

ALPHA2 L

Circulator pumps

50 Hz



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1. Product introduction	3
Type key	3
Performance range	3
2. Applications	4
Pumped liquids	4
Control of heating systems	4
Advantages of pump control	5
3. Construction	6
Sectional drawing	6
Material specification	6
Motor and control box	7
4. Installation and startup	8
Installation	8
Electrical data	8
Startup	8
Liquid temperature	8
System pressure	8
Inlet pressure	8
Setting the pump	8
Change of pump performance	9
5. Guide to performance curves	10
Energy labelling	10
Curve conditions	10
6. Performance curves and technical data	11
ALPHA2 L 15-40, 20-40 (N), 25-40 (N), 32-40	11
ALPHA2 L 20-45 N	12
ALPHA2 L 15-50, 20-50 N, 25-50 (N), 32-50	13
ALPHA2 L 15-60, 20-60, 25-60, 32-60	14
7. Accessories	15
Insulating kits	15
ALPHA plugs	15
Union and valve kits	16
8. Product range	17
ALPHA2 L, United Kingdom	17
ALPHA2 L, Russia	17
9. Grundfos Product Center	18

1. Product introduction

Grundfos ALPHA2 L is a complete range of circulator pumps with the following features:

- integrated differential-pressure control enabling adjustment of pump performance to the actual system requirement
- motor based on permanent-magnet/compact-rotor technology.

The pumps are energy-optimised and comply with the requirements of the EuP directive.



Fig. 1 EuP ready

The installation of one of these pumps will reduce power consumption considerably, reduce noise from thermostatic valves and similar fittings and improve the control of the system.

The Grundfos ALPHA2 L range offers a host of advantages:

Energy savings

High-efficient permanent-magnet motors.

Flexibility

Suitable for installation in existing systems.

Comfort

Low-noise operation.

Safety

Built-in electrical and thermal protection of the pump.

User friendliness

Simple setting and operation.

Type key

Example	ALPHA2 L 15 - 50	130
Pump range		
Nominal diameter (DN) of suction and discharge ports [mm] (15 = 1", 20 = 1 1/4", 25 = 1 1/2", 32 = 2")		
Maximum head [dm]		
[]: Cast-iron pump housing		
Port-to-port length [mm]		

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

Performance range

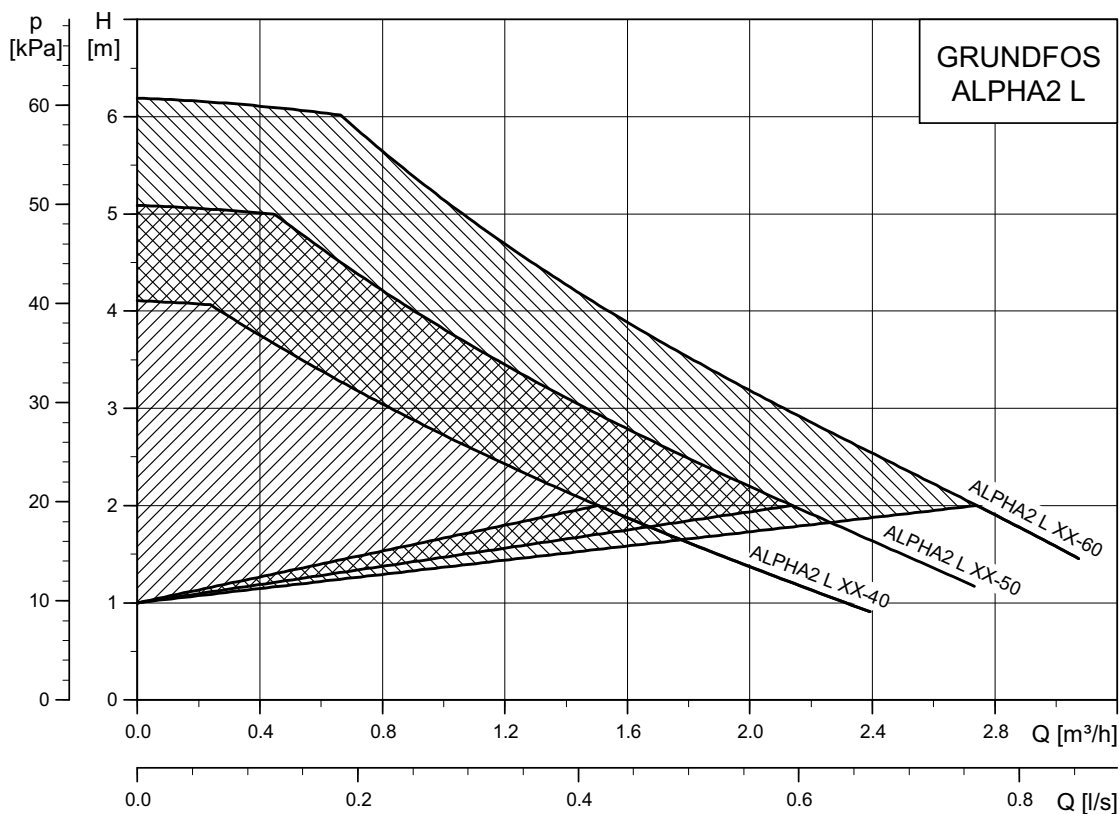


Fig. 2 Performance range

TM04 2107 2708

2. Applications

Grundfos ALPHA2 L is designed for circulating liquids in heating systems.

The pumps are suitable for the following systems:

- 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 the following:

- 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

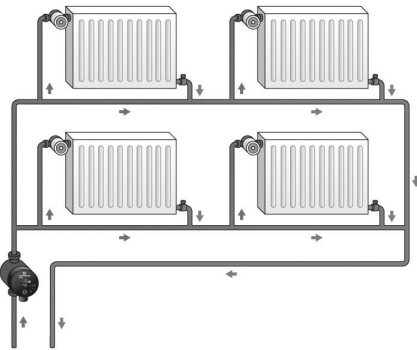


Fig. 3 One-pipe heating system

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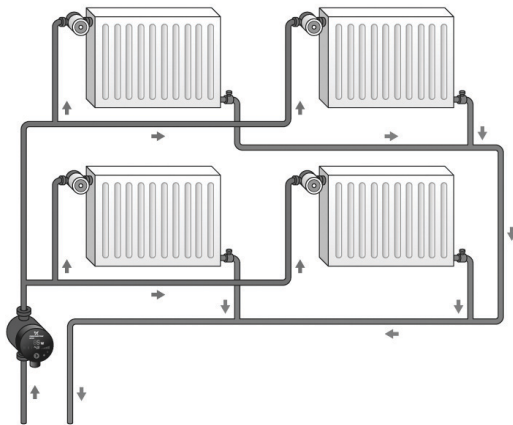


Fig. 4 Two-pipe heating system

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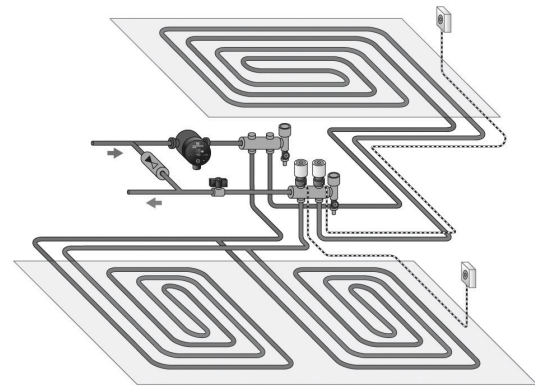


Fig. 5 Underfloor heating system

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Pumped liquids

The pump is suitable for 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 ALPHA2 L pump reduces the differential pressure in case 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 ΔH_1 .

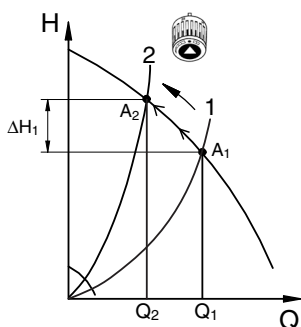


Fig. 6 Uncontrolled pump

In a system with a Grundfos ALPHA2 L pump, the pressure will be reduced by ΔH_2 .

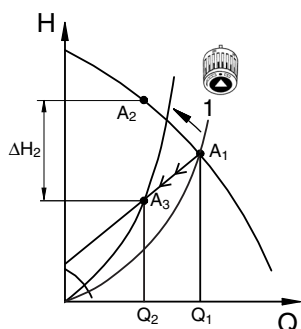


Fig. 7 Pump in proportional-pressure control mode

In a system with an uncontrolled pump, a pressure rise will often cause flow-generated noise in the thermostatic valves. This noise will be reduced considerably with the Grundfos ALPHA2 L.

The pump has the following control modes

- Proportional-pressure control
- Constant-pressure control
- Constant-curve control.

Proportional-pressure control

Proportional-pressure control adjusts the pump performance to the actual heat demand in the system, but the pump performance follows the selected performance curve, PP1 or PP2. See fig. 8 where PP2 has been selected. See [Change of pump performance](#) for further information.

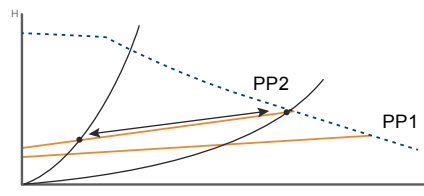


Fig. 8 Three proportional-pressure curves/settings

Constant-pressure control

Constant-pressure control adjusts the pump performance to the actual heat demand in the system, but the pump performance follows the selected performance curve, CP1 or CP2. See fig. 9 where CP1 has been selected. See [Change of pump performance](#) for further information.

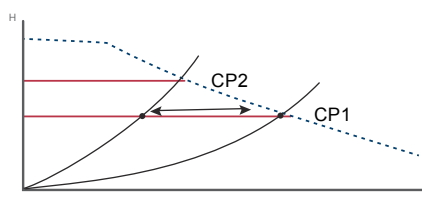


Fig. 9 Three constant-pressure curves/settings

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

Constant-curve control

At constant-curve/constant-speed operation, the pump runs at a constant speed, independent of the actual flow demand in the system. The pump performance follows the selected performance curve, I, II or III.

See fig. 10 where II has been selected. See [Change of pump performance](#) for further information.

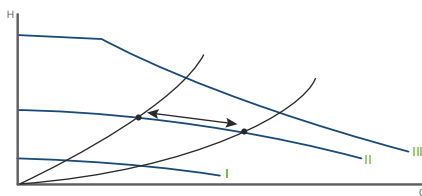


Fig. 10 Three constant-curve/constant-speed settings

3. Construction

Grundfos ALPHA2 L is designed for long and trouble-free operation due to 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. These constructions ensure maintenance-free operation.

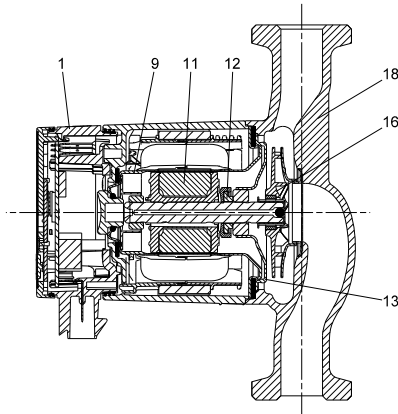
The pumps are characterised by the following:

- Permanent-magnet/compact-stator motor which contribute 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.
- Automatic air venting which contributes to easy commissioning.
- Compact design featuring pump head with integrated control box and control panel which fit into most common installation.

Material specification

Pos.	Description	Material	EN	AISI/ ASTM
1	Controller complete	Composite, PC		
9	Rotor can	Stainless steel	1.4301	304
	Radial bearing	Ceramics		
11	Shaft	Ceramics		
	Rotor cladding	Stainless steel	1.4301	304
12	Thrust bearing	Carbon		
	Thrust bearing retainer	EPDM rubber		
13	Bearing plate	Stainless steel	1.4301	304
16	Impeller	Composite, PP or PES		
18	Pump housing	Cast iron	EN-JL 1020	A48-25
	Gaskets	EPDM rubber		

Sectional drawing



TM03 9728 4307

Fig. 11 Position numbers

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 screws.

Control panel

The control panel is located on the front and is connected to the stator via a terminal plug. The control panel has a push-button (pos. 1) for selection of pump setting and seven light fields for indication of the selected pump setting. See fig. 12.

The "POWER ON" light field indicates that the power supply has been switched on. When the "POWER ON" light field is on and shows "- -", a fault preventing the pump from operating properly (for example seizing-up) has occurred.

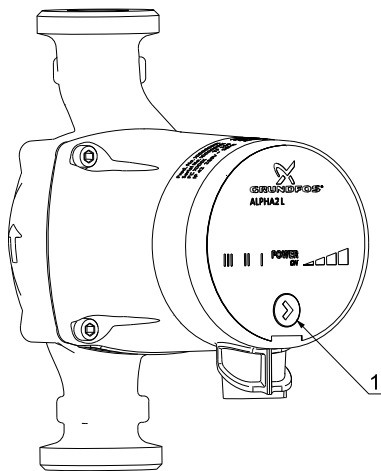


Fig. 12 Push-button position

Control box positions

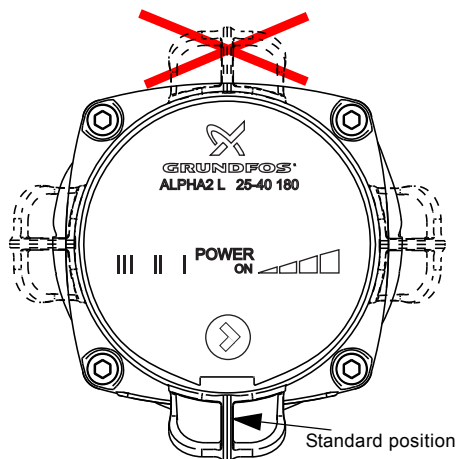


Fig. 13 Possible control box positions

ALPHA cable with plug

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



Fig. 14 ALPHA plug with cable relief and angled ALPHA plug with fixed cable

Stainless-steel versions N

The pump housing of the stainless-steel versions is painted in red colour. The stainless-steel versions can be identified by the N in the type key or by the silver ring around the display. See fig. 15.



Fig. 15 Stainless-steel version N

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GF-350

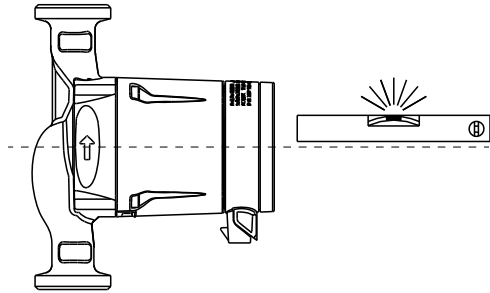
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4. Installation and startup

Installation

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

The pump must always be installed with horizontal motor shaft.



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Fig. 16 Horizontal motor shaft

Electrical data

Supply voltage	1 x 230 V - 10 %/+ 10 %, 50/60 Hz, PE
Motor protection	The pump requires no external motor protection.
Enclosure class	IP42
Insulation class	F
Relative air humidity	Maximum 95 %
Ambient temperature	0-40 °C
Temperature class	TF110 to CEN 335-2-51
EMC (electromagnetic compatibility)	EN 55014-1:2006 and EN 55014-2:1997
Sound pressure level	≤ 43 dB(A)

Startup

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 and does not require venting before startup.

Liquid temperature

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

Ambient temperature [°C]	Liquid temperature	
	Minimum [°C]	Maximum [°C]
0	2	110
10	10	110
20	20	110
30	30	110
35	35	90
40	40	70

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.

Liquid temperature		
75 °C	90 °C	110 °C
0.5 m head	2.8 m head	10.8 m head

Setting the pump

Using 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.

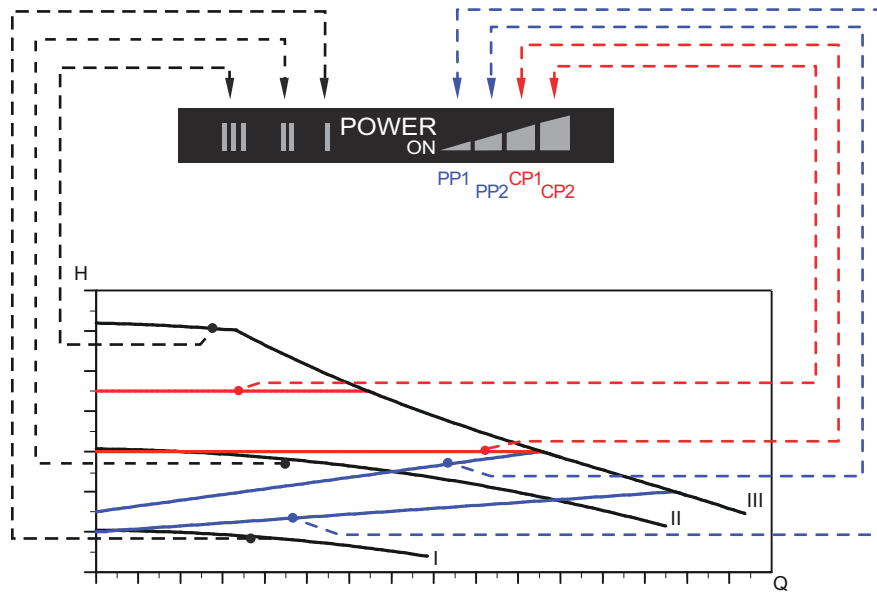
Factory setting

The pump has been factory-set to proportional-pressure curve (PP2). See fig. 17.

This setting is suitable for the majority of all single-family houses.

Change of pump performance

The pump performance (flow and head) can be changed by pressing the control box push-button as indicated in fig. 17 and the table below.



TM04 2532 2608

Fig. 17 Pump setting in relation to performance

Setting	Pump curve	Function
PP1	Lowest proportional-pressure curve	The duty point of the pump will move up or down on the lowest proportional-pressure curve, depending on the heat demand in the system. See fig. 17. The head (pressure) is reduced at falling heat demand and increased at rising heat demand.
PP2	Highest proportional-pressure curve	The duty point of the pump will move up or down on the highest proportional-pressure curve, depending on the heat demand in the system. See fig. 17. The head (pressure) is reduced at falling heat demand and increased at rising heat demand.
CP1	Lowest constant-pressure curve	The duty point of the pump will move out or in on the lowest constant-pressure curve, depending on the heat demand in the system. See fig. 17. The head (pressure) is kept constant, irrespective of the heat demand.
CP2	Highest constant-pressure curve	The duty point of the pump will move out or in on the highest constant-pressure curve, depending on the heat demand in the system. See fig. 17. The head (pressure) is kept constant, irrespective of the heat demand.
III	Speed III	The pump runs at a constant speed and consequently on a constant curve. In speed III, the pump is set to run on the maximum curve under all operating conditions. See fig. 17. Quick venting of the pump can be obtained by setting the pump to speed III for a short period.
II	Speed II	The pump runs at a constant speed and consequently on a constant curve. In speed II, the pump is set to run on the intermediate curve under all operating conditions. See fig. 17.
I	Speed I	The pump runs at a constant speed and consequently on a constant curve. In speed I, the pump is set to run on the minimum curve under all operating conditions. See fig. 17.

5. Guide to performance curves

Energy labelling

The Grundfos ALPHA2 L is energy-optimised and complies with the EuP Directive (Commission Regulation (EC) No 641/2009) which has been effective since 1 January 2013.

For more information about the new energy directive, please visit:



Energy.grundfos.com

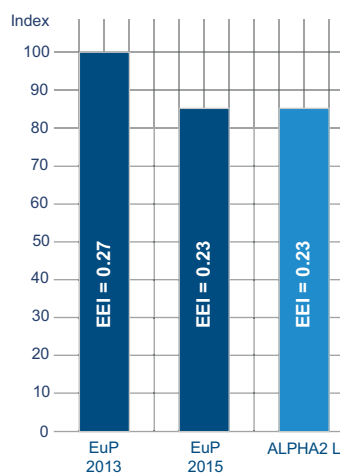
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Curve conditions

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

- Test liquid: airless water.
- The curves apply to a density of $\rho = 983.2 \text{ kg/m}^3$ and a liquid temperature of $60 \text{ }^\circ\text{C}$.
- All curves show average values and should not be used as guarantee curves. If a specific minimum performance is required, individual measurements must be made.
- The curves for speeds I, II and III are marked.
- The curves apply to a kinematic viscosity of $\nu = 0.474 \text{ mm}^2/\text{s}$ (0.474 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, for example hot water, the discharge pressure is proportional to the density.

The EEI values for Grundfos ALPHA2 L pumps are far below the EuP 2013 value and comply with the requirements for 2015. See fig. 18.



TM05 7835 1613

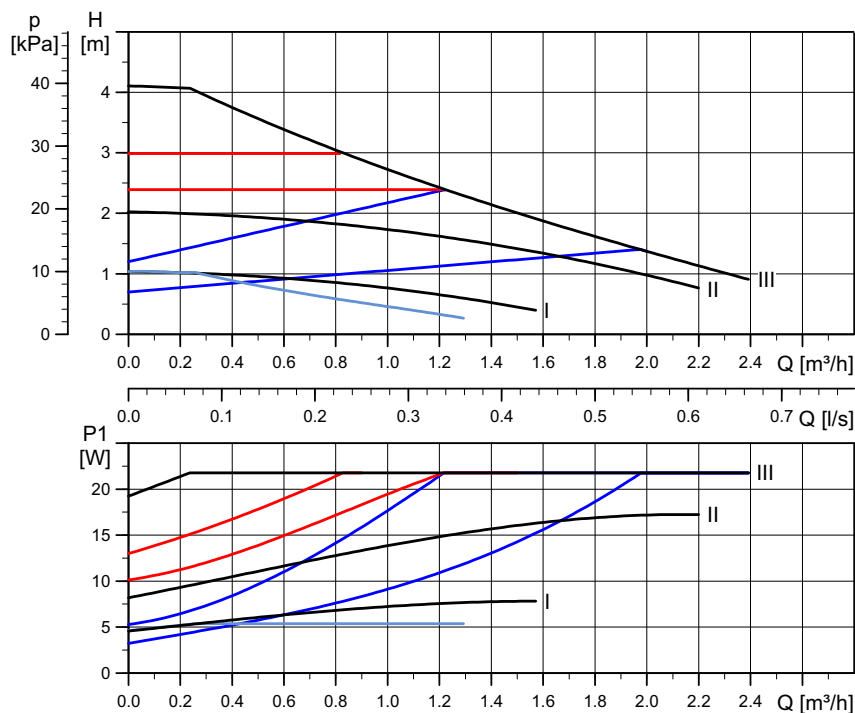
Fig. 18 EEI limits and the current positioning of the ALPHA2 L

With an energy efficiency index (EEI) at the EuP 2015 requirement level, you can achieve considerable energy savings compared to a typical circulator pump and thus a remarkably fast return on investment.

6. Performance curves and technical data

ALPHA2 L 15-40, 20-40 (N), 25-40 (N), 32-40

1 x 230 V, 50/60 Hz

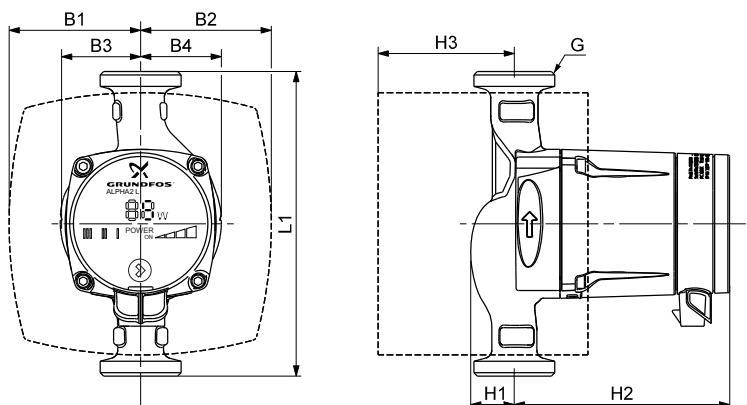


TM04 2110 2614 - TM03 0868 0705

Speed	P1 [W]	I _{1/1} [A]
Min.	5	0.05
Max.	22	0.19

Connections: See [Insulating kits](#), page 15.
 System pressure: Maximum 1.0 MPa (10 bar).
 Liquid temperature: 2-110 °C (TF 110).

The pump incorporates overload protection.

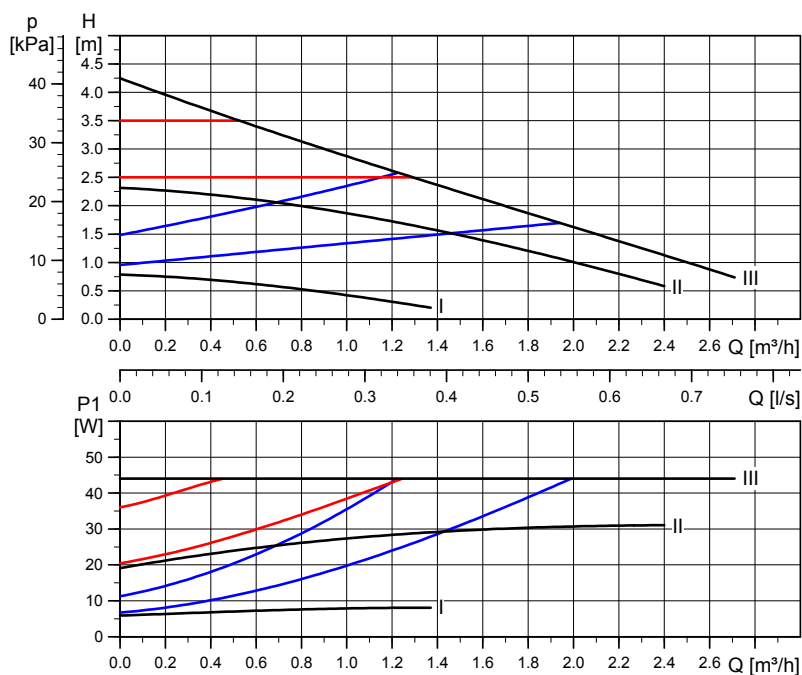


TM05 8040 1813

Pump type	EEI <	Dimensions [mm]									Weights [kg]		Ship. vol. [m³]
		L1	B1	B2	B3	B4	H1	H2	H3	G	Net	Gross	
ALPHA2 L 15-40	0.23	130	78	78	46	49	27	129	58	1	1.9	2.1	0.00383
ALPHA2 L 20-40	0.23	130	78	78	46	49	27	129	58	1 1/2	1.9	2.1	0.00383
ALPHA2 L 20-40 N	0.23	150	78	78	46	49	27	129	58	1 1/4	2.4	2.6	0.00383
ALPHA2 L 25-40	0.23	130	78	78	46	49	27	129	79	1 1/2	1.9	2.1	0.00383
ALPHA2 L 25-40 (N)	0.23	180	78	78	47	48	26	127	81	1 1/2	2.1	2.3	0.00383
ALPHA2 L 25-40 A	0.23	180	63	93	32	65	50	135	82	1 1/2	3.1	3.3	0.00383
ALPHA2 L 32-40	0.23	180	78	78	47	65	26	127	81	2	2.1	2.3	0.00383
ALPHA2 L 32-40	0.23	180	78	78	47	48	26	127	81	2	2.1	2.3	0.00383

ALPHA2 L 20-45 N

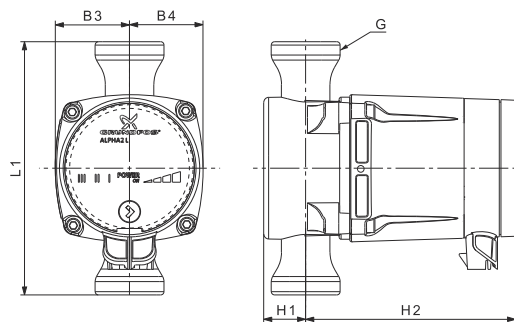
1 x 230 V, 50 Hz



Speed	P1 [W]	$I_{1/1}$ [A]
Min.	7	0.07
Max.	45	0.34

System pressure: Maximum 1.0 MPa (10 bar).
Liquid temperature: 2-110 °C (TF 110).

The pump incorporates overload protection.



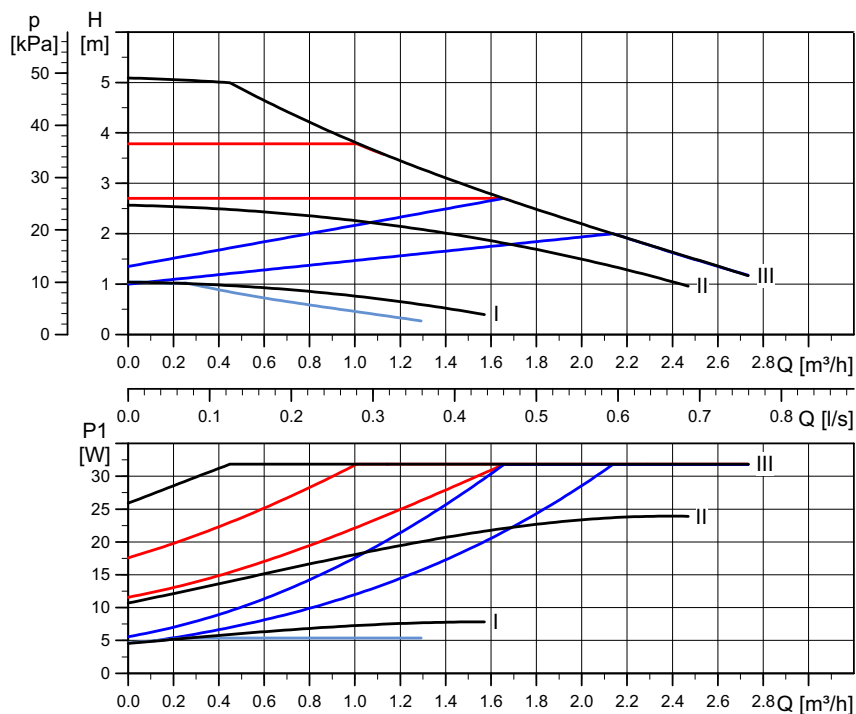
Pump type	Dimensions [mm]						Weights [kg]		Ship. vol. [m³]
	L1	B3	B4	H1	H2	G	Net	Gross	
ALPHA2 L 20-45 N	150	43	43	27	127	1 1/4	1.8	2.0	0.00383

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TM05 2201 4611

ALPHA2 L 15-50, 20-50 N, 25-50 (N), 32-50

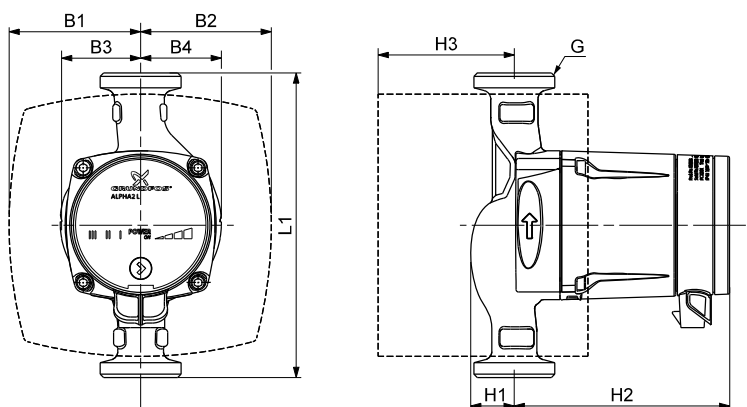
1 x 230 V, 50/60 Hz



Speed	P1 [W]	I _{1/1} [A]
Min.	5	0.05
Max.	32	0.27

Connections: See [Insulating kits](#), page 15.
 System pressure: Maximum 10 bar.
 Liquid temperature: 2-110 °C (TF 110).

The pump incorporates overload protection.



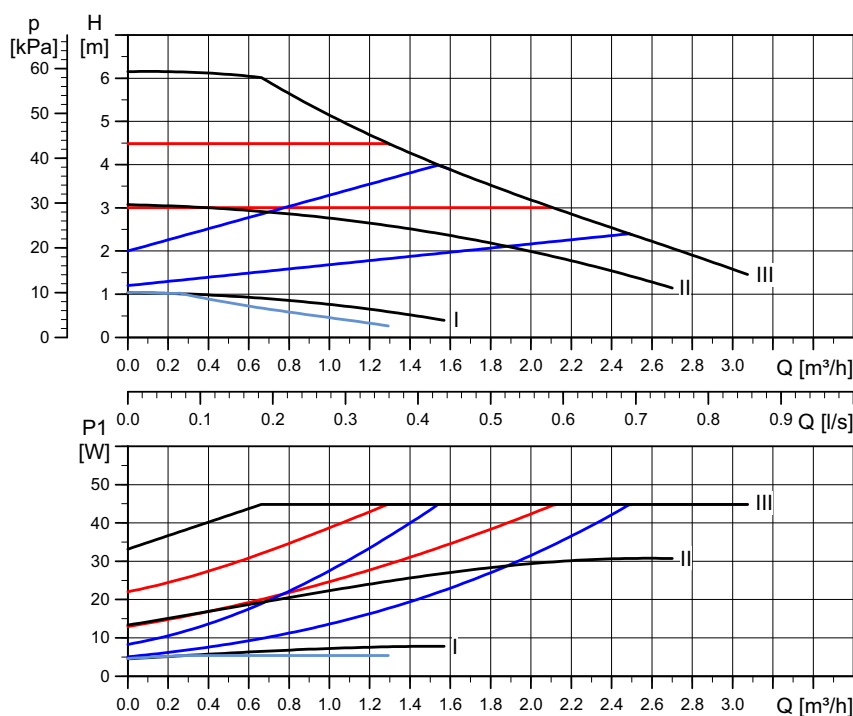
Pump type	EEI <	Dimensions [mm]									Weights [kg]		Ship. vol. [m³]
		L1	B1	B2	B3	B4	H1	H2	H3	G	Net	Gross	
ALPHA2 L 15-50	0.23	130	78	78	46	49	27	129	58	1 1/2	2.0	2.2	0.00383
ALPHA2 L 20-50	0.23	130	78	78	46	49	27	129	58	1 1/2	1.9	2.1	0.00383
ALPHA2 L 20-50 N	0.23	150	78	78	46	49	27	129	58	1 1/4	2.4	2.6	0.00383
ALPHA2 L 25-50	0.23	130	78	78	46	49	27	129	79	1 1/2	1.9	2.1	0.00383
ALPHA2 L 25-50 (N)	0.23	180	78	78	47	65	26	127	81	2	2.1	2.3	0.00383
ALPHA2 L 32-50	0.23	180	78	78	47	65	26	127	81	2	2.1	2.3	0.00383

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ALPHA2 L 15-60, 20-60, 25-60, 32-60

1 x 230 V, 50/60 Hz

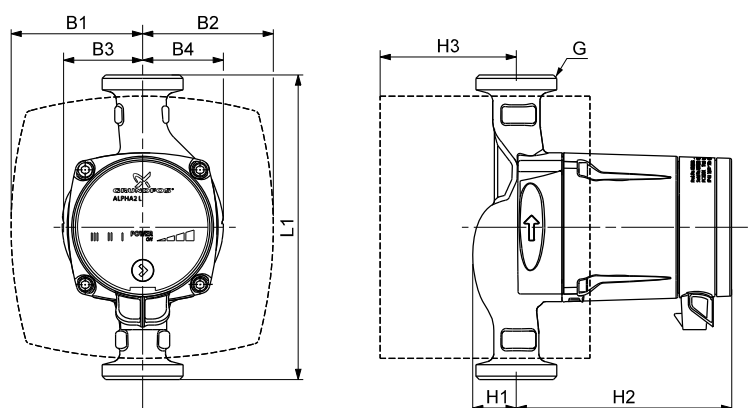


TM04 2108 2614 - TM03 0868 0705

Speed	P1 [W]	$I_{1/1}$ [A]
Min.	5	0.05
Max.	45	0.38

Connections: See [Insulating kits](#), page 15.
 System pressure: Maximum 10 bar.
 Liquid temperature: 2-110 °C (TF 110).

The pump incorporates overload protection.



TM04 2533 2608

Pump type	EEI <	Dimensions [mm]									Weights [kg]		Ship. vol. [m³]
		L1	B1	B2	B3	B4	H1	H2	H3	G	Net	Gross	
ALPHA2 L 15-60	0.23	130	78	78	46	49	27	129	58	1 1/2	1.9	2.1	0.00383
ALPHA2 L 20-60	0.23	130	78	78	46	49	27	129	58	1 1/2	1.9	2.1	0.00383
ALPHA2 L 20-60 N	0.23	150	78	78	46	49	27	129	58	1 1/4	2.4	2.6	0.00383
ALPHA2 L 25-60	0.23	180	78	77	47	48	26	127	81	1 1/2	2.1	2.3	0.00383
ALPHA2 L 25-60 (N)	0.23	180	78	78	47	65	26	127	81	2	2.1	2.3	0.00383
ALPHA2 L 25-60 A	0.23	180	63	93	32	65	50	135	82	1 1/2	3.1	3.3	0.00383
ALPHA2 L 32-60	0.23	180	78	77	47	48	26	127	81	2	2.1	2.3	0.00383

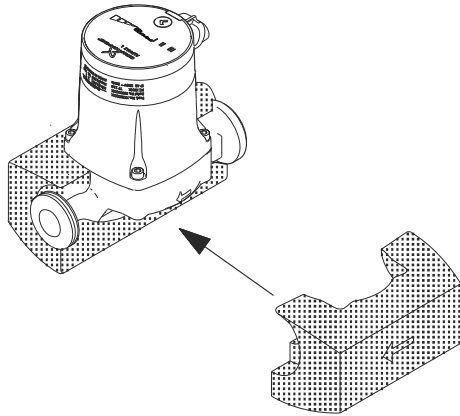
7. Accessories

Insulating kits

Grundfos ALPHA2 L pumps can be fitted with two insulating shells.

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

The insulating kit, which is tailored to the individual pump type, encloses the entire pump housing. The two insulating shells are easy to fit around the pump.



TM04 2806 3208

Fig. 19 Insulating shells

Pump type	Product number
Insulating shells (not available for ALPHA2 L 20-45)	505821

ALPHA plugs



TM05 3073 0612

Fig. 20 ALPHA plugs

Pos.	Description	Product number
1	ALPHA plug, standard plug connection	98284561
2	ALPHA angle plug, standard angle plug connection	98610291
3	ALPHA plug, 90 ° bend, including 4 m cable	96884669

Grundfos offers a special cable with an active built-in NTC protection circuit which will reduce possible inrush currents. To be used in case of e.g poor quality of relay components which are sensitive to inrush current.

Union and valve kits

		Product numbers, unions															
ALPHAX	Connection	Rp			R		★ Rp			★ mm		mm					
		3/4	1	1 1/4	1	1 1/4	3/4	1	1 1/4	Ø22	Ø28	Ø15	Ø18	Ø22	Ø28	Ø42	
15-xx*	G 1	•															
15-xx N*		•															
25-xx	G 1 1/2	529921	529922	529821	529925	529924											
25-xx N		529971	529972				519805	519806	519807	519808	519809			529977	529978	529979	
32-xx	G 2		509921	509922													
32-xx N				509971													•

* When ordering UK versions, use product numbers for 25-xx (G 1 1/2).

• Available on request.

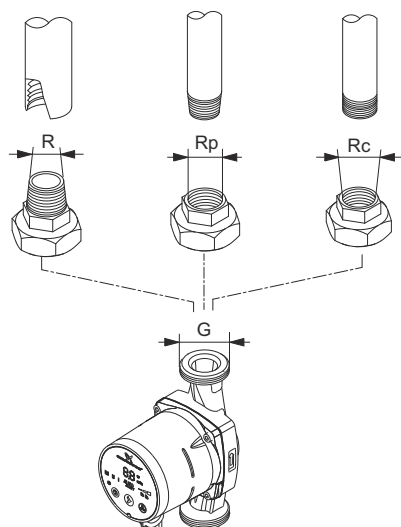
★ Fittings including isolating valve.

Thread types

G-threads have a cylindrical form in accordance with the EN-ISO 228-1 standard.

R-threads have a conical form in accordance with the ISO 7-1 standard.

In the case of a thread of size 1 1/2", for example, the threads are specified as G1 1/2 or R1 1/2. Male G-threads (cylindrical) can only be screwed into female G-threads. Male R-threads (conical) can be screwed into female G-threads or R-threads. See fig. 21.



TM064955 3415

Fig. 21 G-thread and R-thread

8. Product range

ALPHA2 L, international

Note: Click on the product number and go directly to the performance curve in Grundfos Product Center.

Pump type	Port-to-port length [mm]	Connection	Voltage [V] 50 Hz	Product number	Product number stainless steel	Data sheet Page
ALPHA2 L 15-40	130			95047560		11
ALPHA2 L 15-50	130	G 1		98288721		13
ALPHA2 L 15-60	130			96984037		14
ALPHA2 L 20-40	130			98288722		11
ALPHA2 L 20-40 N	150				98288708	11
ALPHA2 L 20-45 N	150				98094952	12
ALPHA2 L 20-50	130	G 1 1/4		98288723		13
ALPHA2 L 20-50 N	150				98290112	13
ALPHA2 L 20-60	130			98288724		13
ALPHA2 L 20-60 N	150				98288709	14
ALPHA2 L 25-40	130		230	95047561		11
ALPHA2 L 25-40 (N)	180			95047562	98288702	11
ALPHA2 L 25-40 A	180			98288725		11
ALPHA2 L 25-50	130			98288726		13
ALPHA2 L 25-50 (N)	180	G 1 1/2		98124072	98288705	13
ALPHA2 L 25-60	130			95047563		14
ALPHA2 L 25-60 (N)	180			95047564	95047506	14
ALPHA2 L 25-60 A	180			98288728		14
ALPHA2 L 32-40	180			95047565		11
ALPHA2 L 32-50	180	G 2		98288729		13
ALPHA2 L 32-60	180			95047566		14

ALPHA2 L, United Kingdom

Note: Click on the product number and go directly to the performance curve in Grundfos Product Center.

Pump type	Port-to-port length [mm]	Connection	Voltage [V] 50 Hz	Product number	Data sheet Page
ALPHA2 L 15-50				95047567	12
ALPHA2 L 15-60	130	G 1 1/2	230	95047568	14

ALPHA2 L, Russia

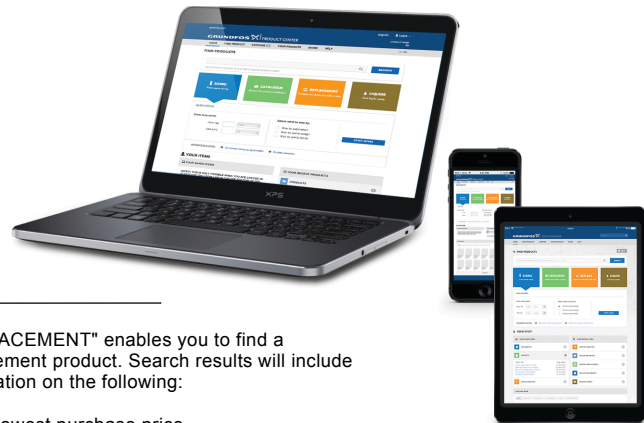
Note: Click on the product number and go directly to the performance curve in Grundfos Product Center.

Pump type	Port-to-port length [mm]	Connection	Voltage [V] 50 Hz	Product number	Data sheet Page
ALPHA2 L 25-40				98257789	11
ALPHA2 L 25-60		G 1 1/2		98286490	14
ALPHA2 L 32-40	180		230	98286501	11
ALPHA2 L 32-60		G 2		98286503	14

9. Grundfos Product Center

Online search and sizing tool to help you make the right choice.

<http://product-selection.grundfos.com>



"SIZING" enables you to size a pump based on entered data and selection choices.

"REPLACEMENT" enables you to find a replacement product. Search results will include information on the following:

- the lowest purchase price
- the lowest energy consumption
- the lowest total life cycle cost.

The screenshot shows the Grundfos Product Center website. At the top, there is a navigation bar with 'HOME', 'FIND PRODUCT', 'COMPARE', 'YOUR PROJECTS', 'SAVED ITEMS', and 'HELP'. Below this is a search bar with the placeholder text 'Input product number or a whole or partial product name' and a 'SEARCH' button. The main content area features four large colored buttons: 'SIZING' (blue), 'CATALOGUE' (green), 'REPLACEMENT' (orange), and 'LIQUIDS' (brown). Below these buttons is a 'QUICK SIZING' section with input fields for 'Flow (Q)*' (m³/h) and 'Head (H)*' (m), and radio buttons for 'Select what to size by: Size by application', 'Size by pump design', and 'Size by pump family'. A 'START SIZING' button is located to the right of these options. At the bottom of the quick sizing section, there are links for 'Advanced sizing by application' and 'Guided selection'.

"CATALOGUE" gives you access to the Grundfos product catalogue.

"LIQUIDS" enables you to find pumps designed for aggressive, flammable or other special liquids.

All the information you need in one place

Performance curves, technical specifications, pictures, dimensional drawings, motor curves, wiring diagrams, spare parts, service kits, 3D drawings, documents, system parts. The Product Center displays any recent and saved items - including complete projects - right on the main page.

Downloads

On the product pages, you can download installation and operating instructions, data booklets, service instructions, etc. in PDF format.

Subject to alterations.

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