GRUNDFOS ALPHA2 L

Circulator pumps
50 Hz
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Circulator pumps
GRUNDFOS ALPHA2 L is a range of circulator pumps featuring:

- Integrated differential-pressure control enabling adjustment of pump performance to the actual system requirements.
- Motor based on permanent-magnet/compact-rotor technology.

GRUNDFOS ALPHA2 L is energy-optimised and A-labelled.

The energy label A indicates the energy-saving level of the pump. The energy classification system has seven levels, i.e. from A to G. Level A is the best.

The installation of a GRUNDFOS ALPHA2 L pump will reduce the power consumption considerably, reduce noise from thermostatic valves and similar fittings, and improve the control of the system.

Performance range

GRUNDFOS ALPHA2 L offers a host of advantages:

- **Energy savings** Automatic control of the differential pressure.
- **Flexibility** Suitable for installation in existing systems.
- **Comfort** Low-noise operation.
- **Safety** Built-in electrical and thermal protection of the pump.
- **Userfriendliness** Simple setting and operation.

**Type key**

<table>
<thead>
<tr>
<th>Example</th>
<th>ALPHA2 L 25 - 40 180</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump range</td>
<td>Nominal diameter (DN) of suction and discharge ports [mm]</td>
</tr>
<tr>
<td>Maximum head [dm]</td>
<td>Port-to-port length [mm]</td>
</tr>
</tbody>
</table>

![Performance range, ALPHA2 L](image)

**Fig. 1** Performance range, ALPHA2 L
Applications
GRUNDFOS ALPHA2 L is designed for circulating liquids in heating systems.

GRUNDFOS ALPHA2 L is suitable for
• systems with constant or variable flows where it is desirable to optimise the pump duty point.
• systems with variable flow-pipe temperature.

GRUNDFOS ALPHA2 L is especially suitable for
• installation in existing systems where the differential pressure of the pump is too high during periods of reduced flow demand.
• installation in new systems for automatic adjustment of the performance to flow demands without the use of bypass valves or similar expensive components.

Examples of systems

Fig. 2 One-pipe heating system

Fig. 3 Two-pipe heating system

Fig. 4 Underfloor heating system

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

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

Control of heating systems
The heating required in a building varies greatly during the day due to changing outdoor temperatures, solar radiation and heat emanating from human beings, electric appliances, etc.

Add to this that the need for heating may vary from one section of the building to another and that the thermostatic valves of some radiators may be turned down by the users.

These circumstances will cause an uncontrolled pump to produce a too high differential pressure when the heating demand is low.

Possible consequences:
• too high energy consumption
• irregular control of the system
• noise in thermostatic valves and similar fittings.

GRUNDFOS ALPHA2 L automatically controls the differential pressure by adjusting the pump performance to the actual heating demand, without the use of external components.
Advantages of pump control

In GRUNDFOS ALPHA2 L, control is effected by adapting the differential pressure to the flow (proportional- and constant-pressure control).

Contrary to an uncontrolled pump, the proportional-pressure-controlled GRUNDFOS ALPHA2 L reduces the differential pressure as a result of falling heating demand.

If the heating demand falls - for instance due to solar radiation - the radiator valves will close, and, for the uncontrolled pump, the flow resistance of the system will rise for instance from $A_1$ to $A_2$.

In a heating system with an uncontrolled pump, this situation will cause a pressure rise in the system by $\Delta H_1$.

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Construction

GRUNDFOS ALPHA2 L is of the canned-rotor type, i.e. pump and motor form an integral unit without shaft seal and with only two gaskets for sealing. The bearings are lubricated by the pumped liquid.

The pump is characterised by

- integrated proportional-pressure control
- integrated constant-pressure control
- three fixed-speed curves
- frequency converter
- permanent-magnet/compact-stator motor
- ceramic shaft and radial bearings
- carbon thrust bearing
- stainless-steel rotor can, bearing plate and rotor cladding
- composite impeller
- cast-iron pump housing
- compact design featuring pump head with integrated control box and control panel.

---

Material specification

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Description</th>
<th>Material</th>
<th>EN/DIN W.-Nr.</th>
<th>AISI/ASTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Controller complete</td>
<td>Composite, PC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Rotor can</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
</tr>
<tr>
<td>11</td>
<td>Shaft</td>
<td>Ceramics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Rotor cladding</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
</tr>
<tr>
<td>13</td>
<td>Thrust bearing</td>
<td>Carbon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Thrust bearing retainer</td>
<td>EPDM rubber</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Bearing plate</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
</tr>
<tr>
<td>18</td>
<td>Impeller</td>
<td>Composite, PP or PES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Pump housing</td>
<td>Cast iron</td>
<td>EN-JL 1020</td>
<td>A48-25</td>
</tr>
<tr>
<td></td>
<td>Gaskets</td>
<td>EPDM rubber</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**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 with two screws and connected to the stator via a terminal plug.

The control panel is placed on the front. It has one push-button and 7 light fields for indication of the pump setting, see fig. 8. The "POWER ON" light field indicates that the mains supply has been switched on.

Fig. 8 Push-button position

- Push-button (pos. 1) for selection of control mode. The light in the display is on when the electricity supply has been switched on. During operation, the light field of the chosen control mode is lit.

When the "POWER ON" indicator light is on only, a fault preventing the pump from operating properly (e.g. seizing-up) has occurred.

Possible control box positions:

**Installation**

In most cases, the installation of the ALPHA2 L is reduced to the mechanical installation and the connection to the electricity supply.

The pump must always be installed with horizontal motor shaft.

**Electrical data**

Supply voltage: 1 x 230 V – 10 %/+ 6 %, 50 Hz, PE

Motor protection: The pump requires no external motor protection.

Enclosure class: IP 42

Insulation class: F

Relative air humidity: Maximum 95 %

Ambient temperature: 0 °C to +40 °C

Temperature class: TF110 to CEN 335-2-51

EMC (electromagnetic compatibility): EN 61000-6-2 and EN 61000-6-3

Sound pressure level: ≤ 43 dB(A)

**Start-up**

The pump must not be started until the system has been filled with liquid and vented. Furthermore, the required minimum inlet pressure must be available at the pump inlet. The system cannot be vented through the pump.

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

Liquid temperature
Cast-iron pumps: +2 °C to +110 °C.
To avoid condensation in the control box and stator, the liquid temperature must always be higher than the ambient temperature. See table.

<table>
<thead>
<tr>
<th>Ambient temperature [°C]</th>
<th>Liquid temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min. [°C]</td>
</tr>
<tr>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

System pressure
PN 10: Maximum 1.0 MPa (10 bar).

Inlet pressure
To avoid cavitation noise and damage to the pump, the following minimum pressures are required at the pump suction port.

<table>
<thead>
<tr>
<th>Liquid temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 °C</td>
</tr>
<tr>
<td>90 °C</td>
</tr>
<tr>
<td>110 °C</td>
</tr>
<tr>
<td>0.5 m head</td>
</tr>
<tr>
<td>2.8 m head</td>
</tr>
<tr>
<td>10.8 m head</td>
</tr>
</tbody>
</table>

Setting of pump head
With the push-button on the control box, the electronically controlled pump can be set to the following:
- two constant-pressure curves
- two proportional-pressure curves
- three fixed-speed curves.

Factory setting
The ALPHA2 L pump is factory-set to start on the proportional-pressure curve (PP2) fig. 12.
This setting is suitable for a large majority of all single-family houses.
Change of performance
The pump performance (flow and head) can be changed by pressing the control box push-button as indicated in the table below and fig. 12.

Fig. 12 Pump setting in relation to performance

<table>
<thead>
<tr>
<th>Setting</th>
<th>Pump curve</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP1</td>
<td>Lowest proportional-pressure curve</td>
<td>The duty point of the pump will move up or down on the lowest proportional-pressure curve, see fig. 12, depending on the heat demand. The head (pressure) is reduced at falling heat demand and increased at rising heat demand.</td>
</tr>
<tr>
<td>PP2</td>
<td>Highest proportional-pressure curve</td>
<td>The duty point of the pump will move up or down on the highest proportional-pressure curve, see fig. 12, depending on the heat demand. The head (pressure) is reduced at falling heat demand and increased at rising heat demand.</td>
</tr>
<tr>
<td>CP1</td>
<td>Lowest constant-pressure curve</td>
<td>The duty point of the pump will move out or in on the lowest constant-pressure curve, see fig. 12, depending on the heat demand in the system. The head (pressure) is kept constant, irrespective of the heat demand.</td>
</tr>
<tr>
<td>CP2</td>
<td>Highest constant-pressure curve</td>
<td>The duty point of the pump will move out or in on the highest constant-pressure curve, see fig. 12, depending on the heat demand in the system. The head (pressure) is kept constant, irrespective of the heat demand.</td>
</tr>
<tr>
<td>III</td>
<td>Speed III</td>
<td>ALPHA2 L runs at a constant speed and consequently on a constant curve. In speed III, the pump is set to run on the max. curve under all operating conditions. See fig. 12. Quick venting of the pump can be obtained by setting the pump to speed III for a short period.</td>
</tr>
<tr>
<td>II</td>
<td>Speed II</td>
<td>ALPHA2 L runs at a constant speed and consequently on a constant curve. In speed II, the pump is set to run on the medium curve under all operating conditions. See fig. 12.</td>
</tr>
<tr>
<td>I</td>
<td>Speed I</td>
<td>ALPHA2 L runs at a constant speed and consequently on a constant curve. In speed I, the pump is set to run on the min. curve under all operating conditions. See fig. 12.</td>
</tr>
</tbody>
</table>
Guide to performance curves

Each pump setting has its own performance curve (Q/H curve).

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

Fig. 13 Performance curves in relation to pump setting

<table>
<thead>
<tr>
<th>Setting</th>
<th>Pump curve</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP1</td>
<td>Lowest proportional-pressure curve</td>
</tr>
<tr>
<td>PP2</td>
<td>Highest proportional-pressure curve</td>
</tr>
<tr>
<td>CP1</td>
<td>Lowest constant-pressure curve</td>
</tr>
<tr>
<td>CP2</td>
<td>Highest constant-pressure curve</td>
</tr>
<tr>
<td>III</td>
<td>Constant speed, speed III</td>
</tr>
<tr>
<td>II</td>
<td>Constant speed, speed II</td>
</tr>
<tr>
<td>I</td>
<td>Constant speed, speed I</td>
</tr>
</tbody>
</table>
General data

Product range

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Port-to-port length [mm]</th>
<th>Connection</th>
<th>Voltage [V] 50 Hz</th>
<th>Product number</th>
<th>Data sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALPHA2 L 15-40</td>
<td>130</td>
<td>G 1</td>
<td></td>
<td>95047560</td>
<td>page 11</td>
</tr>
<tr>
<td>ALPHA2 L 25-40</td>
<td>180</td>
<td>G 1 1/2</td>
<td></td>
<td>95047561</td>
<td>page 11</td>
</tr>
<tr>
<td>ALPHA2 L 25-40</td>
<td>180</td>
<td>G 2</td>
<td></td>
<td>95047562</td>
<td>page 11</td>
</tr>
<tr>
<td>ALPHA2 L 32-40</td>
<td>130</td>
<td>G 1 1/2</td>
<td></td>
<td>95047563</td>
<td>page 12</td>
</tr>
<tr>
<td>ALPHA2 L 25-60</td>
<td>180</td>
<td>G 2</td>
<td></td>
<td>95047564</td>
<td>page 12</td>
</tr>
<tr>
<td>ALPHA2 L 32-60</td>
<td>180</td>
<td>G 2</td>
<td></td>
<td>95047566</td>
<td>page 12</td>
</tr>
</tbody>
</table>

Curve conditions

The guidelines below apply to the performance curves on the next pages:

- Test liquid: airless water.
- The curves apply to a density of $\rho = 983.2 \text{ kg/m}^3$ and a liquid temperature of +60 °C.
- All curves show average values and should not be used as guarantee curves. If a specific minimum performance is required, individual measurements must be made.
- The curves for the speeds I, II and III are marked.
- The curves apply to a kinematic viscosity of $\nu = 0.474 \text{ mm}^2/\text{s} (0.474 \text{ cSt})$.
- The conversion between head $H$ [m] and pressure $p$ [kPa] has been made for water with a density of $\rho = 1000 \text{ kg/m}^3$. For liquids with other densities, e.g. hot water, the discharge pressure is proportional to the density.
Technical data

ALPHA2 L 15-40, 25-40, 32-40

1 x 230 V, 50 Hz

The pump incorporates overload protection.

Connections: See "Union and valve kits" on page 13.

System pressure: Max. 1.0 MPa (10 bar).

Liquid temperature: +2 °C to +110 °C (TF 110).

<table>
<thead>
<tr>
<th>Speed</th>
<th>P1 [W]</th>
<th>I1/I2 [A]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min.</td>
<td>5</td>
<td>0.05</td>
</tr>
<tr>
<td>Max.</td>
<td>22</td>
<td>0.19</td>
</tr>
</tbody>
</table>

The pump incorporates overload protection.
Technical data

ALPHA2 L 25-60, 32-60

1 x 230 V, 50 Hz

The pump incorporates overload protection.

Connections: See "Union and valve kits" on page 13.

System pressure: Max. 10 bar.

Liquid temperature: +2 °C to +110 °C (TF 110).

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Dimensions [mm]</th>
<th>Weights [kg]</th>
<th>Ship. vol. [m³]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L1</td>
<td>B1</td>
<td>B2</td>
</tr>
<tr>
<td>ALPHA2 L 25-60</td>
<td>130</td>
<td>77</td>
<td>78</td>
</tr>
<tr>
<td>ALPHA2 L 25-60</td>
<td>180</td>
<td>78</td>
<td>77</td>
</tr>
<tr>
<td>ALPHA2 L 32-60</td>
<td>180</td>
<td>78</td>
<td>77</td>
</tr>
</tbody>
</table>
Accessories

Union and valve kits

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Description</th>
<th>Material</th>
<th>Product number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALPHA2 L 25-40,</td>
<td>3/4&quot; unions</td>
<td>Cast iron</td>
<td>529921</td>
</tr>
<tr>
<td>25-60</td>
<td>1&quot; unions</td>
<td>Cast iron</td>
<td>529922</td>
</tr>
<tr>
<td>ALPHA2 L 32-40,</td>
<td>1&quot; unions</td>
<td>Cast iron</td>
<td>509921</td>
</tr>
<tr>
<td>32-60</td>
<td>1 1/4&quot; unions</td>
<td>Cast iron</td>
<td>509922</td>
</tr>
</tbody>
</table>

Insulation kits

GRUNDFOS ALPHA2 L can be fitted with two insulating shells.

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

The insulation kit, which is tailored to the individual pump type, encloses the entire pump housing. The two shells are easily fitted around the pump.

Service kit

<table>
<thead>
<tr>
<th>Description</th>
<th>Product number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug</td>
<td>595562</td>
</tr>
</tbody>
</table>

WebCAPS

WebCAPS is a Web-based Computer Aided Product Selection program available on www.grundfos.com. WebCAPS contains detailed information on more than 185,000 Grundfos products in more than 20 languages.

In WebCAPS, all information is divided into 6 sections:

- Catalogue
- Literature
- Service
- Sizing
- Replacement
- CAD drawings.

Catalogue

With a starting point in areas of applications and pump types, this section contains:

- technical data
- curves (QH, Eta, P1, P2, etc) which can be adapted to the density and viscosity of the pumped liquid and show the number of pumps in operation
- product photos
- dimensional drawings
- wiring diagrams
- quotation texts, etc.

Literature

In this section you can access all the latest documents of a given pump, such as:

- data booklets
- Installation and operating instructions
- service documentation, such as Service kit catalogue and Service kit instructions
- quick guides
- product brochures, etc.

Service

This section contains an easy-to-use interactive service catalogue. Here you can find and identify service parts of both existing and cancelled Grundfos pumps. Furthermore, this section contains service videos showing you how to replace service parts.
Sizing

With a starting point in different application areas and installation examples, this section gives easy step-by-step instructions in how to:
- select the most suitable and efficient pump for your installation
- carry out advanced calculations based on energy consumption, payback periods, load profiles, lifecycle costs, etc.
- analyse your selected pump via the built-in lifecycle cost tool
- determine the flow velocity in wastewater applications, etc.

Replacement

In this section you find a guide to select and compare replacement data of an installed pump in order to replace the pump with a more efficient Grundfos pump.

The section contains replacement data of a wide range of pumps produced by other manufacturers than Grundfos.

Based on an easy step-by-step guide, you can compare Grundfos pumps with the one you have installed on your site. After having specified the installed pump, the guide suggests a number of Grundfos pumps which can improve both comfort and efficiency.

CAD drawings

In this section it is possible to download 2-dimensional (2D) and 3-dimensional (3D) CAD drawings of most Grundfos pumps.

The following formats are available in WebCAPS:

2-dimensional drawings
- .dxf, wireframe drawings
- .dwg, wireframe drawings.

3-dimensional drawings
- .dwg, wireframe drawings (without surfaces)
- .stp, solid drawings (with surfaces)
- .eprt, E-drawings.

WinCAPS

WinCAPS is a Windows-based Computer Aided Product Selection program containing detailed information on more than 185,000 Grundfos products in more than 20 languages.

The program contains the same features and functions as WebCAPS, but is an ideal solution if no Internet connection is available.

WinCAPS is available on CD-ROM and updated once a year.