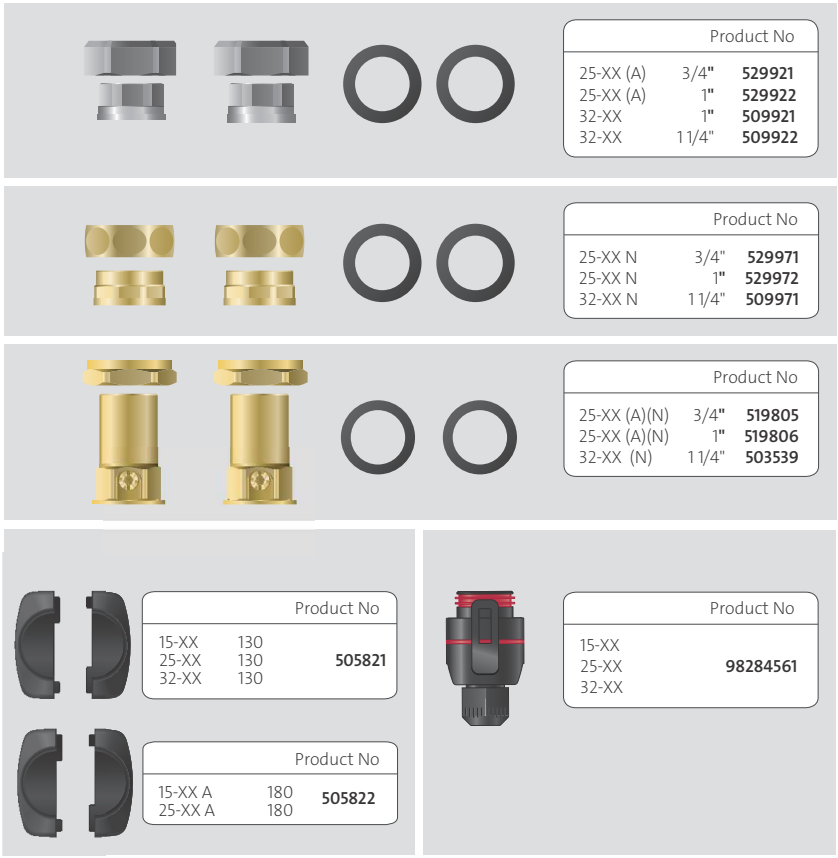

Fig. 20 Accessories

17. Disposal

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.

Subject to alterations.

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