ALPHA2

Variable-speed circulators with Auto$_{ADAPT}$™

Installation and operating instructions

Listed

3191277

Conforms to ANSI/UL Std. 778
Certified to CAN/CSA Std. C22.2 No. 108

be
think
innovate

GRUNDFOS

English (US) Installation and operating instructions

Original installation and operating instructions

These installation and operating instructions describe Grundfos ALPHA2.

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

Sections 6-11 give important information about the product, as well as information on service, fault finding and disposal of the product.

CONTENTS

Prior to installation, read this document. 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 the use of the appliance in a safe way and understand the hazards involved. Children must not use or play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

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 Symbols used in this document

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 will be structured in the following way:

SIGNAL WORD

Description of hazard

Consequence of ignoring the warning.

- Action to avoid the hazard.

Example

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.

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

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.

Notes or instructions that make the work easier and ensure safe operation.

3. Receiving the product

3.1 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 *7. Identification* for information on the nameplate.

3.2 Scope of delivery

The box contains the following items:

- one Grundfos ALPHA2 pump
- one insulation shell
- one line cord or terminal box
- two gaskets
- installation and operating instructions
- one check valve
- one "Check Valve Installed" sticker.

4. Installing the product

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.

- This pump has not been investigated for use in swimming pool or marine areas.

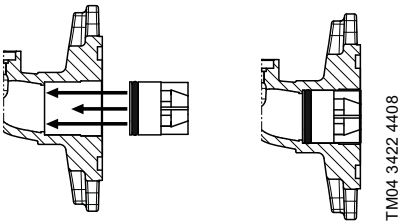
4.1 Quick installation tips

1. To ensure proper air venting of your system, place the pump in "Fixed Speed III" mode until all air has been removed. Isolating zones during this process will ensure proper air removal.
2. For balancing manifold zone(s) applications, utilizing "Constant Pressure mode 1 or 2" and only one zone at a time during balancing will ensure proper flow rate to each zone.
3. Always review your boiler minimum flow rate requirements if utilizing the pump as a primary pump. Select one of the fixed speed modes for boiler primary pump applications.
4. In general, for maximum energy savings and comfort level, start with the AUTO$_{ADAPT}$™ mode.
5. You may change hydraulic selection while pumping. No permanent damage will occur. In fact, Grundfos encourages testing the various hydraulic modes with your hydronic system to ensure maximum energy savings and comfort level.
6. With zone panel control applications, when there is a call for heat and power has been sent to the pump, the pump will remember and restart from the last duty point and hydraulic mode.

4.2 Mechanical installation

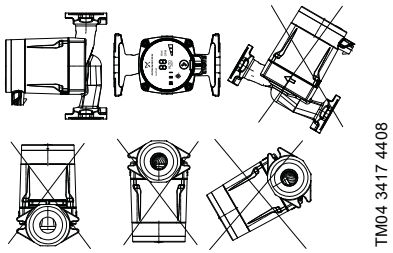
When making pipe connections, follow the piping manufacturer's recommendations and all code requirements for the piping material.

- Flush the system of debris before installation.
- Insert the check valve if required. See fig. 1.
- Refer to the arrows on the pump housing indicating the direction of the liquid flow through the pump.
- Install the pump with horizontal motor shaft. See fig. 2.
- Fit the two gaskets supplied to the pump ends.



TM04 3422 4408

Fig. 1 Check valve installation



TM04 3417 4408

Fig. 2 Installation positions

4.3 Changing the power head position

CAUTION

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

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.

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

- Make any change to the power head orientation before filling the system with liquid. You can turn the power head in steps of 90 °.
- See fig. 3 for permissible positions.
- Only use orientations C and D for CSA, enclosure type 2.

Proceed as follows:

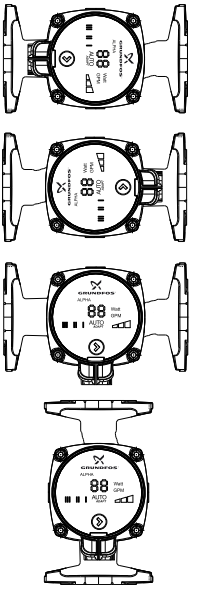
1. If liquid is present, drain the liquid from the pump or isolate the liquid from the pump.
2. Remove the four socket head cap screws.
3. Turn the pump head to the desired position. See fig. 3.
4. Cross-tighten the screws to: 7 ft-lbs torque.

Power head orientation A

Power head orientation B

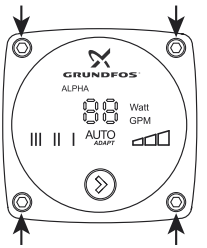
Power head orientation C

Power head orientation D



TM04 3418 1010

Fig. 3 Changing the power head position



TM06 7559 3616

Fig. 4 Remove the four socket head cap screws on the power head to change the power head position

4.4 Insulating the pump housing

TM06 7711 3816

Fig. 5 Insulating the pump housing

Limit the heat loss from the pump housing and pipes.

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

You can reduce the heat loss from the pump and pipes by insulating the pump housing and the pipes. See figures 5 and 6.

- Insulating shells are supplied with ALPHA2 cast iron flanged versions. See fig. 6.
- For pumps in air-conditioning and cooling systems (down to +14 °F (-10 °C)), it is required to apply a silicon sealant to the internal contours of the shell in order to eliminate any air gaps and prevent condensation between the insulating shell and pump housing. Alternatively, you can insulate the pump manually in accordance with standard insulating requirements for heating and cooling systems.
- The fitting of insulating shells will increase the pump dimensions.

TM06 7589 4716

TM06 7588 3516

Fig. 6 Fitting insulating shells to the pump

4.5 Electrical 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 accidentally switched on.

DANGER

Electric shock

Death or serious personal injury.

- This pump has not been investigated for use in swimming pool or marine areas.

DANGER

Electric shock

Death or serious personal injury.

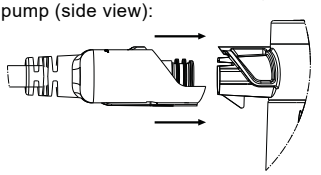
- This pump is supplied with a grounding conductor and grounding-type attachment plug. To reduce the risk of electric shock, be certain that it is connected only to a properly grounded, grounding-type receptacle in accordance with the National Electric Code and any state, local governing codes and regulations.

- The motor is protected by the electronics in the control box and requires no external motor protection.
- Check that the supply voltage and frequency correspond to the values stated on the pump.
- Only connect the pump to the power supply with the line cord or through the terminal box supplied with the pump; see sections *4.5.1 For pump models with line cord* and *4.5.2 For pump models with terminal box*.
- Do not modify and only use the line cord supplied.
- The lights on the control panel indicate that the electrical supply has been switched on.

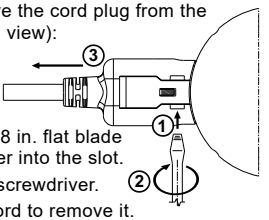
4.5.1 For pump models with line cord

Follow the procedure as shown in fig. 7.

How to insert the line cord plug onto the pump (side view):



How to remove the cord plug from the pump (bottom view):



1. Insert a 1/8 in. flat blade screwdriver into the slot.
2. Twist the screwdriver.
3. Pull the cord to remove it.

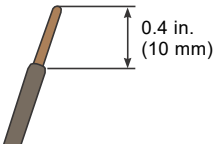
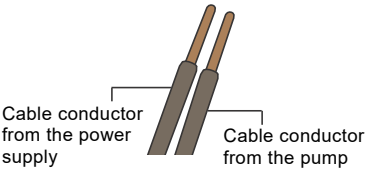
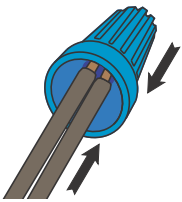
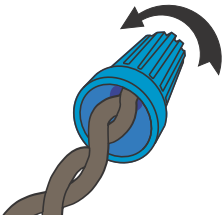
Fig. 7 Connecting and removing the power plug for line cord models

4.5.2 For pump models with terminal box

1. Loosen the terminal box screw from the terminal box cover.
2. Utilize either conduit port for the wiring entrance.
3. Wirethe plug connector as illustrated in the section *Wiring procedure* below, steps 3a-3d. Then complete steps 4-7.

Be sure to connect the ground cable conductor (green) of the pump to the ground cable conductor of the power supply.

Wiring procedure

Step	Action	Illustration
3a	Strip the ends of the cable conductors as illustrated.	 TM06 8250 4816
3b	Align the end of each of the pump's cable conductors, including any frayed strands, with the end of the corresponding cable conductor from the power supply. Green conductor: ground Black conductor: line White conductor: neutral	 TM06 8253 4816
3c	Insert the ends of the cable conductors into the connector. Push the cable conductors fully into the connector.	 TM06 8251 4816
3-d	Twist the connector until you see two twists in the cable conductors.	 TM06 8252 4816

4. Slide the terminal box cover over the terminal box body.
5. Tighten the cross-head screw on the terminal box to 5 in-lbs.
6. Switch on the power supply.
7. The lights on the control panel will then indicate that the power supply has been switched on.

5. Starting up the product

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.

5.1 Venting the pump

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

The pump must not run dry.

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

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 *8.3 Setting the pump*.

You cannot vent the system through the pump.

5.2 First startup

- The light in the control panel shows that the power supply has been switched on. See fig. 9.
- Factory setting: $AUTO_{ADAPT}$.

6. Product introduction

6.1 Product description

The ALPHA2 circulator 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 *7. Identification* and *8. Control functions*.

When you install an ALPHA2, it means:

- Easy installation and start-up.
  - The pump is easy to install. Thanks to the $AUTO_{ADAPT}$ function (factory setting), you can start the pump, in most cases, without making any settings.
- High degree of comfort.
- Minimum noise from valves, etc.
- Low energy consumption.
  - Low energy consumption compared to conventional circulator pumps.

6.2 Applications

DANGER

Explosion hazard

Death or serious personal injury.

- Do not use the pump for transfer of flammable liquids such as diesel oil, gasoline, and similar liquids.

DANGER

Electric shock

Death or serious personal injury.

- This pump has not been investigated for use in swimming pool or marine areas.

The ALPHA2 circulator pump is 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.

The pump is the best choice for the following systems:

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

The pump is suitable for the following:

- systems with constant or variable flows where you want to optimize the setting of the pump duty point.
- systems with variable flow-pipe temperature.
- balancing of domestic heating systems.

6.3 Pumped liquids

For information about pressures and temperatures, see section *10. Technical data*.

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 122 °F (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.

In heating systems, the water must meet the requirements of accepted standards on water quality in heating systems.

The pump is suitable for the following liquids:

- Thin, clean, non-aggressive and non-explosive liquids, not containing solid particles or fibers.
- Cooling liquids, not containing mineral oil.
- Domestic hot water
  Maximum: 14 °dH
  Maximum: 149 °F (65 °C)
  Maximum peak: 158 °F (70 °C).
  For water with a higher degree of hardness, contact Grundfos.
- Softened water.

The kinematic viscosity of water is 1 mm^2/s (1 cSt) at 68 °F (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 68 °F (20 °C) means a viscosity of approximately 10 mm^2/s (10 cSt) and a reduction of the pump performance by approximately 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 technical data, see section *10. Technical data*.

6.3.1 Glycol

The pump is designed for pumping clean water, or up to 50/50 mixtures by weight of glycol and water.

For glycol usage as well as additional liquid information, see section *10. Technical data*.

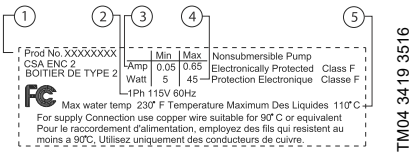
To prevent the glycol mixture from degrading, avoid temperatures exceeding the rated liquid temperature and minimize the operating time at high temperatures.

It is important to clean and flush the system before adding the glycol mixture.

To prevent corrosion or precipitation, check the glycol mixture and maintain it regularly. If further dilution of the supplied glycol is required, follow the glycol supplier's instructions.

7. Identification

7.1 Nameplate



TM04 3419 3516

Fig. 8 Nameplate

Pos.	Description
1	Product number
2	Voltage [V]
3	Rated current [A]: • Min.: Minimum current [A] • Max.: Maximum current [A]
4	Input power [W]: • Min.: Minimum power [W] • Max.: Maximum power [W]
5	Maximum fluid temperature [°F]

7.2 Type key

Example	ALPHA2	15	-55	-	165
Pump type					
Nominal diameter (DN) of inlet and outlet ports [mm]					
Maximum head [dm]					
: Cast-iron pump housing N: Stainless-steel pump housing					
Port-to-port length [mm]					

7.3 Approvals

Listed

Intertek
3191277

FCC sections

Section 15.19 (a) 3

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Section 15.21

Any changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment void.

Section 15.105 (b)

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

Canadian EMC Standard: ICES-003

This class B digital apparatus complies with Canadian ICES-003.

8. Control functions

8.1 Elements on the control panel

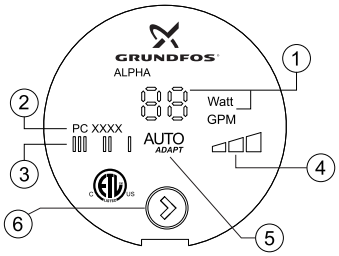


Fig. 9 Control panel

Pos.	Description
1	Display showing the power consumption in watt or the flow.
	Light field indicating high and low flow
2	Production code:
	• 1st and 2nd figures: year
	• 3rd and 4th figures: week
3	Light field indicating fixed speed
4	Light field indicating constant pressure
5	Light field indicating $AUTO_{ADAPT}$
6	Push-button for selection of pump setting

8.2 Display

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

The display shows the actual pump power consumption in watt (integer) or the actual flow during operation.

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.

Light field indicating high and low flow

- The light field blinks for low flow
  - If the flow is lower than 1 gpm, the light field alternately flashes between "0" and "1" randomly.
- The light field shows HI for high flow
  - If the flow is higher than 12 gpm, the light field shows "HI" on user interface.

8.2.1 Light fields indicating the pump setting

The pump has optional performance settings which you can select with the push-button. See fig. 9.

The pump setting is indicated by light fields in the display. See fig. 10.

Fig. 10 Light fields

For more information about the function of the settings, see section *9. Fault finding the product*.

8.3 Setting the pump

You can change the pump setting by pressing the push-button.

8.3.1 Factory default setting

The pump's factory default setting is the $AUTO_{ADAPT}$ setting.

8.3.2 Changing from recommended to alternative pump setting

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

However, if the recommended pump setting in some applications does not give the desired distribution of heat in the rooms of the house, you can change to an alternative pump setting.

8.4 Selection of control mode by application

Application	Control mode
Floor heating	Constant pressure
Two-pipe system	$AUTO_{ADAPT}$
Ventilation	Speed 1, 2 or 3
Boiler-shunt	Speed 1, 2 or 3
One-pipe system	Speed 1, 2 or 3 or constant pressure
Domestic hot water	Speed 1, 2 or 3

See also sections *8. Control functions* and *8.6 Pump performance and operating mode selection*.

8.5 Pump control

See section *8.6 Pump performance and operating mode selection*.

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

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 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.

Constant-pressure control

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

See also sections *8. Control functions* and *8.3 Setting the pump*.

Constant speed control (III, II, or I)

In this control mode, the pump runs at a constant speed and consequently on a constant curve.

- In speed III, the pump is set on the maximum curve under all operating conditions. You can quickly vent the pump by setting the pump to speed III for a short period.
- In speed II, the pump is set on the medium curve under all operating conditions.
- In speed I, the pump is set on the minimum curve under all operating conditions.

Manual summer mode

In manual summer mode, the pump is stopped to save energy and only the electronics are running. To avoid lime deposit that could block the pump, the pump is started every 24 hours for two minutes at a low speed. This is an alternative to shutting down the pump if there is a risk of lime deposit.

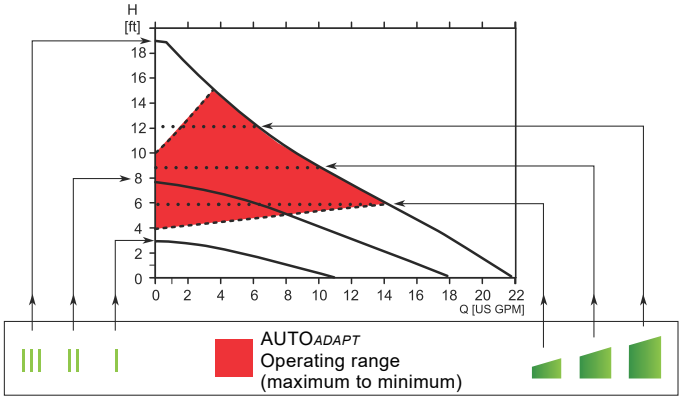
The display is turned off. If any faults occur during manual summer mode, the display will show the faults when the pump is taken out of manual summer mode.

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.

- To activate manual summer mode, press and hold the push-button for three seconds. All light fields will turn off, and the pump will stop. The AUTO$_{ADAPT}$ light field will flash for four seconds.
- To deactivate manual summer mode, press the push-button to return to normal operation.

8.6 Pump performance and operating mode selection

The hydraulic performance shown is without check valve.



TM06 7506 3516

Pos.	Description
	• Push-button for selection of pump setting • Every time you press the push-button, the circulator setting is changed.
III	**High constant speed** • The pump runs at a constant speed and consequently on a constant curve. In speed III, the pump is set on the maximum curve under all operating conditions. You obtain quick vent of the pump by setting the pump to speed III for a short period.
II	**Medium constant speed** • The pump runs at a constant speed and consequently on a constant curve. In speed II, the pump is set on the medium curve under all operating conditions.
I	**Low constant speed** • The pump runs at a constant speed and consequently on a constant curve. In speed I, the pump is set on the minimum curve under all operating conditions.
	**Constant pressure I** • The duty point of the pump will move left and right along the lowest constant-pressure curve depending on the water demand in the system. The head is kept constant, irrespective of the water demand.
	**Constant pressure II** • The duty point of the pump will move left and right along the middle constant-pressure curve depending on the water demand in the system. The head is kept constant, irrespective of the water demand.
	**Constant pressure III** • The duty point of the pump will move left and right along the highest constant-pressure curve depending on the water demand in the system. The head is kept constant, irrespective of the water demand.
	**AUTO$_{ADAPT}$ (factory setting)** • This function controls the pump performance automatically within the defined performance range (shaded area). AUTO$_{ADAPT}$ will adjust the pump performance to system demands over time.
 (Hold for 3 sec.)	**Manual summer mode** The pump is stopped to save energy, and only the electronics are running. To avoid liming and blocking of the pump, the pump is started every 24 hours for two minutes at a low speed.

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 be 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 the screws are removed. The pumped liquid may be scalding hot and under high pressure.

Fault	Control panel			Remedy
1. The pump does not run.	Light field is off.	a)	The pump is not connected to the power supply.	Connect the pump to the power supply.
		b)	The circuit breaker has tripped.	Cut in the circuit breaker.
		c)	The pump is defective.	Replace the pump.
	Light field is on.	a)	Supply voltage is too high.	Check that the power supply falls within the specified range.
		b)	The rotor is blocked by impurities.	Remove the impurities.
	"▬▬ ▬▬"	a)	Supply voltage is too low.	Switch the power off and on. Check for air, locked rotor and/or voltage. Correct the power supply.
2. Noise in the system	Light field is on.	a)	There is air in the system.	Install an air eliminator.
		b)	The flow is too high.	Reduce the pump speed.
		c)	Thermal expansion of system components.	Check the mounting brackets for the pipes. Secure loose mounting brackets.
3. Noise in the pump	Light field is on.	a)	There is air in the pump.	Let the pump run, as it will vent over time. Install an air eliminator.
		b)	The inlet pressure is too low.	Increase the inlet pressure. Check the air volume in the expansion tank, if this is installed. (Pressure leaks in the system can lead to cavitation.)
		c)	No liquid (dry running).	Ensure the system has been filled with liquid and vented. Open the isolating valves.
		d)	The pump is defective.	Replace the pump.

Fault		Control panel			Remedy
4.	Insufficient heat	Light field is on.	a)	The pump performance is set too low.	Increase the pump speed or constant pressure.
			b)	The thermostat is set too low or is not working.	Check to see if the circulator is in the proper operating mode. Check the thermostat to ensure that it is set to the desired temperature and is working. Replace the batteries in the thermostat.
			c)	Air or gas in the system.	Vent the air or gas from the system by allowing the pump to run, as it will vent over time. Install an air eliminator. If necessary rework the piping.
			d)	The valves are sticking.	Make sure all valves are in good working order, i.e. remove lime deposits.
			e)	Wrong direction of flow.	See the direction of flow arrow marked on the pump. Reinstall the pump to correct the direction of flow.
			f)	The boiler is not working properly.	Check the water temperature from the boiler and check the boiler functions. Repair the boiler if required.
			g)	The pump performance is not adequate for the application.	Check for proper sizing of the circulator and other system components.
			h)	The pump performance is not adequate for the application.	Check the ΔT calculation.

10. Technical data

10.1 Operating conditions

Supply voltage

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

Motor protection

The pump requires no external motor protection.

Enclosure class

Indoor use only, IP42.

CSA enclosure type 2.

Insulation class

F.

Relative humidity

Maximum 95 %.

Maximum outlet pressure

150 psi (10.34 bar).

Inlet pressure

Liquid temperature	Minimum inlet pressure
167 °F (75 °C)	0.75 psi (0.05 bar)
194 °F (90 °C)	4.06 psi (0.28 bar)
230 °F (110 °C)	15.7 psi (1.08 bar)

Sound pressure level

43 dB (A).

Ambient temperature

32 °F (0 °C) to 104 °F (40 °C).

Liquid temperature

36 °F (2 °C) to 230 °F (110 °C).

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

Ambient temperature [°F (°C)]	Liquid temperature	
	Minimum [°F (°C)]	Maximum [°F (°C)]
32 °F (0 °C)	36 °F (2 °C)	230 °F (110 °C)
50 °F (10 °C)	50 °F (10 °C)	230 °F (110 °C)
68 °F (20 °C)	68 °F (20 °C)	230 °F (110 °C)
86 °F (30 °C)	86 °F (30 °C)	230 °F (110 °C)
95 °F (35 °C)	95 °F (35 °C)	194 °F (90 °C)
104 °F (40 °C)	104 °F (40 °C)	158 °F (70 °C)

In domestic hot water systems, keep the liquid temperature below 149 °F (65 °C) to eliminate the risk of lime precipitation.

Glycol

Maximum glycol concentrations with clean water:

50 % glycol @ 36 °F (2 °C).

Hydraulic performance change can be expected.

Watt readings

Accuracy: ± 1 watt.

Flow indicator

Provides a relative indication of flow – should not be used in lieu of a flow meter.

Check valve

Use of a check valve may reduce pump hydraulic performance (up to - 10 %).

Use a check valve in parallel pumping applications.

Curve conditions

Test liquid: Airless water.

Curves apply to a density of 983.2 kg/m^3 and a liquid temperature of 140 °F (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.

Curves apply to a kinematic viscosity of 0.474 cSt.

Approximate power usage

Speed setting		Minimum	Maximum
High constant speed	**III**	39 W	45 W
Medium constant speed	**II**	15 W	30 W
Low constant speed	**I**	5 W	8 W
Constant pressure		8 W	45 W
Constant pressure		14 W	45 W
Constant pressure		22 W	45 W
$AUTO_{ADAPT}$		5 W	45 W

11. 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.

GRUNDFOS Kansas City
9300 Loiret Blvd.
Lenexa, Kansas 66219
Phone: (913) 227-3400
Fax: (913) 227-3500

www.grundfos.us

GRUNDFOS Canada
2941 Brighton Road
Oakville, Ontario L6H 6C9 Canada
Phone: +1-905 829 9533
Telefax: +1-905 829 9512

www.grundfos.ca

GRUNDFOS México
Boulevard TLC No. 15
Parque Industrial Stiva Aeropuerto
C.P. 66600 Apodaca, N.L. México
Phone: 011-52-81-8144 4000
Fax: 011-52-81-8144 4010

www.grundfos.mx

99187617 0220

ECM: 1279905