

ALPHA 26-99

Installation and operating instructions



English (US) Installation and operating instructions

Original installation and operating instructions

These installation and operating instructions describe Grundfos ALPHA2 26-99 circulator pumps.

Sections 1-4 give the information necessary to be able to unpack, install and start up the product in a safe way.

Sections 5-9 give important information about the product, as well as information on service, fault finding and disposal of the product.

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



Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children.



Successful operation depends on careful attention to the procedures described in this manual. Keep this manual for future use.

1. Limited warranty

Products manufactured by Grundfos Pumps Corporation (Grundfos) are warranted to the original user only to be free of defects in material and workmanship for a period of 30 months from date of installation, but not more than 36 months from date of manufacture. Grundfos' liability under this warranty shall be limited to repairing or replacing at Grundfos' option, without charge, F.O.B. Grundfos' factory or authorized service station, any product of Grundfos manufacture. Grundfos will not be liable for any costs of removal, installation, transportation, or any other charges that may arise in connection with a warranty claim.

Products which are sold, but not manufactured by Grundfos, are subject to the warranty provided by the manufacturer of said products and not by Grundfos' warranty.

Grundfos will not be liable for damage or wear to products caused by abnormal operating conditions, accident, abuse, misuse, unauthorized alteration or repair, or if the product was not installed in accordance with Grundfos' printed installation and operating instructions and accepted codes of good practice. The warranty does not cover normal wear and tear.

To obtain service under this warranty, the defective product must be returned to the distributor or dealer of Grundfos' products from which it was purchased together with proof of purchase and installation date, failure date and supporting installation data. Unless otherwise provided, the distributor or dealer will contact Grundfos or an authorized service station for instructions. Any defective product to be returned to Grundfos or a service station must be sent freight prepaid; documentation supporting the warranty claim and/or a Return Material Authorization must be included if so instructed.

Grundfos will not be liable for any incidental or consequential damages, losses, or expenses arising from installation, use, or any other causes. There are no express or implied warranties, including merchantability or fitness

for a particular purpose, which extend beyond those warranties described or referred to above. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages and some jurisdictions do not allow limitations on how long implied warranties may last. Therefore the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.

Products which are repaired or replaced by Grundfos or authorized service center under the provisions of these limited warranty terms will continue to be covered by Grundfos warranty only through the remainder of the original warranty period set forth by the original purchase date.

2. General information

2.1 Hazard statements

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



DANGER

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



WARNING

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



CAUTION

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

The hazard statements are structured in the following way:



SIGNAL WORD

Description of hazard

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

2.2 Notes

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



Observe these instructions for explosion-proof products.



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



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



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



Tips and advice that make the work easier.

3. Installation

WARNING

Pressurized system

Death or serious personal injury
- Before dismantling the pump, drain the system or close the isolating valve on either side of the pump before the screws are removed. The pumped liquid may be scalding hot and under high pressure.



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
- Do not use the pump in swimming pool or marine areas.



3.1 Changing the pump head position

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.

WARNING**Pressurized system**

- Death or serious personal injury
- Before dismantling the pump, drain the system or close the isolating valve on either side of the pump before you remove the screws. The pumped liquid may be scalding hot and under high pressure.

CAUTION**Hot surface**

- Minor or moderate personal injury
- Position the pump so that persons cannot accidentally come into contact with hot surfaces.

Make any change to the pump head orientation before filling the system with liquid. You can turn the pump head in steps of 90°.

For permissible positions, see fig. 1.

Proceed as follows:

1. If liquid is present, drain the liquid from the pump or isolate the liquid from the pump.
2. Remove the four socket head cap screws.
3. Turn the pump head to the desired position.
4. Cross-tighten the screws.

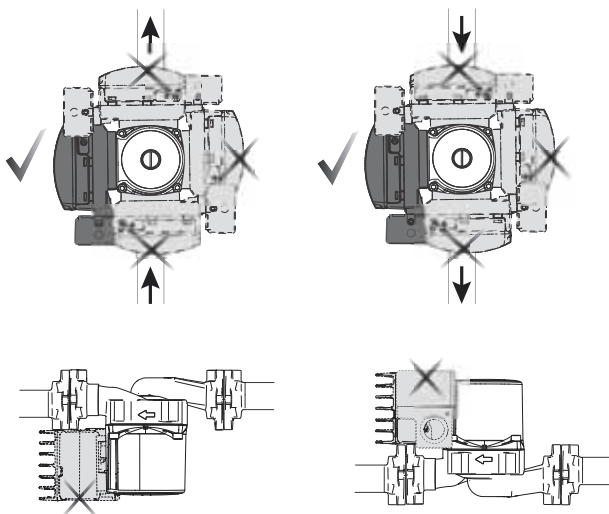


Fig. 1 Control box positions

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3.2 Insulating the pump housing



Do not insulate the control box, especially the heat sink, in order to allow cooling by the surrounding air.

Do not cover the pump head with diffusion-tight, cold-water insulation.



Keep the drain holes located in the stator housing free.

If the pump is installed in a cabinet or fitted with insulation shells, the inside air temperature must be evaluated. If you expect constant ambient air temperatures higher than 130 °F (54 °C), please contact Grundfos.

3.3 Electrical installation

DANGER



Electric shock

Death or serious personal injury

- All electrical work must be carried out by a qualified electrician in accordance with the latest edition of the National Electric Code and state, local codes and regulations.

DANGER



Electric shock

Death or serious personal injury

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

DANGER



Electric shock

Death or serious personal injury

- Do not use the pump in swimming pool or marine areas.

WARNING



Electric shock

Death or serious personal injury

- This pump is supplied with a grounding conductor. To reduce the risk of electric shock, be certain that it is connected only to a properly grounded, grounding-type receptacle in accordance with the National Electric Code and any state, local governing codes and regulations.



The pump must not be used with an external speed control which varies the supply voltage, for example phase-cut or pulse-cascade control.



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

- The motor is protected by the electronics in the control box and requires no external motor protection.
- UL-approved ALPHA1 26-99/ALPHA2 26-99 circulators are equipped with a conduit box for easy installation of the power cable.

Inrush current

The inrush current is the charge current to the electrolytic capacitor in the power supply to the electronics. The maximum current amplitude depends on the power supply and the complete wiring from the distributor transformer to the pump. The pump is internally controlled by a small variable frequency drive (VFD) running on a DC voltage. Therefore, the supply voltage is rectified to a DC voltage before it reaches the VFD.

The load of electronically commutated motors (ECM) behaves as a capacitive load and not as a motor load as in a standard pump. When the power supply is switched on, the capacitor will behave as a short circuit (as it is "empty", i.e. it has not been charged). Therefore, the current is only limited by the sum of the resistance in the NTC thermistor and the resistance in the coil of the EMC filter.

If the power supply is switched on when the supply voltage is at its highest level, the inrush current can become very high for a very short period of time. After this period of time, the current will drop to the rated current.

When the power supply to the pump is switched on and off via an external relay, it must be ensured that the contact material of the relay is able to handle higher inrush currents. We recommend to use special inrush relays with silver-tin-oxide (AgSnO) contacts.

Leakage current

The pump mains filter causes a leakage current to ground during operation.

High-voltage test

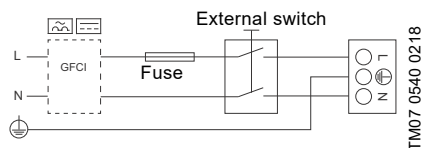
The pump incorporates filter components that are connected to ground. The voltage level and the number of tests should be as low as possible, in order to grant the longest lifetime in the market. Additional standard high-voltage tests of the complete pump including filter must be avoided to eliminate the risk of filter damage.

Ground fault circuit interrupter (GFCI)

WARNING**Electric shock**

- Death or serious personal injury
- Use a suitable type of GFCI capable of handling ground fault currents with DC content (pulsating DC).

If the pump is connected to an electrical installation where a ground fault circuit interrupter (GFCI) is used for additional protection, this Ground Fault Circuit Interrupter must be able to trip when ground fault currents with DC content occur.



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Fig. 2 GFCI connection diagram

3.3.1 Power supply connection

DANGER**Electric shock**

- Death or serious personal injury
- All electrical work must be carried out by a qualified electrician in accordance with the latest edition of the National Electric Code and state, local codes and regulations.

DANGER**Electric shock**

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

WARNING**Electric shock**

- Death or serious personal injury
- This pump is supplied with a grounding conductor. To reduce the risk of electric shock, be certain that it is connected only to a properly grounded, grounding-type receptacle in accordance with the National Electric Code and any state, local governing codes and regulations.

WARNING**Electric shock**

- Death or serious personal injury
- The connection to the fixed wiring systems must be made using a flexible conduit system only.
 - The terminal block is suitable for copper conductors only.



Do not use the pump with an external speed control which varies the supply voltage, for example phase-cut or pulse-cascade control.

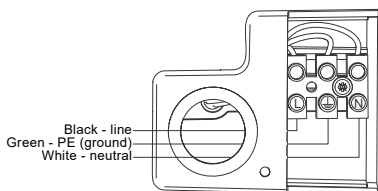
Do not connect the pump using rigid conduit connections.

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

All cables and connectors used must be connected in accordance with local regulations.

- UL-approved ALPHA1 26-99/ALPHA2 26-99 circulators are equipped with a conduit box for easy installation of the power cable.
- The motor is protected by the electronics in the control box and requires no external motor protection.
- The pump can be connected to the power supply by a 3-wire cable with protective earth (ground) connection.

The protective earth (ground) symbol identifies any terminal which is intended for connection to an external conductor for protection against electrical shock in case of a fault, or the terminal of a protective earth (ground) electrode.



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Fig. 3 Conduit box connection

3.3.2 Signal-cable connection

WARNING

Electric shock



- The pump must be connected to an external main switch with a minimum contact gap of 0.12 inches (3 mm) in all poles.
- Grounding or neutralization must be used for protection against indirect contact.

WARNING

Electric shock



Death or serious personal injury

- External signal cables must be in accordance with chapter 725 of the NEC in order to insulate this circuit from others. The suitable type of signal cable is type CL3, CL3R, CL3P or equivalent.



Do not connect the signal-reference wire to the ground.



Connect the signal wires to the correct poles. Otherwise the pump might be damaged.

ALPHA2 26-99 pumps are internally speed-controlled and have no active signal-cable connection. It is covered by a blanking plug.

0-10 VDC

ALPHA1 26-99 circulator pumps are externally speed-controlled by an analog 0-10 VDC signal. To enable pump control, a signal cable is required.

The signal cable has two or three conductors. The signal cable must be connected to the control box by a duxbox housing with an FCI terminal block and terminals.

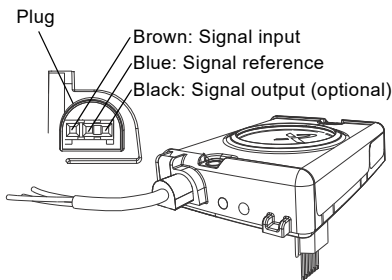


Fig. 4 VDC signal cable connection

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4. Starting up the product

CAUTION



Hot liquid

- Minor or moderate personal injury
- When loosening the inspection screw, be aware of hot, spraying water.



Flush the system of debris before installation.



The pump must not run dry.

The required minimum inlet pressure must be available at the pump inlet.



Do not start the pump until the system has been filled with liquid and vented.



The pump is self-venting, and does not need to manually be vented before startup.

The system cannot be vented through the pump.



Air in the pump may cause noise. This noise ceases after a few minutes of running.

Air inside the pump will be transported by the medium into the system during the first minutes after pump startup.

- The pump may stop when the inspection screw is loosened.
- When the pump is connected to power the pump starts automatically either on the preset control mode or the last stored setting (AUTO) or with the speed that refers to the external control signal (VDC).
- Without signal, the pump will run at maximum speed (profile heating).
- In special systems (e.g. with check valve at the top of the pump), it might be necessary to check if the system has been vented completely by opening the inspection screw in the middle of the nameplate.

5. Product introduction

5.1 Product description

ALPHA1 26-99/ALPHA2 26-99 circulator pumps are of the canned-rotor type. Pump and motor form an integral unit without shaft seal, with only one gasket for sealing and four screws for fastening the stator housing to the pump housing. The bearings are lubricated by the pumped liquid.

5.1.1 ALPHA2 26-99 - internally controlled

These circulator pumps are designed for systems with variable flow rates, where the pump is internally controlled via a user interface. Speed control can reduce the power consumption considerably. In addition, speed control is required to control the performance of a system.



Fig. 1 ALPHA2 26-99

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5.1.2 ALPHA1 26-99 - externally controlled

These circulator pumps are remote-controlled via a low-voltage 0-10 VDC signal by a system controller integrated in a boiler or a building management system (BMS).



Fig. 2 ALPHA1 26-99

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5.2 Applications

DANGER



Electric shock

- Death or serious personal injury
- Do not use the pump in swimming pool or marine areas.

ALPHA1 26-99/ALPHA2 26-99 circulator pumps are designed for circulating liquids in heating and air-conditioning systems. They are suitable for cold-water applications in the stainless steel versions.

5.3 Pumped liquids

For more technical data, see section

8. [Technical data](#).

DANGER



Flammable material

- Death or serious personal injury
- Do not use the pump for flammable liquids, such as diesel oil and gasoline.

WARNING



Biological hazard

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

CAUTION



Corrosive substance

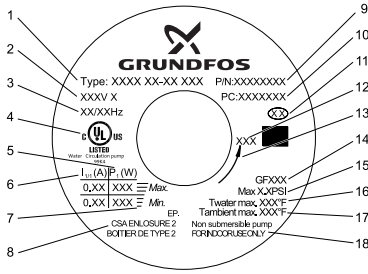
- Minor or moderate personal injury
- Do not use the pump for aggressive liquids.

The pump is suitable for the following liquids:

- Clean, thin, non-aggressive and non-explosive liquids without solid particles or fibers.
- If the pump is installed in a heating system, the water must meet the requirements of accepted standards on water quality in heating systems.
- In domestic hot-water systems, the pump should be used only for water with a degree of hardness lower than approx. 15 grain CaCO₃/gal (US) (2.5 mmol CaCO₃/l). To eliminate the risk of lime precipitation, the medium temperature must not exceed 150 °F (65 °C).
- Mixtures of water with anti-freezing media such as glycol or ethanol down to 14 °F (-10 °C) with a validated temperature profile. Depending on the type of glycol, the mixture and the liquid temperature, the viscosity increases. The viscosity must not exceed 10 cSt (10 mm²/s).

5.4 Identification

5.4.1 Nameplate



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Fig. 3 Nameplate

Pos.	Description
1	Type designation
2	Voltage [V]
3	Frequency [Hz]
4	Approval mark UL
5	Input power P1 [W] at maximum and minimum performance
6	Rated current [A] at maximum and minimum performance
7	Speed
8	Enclosure class
9	Product number
10	Production code (YYMM)
11	Country of origin
12	Control signal
13	Direction of rotation
14	Code for UL Listed pumps
15	Maximum system pressure [psi]
16	Maximum water temperature [°F]
17	Maximum ambient temperature [°F]
18	Application
19	Customer type code

5.5 Approvals

5.5.1 cULus approval

ALPHA1 26-99/ALPHA2 26-99 pumps for the North American market are UL approved (E96215 vol. 1 and MH26400). To identify which models are approved, find a list with the codes in section 8.1 Approval codes.



Fig. 4 Left: UL approval mark for water-circulation pumps. Right: UL approval mark for drinking-water system components made of stainless steel.

CAUTION



Description of hazard

Minor or moderate personal injury

- cULus listed pumps are tested and evaluated with water only.

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5.6 Performance curves

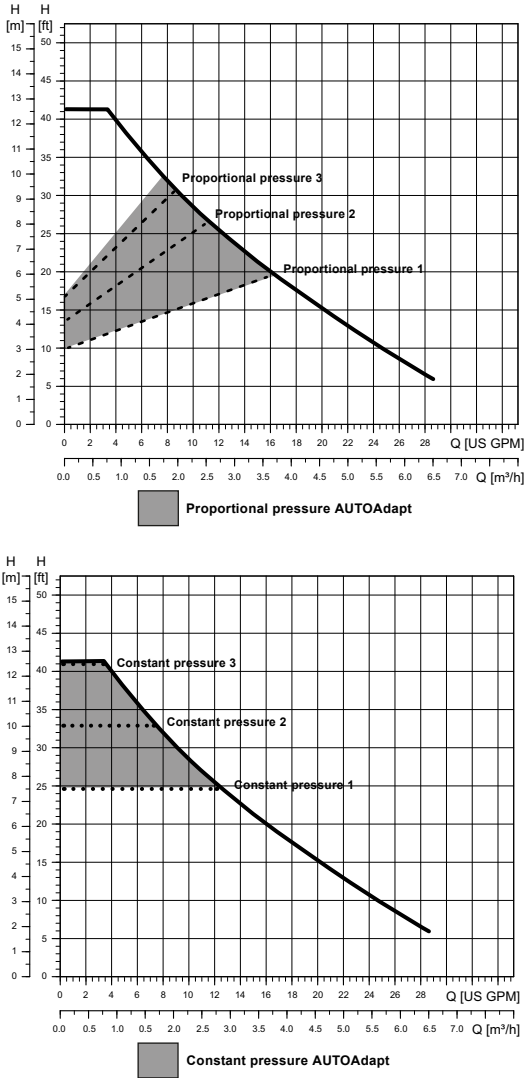


Fig. 5 Performance curves, ALPHA2 26-99 circulators*

* ALPHA1 26-99 circulators are externally speed-controlled by an analog 0-10 V DC signal.

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6. Control functions

6.1 Internal control principles

ALPHA2 26-99 circulator pumps automatically control the differential pressure by adjusting the pump performance to the actual heat demand, without the use of external components.

Two different control modes are available:

Proportional Pressure

The differential pressure increases at increased flow.



Constant Pressure

The differential pressure is constant.



6.1.1 GRUNDFOS AUTOADAPT

The Grundfos AUTOADAPT function enables the circulator to control the pump performance automatically within a defined performance range.

- Adjusting the pump performance to the size of the system.
- Adjusting the pump performance to the variations in load over time.

Two different control modes are available for Grundfos AUTOADAPT:

Proportional Pressure AUTOADAPT

In proportional pressure AUTOADAPT, the circulator is set to proportional-pressure control.



Constant Pressure AUTOADAPT

In constant pressure AUTOADAPT, the circulator is set to constant-pressure control.

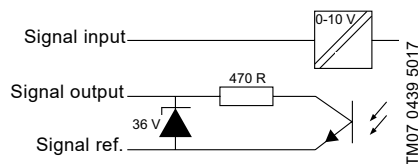


6.2 External control principles

6.2.1 0-10 VDC

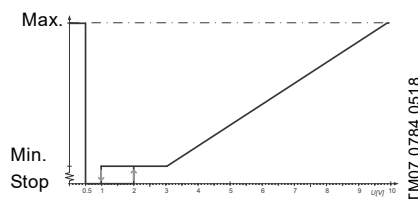
ALPHA1 26-99 circulators are externally speed-controlled by an analog 0-10 V DC signal.

The pump requires a 0-10 V signal on the signal port to control the speed of the pump. The pump will run at its minimum speed if the signal fails (cable break).



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Profile R



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Fig. 6 Profile R

U [V]	Pump status
$0.5 < U \leq 1$	Standby (Stop)
$1 < U \leq 2$	Hysteresis
$2 < U \leq 3$	Min. speed
$3 < U \leq 10$	Speed between Min. and Max.

Alarm output signal

An alarm output signal is available.

Output transistor status indicates pump operation.

Output signal is activated if:

- Stop (input signal 0.5 V - 2 V)
- Stop (because of an alarm) (input signal 2 V - 10 V)

Output signal is not activated if:

- Pump fault.
- Running (input voltage < 0.5 V) (interpreted as cable break).

Rating		Value
Rated input voltage - high level	U_{IH}	4-24 V
Rated input voltage - low level	U_{IL}	< 1 V
High-level input current	I_{IH}	< 10 mA
PWM frequency output, open collector	f	75 Hz \pm 5 %
Accuracy of output signal regarding power consumption	-	\pm 2 % of PWM signal
Collector-emitter breakdown voltage on output transistor	U_C	< 70 V
Collector current on output transistor	I_C	< 50 mA
Max. power dissipation on output resistor	P_R	125 mW
Zener diode working voltage	U_Z	36 V
Max. power dissipation in Zener diode	P_Z	300 mW

6.3 User interface (AUTO version)

Eight settings are easily available by pushing the button. Three LEDs show the chosen setting.

The user interface allows selection between eight control curves in two control modes:

- three proportional pressure curves (PP) + PP AUTOAdapt
- three constant pressure curves (CP) + CP AUTOAdapt.

First startup is in factory presetting of proportional pressure curve 2.

If a setting has already been selected: Start at the actual setting.

- Press the button for two seconds.
 - The pump enters setting mode, and the LED starts flashing.
- Each time you press the button, the setting changes.
 - LEDs 1, 2 and 3 are permanently on, and control curve and mode change.
 - Flashing mode:
 - Fast: proportional pressure
 - Slow: constant pressure/power.
- If the button is not pressed for ten seconds, the selected setting is adapted, and the pump returns to operating mode.
- LED 1, 2 or 3 is permanently on, or all are permanently on:
 - The pump is running with the selected control curve and mode.

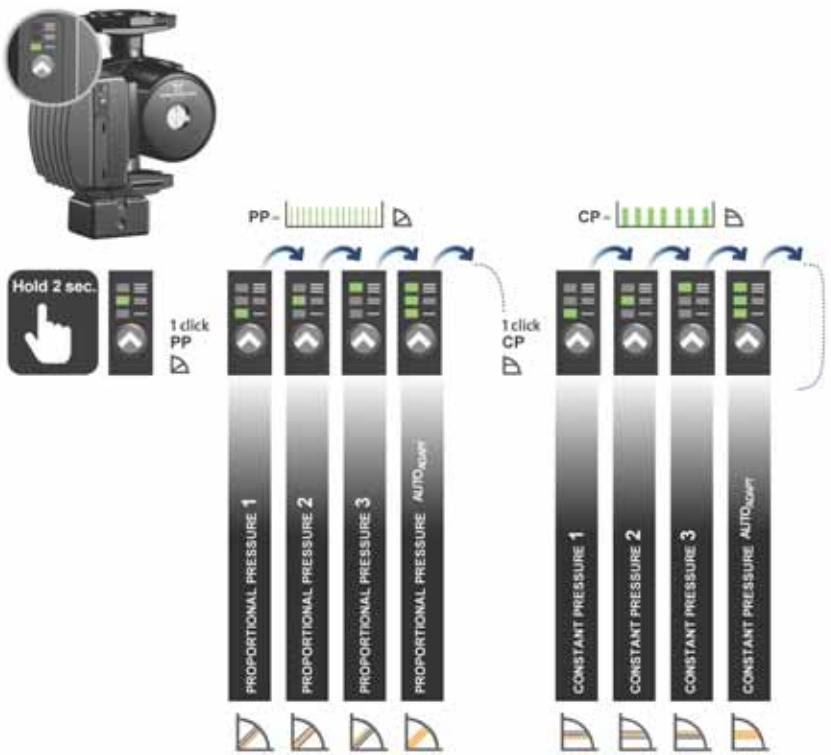


Fig. 7 Changing the settings

7. 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.
 - Be aware that capacitors will be live up to 30 seconds after the power supply has been switched off.



Before dismantling the circulator, drain the system, or close the isolating valves on either side of the circulator.

CAUTION



Hot liquid

- Minor or moderate personal injury
- The pumped liquid may be scalding hot.

CAUTION



Pressurized system

- Minor or moderate personal injury
- The pumped liquid may be under high pressure.

Fault	Power supply	Cause	Remedy
1. The pump does not run.	No power supply.	a) The system is switched off.	Check the system controller.
		b) One fuse in the installation is blown.	Replace the fuse.
		c) The current-operated or voltage-operated circuit breaker has tripped.	Cut in the circuit breaker.
		d) Power supply failure.	Check that the power supply falls within the specified range.
	Normal power supply.	a) The controller has switched off.	Check the controller and its settings.
		b) The pump is blocked by impurities.	Remove the impurities.
		c) The pump is defective.	Replace the pump.
2. The pump cannot be controlled and only runs at maximum speed.	Normal power supply.	a) No signal through the signal cable.	Check if the cable is connected to the controller. If yes, replace the cable.
3. Noise in the system.	Normal power supply.	a) Air in the system.	Vent the system.
		b) The outlet pressure is too high.	Reduce the setting of the controller or the valve.
4. Noise in the pump.	Normal power supply.	a) Air in the pump.	Let the pump run. The pump vents itself over time.
		b) The inlet pressure is too low.	Increase the inlet pressure or check the air volume in the expansion tank, if installed.
5. Insufficient flow.	Normal power supply.	a) The pump performance is too low.	Check the controller and its settings.
		b) The hydraulic system is closed or the system pressure is insufficient.	Check the check valve and filter. Increase the system pressure.

8. Technical data

8.1 Approval codes

Code	Voltage	Power	Control mode
GFJNH	115 V	120 W	VDC
GFJOF	115 V	120 W	AUTO

8.2 Operating conditions

Supply voltage

- 1 x 115 V + 10 %/- 10 %, 50/60 Hz.

Motor protection

EP - Electronically Protected

The pump requires no external motor protection.

Enclosure class

CSA enclosure type 2. For indoor use only.

Maximum system pressure

150 psi (1.0 MPa).

Inlet pressure

The minimum inlet pressure must be available at the pump inlet during operation.

Liquid temperature	Minimum inlet pressure
203 °F (95 °C)	> 7 psi (> 0.05 MPa)

Ambient temperature

Maximum 130 °F (55 °C) near the pump surface.

Storage temperature

Maximum 158 °F (70 °C).

Liquid temperature

- Maximum (continuously): 203 °F (95 °C).
- Minimum: 14 °F (-10 °C).

Inrush current

Measured on a flicker network according to IEC 61000-3-3:1994 + A1, + A2, Annex B.

- 115 V: 25.2 A.

Leakage current

< 3.5 mA.

9. Disposing of the product

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

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

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