

ALPHA3

Model B

Circulator pump

50/60 Hz



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GRUNDFOS 

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1. Product data



TM07 1206 1118

Product description

The Grundfos ALPHA3 pump is designed for circulating liquids in systems with variable flow rates where it is desirable to optimise the setting of the pump duty point to reduce energy costs.

ALPHA3 is completely controlled with Grundfos GO Remote via Bluetooth, which gives you step by step assistance to pump configuration, maintenance and commissioning, including:

- operating and control modes.
- scheduling for when the pump should operate and when not.
- warning and alarm status with up to 40 fault logs.

Furthermore, ALPHA3 is able to communicate directly with the Grundfos GO Balance app on your smart device, which allows you to hydraulically balance two-pipe radiators and underfloor heating systems in a fast and safe way.

ALPHA3 is energy-optimised and complies with the ErP Directive, Commission Regulation (EC) No 641/2009 and Commission Regulation (EU) No 622/2012, which have been effective as from 1 January 2013.

Intended use

The pump is designed for circulating liquids in heating and air-conditioning systems with temperatures equal to or higher than 2 °C.

Duty range

| Data | ALPHA3 |
|-------------------------|-----------------------|
| Maximum flow rate, Q | 3.8 m ³ /h |
| Maximum head, H | 8 m |
| Maximum system pressure | 1.0 MPa (10 bar) |
| Liquid temperature | 2 to 110 °C |
| Ambient temperature | 0 to 40 °C |

Features

- Simple, fast and easy setting, control and monitoring via Grundfos GO Remote.
- Hydronic balancing via Grundfos GO Balance.
- Radiator and underfloor heating modes with AUTO_{ADAPT}.
- Proportional pressure, constant pressure and constant curve with setpoint adjustment anywhere between the maximum and minimum curve of the chosen setting.
- Automatic night setback.
- Customised scheduling with real time clock.
- Summer-mode function.
- Dry-running protection.
- High-torque start.
- Pump-venting process after which the pump automatically returns to its initial settings.
- Simple pump display showing the actual power consumption in watt or the actual flow rate in m³/h.
- Motor based on permanent-magnet rotor/compact-stator technology.
- Built-in electrical and thermal protection of the pump.

Benefits

- Easy, timesaving installation thanks to the ALPHA plug eliminating the need for tools.
- Compact design makes the ALPHA3 suitable even in confined spaces.
- The integrated AUTO_{ADAPT} function provides high comfort levels with the lowest possible energy consumption and makes the commissioning safe and easy.
- Firmware upgrades ensuring that the pump is always up to date and prepared for future digital offerings.
- Low-noise operation.

Type key

| Example | ALPHA3 | 25 - 40 | 180 |
|---|--------|---------|-----|
| Pump range | | | |
| Nominal diameter (DN) of inlet and outlet ports [mm] (15 = G 1", 25 = G 1 1/2, 32 = G 2) | | | |
| Maximum head [dm] | | | |
| Cast-iron pump housing | | | |
| Port-to-port length [mm] | | | |

* Exception: UK version, size 15 = G 1 1/2.

Model type

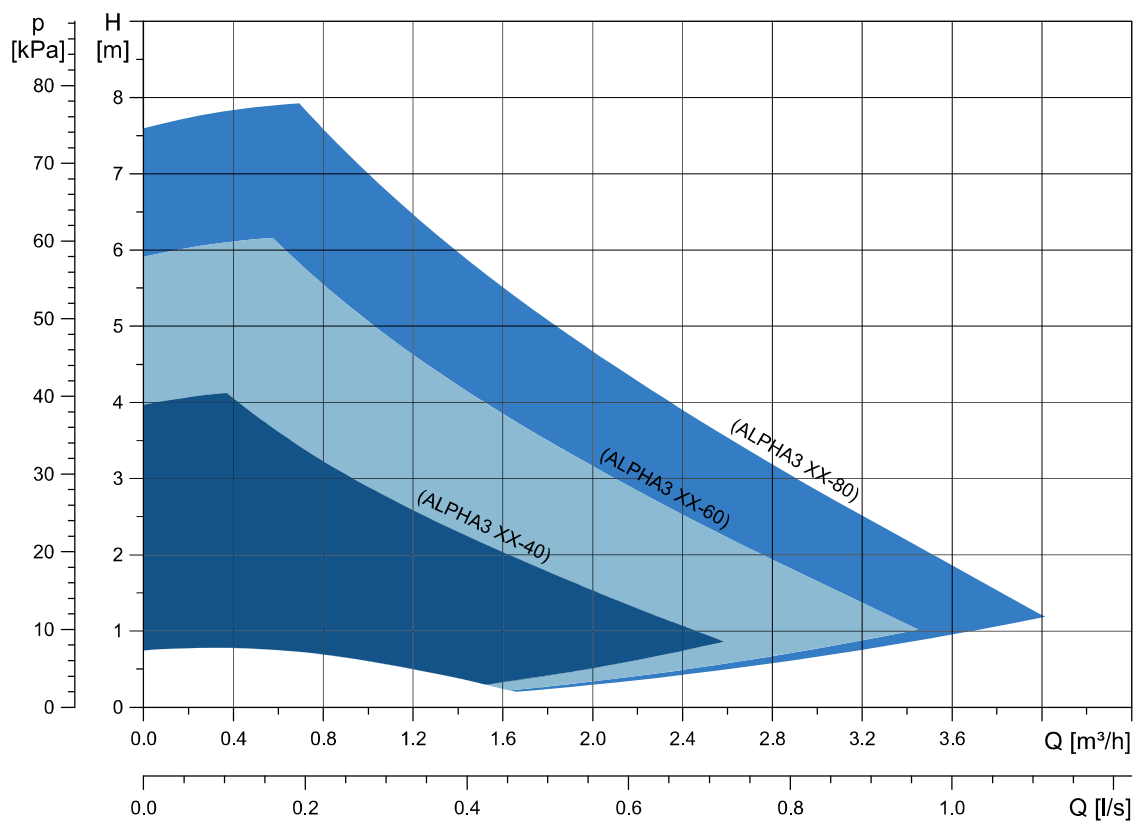
This data booklet covers ALPHA3 model B. The model type is stated on the nameplate.



TM06 1716 2515

Fig. 1 Model type on the nameplate

Performance range



TM07 1570 1618

Fig. 2 Performance range, ALPHA3

System applications

ALPHA3 is designed for circulating liquids in heating and air-conditioning systems with temperatures equal to or higher than 2 °C. It can be used as stand-alone pump and is also suitable as a replacement pump for older and inefficient circulator pumps.

ALPHA3 is suitable for the following systems:

- Systems with variable flows such as two-pipe heating systems with thermostatic valves for radiators or underfloor heating.
- Systems with constant or slightly variable flows such as one-pipe heating systems.

The pump is also ideal when operating in systems requiring an automatic adjustment of differential pressure to flow demands without the use of expensive bypass valves and similar components.

If an automatic bypass valve is installed to ensure a minimum flow, you must adjust the differential-pressure control of the circulator pump in a way to ensure the function of the automatic bypass valve. For example, select a constant-pressure curve that is higher than the differential pressure of the valve.

You can select the appropriate pump type for a heating system according to the following guidelines:

| Up to | Radiator system (Δt 20 °C) | Underfloor heating (Δt 5 °C) | Pump type |
|-------------------|--|--|-----------|
| [m ²] | [m ³ /h] | [m ³ /h] | ALPHA3 |
| 120 | 0.4 | 1.5 | XX-40 |
| 200 | 0.6 | 2.5 | XX-60 |
| 300 | 0.8 | 3.5 | XX-80 |

- **Note:** The data are approximate values. Grundfos cannot be held responsible for wrong sizing of pumps in heating systems.

Examples of systems

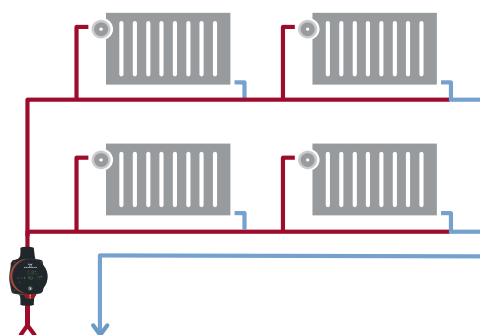


Fig. 3 One-pipe heating system

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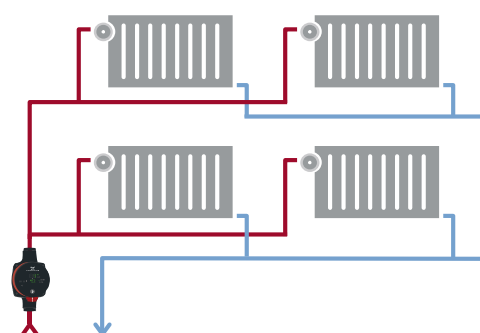


Fig. 4 Two-pipe heating system

TM06 8561 1417

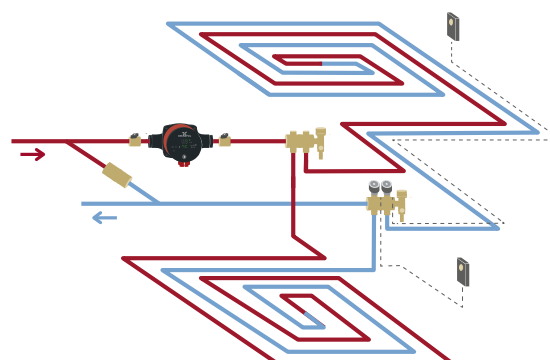


Fig. 5 Underfloor heating system

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2. Construction

ALPHA3 is designed for long and trouble-free operation as a canned-rotor type, that is pump and motor form an integral unit without shaft seal, with only one gasket for sealing. The bearings are lubricated by the pumped liquid. These constructions ensure maintenance-free operation.

The pump is characterised by the following:

- Permanent-magnet rotor/compact-stator motor which contributes to high efficiency and high starting torque.
- Ceramic shaft and radial bearings which contribute to long life.
- Carbon thrust bearing which contributes to long life.
- Stainless-steel rotor can, bearing plate and rotor cladding which contribute to corrosion-free long life.
- Composite impeller which contributes to corrosion-free long life.
- Cast-iron pump housing.
- Automatic venting which contributes to easy commissioning.
- Compact design featuring pump head with integrated control box and operating panel which fits into most common installations.

Material specification

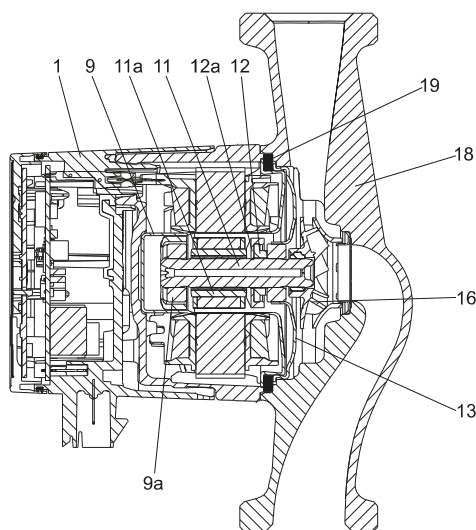


Fig. 6 Position numbers

| Pos. | Description | Material | EN/DIN | AISI/ASTM |
|------|-------------------------|-----------------|------------|-----------|
| 1 | Controller complete | Composite, PC | | |
| 9 | Rotor can | Stainless steel | 1.4401 | 316 |
| 9a | Radial bearing | Ceramics | | |
| 11 | Shaft | Ceramics | | |
| 11a | Rotor cladding | Stainless steel | 1.4401 | 316 |
| 12 | Thrust bearing | Carbon | | |
| 12a | Thrust bearing retainer | EPDM rubber | | |
| 13 | Bearing plate | Stainless steel | 1.4301 | 304 |
| 16 | Impeller | Composite, PES | | |
| 18 | Pump housing | Cast iron | EN-GJL-150 | A48-150B |

Motor and control box

The motor is a 4-pole synchronous permanent-magnet motor.

The pump controller is incorporated in the control box, which is fitted to the stator housing and connected to the stator via a terminal plug.

The control box has an integrated operating panel with two push-buttons (1 and 2). See fig. 7.

For more information on the operating panel, see [Operating panel](#), page 10.

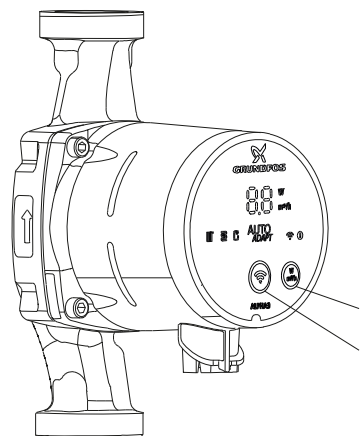


Fig. 7 Position of push-buttons

| Pos. | Description |
|------|--|
| 1 | Push-button for connecting to Grundfos GO Remote. |
| 3 | Push-button for selection of parameter to be shown in the display, that is actual power consumption in watt or actual flowrate in m ³ /h. |

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TM05 2518 0112

3. Operation

Pumped liquids

The pump is suitable for the following liquids:

- clean, thin, non-aggressive and non-explosive liquids, not containing solid particles or fibres
- cooling liquids, not containing mineral oil
- softened water.

The kinematic viscosity of water is $\nu = 1 \text{ mm}^2/\text{s}$ (1 cSt) at 20 °C. If you use the pump for a liquid with a higher viscosity, the hydraulic performance of the pump will be reduced.

Example: 50 % glycol at 20 °C means a viscosity of approximately 10 mm²/s (10 cSt) and a reduction of pump performance by approximately 15 %.

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

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

Technical data

Liquid temperature

ALPHA3 pumps: 2-110 °C.

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

| 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 |

The ALPHA3 pump can, however, run at ambient temperatures higher than the liquid temperature if the plug connection in the pump head is pointing downwards.

System pressure

PN 10: Maximum 1.0 MPa (10 bar).

Inlet pressure

To avoid cavitation noise and damage to the pump bearings, the following minimum pressures are required at the inlet port.

| Liquid temperature | 75 °C | 90 °C | 110 °C |
|--------------------|------------|------------|-------------|
| | 0.5 m head | 2.8 m head | 10.8 m head |
| Inlet pressure | 0.005 MPa | 0.028 MPa | 0.108 MPa |
| | 0.05 bar | 0.28 bar | 1.08 bar |

Electrical data

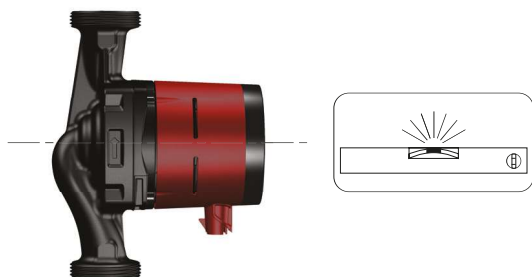
| | |
|-------------------------------------|---|
| Supply voltage | 1 x 230 V ± 10 %, 50/60 Hz, PE. |
| Motor protection | The pump requires no external motor protection. |
| Enclosure class | IPX4D. |
| Insulation class | F. |
| Relative air humidity | Maximum 95 %. |
| Ambient temperature | 0-40 °C. |
| Temperature class | TF110 to EN 60335-2-51. |
| EMC (electromagnetic compatibility) | EMC Directive (2014/30/EU) |
| Radio communication | Bluetooth GLoWPAN |
| Sound pressure level | ≤ 43 dB(A). |

4. Installation

Mechanical installation

In most cases, the installation of ALPHA3 is reduced to the mechanical installation and connection to the power supply.

Always install the pump with horizontal motor shaft.

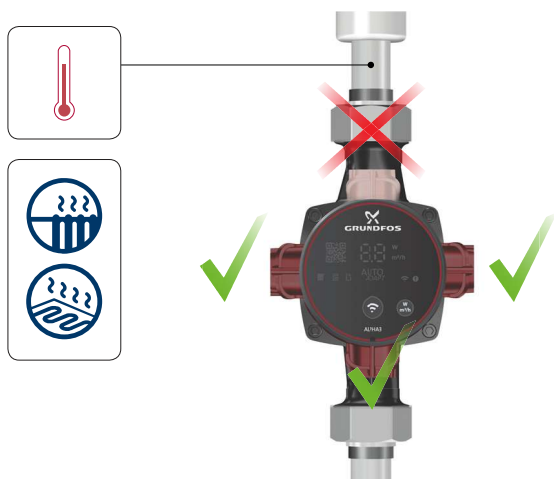


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Fig. 8 Horizontal motor shaft

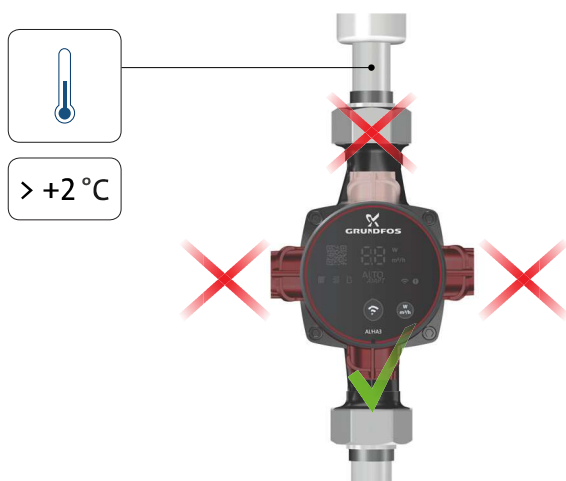
Control box positions

Figures 9 and 10 show the possible control box positions in heating systems as well as in air-conditioning and cold-water systems.



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Fig. 9 Possible control box positions, heating systems



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Fig. 10 Possible control box position, air-conditioning and cold-water systems above 2 °C

Electrical installation

The ALPHA plug incorporates cable relief and a locking function for securing the connection of the supply cable.



Fig. 11 ALPHA plug

Angled ALPHA plugs are available as accessories. See [ALPHA plugs](#) page 23.

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5. Control and communication

| | ALPHA2 | ALPHA3 | Page |
|---|--------|--------|------|
| Communication | | | |
| Grundfos GO Remote | | • | 10 |
| Operating modes | | | |
| Normal | | • | 10 |
| Stop | | • | |
| Min. | | • | |
| Max. | | • | |
| Control modes | | | |
| Radiator mode with AUTO _{ADAPT} | | • | 11 |
| Underfloor mode with AUTO _{ADAPT} | | • | 11 |
| Radiator and underfloor mode with AUTO _{ADAPT} | | • | 11 |
| Proportional-pressure curve | • | • | 12 |
| Constant-pressure curve | • | • | 12 |
| Constant curve | • | • | 12 |
| AUTO _{ADAPT} | • | • | 11 |
| Automatic night setback | • | • | 13 |
| Features | | | |
| Scheduling including summer mode | | • | 13 |
| Dry-running protection | •* | • | 14 |
| High-torque start | •* | • | 13 |
| Hydronic balancing | •** | • | 13 |

* As of model D

** As of model E and ALPHA3 model A

Communicate with ALPHA3 using Grundfos GO Remote

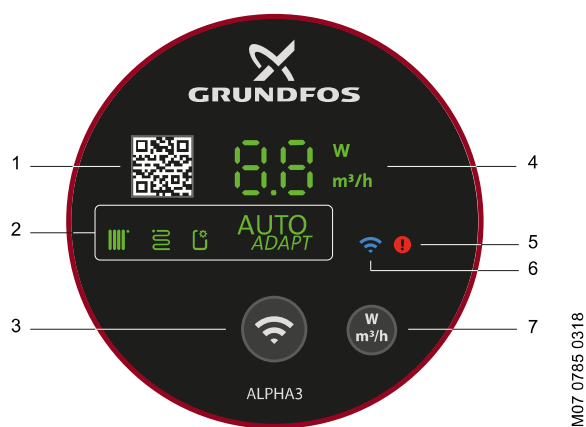
ALPHA3 is completely controlled with the Grundfos GO Remote app, which gives you step by step assistance to pump configuration, maintenance and commissioning, including:

- Setting the operating and control mode
- Reading out the current operating status of the pump
- Reading out alarms, warnings and fault logs
- Scheduling periods in which the pump should and should not operate, including summer mode
- Updating the pump's firmware
- Venting the pump.

The first time you connect to the pump, Grundfos GO Remote starts up an initial setup wizard, which will also guide you through hydronic balancing of your system (optional).

Operating panel

The operating panel reflects the settings of the pump as set in Grundfos GO Remote.



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Fig. 12 Operating panel

| Pos. | Description |
|------|---|
| 1 | QR code. When scanned with Grundfos GO Remote, you get access to detailed product information, documentation and service information. The QR scanner is found in the app's side menu. |
| 2 | Four light fields indicating the pump setting. |
| 3 | Connectivity button: Push-button for connecting the pump to Grundfos GO Remote and Grundfos GO Balance. |
| 4 | Light field indicating either the actual pump power consumption in watt or the actual flow rate in m³/h in steps of 0.1 m³/h during operation. |
| 5 | Alarm and warning indication. |
| 6 | Connectivity symbol: When lit, the pump is connected to Grundfos GO Remote. |
| 7 | Button for selection of parameter to be shown in the power consumption light field (pos. 4). |

Operating modes

Normal

The pump runs according to the selected control mode.

Stop

Stop the pump via Grundfos GO Remote.

Min.

You can use the minimum curve mode in periods in which a minimum flow is required. This operating mode is for instance suitable for manual night setback if automatic night setback is not desired.

Max.

You can use the maximum curve mode in periods in which a maximum flow is required. This operating mode is for instance suitable for hot-water priority.

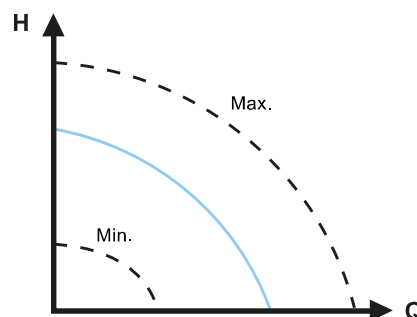


Fig. 13 Maximum and minimum curves

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Control modes



Radiator mode

The radiator mode uses the $AUTO_{ADAPT}$ function to automatically adjust the pump performance to the actual heat demand in the system. The pump performance follows a proportional-pressure curve within the $AUTO_{ADAPT}$ range, which is anywhere between the maximum and minimum proportional curve.

See [\$AUTO_{ADAPT}\$](#) , page 11 for further information.

Note: If the pump operates in a one-string system, we recommend that you use the constant-pressure mode.



Underfloor mode

The underfloor mode uses the $AUTO_{ADAPT}$ function to automatically adjust the pump performance to the actual heat demand in the system. The pump performance follows a constant-pressure curve within the $AUTO_{ADAPT}$ range, which is anywhere between the maximum and minimum constant curve.

See [\$AUTO_{ADAPT}\$](#) , page 11 for further information.



Radiator and underfloor mode

If the pump is placed in a system that consists of both radiator and underfloor heating, it is possible to select a combination of the two, called "Radiator & Underfloor mode".

This mode uses the $AUTO_{ADAPT}$ function to automatically adjust the pump performance to the actual heat demand in the system. The pump performance follows a proportional-pressure curve within the $AUTO_{ADAPT}$ range, which is anywhere between the maximum and minimum proportional curve.

See [\$AUTO_{ADAPT}\$](#) , page 11 for further information.

$AUTO_{ADAPT}$

$AUTO_{ADAPT}$

$AUTO_{ADAPT}$ is an integrated function in the radiator, underfloor and radiator and underfloor mode and is designed to continuously adapt the setting to the actual heating demand in the system.

$AUTO_{ADAPT}$ selects the best control curve under the given operating conditions. $AUTO_{ADAPT}$ optimises the position of the proportional or constant pressure curve via three steps.

First, it analyses the heating system, which the circulator is a part of. Then, on the basis of this analysis, $AUTO_{ADAPT}$ verifies whether the pump pressure is too high, too low, or correct. Hereby it selects the optimum proportional or constant pressure curve for the system within the $AUTO_{ADAPT}$ performance range. See fig. 14. Finally, the pump is controlled according to the selected proportional or constant pressure curve. The pump will continue this cycle as long as it is running.

$AUTO_{ADAPT}$ performance range

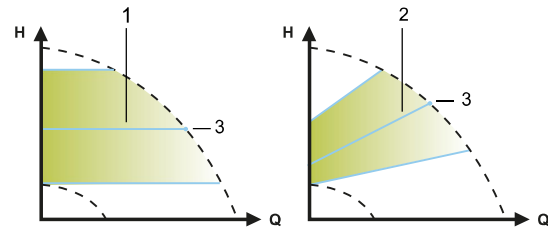


Fig. 14 $AUTO_{ADAPT}$

| Pos. | Description |
|------|--|
| 1 | Constant pressure curve (underfloor mode) |
| 2 | Proportional pressure curve (radiator mode / radiator and underfloor mode) |
| 3 | Setpoint |

You cannot expect an optimum pump setting from day one.

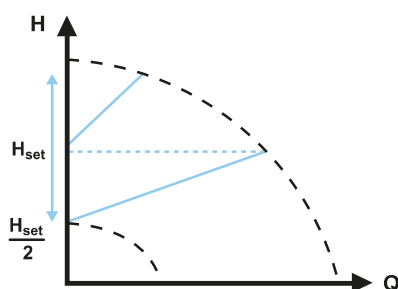
If the power supply fails or is disconnected, the pump stores the $AUTO_{ADAPT}$ setting in an internal memory and resumes the automatic adjustment when the power supply has been restored.



Proportional pressure

Proportional-pressure mode adjusts the pump performance to the actual heat demand in the system, but the pump performance follows the selected performance curve. The selection of the proportional-pressure setting depends on the characteristics of the heating system and the actual heat demand.

The curve's setpoint is user defined in the Grundfos GO Remote app. The setpoint can be chosen anywhere between the minimum and maximum proportional curve in intervals of 0.1 m. The head against a closed valve is half the setpoint H_{set} , although never below 1 m.



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Fig. 15 Proportional-pressure curve settings

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

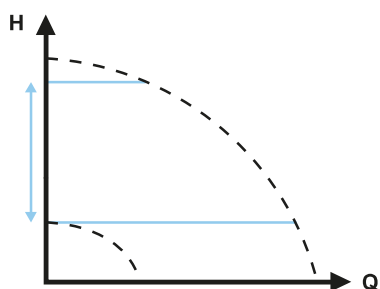
See [Guide to performance curves](#), page 14 for further information.



Constant pressure

Constant-pressure mode adjusts the pump performance to the actual heat demand in the system, but the pump performance follows the selected performance curve. The selection of the constant-pressure setting depends on the characteristics of the heating system and the actual heat demand.

The curve's setpoint is user defined in the Grundfos GO Remote app. The setpoint can be chosen anywhere between the minimum and maximum constant-pressure curve in intervals of 0.1 m.



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Fig. 16 Constant-pressure curve settings

See [Guide to performance curves](#), page 14 for further information.

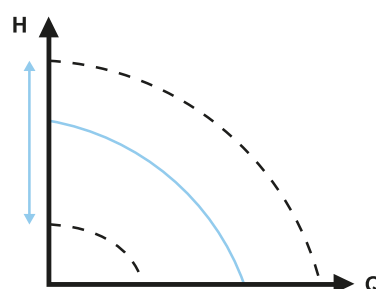


Constant curve

At constant curve, the pump runs at a constant curve independently of the actual flow demand in the system. The pump performance follows the selected performance curve. The selection of the constant-curve setting depends on the characteristics of the heating system and the actual heat demand.

The curve's setpoint is user defined in the Grundfos GO Remote app. The speed in % of maximum speed can be chosen anywhere between the minimum and maximum constant curve in intervals of 1 %.

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



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Fig. 17 Constant-curve settings

See [Guide to performance curves](#), page 14 for further information.

Features

Automatic night setback

With automatic night setback enabled the pump automatically changes between normal operation and the automatic night setback curve.

The pump automatically changes between normal operation and automatic night setback (operation at low demand) depending on the flow-pipe temperature. Once activated, the pump runs on the curve for automatic setback.

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

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

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 boiler must incorporate automatic control of the liquid temperature.

Automatic night setback is enabled in Grundfos GO Remote.

Scheduling

In some applications it can be useful to predefine a start and stop schedule for the pump in order to lower energy costs.

The scheduling function allows you to customise the operating time in several ways:

- Individual schedule for each day of the week: Total customisation of pump operation cycles.
- 9-to-5 work week template: Inserts an adjustable template for a typical work week. Suitable when no operation is needed on weekends.
- Stop at night only.
- Summer mode: Presets the pump to stop operation in a specific time period and automatically start again.

The pump will automatically run for two minutes every 24 hours at low speed to avoid blocking the rotor as well as sticky valves and non-return valves.

Dry-running protection

The active dry-running feature protects the reliable wet-runner design of the ALPHA3 pumps.

Dry-running protection protects the pump against dry running during startup and normal operation.

High-torque start

In case of a blocked rotor, the pump will start vibrating automatically with a frequency of around 3 Hz during startup. Any dirt deposits that might prevent the impeller from rotating will be broken up swiftly, and the pump will resume normal operation.

Hydronic balancing

Hydronic balancing is important for a well-performing heating system regarding energy consumption and room comfort. A balanced system secures the best possible distribution of the needed flow in the heating system. It also secures that the pump performance is not too high.

Using the ALPHA3 pump together with the Grundfos GO Balance app, it is possible to perform hydronic balancing of two-pipe or underfloor heating system by using real time flow measurement from the pump.

As the maximum Bluetooth range is approximately 10 m you may experience that the Bluetooth signal becomes too weak between the pump and the smart device when moving from room to room. In such cases the ALPHA Reader can be used as an extender. See [ALPHA Reader](#), page 23.

Pump venting

In new installations or when the pipes have been emptied and refilled with water, we recommend that you vent the pump. This is easily done using Grundfos GO Remote. The venting process lasts for 30 min after which the pump automatically returns to its initial settings.

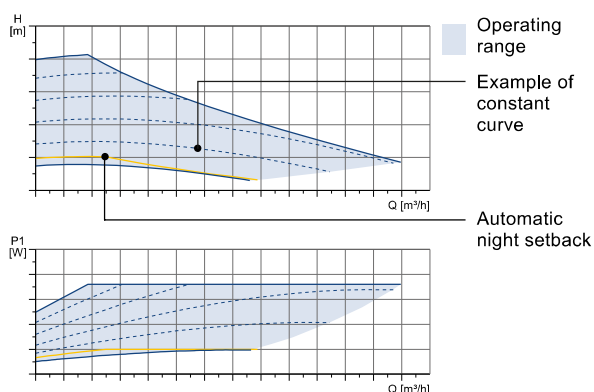
In addition, the pump is self-venting through the system, ensuring that potential noise from small air pockets trapped inside the pump ceases over a period of time.

6. Guide to performance curves

Each control mode has a performance range (Q, H) within which a performance curve is selected. Control modes with **AUTO_{ADAPT}** automatically select a performance curve within the performance range.

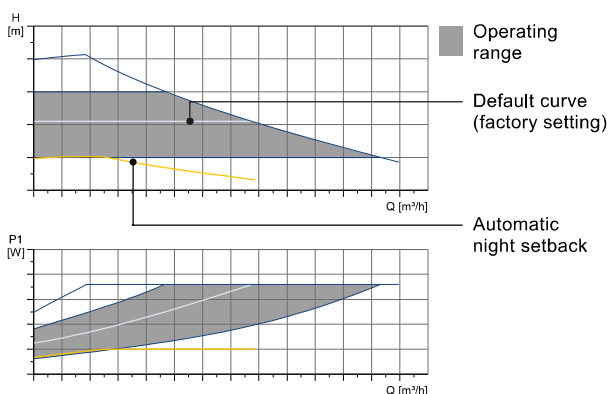
A power curve, P1, belongs to each QH curve. The power curve shows the pump power consumption in watt at a given QH curve. The P1 value corresponds to the value that you can read from the pump display.

Constant curve



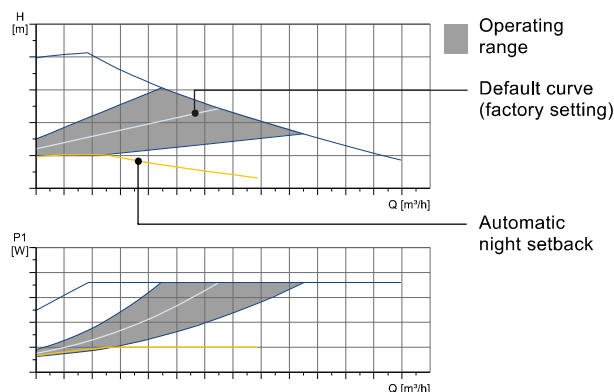
| Control mode | Operating panel | Curve | Setpoint adjustment |
|----------------|-----------------|---------------------------|--|
| Constant curve | | User defined within range | 1 % intervals set in % of maximum speed. |

Constant pressure



| Control mode | Operating panel | Curve | Setpoint adjustment |
|-------------------|-----------------|---------------------------|-----------------------------|
| Underfloor mode | | Anywhere within range | AUTO_{ADAPT} |
| Constant pressure | | User defined within range | 0.1 m intervals |

Proportional pressure



| Control mode | Operating panel | Curve | Setpoint adjustment |
|------------------------------|-----------------|---------------------------|-----------------------------|
| Radiator mode | | Anywhere within range | AUTO_{ADAPT} |
| Radiator and underfloor mode | | Anywhere within range | |
| Proportional pressure | | User defined within range | 0.1 m intervals |