

UPS2

Circulator pumps

50/60 Hz



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1. Product introduction

UPS2 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.

The installation of UPS2 will reduce power consumption considerably, reduce noise from thermostatic valves and similar fittings and improve the control of the system.

The UPS2 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	UPS2	15 - 40/50/60 130
Pump range		
Nominal diameter (DN) of inlet and outlet ports [mm] (15 = 1"25 = 1 1/2", PH = pump head only)		
Maximum head [dm] of the UPS pump types that can be replaced by the UPS2		
Port-to-port length [mm]		

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

Performance range

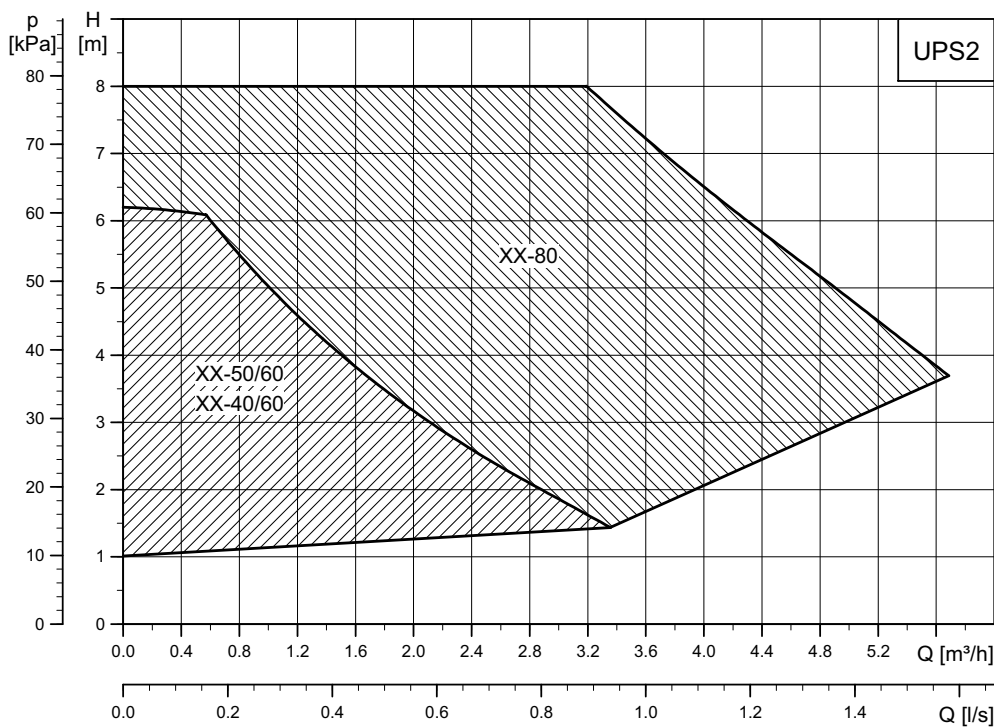


Fig. 1 Performance range

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2. Applications

UPS2 is designed specifically for domestic heating systems. The pumps are used primarily for one- and two-pipe heating systems, but are, for example, also suitable for mixing loops in large systems.

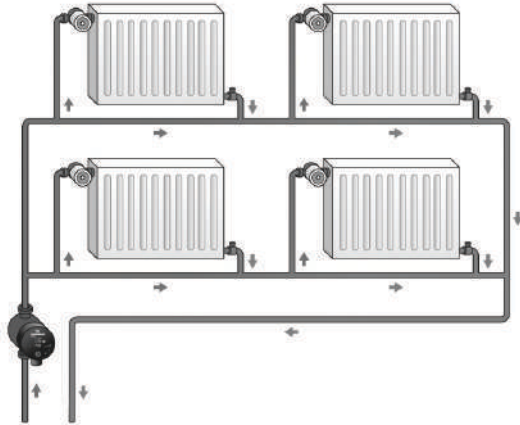


Fig. 2 One-pipe heating system

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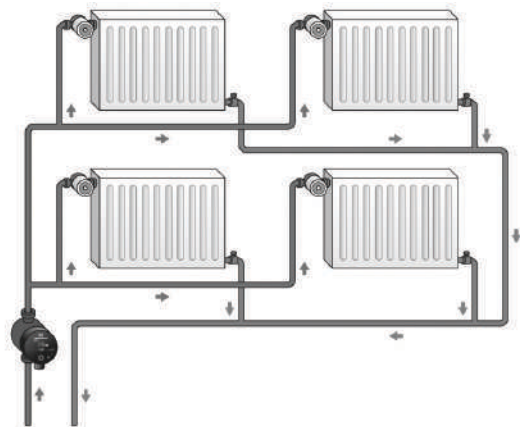


Fig. 3 Two-pipe heating system

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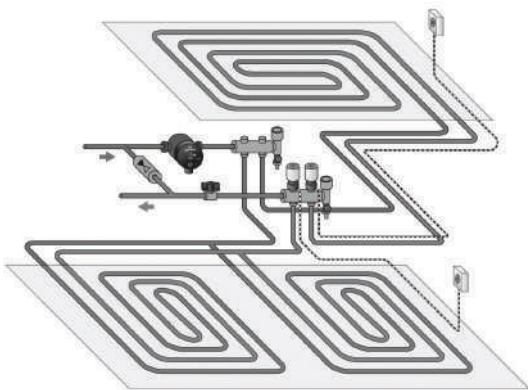


Fig. 4 Underfloor heating system

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UPS replacement

UPS2 is the perfect replacement option to optimise efficiency in domestic heating systems.

The most modern technology has been used in the development and manufacturing of the UPS2 pumps. With an EEI value ≤ 0.23 , the pump is designed to meet the efficiency demands of the 2015 EuP directive.

UPS2 is designed specifically to meet performance and dimensional demands in relation to replacement of existing UPS pumps.

UPS2 is available as a pump head (PH version) which can be fitted to the pump housing of existing UPS pumps. We offer this solution for the replacement of all UPS pump types. This is a very time-efficient and simple replacement solution as the pump housing does not need to be removed from the pipework.

Design benefits which make UPS2 the ideal replacement pump:

- direct compatibility
- compact pump head
- cable plug integrated in control box
- performance change in terms of speed setting
- easy-to-read interface.

The table below shows a comparison of the speed setting of an existing UPS pump and a UPS2 pump.

Existing pump Head [m]	Speed setting of existing UPS pump	Equivalent speed setting of UPS2
4	I, II, III	I
	I	I
	II	II
5	III	II
	I	I
	II	II
6	III	III
	I	I
	II	II
8	III	III
	I	I
	II	II

See section [Control of the pump](#), page 7, for further details.

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.

UPS2 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 UPS2, control is effected by adapting the differential pressure to the flow. Contrary to an uncontrolled pump, the proportional-pressure-controlled UPS2 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 .

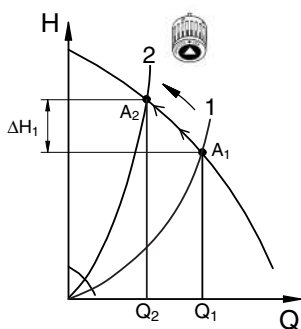


Fig. 5 Uncontrolled pump

In a system with a UPS2 pump, the pressure will be reduced by ΔH_2 .

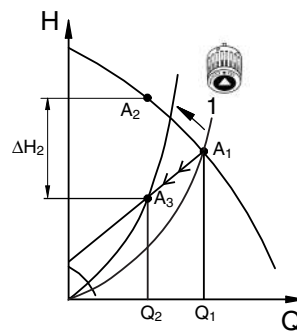


Fig. 6 Pump in proportional-pressure control mode

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 UPS2.

UPS2 has three proportional-pressure curves which are close to the best efficiency point.

As the pump is the obvious UPS replacement option, the three fixed speeds are under normal conditions the best choice from a user's point of view.

The pump has the following control modes:

- proportional-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, PP2 or PP3. See fig. 7 where PP2 has been selected. See [Change of pump performance](#) for further information.

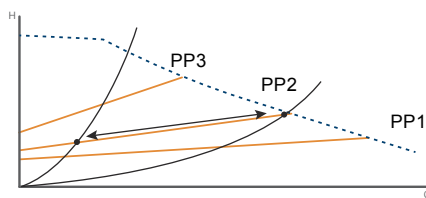


Fig. 7 Three proportional-pressure curves/settings

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. 8 where II has been selected.

See [Change of pump performance](#) for further information.

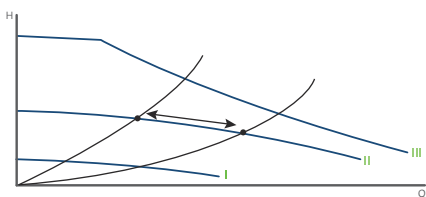


Fig. 8 Three constant-curve/constant-speed settings

TM01 9120 5002

TM06 1830 3114

TM01 9119 5002

TM05 3068 0912

3. Construction

UPS2 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 contributing to high efficiency and high starting torque.
- Ceramic shaft and radial bearings contributing to long life.
- Carbon thrust bearing contributing to long life
- Stainless-steel rotor can, bearing plate and rotor cladding contributing to corrosion-free long life.
- Composite impeller contributing to corrosion-free long life.
- Design featuring pump head with integrated control box and control panel or the compact UPS2 design.

Sectional drawing

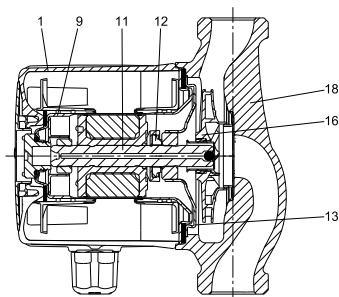


Fig. 9 Position numbers

TM05 5379 1012

Material specification

Pos.	Description	Material	EN	AISI/ ASTM
1	Controller complete	Composite, PC		
9	Rotor can	Stainless steel	1.4301	304
	Radial bearing	Ceramics		
	Shaft	Ceramics		
11	Rotor cladding	Stainless steel	1.4301	304
	Thrust bearing	Carbon		
12	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		

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

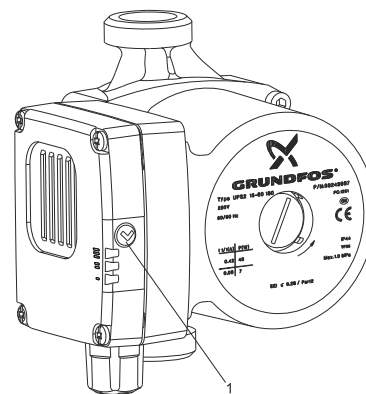


Fig. 10 Push-button position

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UPS2 has a push-button (pos. 1) for selection of pump setting and light fields for indication of the selected pump setting. See fig. 10.

The light is on when the power supply has been switched on.

Control box positions

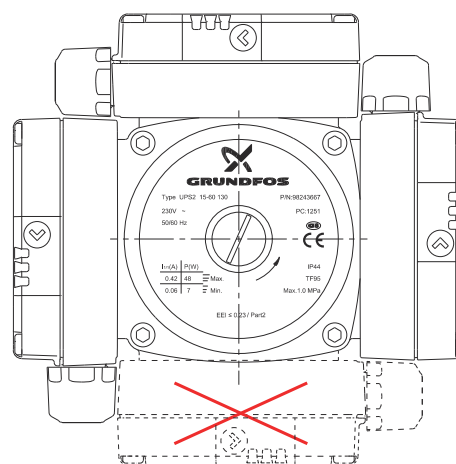


Fig. 11 Possible control box positions

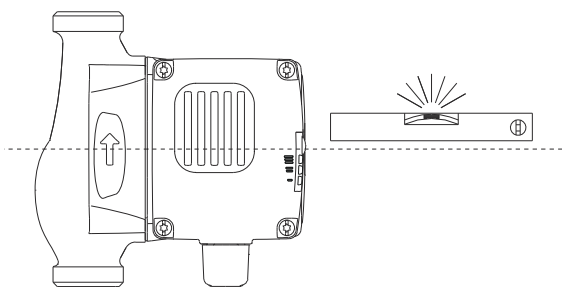
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4. Installation and startup

Installation

In most cases, the installation of UPS2 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. 12 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	IP44.
Insulation class	F.
Relative air humidity	Maximum 95 %.
Ambient temperature	0-55 °C.
Temperature class	TF95 to CEN 335-2-51.
EMC (electromagnetic compatibility)	EN 61000-6-2 and EN 61000-6-3.
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	95
10	10	95
20	20	95
30	30	95
35	35	95
40	40	95

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 inlet 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, you can set the electronically controlled pump to the following:

- three fixed-speed curves
- three proportional-pressure curves.

Factory setting

The UPS2 pump has been factory-set to speed III. See fig. 14.

At this setting, the pump will deliver its maximum performance, but the setting can be changed so that it matches the actual heating demand.

Control of the pump

The pump setting can be changed with a single press on the push-button.

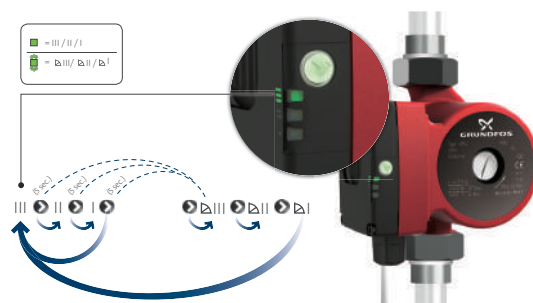
Figure 13 illustrates how UPS2 changes between the three speeds. This setting is indicated by a steady green light.

When you press the button for five seconds, the pump will change from fixed-speed operation to proportional-pressure control.

Figure 13 also illustrates how UPS2 changes between the three proportional-pressure curves.

This setting is indicated by a flashing green light.

See section [Change of pump performance](#), page 8, for further details.

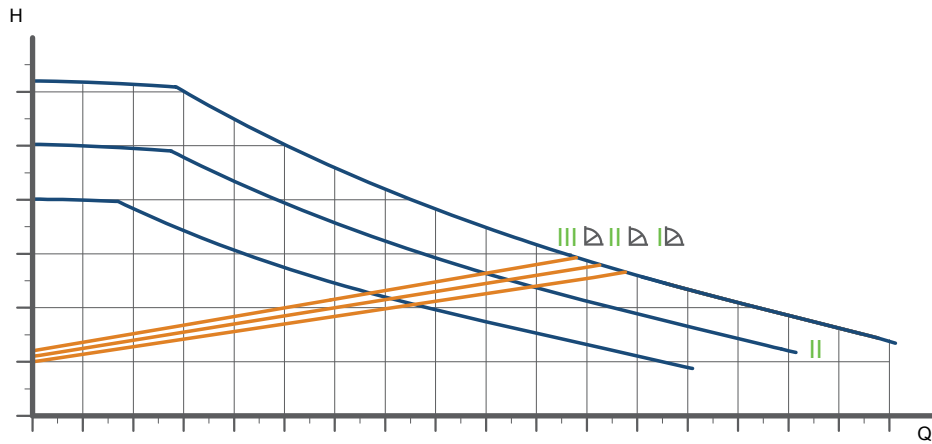


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Fig. 13 Control modes

Change of pump performance

The pump performance (flow and head) can be changed by pressing the control box push-button as indicated in fig. 13 and the table below.



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Fig. 14 Pump setting in relation to performance

Setting	Pump curve	Function
I ▷	Lowest proportional-pressure curve PP1	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. 14. The head (pressure) is reduced at falling heat demand and increased at rising heat demand.
II ▷	Intermediate proportional-pressure curve PP2	The duty point of the pump will move up or down on the intermediate proportional-pressure curve, depending on the heat demand in the system. See fig. 14. The head (pressure) is reduced at falling heat demand and increased at rising heat demand.
III ▷	Highest proportional-pressure curve PP3	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. 14. The head (pressure) is reduced at falling heat demand and increased at rising 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. 14. 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. 14.
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. 14.

5. Guide to performance curves

Energy labelling

The UPS2 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 outlet pressure is proportional to the density.

The EEI values for UPS2 pumps are far below the EuP 2013 value and comply with the requirements for 2015. See fig. 15.



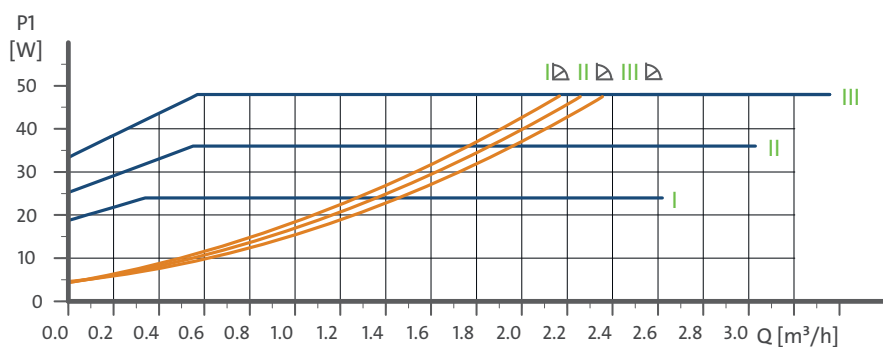
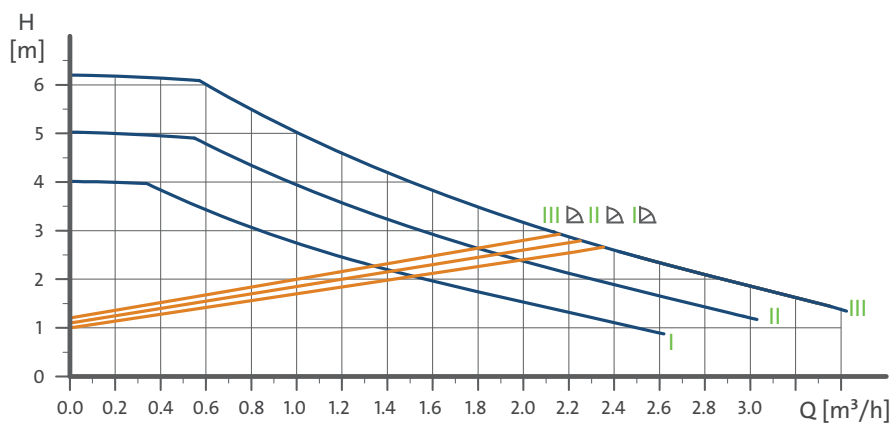
TM05 7834 1613

Fig. 15 EEI limits and the current positioning of the UPS2

6. Performance curves and technical data

UPS2 15-40/60 130, UPS2 25-40/60 130, UPS2 25-40/60 180, UPS2 PH-40/60

1 x 230 V, 50/60 Hz



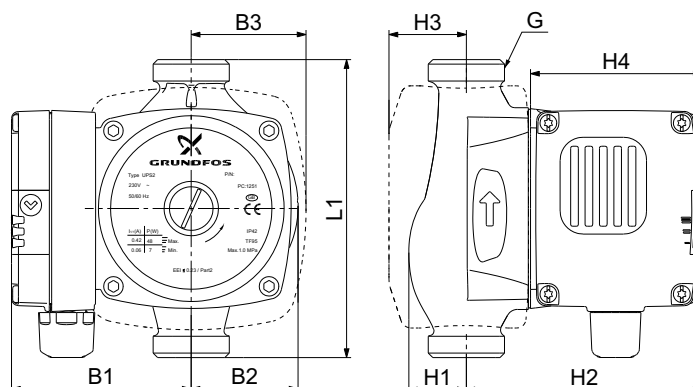
Speed	P1 [W]	$I_{1/1}$ [A]
Min.	7	0.06
Max.	48	0.42

Connections: See [Insulating kits](#), page 13.

System pressure: Maximum 10 bar.

Liquid temperature: 2-95 °C (TF 95).

The pump incorporates overload protection.



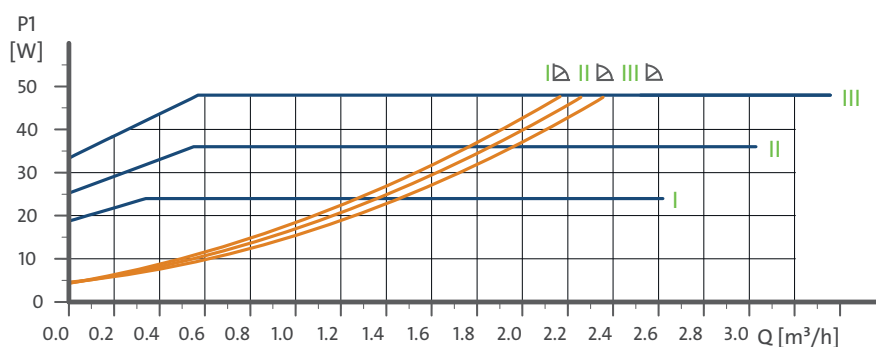
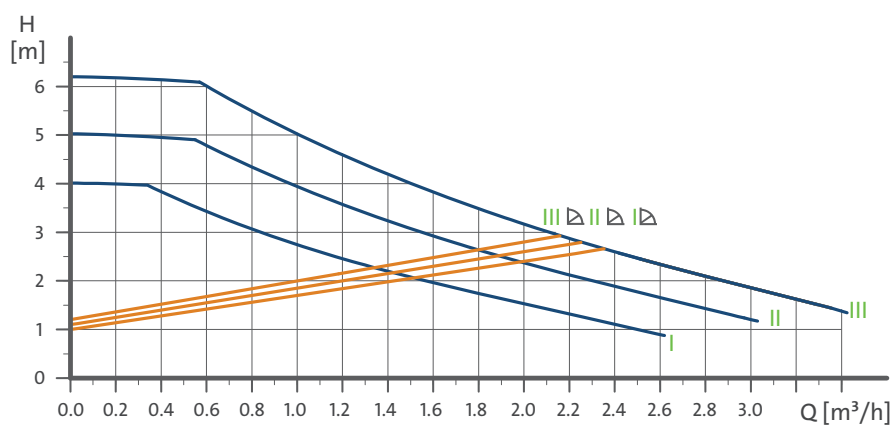
Pump type	Dimensions [mm]										Weights [kg]		Ship. vol. [m³]
	EEI ≤	L1	B1	B2	B3	H1	H2	H3	H4	G	Net	Gross	
UPS2 15-40/60	0.23	130	79	47	75	28	102	60	76	1	2.5	2.7	0.004
UPS2 25-40/60	0.23	130	79	47	75	29	102	60	76	1 1/2	2.7	2.9	0.004
UPS2 PH-40/60	0.23	-	-	-	-	-	-	-	76	-	1.7	1.9	0.004

TM05 5403 3612

TM05 5202 3612

UPS2 15-50/60 130, UPS2 PH-50/60

1 x 230 V, 50/60 Hz



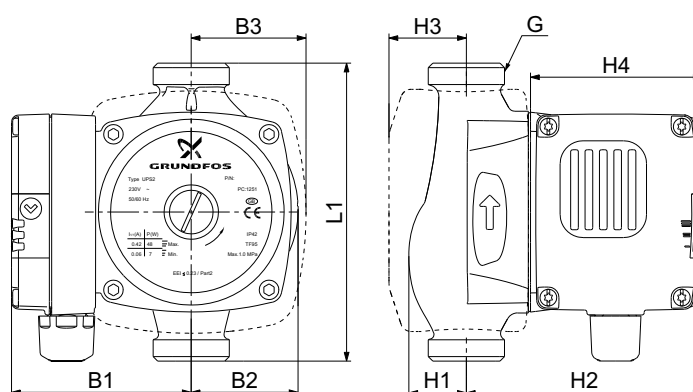
Speed	P1 [W]	I _{1/1} [A]
Min.	7	0.06
Max.	48	0.42

The pump incorporates overload protection.

Connections: See [Insulating kits](#), page 13.

System pressure: Maximum 10 bar.

Liquid temperature: 2-95 °C (TF 95).



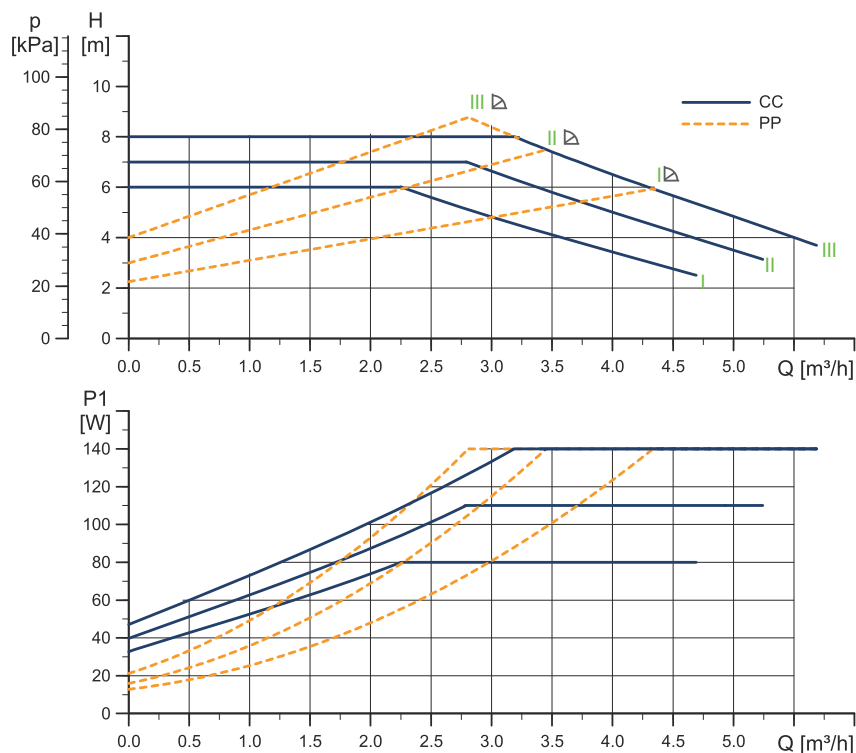
Pump type	Dimensions [mm]										Weights [kg]		Ship. vol. [m³]
	EEI ≤	L1	B1	B2	B3	H1	H2	H3	H4	G	Net	Gross	
UPS2 15-50/60	0.23	130	79	47	75	29	102	60	76	1 1/2	2.7	2.9	0.004
UPS2 PH-50/60	0.23	-	-	-	-	-	-	-	76	-	1.7	1.9	0.004

TM05 5403 3612

TM05 6202 3612

UPS2 25-80 180, UPS2 32-80 180

1 x 230 V, 50/60 Hz



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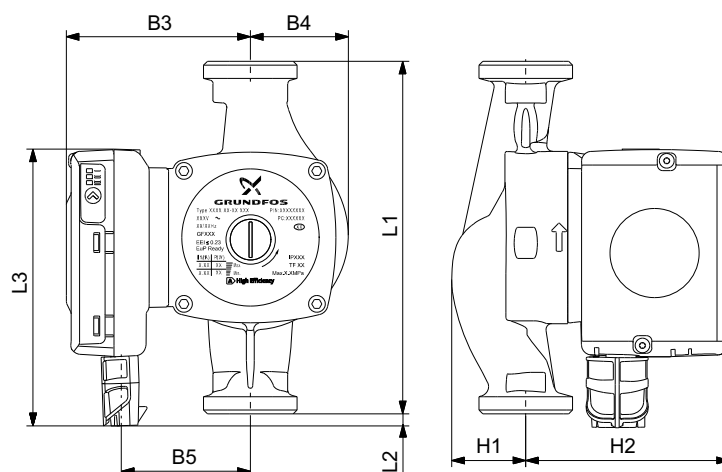
Speed	P1 [W]	$I_{1/1}$ [A]
Min.	11	0.1
Max.	140	1.1

Connections: See [Insulating kits](#), page 13.

System pressure: Maximum 10 bar.

Liquid temperature: 2-95 °C (TF 95).

The pump incorporates overload protection.



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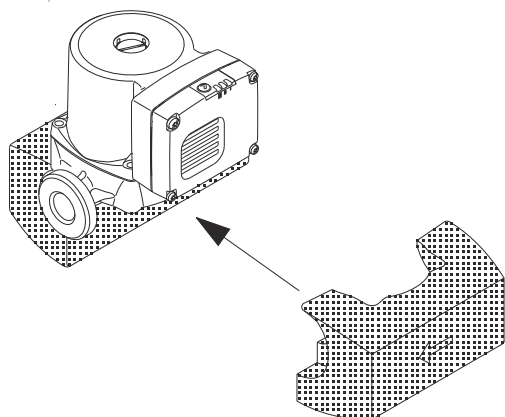
Pump type	Dimensions [mm]										Weights [kg]		Ship. vol. [m³]
	EEI ≤	L1	L2	L3	B3	B4	B5	H1	H2	G	Net	Gross	
UPS2 25-80	0.23	180	22	141	95	50	64	27	112	1 1/2	2.7	2.9	0.005
UPS2 32-80	0.23	180	22	141	95	50	64	27	112	2	2.7	2.9	0.005

7. Accessories

Insulating kits

UPS2 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.



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Fig. 16 Insulating shells

Pump type	Product number
Insulating shells	505821

ALPHA plugs



TM05 3073 0612

Fig. 17 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 that are sensitive to inrush current.

Union and valve kits

UPS2 pumps can be fitted with ALPHA compatible unions, see the list below:

Product numbers, unions						
ALPHA	Connection	Rp			R	
		3/4	1	1 1/4	1	1 1/4
15-xx*	G 1	•				
25-xx	G 1 1/2	529921	529922	529821	529925	529924
32-xx	G 2		509921	509922		

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

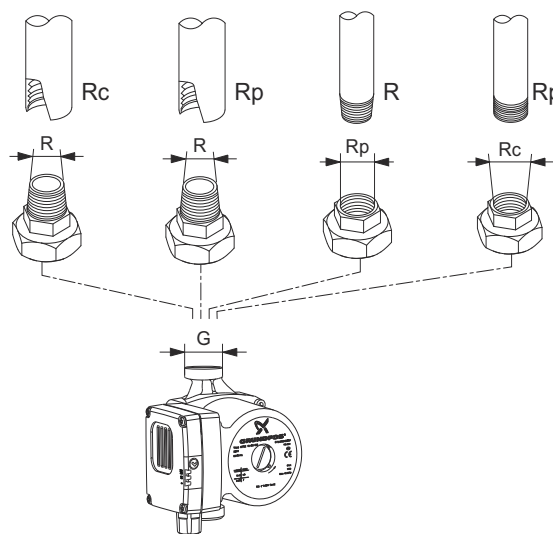
• Available on request.

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 or R-threads. See fig. 18.



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Fig. 18 G-thread and R-thread

8. Product range

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

UPS2

Pump type	Port-to-port length [mm]	Connection	Voltage [V] 50/60 Hz	Product number	Data sheet Page
UPS2 15-40/60	130	G 1	230	98243667	10
UPS2 25-40/60	130	G 1 1/2		98243668	
UPS2 PH-40/60	-	-		98334567	
UPS2 25-80	180	G 1 1/2		98707853	12
UPS2 32-80	180	G 2		98707855	

UPS2, United Kingdom

Pump type	Port-to-port length [mm]	Connection	Voltage [V] 50/60 Hz	Product number	Data sheet Page
UPS2 15-50/60	130	G 1 1/2	230	98334549	11
UPS2 PH-50/60	-	-		98334563	
UPS2 25-80	180	G 1 1/2		98707848	12
UPS2 32-80	180	G 2		98707851	

UPS2, Ireland

Pump type	Port-to-port length [mm]	Connection	Voltage [V] 50/60 Hz	Product number	Data sheet Page
UPS2 25-50/60	130	G 1 1/2	230	98568293	11

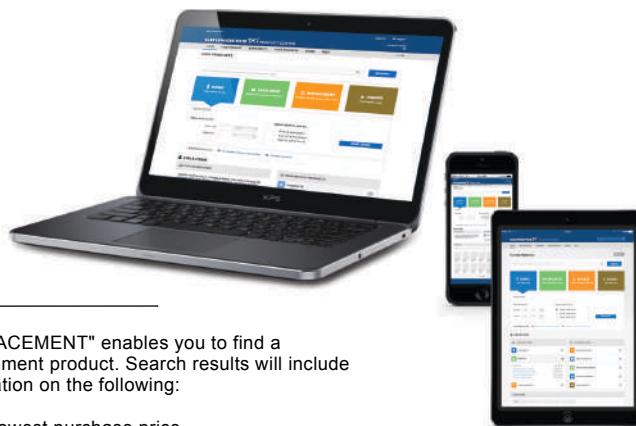
UPS2, BU/RO/GR

Pump type	Port-to-port length [mm]	Connection	Voltage [V] 50/60 Hz	Product number	Data sheet Page
UPS2 25-40/60	180	G 1 1/2	230	98633963	10

9. Grundfos Product Center

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

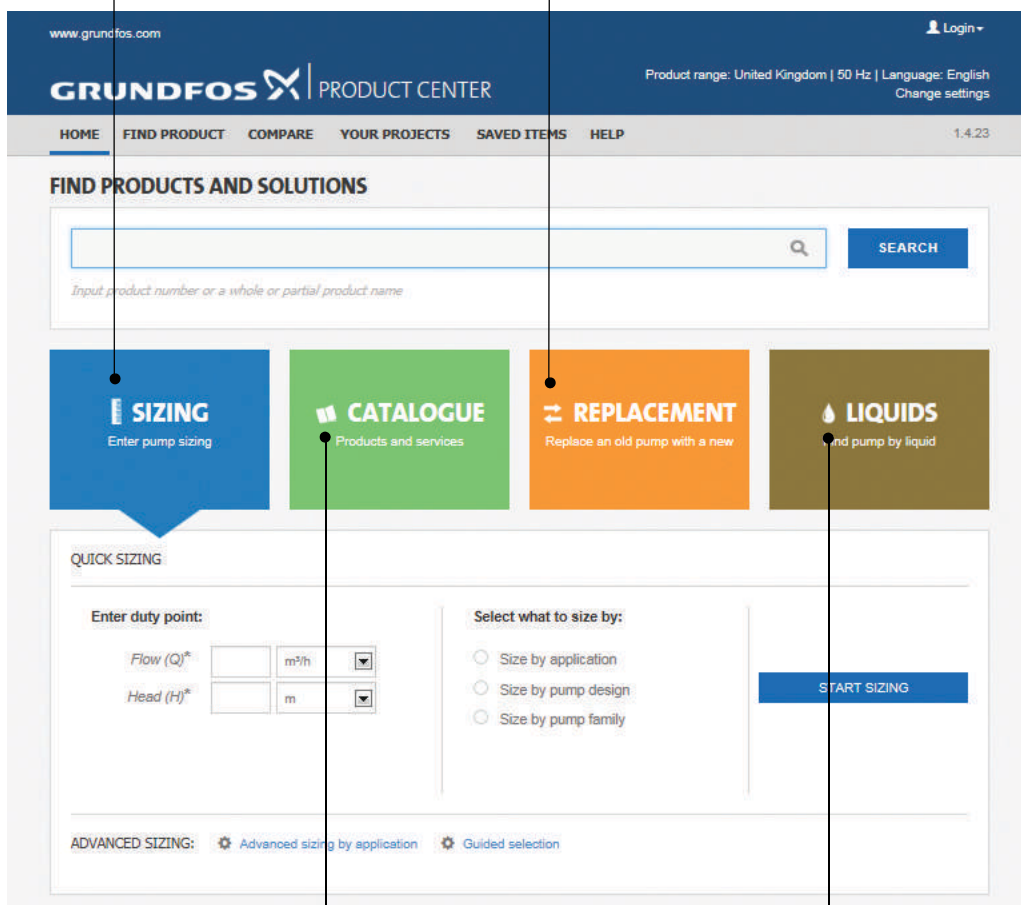
<http://product-selection.grundfos.com>



"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.



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

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

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