UPML, UPMXL

1 x 230 V

50/60 Hz

be
think
innovate

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Table of contents

1. General data

Introduction

This data booklet applies to the Grundfos UPML and UPMXL product ranges:

- UPML XX-95 AUTO
- UPML XX-105 PWM
- UPML GEO XX-105 PWM
- UPMXL XX-105 AUTO
- UPMXL GEO XX-125 PWM
- SOLAR PML XX-145 PWM.

Applications

The UPML, UPMXL circulator pumps are designed for circulating liquids in heating and air-conditioning systems with variable flows, where the pump is remote controlled via low-voltage PWM signal or internally controlled via AUTO user interface. Speed control can reduce the power consumption considerably.
In addition, speed control is required to control the performance of a system.

UPML GEO, UPMXL GEO

This circulator pump is particularly suitable for cold-water applications.

The pump is designed to be integrated in geothermal heating pumps as well as in heating and air-conditioning systems with remote control of the speed, corresponding to low-voltage PWM (pulse-width modulation) signal input. In addition, speed control is required to control the performance of a system.

SOLAR PML

This circulator pump is designed to be integrated in matched-flow solar thermal energy systems with remote control of the speed, corresponding to low-voltage PWM signal from a solar controller.

By controlling the speed of the pump in so-called matched-flow systems, the solar harvesting and temperature of the system can be optimised.

Additionally, the power consumption of the pump will be reduced considerably.

Features and benefits

The UPML, UPMXL, UPML GEO, UPMXL GEO and SOLAR PML offer a number of features and benefits of importance to the customer.

- remote speed-controlled, high-efficiency pump fitted with electronically commutated motor (ECM) with permanent-magnet rotor and frequency converter
- validated components extension of the second UPM generation, the first boiler-integrated, variable-speed ECM circulator pumps
- highly reliable, based on a range with more than 700,000 units installed with success since 2006
- improved motor technology and hydraulics, resulting in high pump efficiency
- cost-optimised and highly available thanks to the use of existing mass production facilities
- motor protected against condensed water by means of drain holes and double-coated wiring
- fitting into most existing boiler ranges, low expanded space requirements, electrical compatibility with existing PWM controllers
- no ambient temperature constraints (EN 60335)
- fit for operation in condensing environments thanks to the electronics being separated from the motor
- electrocoated, cast-iron housing.

UPML, UPMXL

To be controlled via digital pulse-width modulation (PWM) low-voltage signal (profile HEATING) or internally controlled with three proportional pressure curves and three constant pressure/power curves to be selected via user interface.

UPML GEO, UPMXL GEO

- Circulator pump for cold-water applications
- particularly optimised for geothermal heating pumps in terms of performance and robustness
- to be controlled via digital pulse-width modulation (PWM) low-voltage signal (profile HEATING)
- fit for cold antifreeze glycol- or ethanol-containing media.

SOLAR PML

- Optimised for matched-flow solar thermal systems in terms of performance and robustness
- to be controlled via digital pulse-width modulation (PWM) low-voltage signal (profile SOLAR)
- fits into existing systems with the SOLAR PM2 pump, no expanded space requirements, possible use of existing pump housings, electrical compatibility with existing PWM solar controllers and no ambient-temperature constraints (EN 60335)
- suitable for solar media containing glycol up to 110 °C peak.

Benefits

- The pump uses up to 80 % less electrical power than conventional constant-speed pumps.
- The pump uses up to 60 % less electrical power than conventional speed-controlled pumps.

Ecodesign regulation in brief

The EU has addressed the climate challenge:

In August 2015, the new Energy-related Products (ErP) regulation on glandless circulator pumps integrated in products will take effect. The regulation will set radically new standards for energy efficiency in stand-alone pumps and in pumps integrated in boiler, solar and heating pump systems.

The essentials

- Glandless circulator pumps integrated in products must have an energy efficiency index (EEI) of not more than 0.23, the benchmark level being 0.20.
- Integrated pumps will be measured differently from stand-alone pumps due to the various integrated functions in the many customised hydraulic solutions on the market.
- All circulator pumps integrated in products which generate and/or transfer heat, and all types of media, are included. This means that not only heating systems, but also solar thermal and heating pump systems, will be affected by the ErP regulation.
- Spare pumps for systems sold before August 2015 are allowed until 2020.
- Conformity with EU regulations will be governed through mandatory CE marking.

Grundfos is ErP-ready

Grundfos UPML, UPMXL pumps already meet the new ecodesign requirements described in EN 16297-2 (stand-alone) or 16297-3 (integrated).

Pumped liquids

UPML, UPMXL pumps are suitable for these liquids:

- Clean, thin, non-aggressive and non-explosive liquids without solid particles or fibres.
- If the pump is installed in a heating system, the water should meet the requirements of accepted standards on water quality in heating systems, e.g. the German standard VDI 2035.
- In domestic hot-water systems, the pump should be used only for water with a degree of hardness lower than approx. 14 °dH.
- The pump must not be used for the transfer of inflammable liquids such as diesel oil and petrol.
- Mixtures of water with anti-freezing media as glycol or ethanol down to -10 °C with a validated temperature profile (GEO range).
- Solar media for thermal solar systems containing up to 50 % glycol as antifreeze (SOLAR PML).

Glycol

UPML GEO, UPMXL GEO pumps can be used in circuits filled with anti-freezing media containing glycol. Depending on the type of glycol, the mixture and the liquid temperature, the viscosity will increase with water as medium. This will influence the pressure loss of the system as well as the efficiency, performance and load of the pump. As the pump is controlled by a power limitation function protecting against overload, it might affect the max. curve so that it will be lower.

Example

If the water/glycol mixture is 50 %, and the liquid temperature is +2 °C, the viscosity will be 15cSt: The maximum head falls 1.0 to 1.5 m compared to 100 % water at 60 °C (at the same flow).

Glycol curves

Performance curves measured with medium containing glycol at higher viscosity than water will be different from the water curves in this data booklet and can be taken into account by adding these mark-up factors to the required duty point:

Pumped medium at -7 °C	Viscosity [mm^2/s]	Density [kg/m^3]	$H_{mark\ up}$ [%]	$Q_{mark\ up}$ [%]	$P_{mark\ up}$ [%]
Ethylene glycol					
50 %	10.20	1083	7	10	18
30 %	5.18	1054	3	7	9
25 %	4.37	1046	2	5	8
Propylene glycol					
50 %	26.90	1056	14	15	19
30 %	9.71	1038	7	8	8
25 %	7.34	1033	4	5	7
Ethanol					
50 %	10.20	932	4	10	2
30 %	11.00	972	4	8	3
25 %	9.61	980	4	7	4

Identification

Type key

UPM

Example	UPM	XL	25	-105	180
Type range					
L: 140 W XL: 180 W					
Nominal diameter (DN) of suction and discharge ports [mm]					
Maximum head [dm]					
= cast-iron pump housing (no letter) N = stainless-steel pump housing					
Port-to-port length [mm]					

Nameplate

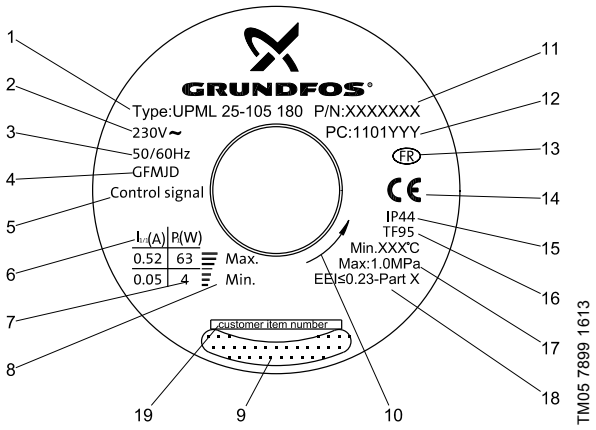
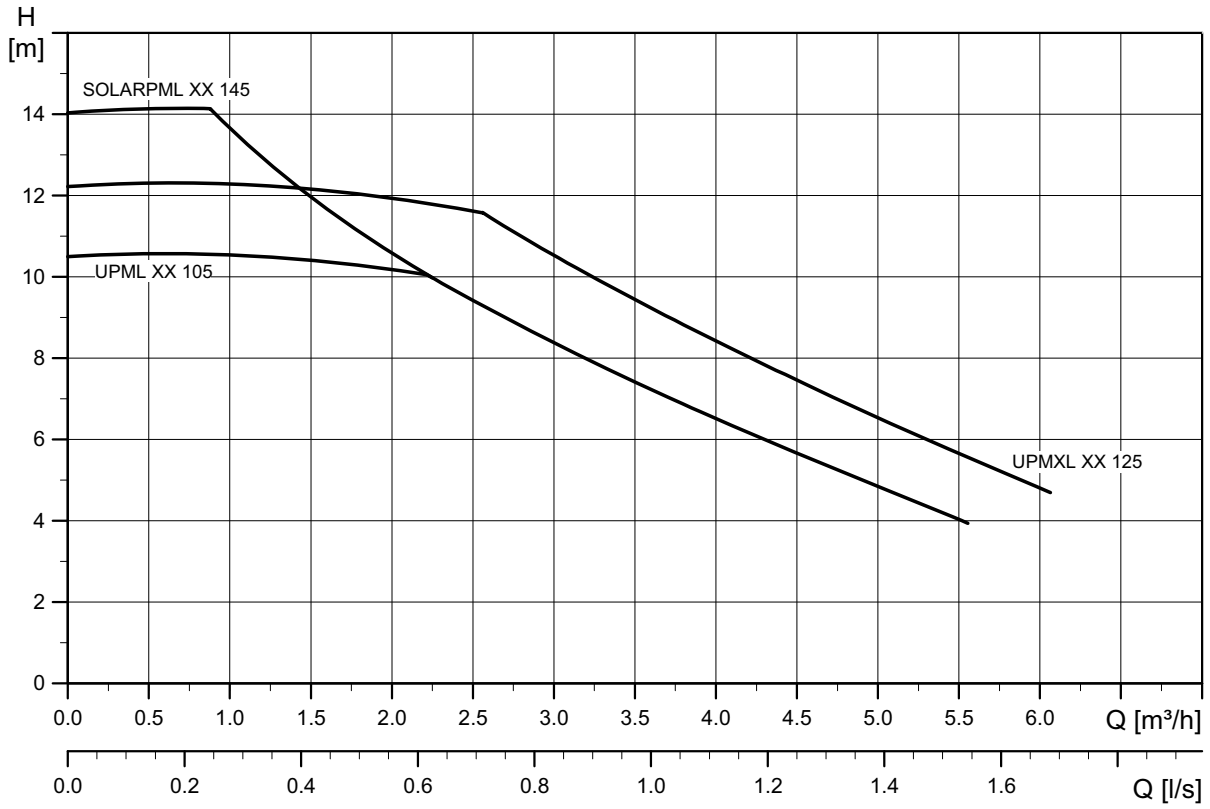


Fig. 1 Nameplate

Pos.	Description
1	Type designation
2	Voltage [V]
3	Frequency [Hz]
4	CE code
5	Control signal
6	Rated current [A] at maximum and minimum performance
7	Input power P1 [W] at maximum and minimum performance
8	Speed
9	Approvals
10	Direction of rotation
11	Product number
12	Production code (YYWW)
13	Country of origin
14	CE marking
15	Enclosure class
16	Temperature class
17	Maximum system pressure [MPa]
18	Energy index
19	Customer item number

Performance range



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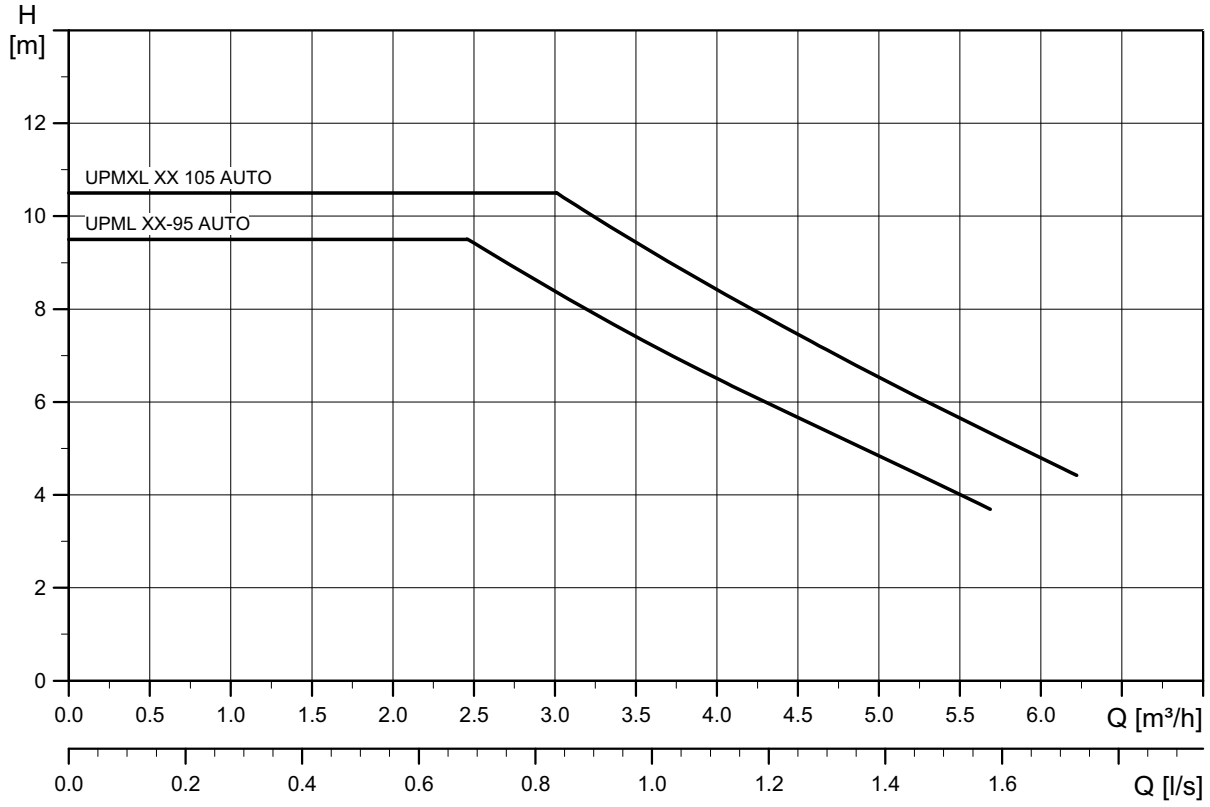

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2. Product range

UPML, UPMXL

1 x 230-240 V, 50/60 Hz

Pump type	Port-to-port length [mm]	Connection pipe thread	Control signal	Data sheet page
UPML 25-95 130 AUTO	130 mm	R1 / G1 1/2	AUTO	23
UPML 25-95 180 AUTO	180 mm	R1 / G1 1/2		24
UPML 25-95 180 N AUTO		R1 / G1 1/2		25
UPML 32-95 180 AUTO		R1 1/2 / G2		26
UPML 25-105 130 PWM	130 mm	R1 / G1 1/2	PWM	27
UPML 25-105 180 PWM	180 mm	R1 / G1 1/2		28
UPML 32-105 180 PWM		R1 1/2 / G2		29
UPML 25-105 180 N PWM		R1 / G1 1/2		30
UPMXL 25-105 130 AUTO	130 mm	R1 / G1 1/2	AUTO	31
UPMXL 25-105 180 AUTO	180 mm	R1 / G1 1/2		32
UPMXL 25-105 180 N AUTO		R1 / G1 1/2		33
UPMXL 32-105 180 AUTO		R1 1/2 / G2		34
UPML GEO 25-105 130 PWM	130 mm	R1 / G1 1/2	PWM	35
UPML GEO 25-105 180 PWM	180 mm	R1 / G1 1/2		36
UPML GEO 25-105 180 N PWM		R1 / G1 1/2		37
UPML GEO 32-105 180 PWM		R1 1/2 / G2		38
UPMXL GEO 25-125 130 PWM	130 mm	R1 / G1 1/2	PWM	39
UPMXL GEO 25-125 180 PWM	180 mm	R1 / G1 1/2		40
UPMXL GEO 25-125 180 N PWM		R1 / G1 1/2		41
UPMXL GEO 32-125 180 PWM		R1 1/2 / G2		42
SOLAR PML 25-145 130 PWM	130 mm	R1 / G1 1/2	PWM	43
SOLAR PML 25-145 180 PWM	180 mm	R1 / G1 1/2		44
SOLAR PML 25-145 180 N PWM		R1 / G1 1/2		45
SOLAR PML 32-145 180 PWM		R1 1/2 / G2		46

3. Control mode and signals

The UPML, UPMXL and SOLAR pumps are controlled via a digital low-voltage pulse-width modulation (PWM) signal which means that the speed of rotation depends on the input signal. The speed changes as a function of the input profile.

Digital low voltage PWM signal

Signal

The PWM signal is a square wave pulse width modulated signal designed to the frequency range 100-4000 Hz, preferable in the 150-800 Hz range.

The PWM signal is used to select the speed (speed command) and as feedback signal.

The PWM frequency of the feedback signal is fixed at 75 Hz in the pump.

Duty cycle

d % 100 x t/T

Example

T = 2 ms

t = 0.6 ms

d %= 100 x 0.6 / 2 = 30 %

Rating

U_{IH} 4-24 V

U_{IL} < 0.5 V

I_{IH} < 10 mA

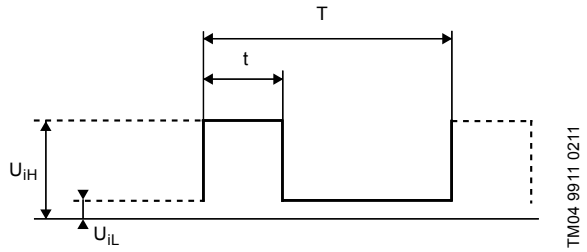

Fig. 2 Low-voltage PWM signal

Abbreviation	Description
T	Period of time [sec.]
d	Duty cycle (t/T)
U_{iH}	High-level input voltage
U_{iL}	Low-level input voltage
I_{iH}	High-level input current

The signal is used to select speed (speed command) and as load feedback. The PWM frequency of the feedback signal is fixed in the pump to 75 Hz.

The interface

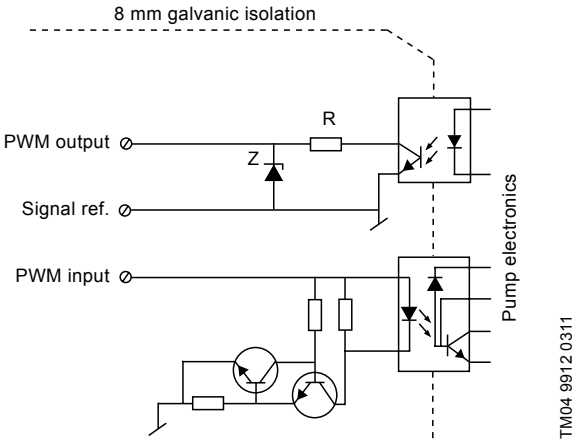

Fig. 3 Schematic drawing, interface

32 V Zener and R = 940 Ω

The UPML, UPMXL interface consists of an electronic part connecting the external control signal to the pump. The interface translates the external signal into a signal type that the microprocessor can understand. In addition, the interface ensures that the user cannot get into contact with dangerous voltage if touching the signal wires when 230 V is connected to the pump.

Note ***"Signal ref." is a signal reference with no connection to protective earth.***

PWM input signal profile HEATING

Input signal profile HEATING for heating and geothermal applications

At high PWM signal percentages (duty cycles), a hysteresis prevents the pump from starting and stopping if the input signal fluctuates around the shifting point. At low PWM signal percentages, the pump speed is high for safety reasons. In case of a cable breakage in a gas boiler system, the pumps will continue to run at maximum speed to transfer heat from the primary heat exchanger. This is also suitable for heating pumps to ensure that the pumps transfer heat in case of a cable breakage.

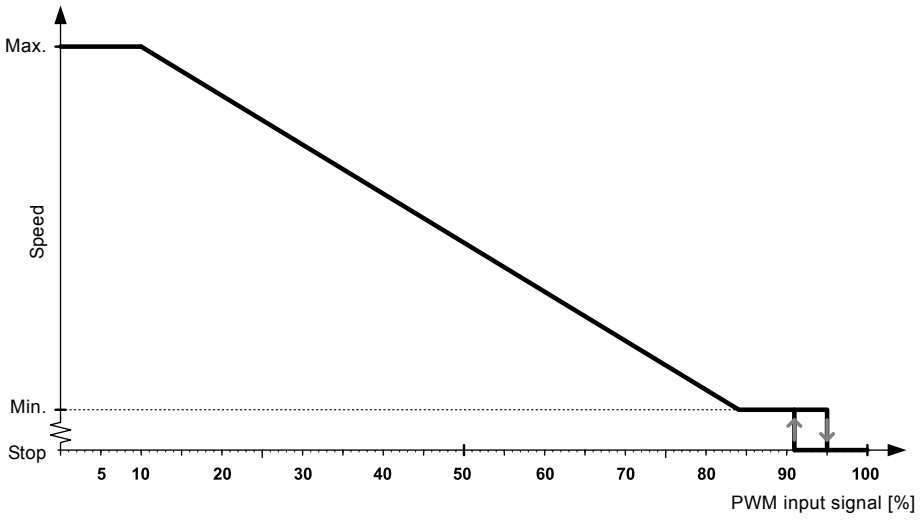

Fig. 4 PWM input profile HEATING

PWM input signal [%]	Pump status
≤ 10	Maximum speed: Max.
> 10 / ≤ 84	Variable speed: Min. to max.
> 84 / ≤ 91	Minimum speed: Min.
> 91 / ≤ 95	Hysteresis area: On/off
> 95 / ≤ 100	Standby mode: Off

PWM feedback signal

A PWM feedback signal provides information about the current performance of the pump, such as current power consumption or various alarm or warning modes. See figures 5 or 6.

Alarms

Alarm output signals are available. Some PWM output signals are dedicated to alarm information. If the supply voltage is measured to a value below 195 V, the output signal is set to 75 %. If, at the same time, the rotor is locked due to deposits in the hydraulics, the output signal is set to 90 %, as this alarm is given a higher priority.

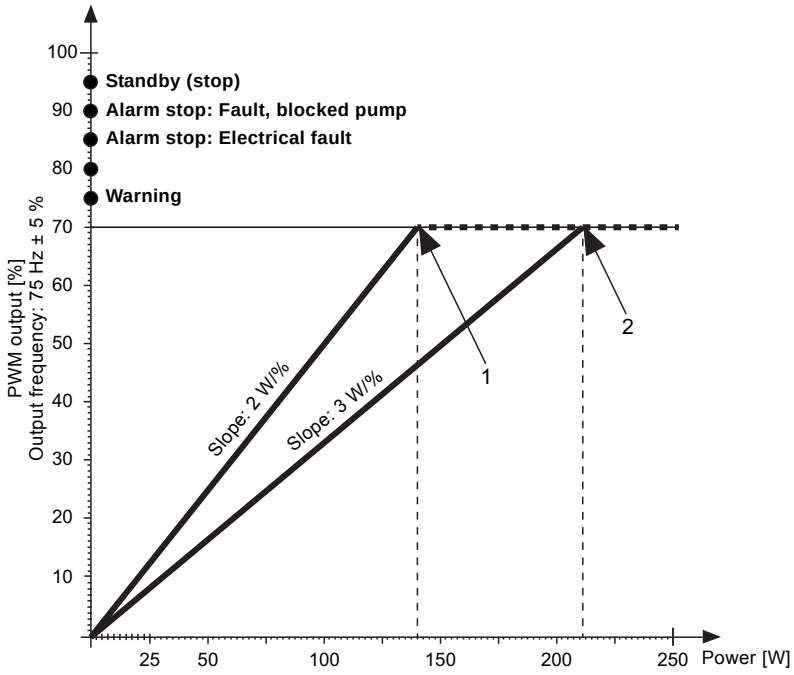

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Fig. 5 PWM feedback signal

Pos.	Description
1	UPML saturation point, 140 W.
2	UPMXL saturation point, 210 W

PWM input signal [%]	Indicates	Pump operation
95	Standby	Stop
90	Rotor blocked	Stop
85	Undervoltage stop	Stop
80	RPM sensor signal fault	Pump is running at a fixed speed, 14 % above minimum speed.
75	Undervoltage warning at Un -15 %	Pump performance is reduced from Un -10 %.
0-70	Power [W]	Pump is running according to setpoint.

PWM input signal profile SOLAR

Input signal profile SOLAR for solar thermal applications

At low PWM signal [%] (duty cycles), a hysteresis prevents the pump from starting and stopping if the input signal fluctuates around the shifting point. Without PWM signal, the pump will stop for safety reasons. If a signal is missing, for example due to cable breakage, the pump will stop to avoid overheating of the solar thermal system.

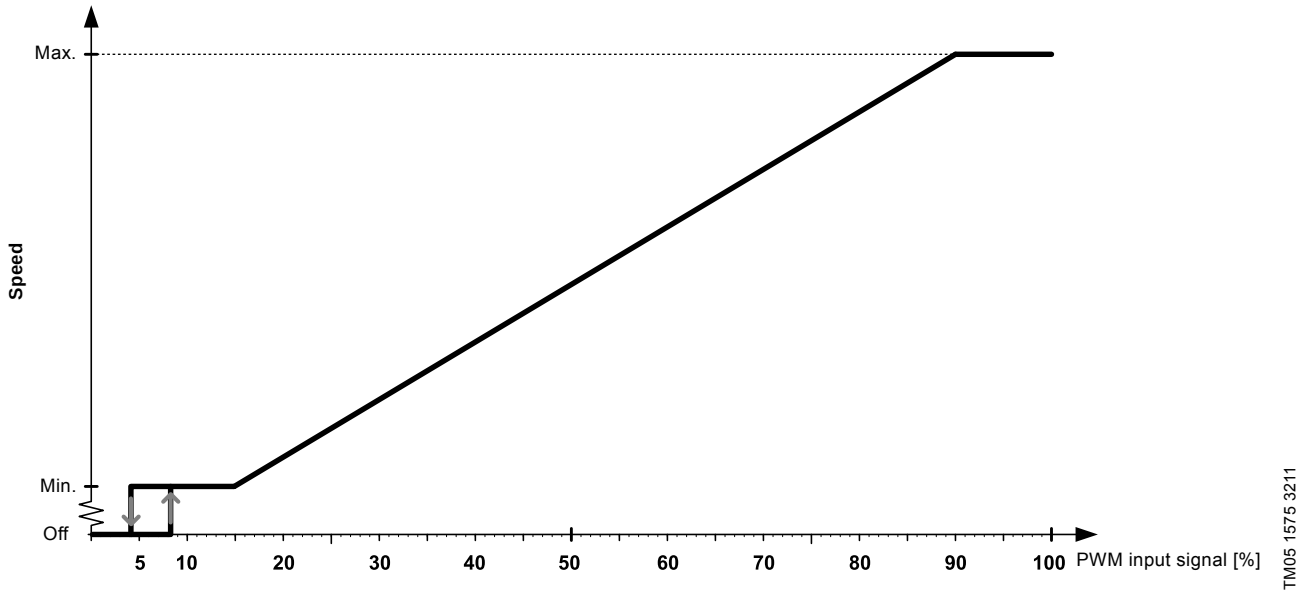

Fig. 6 PWM input profile SOLAR

PWM input signal [%]	Pump status
≤ 5	Standby mode: Off
> 5 / ≤ 8	Hysteresis area: On/off
> 8 / ≤ 15	Minimum speed: Min. (pump is running at minimum speed)
> 15 / ≤ 90	Variable speed: Min. to max.
> 90 / ≤ 100	Maximum speed: Max.

PWM feedback signal

Alarms

Alarm output signals are available. Some PWM output signals are dedicated to alarm information. If the supply voltage is measured to a value below 195 V, the output signal is set to 75 %. If, at the same time, the rotor is locked due to deposits in the hydraulics, the output signal is set to 90 %, as this alarm is given a higher priority.

Flow estimation

The PWM feedback signal can be used to measure the flow of the pump.

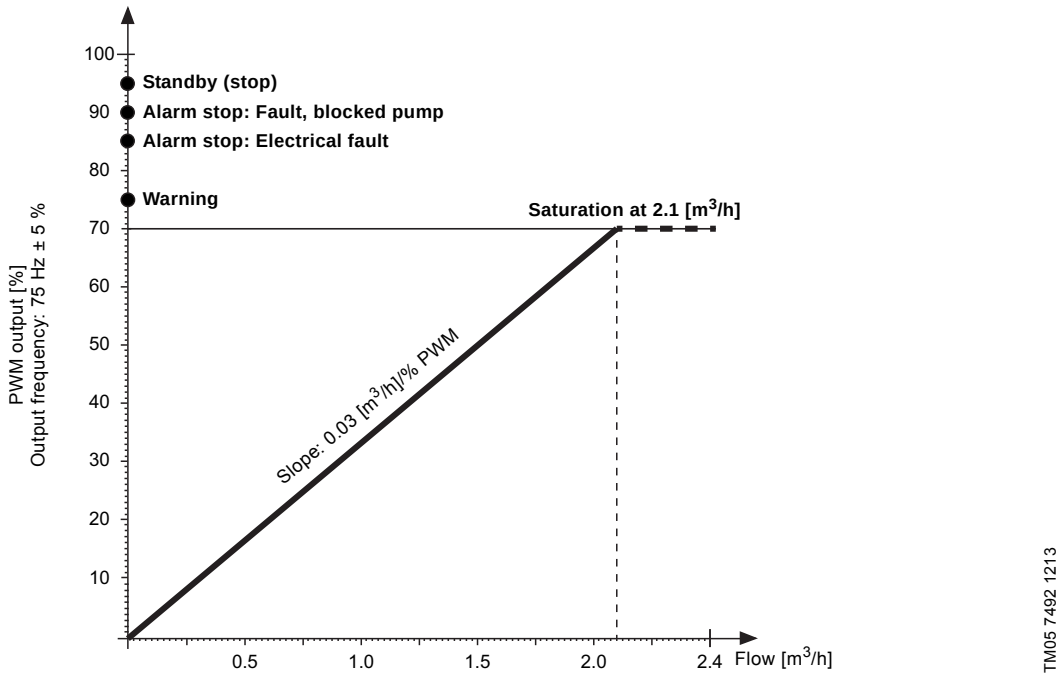

Fig. 7 PWM feedback signal

Data

Maximum rating	Symbol	Value
PWM frequency input		
High-speed optocoupler	f	100-4000 Hz
Low-speed optocoupler		150-800 Hz
Guaranteed standby power consumption		< 3 W
Rated input voltage		
High level	U_{iH}	4-24 V
Low level	U_{iL}	< 0.5 V
High-level input current	I_{iH}	< 10 mA
Input duty cycle	PWM	0-100 %
PWM frequency output, open collector	f	75 Hz ± 1 %
Accuracy of output signal regarding power consumption	-	± 2 % of PWM signal
Note: A PWM output signal below 5 % is too inaccurate for the calculation of the flow. Accuracy of output signal regarding flow: < 1 m^3/h ± 0.1 m^3/h > 1 m^3/h ± 0.2 m^3/h		
Output duty cycle	PWM	0-100 %
Collector emitter breakdown voltage on output transistor	U_c	< 70 V
Collector current on output transistor	I_c	< 50 mA
Maximum power dissipation on output resistor	P_R	60 mW
Zener diode working voltage	U_z	32 V
Maximum power dissipation in Zener diode	P_z	500 mW

User interface

AUTO versions

The UPML AUTO, UPMXL AUTO pumps are internally controlled. Via user interface it is possible to select two control modes with three curves each:

Proportional pressure

Proportional pressure mode offers the best energy savings. The maximum head (differential pressure) of the pump curve will be reached at the maximum performance curve of the pump. The speed will be automatically reduced at reduced flow to minimum 50 % of the maximum head at zero flow.

Constant pressure/power

Constant pressure/power mode limits the maximum power consumption like the performance of standard pumps with speed selector. At reduced flow, the head will increase. When the maximum head selected is reached, the speed of the pump will be reduced to keep this head (differential pressure) down to zero flow.

Applications

Proportional pressure mode should be chosen in systems with variable flow, where the resistance of the heat consumers, such as radiators, is relatively low to the total friction loss of the system (< 50 %) as it is typically in 2-pipe heating systems with radiators and thermostatic valves.

Constant pressure mode should be chosen in systems with variable flow, where the resistance of the heat consumers is relatively high to the total friction loss of the system (> 50 %). This is typical in floor heating systems with thermostatic valves or in systems with constant flow. If the boilers have no control signal available, this is the preferred control mode.

4. Construction

Exploded view

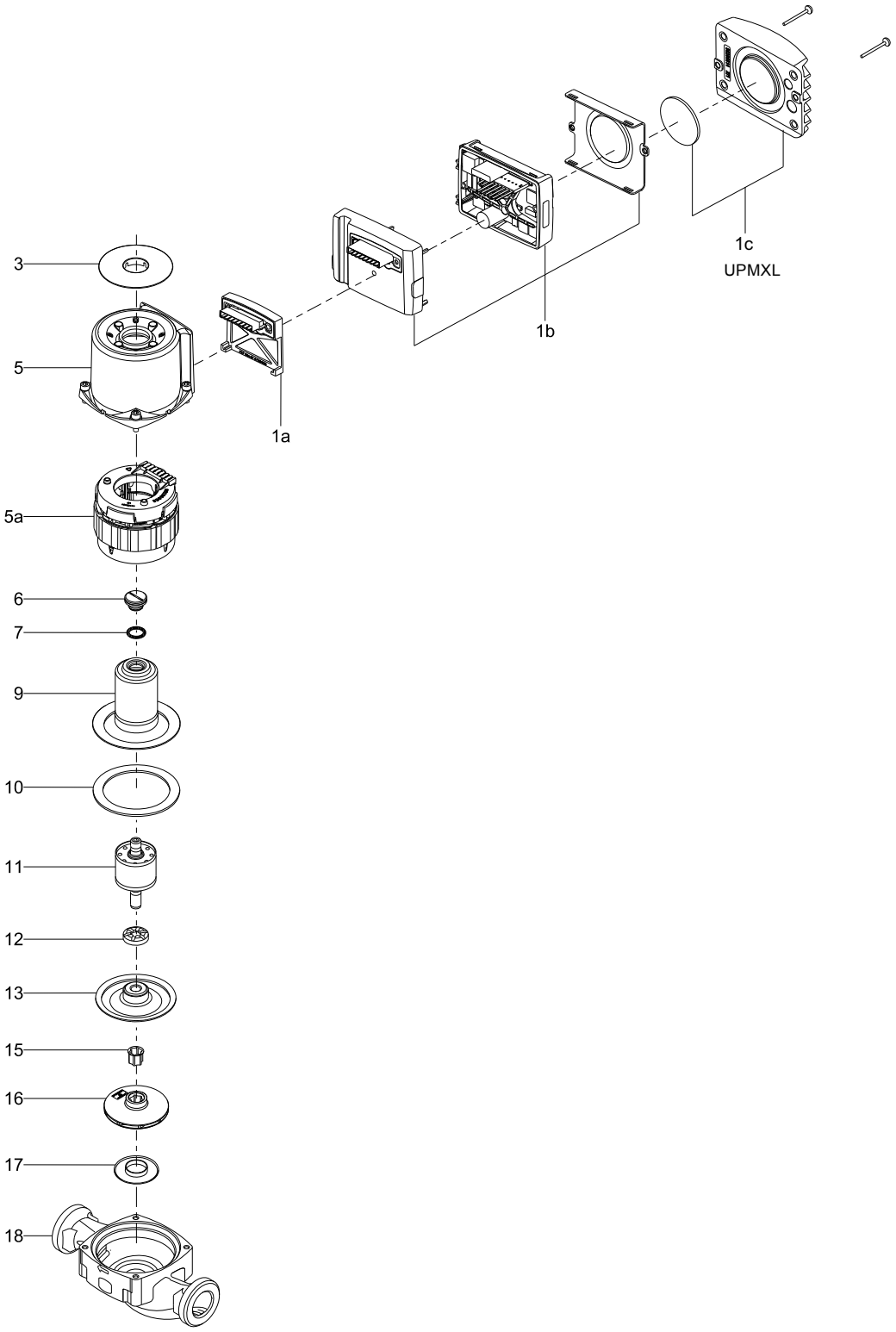

Fig. 8 UPML, UPMXL and SOLAR

Sectional drawing

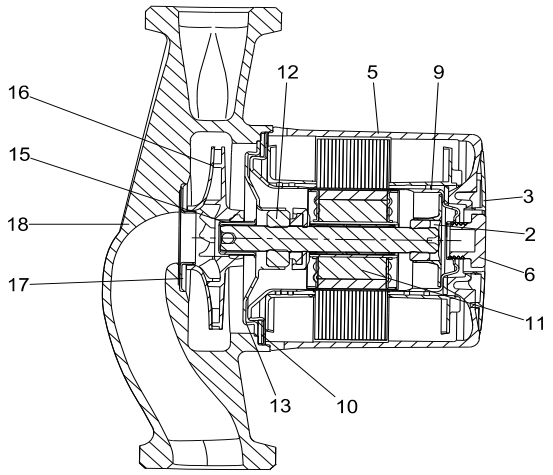

Fig. 9 UPML, UPMXL and SOLAR

Pos.	Component	Material	EN/DIN	AISI/ ASTM
1a	Spacer	Composite		
1b	Control box and cooling cover	Composite		
1c	Heat sink with cooling pad	Aluminium, AlSi11Cu2	EN46100	
2	Radial bearing	Ceramics		
3	Nameplate	Composite, PA 66		
5	Stator housing	Aluminium, AlSi10Cu2		
5a	Stator	Copper wire		
6	Air-venting/ de-blocking screw	Brass, nickelled, Ms58	2.0401.30	
7	O-ring	EPDM	ID2034	
9	Rotor can	Stainless steel	1.4301/ 1.4521	304
10	Gasket	EPDM rubber		
11	Stop ring	PES 30 % GF		
	Shaft	Ceramics		
	Rotor cladding	Stainless steel	1.4301/ 1.4521	304
12	Thrust bearing	Carbon		
	Thrust bearing retainer	EPDM rubber		
13	Bearing plate	Stainless steel	1.4301	304
15	Split cone	Stainless steel	1.4301	304
16	Impeller	Composite/ PES 30 % GF		
17	Neck ring	Stainless steel	1.4301	304
18	Pump housing	Cast iron	EN-GJL-150	
		Stainless steel	1.4308	CF8

Description of components

The UPML, UPMXL is of the canned-rotor type, i.e. pump and motor form an integral unit without shaft seal and with only one gasket for sealing and four screws for fastening the stator housing to the pump housing. The bearings are lubricated by the pumped medium. The focus has been on using eco-friendly materials as well as on limiting the number of materials.

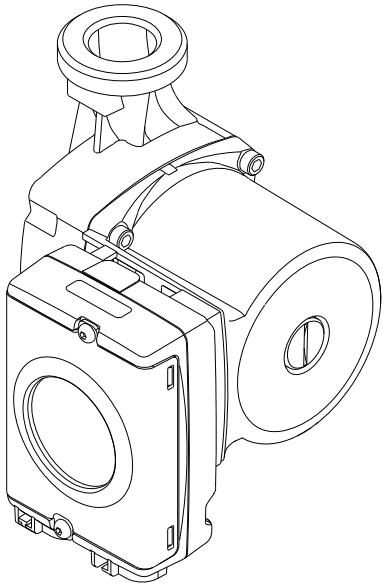

Fig. 10 Example, UPML

Motor

The efficiency of the 4-pole, synchronous, electronically commutated permanent-magnet (ECM/ PM) motor type is considerably higher compared to a conventional asynchronous squirrel-cage motor.

The PM motor is designed according to the canned-rotor principle. The design of the mechanical motor components has mainly focused on these features:

- robustness achieved through efficient protection of loaded components
- simple design meaning as few components as possible, each with several functions
- high efficiency due to permanent magnets and low-friction bearings.

The motor is cooled by the pumped medium which reduces the sound pressure level to a minimum. Being software-protected, the pump requires no further motor protection. The motor/pump and control box have been tested according to VDE 0700 and meet the requirements of EN 61800-3 concerning electromagnetic compatibility.

Stator housing

The die-cast stator housing with four fixing holes enables condensed water to escape from the pump through three drain holes, close to the pump housing. Consequently, one of the drain holes must always point downwards. See fig. 11.

The housings are electrocoated.

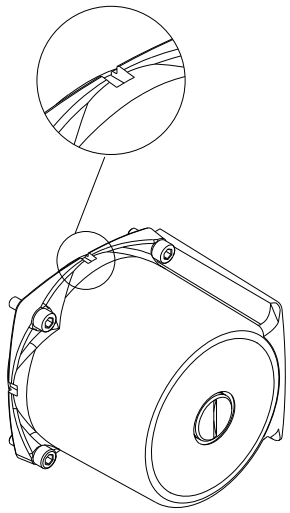

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Fig. 11 Drain hole in stator housing

Stator and windings

The UPML, UPMXL pumps have a three-phase stator.

The UPML GEO, UPMXL GEO pumps are designed for pumping very cold liquids (down to -10 °C). In such applications, condensation may occur in the stator housing. To protect the stator, the copper wires are provided with reinforced insulation.

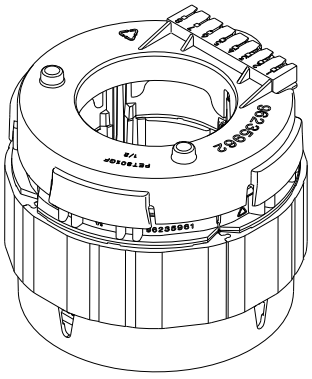

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Fig. 12 Stator

Shaft with rotor

The shaft is made of ceramics. The rotor core is made of iron lamination and fitted with neodymium permanent magnets. The rotor is fitted to the shaft with a pipe and an elastic sleeve. The rotor is encapsulated in a thin stainless-steel cladding welded to the end covers and shaft pipe. To avoid precipitation of calcium in the radial bearings, the shaft has been plunge-ground at the journals. It has a through-going hole to ensure good lubrication and cooling of the upper bearing. Air in the rotor chamber escapes into the system through the through-going holes of the shaft.

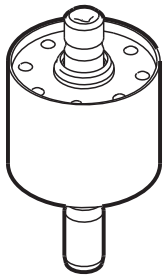

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Fig. 13 Shaft with rotor

Stop ring

The stop ring protects the rotor against axial translation towards the radial bearing at the top of the rotor can. The stop ring is made of PES.

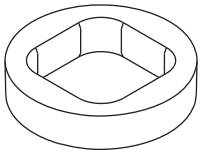

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Fig. 14 Stop ring

Rotor can

The drawn stainless-steel rotor holds the ground and honed upper radial bearing at the top. The rotor can has an air-venting/de-blocking screw.

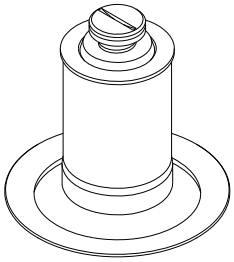

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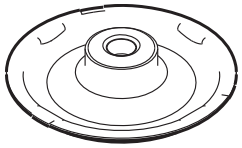
Fig. 15 Rotor can

Bearing plate

The bearing plate is made of stainless steel. The ground and honed inner radial bearing is pressed into the bearing plate. Thanks to the relatively large bearing plate surface, the motor heat is effectively carried away by the pumped medium. The four tiny laser holes of the bearing plate ensure optimum venting and minimise the gradual replacement of rotor liquid with the pumped medium.



TM03 1793 3105

Fig. 16 Bearing plate

Thrust bearing

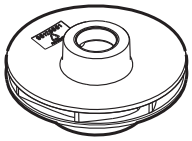
The thrust bearing is fitted to the shaft in a flexible suspension. In combination with the bearing plate, the thrust bearing prevents forces from being transmitted axially to rotor and rotor can.

TM03 1792 3105

Fig. 17 Thrust bearing

Impeller

The composite impeller is of the radial type with curved blades. See fig. 18. The impeller is secured to the shaft with a split cone. See fig. 8, pos. 15. The impeller, shaft with rotor and bearing plate are assembled in one unit to eliminate possible misalignment in the bearings.

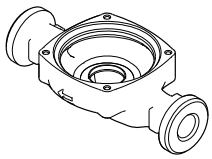


TM03 1794 3105

Fig. 18 Impeller

Pump housing

As standard, the pump housing is available in electrocoated cast iron with threaded suction and discharge ports. The pump housing is of the in-line type. The stainless-steel neck ring is pressed into the pump housing to minimise the amount of liquid running from the discharge side of the impeller to the suction side.



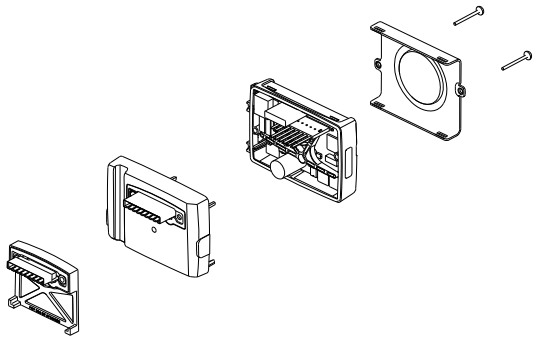
TM03 9732 4307

Fig. 19 Pump housing

Control box

The control box is made of black composite material with an aluminium heat sink. It contains the PCBs for internal power supply and communication.

The spacer fitted between stator and control box decreases the temperature influence of the pumped medium/motor temperature. The XL versions have an additional extended heat sink. The height will be extended by approx. 21 mm.



TM05 0412 1011

Fig. 20 Control box for UPML

5. Installation

Mechanical installation

Mounting dimensions appear from the data sheets. See pages 23 to 46. Arrows on the pump housing indicate the liquid flow direction through the pump. The pump is designed to be installed pumping upwards, downwards or horizontally.

Note: The pump must always be installed with horizontal motor shaft within ± 5 °.The pump should be installed in the system in such a way that no major amount of air flowing through the pump or gathering in the pump housing will affect the pump when it is out of operation. If, in addition, a non-return valve is installed in the flow pipe, there is a high risk of dry running as the air cannot pass the valve.

Control box positions

The permissible control box positions are indicated in the specific pump data sheets. See pages 23 to 46.

Changing the control box position

To change the control box position, remove the screws holding the pump head, and turn the control box to the desired position. Replace the screws and tighten securely. The drain holes in the stator housing must point downwards.

Note

Before any dismantling of the pump, the system must be drained, or the isolating valves on either side of the pump must be closed.

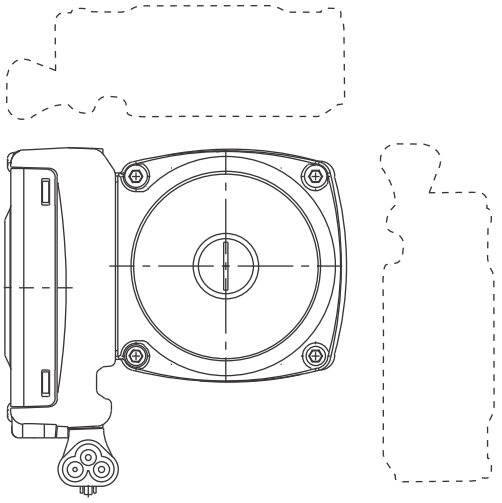


Fig. 21 Control box positions

Insulation

When the pump is to be insulated, the control box (especially the cooling cover) must not be covered to allow cooling by the surrounding air. If the pump is installed in a cabinet or fitted with insulation shells, the inside air temperature has to be evaluated. If constant ambient air temperatures higher than 55 °C are to be expected, please contact the Grundfos HVAC OEM Division. Diffusion-tight, cold-water insulation must not cover the pump head. The drain holes located in the stator housing must always be free.

Inlet pressure

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

Liquid temperature	85 °C	90 °C	110 °C
Inlet pressure	0.5 m head	2.8 m head	11.0 m head
	0.049 bar	0.27 bar	1.08 bar

Electrical connection

The electrical connection and protection must be carried out in accordance with local regulations. The pump requires no external motor protection.

Check that the supply voltage and frequency correspond to the values stated on the nameplate.

Supply voltage

1 x 230 V + 10 %/- 15 %, 50/60 Hz.

Reduced supply voltage

The pump will run with reduced performance at voltages down to 160 VAC.

Inrush current

The inrush current is the charge current to the electrolytic capacitor in the power supply to the electronics. The maximum current amplitude depends on the power supply and the complete wiring from the distributor transformer to the pump.

The pump is internally controlled by a small frequency converter running on a DC voltage. Therefore, the 230 VAC supply voltage is rectified to a DC voltage before it reaches the frequency converter. This is done by a rectifier and a capacitor. See fig. 22.

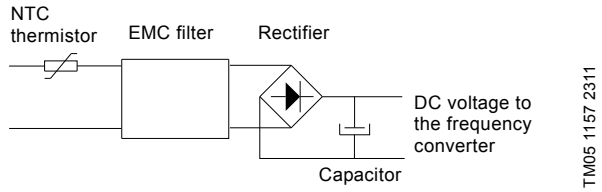


Fig. 22 Rectification of VAC voltage to DC voltage

The load of electronically commutated motors (ECM) behaves as a capacitive load and not as a motor load like in a standard pump.

When the power supply is switched on, the capacitor will behave as a short-circuit (it is "empty", meaning it has not been charged). Therefore, the current is only limited by the sum of the resistance in the NTC thermistor and the resistance in the coil of the EMC filter. If the pump is switched on again, while the NTC is still hot, its influence is reduced significantly. At low medium/ambient temperature, the NTC is normally cooled down after some minutes, at higher temperature it might last much longer.

If the power supply is switched on when the supply voltage is at its highest level, the inrush current can become up to 10.3 A (see below) for a very short period of time. After this period of time, the current will drop to the rated current.

Note: The inrush current of 10.3 A is measured on a flicker network according to IEC 61000-3-3:1994 + A1, + A2, Annex B.

When the power supply to the pump is switched on and off via an external relay, it must be ensured that the contact material of the relay is able to handle higher inrush currents.

We recommend to use special inrush relays with silver tin oxide (AgSnO) contacts.

Leakage current

The pump mains filter will cause a discharge current to earth during operation.

Leakage current: < 3.5 mA.

High-voltage test

The pump incorporates filter components that are connected to protective earth. Therefore, a standard high-voltage test **cannot** be made without damaging the filters.

Earth leakage circuit breaker (ELCB)

If the pump is connected to an electric installation where an earth leakage circuit breaker (ELCB) is used as additional protection, this circuit breaker must trip when earth fault currents with DC content (pulsating DC) occur (type A).

The earth leakage circuit breaker must be marked with the symbol shown in fig. 23.

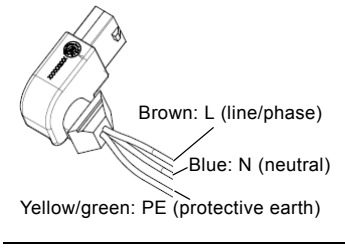
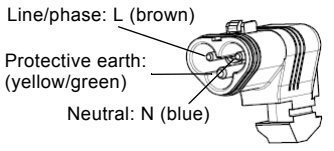
Fig. 23 Symbol on earth leakage circuit breaker

Power supply

The pump must not be used with an external speed control which varies the supply voltage, for example phase-cut or pulse-cascade control.

The pump can be connected to the power supply in different ways, depending on the pump model.

Note: All cables and connectors used must comply with EN 60335-1.

Plug connection	Description
	Molex 3-pin plug pointing towards or away from the nameplate
	Volex plug pointing towards or away from the nameplate

Signal cable

The UPML AUTO, UPMXL AUTO pumps are internally speed-controlled and have no signal cable connection.

The UPML, UPMXL PWM pumps are externally speed-controlled. To enable pump control, a signal cable is required, otherwise the pump will always run at maximum speed (profile HEATING for heating and GEO). The SOLAR PML will not run without signal (PWM profile SOLAR). The signal cable has three leads, i.e. signal input, signal output and signal ref. The cable must be connected to the control box by a Dubox housing with a FCI terminal block and terminals. The optional signal cable can be supplied with the pump as an accessory. The cable length is customised to specific requirements (maximum 3 metres).

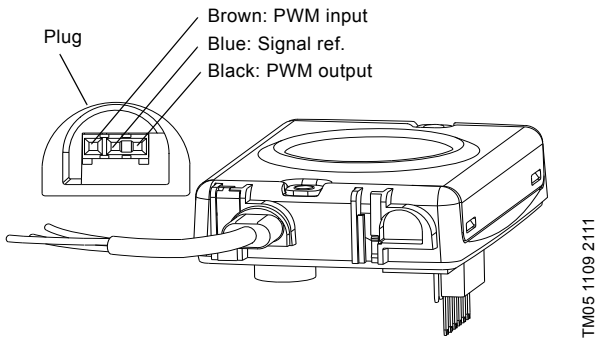


Fig. 24 Signal cable

Start up

Do not start the pump until the system has been filled with liquid and vented. Being self-venting, the rotor can does not require venting before start-up. Air inside the pump will be transported by the medium into the system during the first minutes after pump start-up.

Furthermore, the required minimum inlet pressure must be available at the pump inlet.

The system cannot be vented through the pump. As the pump is self-venting, it does not need to be vented before start-up. However, it is recommended to vent pumps installed in systems where the pumped medium is very dirty, as well as after service of the pump. The screw may be loosened to check if the system has been vented completely.

Caution ***When loosening the air-venting/ de-blocking screw, be aware of hot, spraying water.***

It may happen that the pump stops when the air-venting/de-blocking screw is loosened.

When connected to an external PWM signal, the pump speed is controlled by an external controller which may even stop the pump. Without signal, the pump will run at maximum performance (profile HEATING) or stop (profile SOLAR).

Disposal

This product or parts of it must be disposed of in an environmentally sound way:

1. Use the public or private waste collection service.
2. If this is not possible, contact the nearest Grundfos company or service workshop.

6. Operation

The user interface allows to select between 6 control curves in two control modes:

- three proportional pressure curves (PP)
- three constant pressure/power curves (CP).

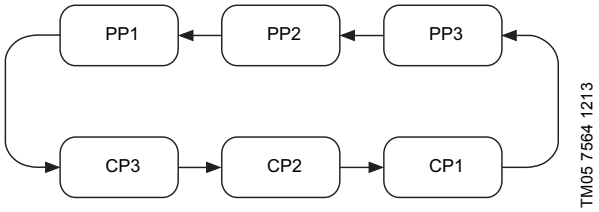


Fig. 25 Serial curve setting

Factory presetting

Proportional pressure curve, PP2:

- Push the button for two seconds:
  - Pump goes to setting mode - LED starts flashing.
- With each push, the setting changes:
  - LED 1-2-3 are permanently on, and then the control curve and mode is changed.
- Flashing mode:
  - Fast: Proportional pressure
  - Slow: Constant pressure/power
- After ten seconds not pushing the button:
  - Setting is adapted.
  - Pump returns to operating mode
- LED 1 or 2 or 3 is permanently on.
  - Pump is running with the selected curve and mode.

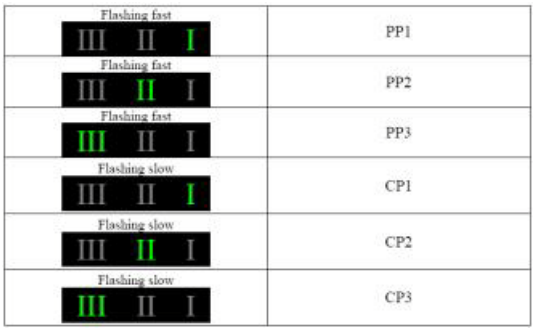
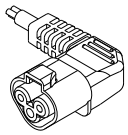
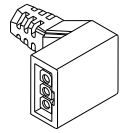
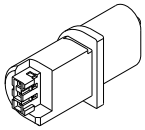
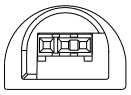
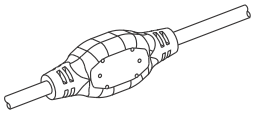


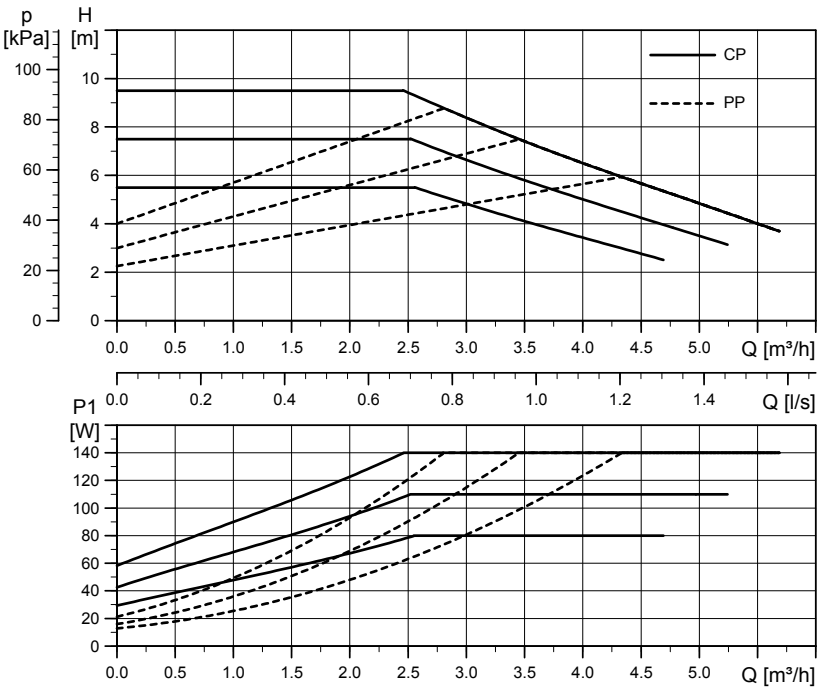
Fig. 26 LED indication of the curve setting

7. Accessories

Product		Description	Product number
Power supply plug with cable			
	TM05 1102 2111	Volex power supply cable, 2000 mm, H03V2V2-F 3G 0.75 ZW 105 GR, 3 x 0.75 mm^2, with wire pins and moulded cable relief	97940975
	TM05 1103 2111	Molex power supply cable, 2000 mm, H03V2V2-F 3G 0.75 ZW 105 GR, 3 x 0.75 mm^2, with wire pins	97940977
Signal cable and blanking plug			
	TM05 1106 2111	PWM signal cable, 2000 mm, RKK90 3 x 0.50 ZW 3 x 0.50 mm^2	97940991
	TM05 1107 2111	Blanking plug for PWM signal plug-in	97823485
NTC connector with cable			
	TM05 7994 1713	NTC connector SCK 10152 (25 Ω)	98429931

8. Performance curves and technical data

UPML 25-95 130 AUTO, 1 x 230 V, 50/60 Hz



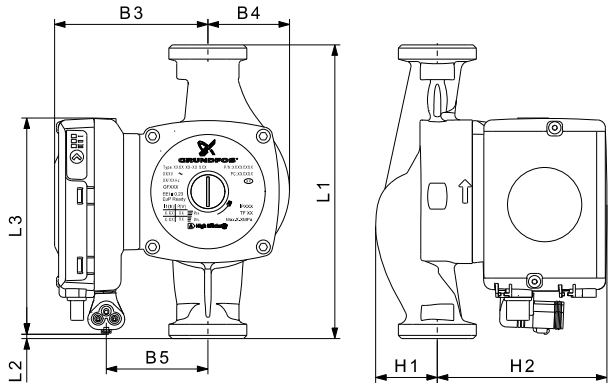
EEI ≤ 0.23

TM05 7960 1713

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	12	0.1
Max.	140	1.1

Dimensional sketches and control box positions



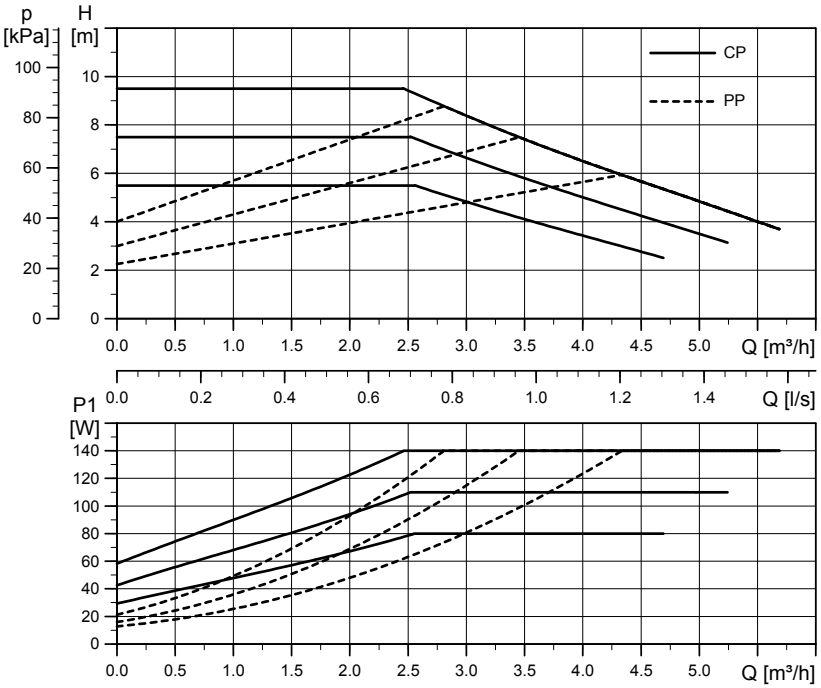
TM05 7427 3312

Pump type	Dimensions [mm]										
	L1	L2	L3	B3	B4	B5	H1	H2	Connection	Net weight [kg]	Quantity per pallet
UPML 25-95	130	22	131	95	50	64	27	112	G 1 1/2	2.4	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPML 25-95 180 AUTO, 1 x 230 V, 50/60 Hz



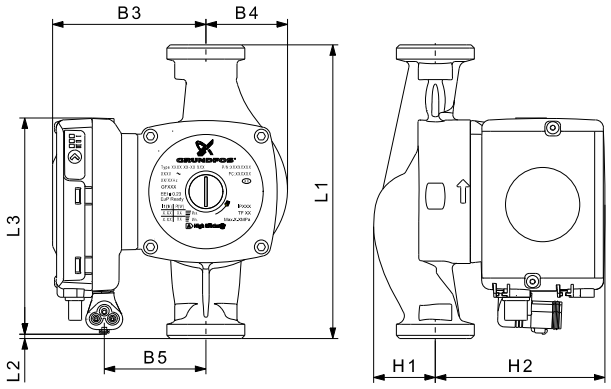
EEI ≤ 0.23

TM05 7960 1713

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	12	0.1
Max.	140	1.1

Dimensional sketches and control box positions



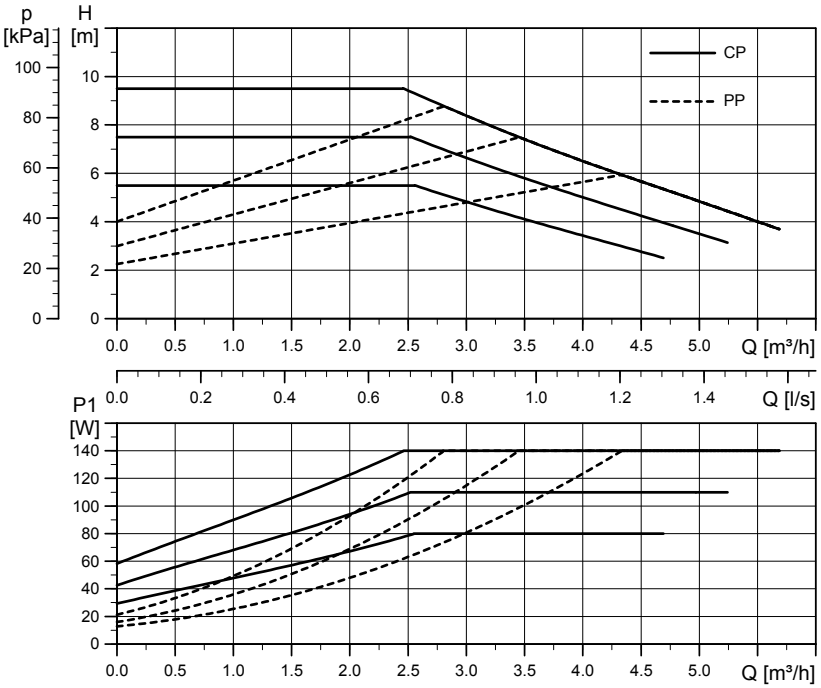
TM05 7427 3312

Pump type	Dimensions [mm]										
	L1	L2	L3	B3	B4	B5	H1	H2	Connection	Net weight [kg]	Quantity per pallet
UPML 25-95	180	3.5	131	95	50	64	38	104	G 1 1/2	2.5	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPML 25-95 N 180 AUTO, 1 x 230 V, 50/60 Hz



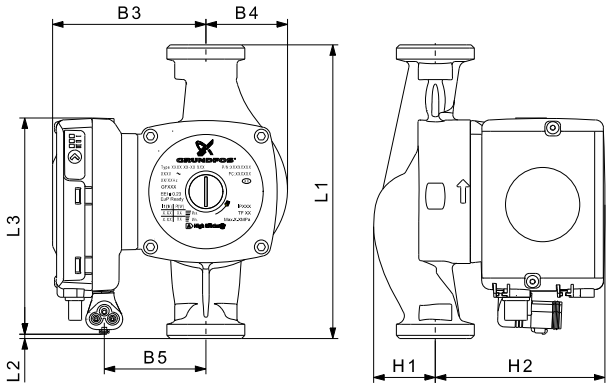
EEI ≤ 0.23

TM05 7960 1713

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	12	0.1
Max.	140	1.1

Dimensional sketches and control box positions



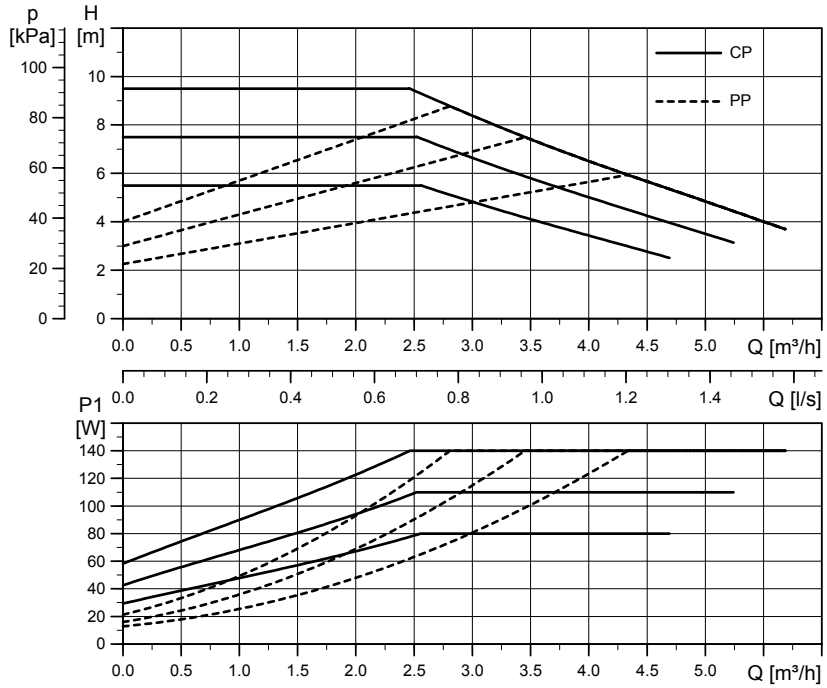
TM05 7427 3312

Pump type	Dimensions [mm]										
	L1	L2	L3	B3	B4	B5	H1	H2	Connection	Net weight [kg]	Quantity per pallet
UPML 25-95	180	3.5	131	95	50	64	38	104	G 1 1/2	2.5	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPML 32-95 180 AUTO, 1 x 230 V, 50/60 Hz



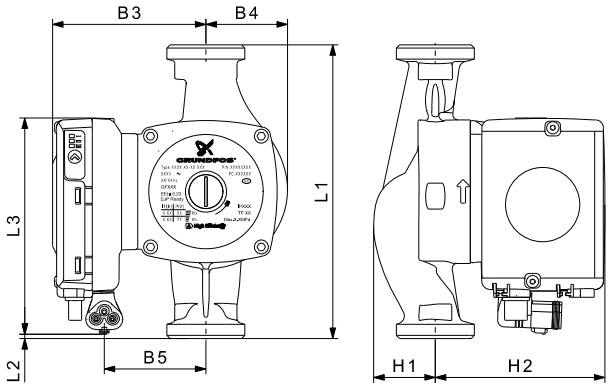
EEI ≤ 0.23

TM05 7960 1713

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	12	0.1
Max.	140	1.1

Dimensional sketches and control box positions



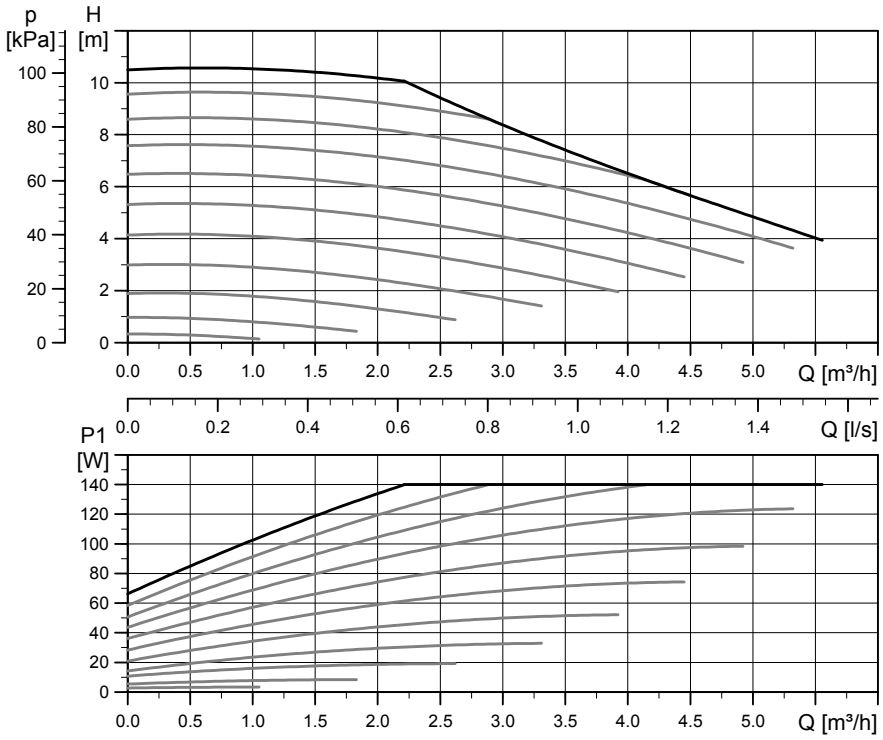
TM05 7427 3312

Pump type	Dimensions [mm]										
	L1	L2	L3	B3	B4	B5	H1	H2	Connection	Net weight [kg]	Quantity per pallet
UPML 32-95	180	3.5	131	95	50	64	38	104	G 2	2.9	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10°C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPML 25-105 130 PWM, 1 x 230 V, 50/60 Hz



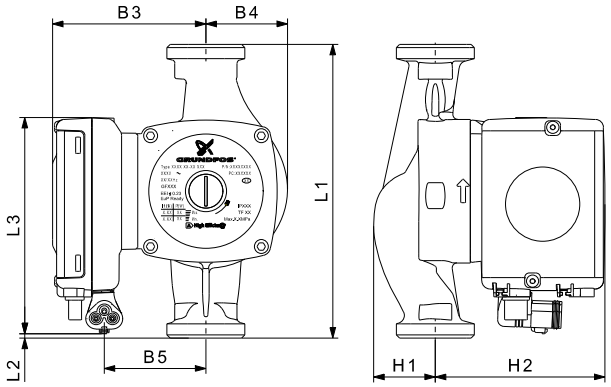
EEI ≤ 0.23

TM05 7251 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.04
Max.	140	1.1

Dimensional sketches and control box positions



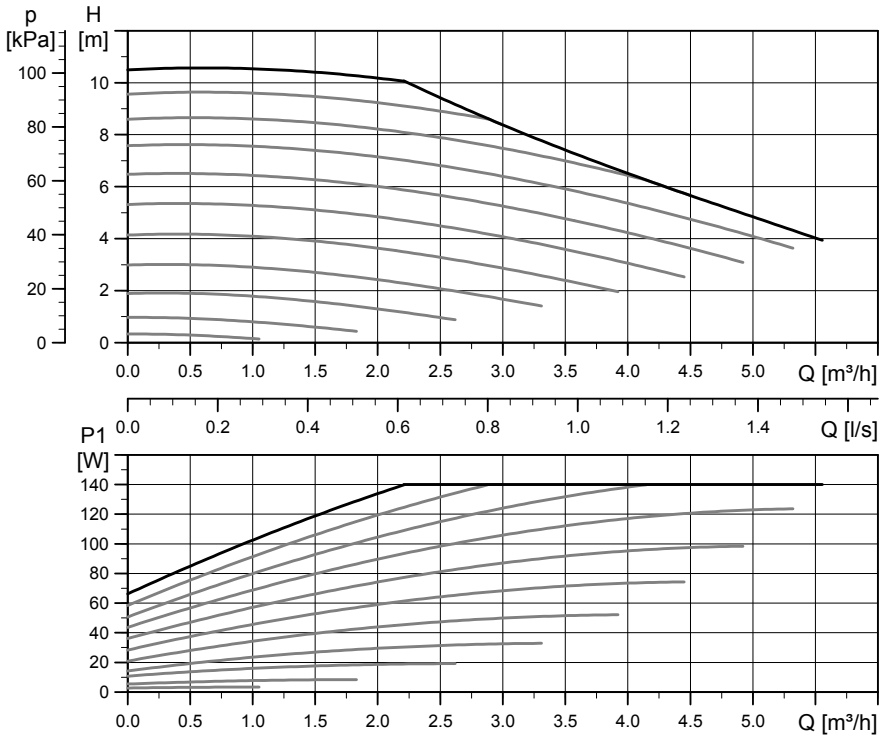
TM05 5123 3312

Pump type	Dimensions [mm]										
	L1	L2	L3	B3	B4	B5	H1	H2	Connection	Net weight [kg]	Quantity per pallet
UPML 25 - 105	130	22	131	95	50	64	27	112	G 1 1/2	2.4	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPML 25-105 180 PWM, 1 x 230 V, 50/60 Hz



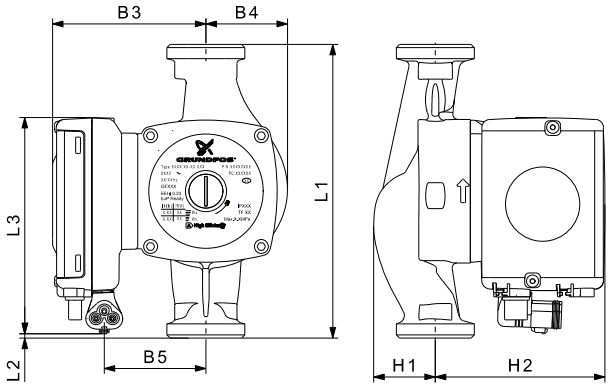
EEI ≤ 0.23

TM05 7251 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.04
Max.	140	1.1

Dimensional sketches and control box positions



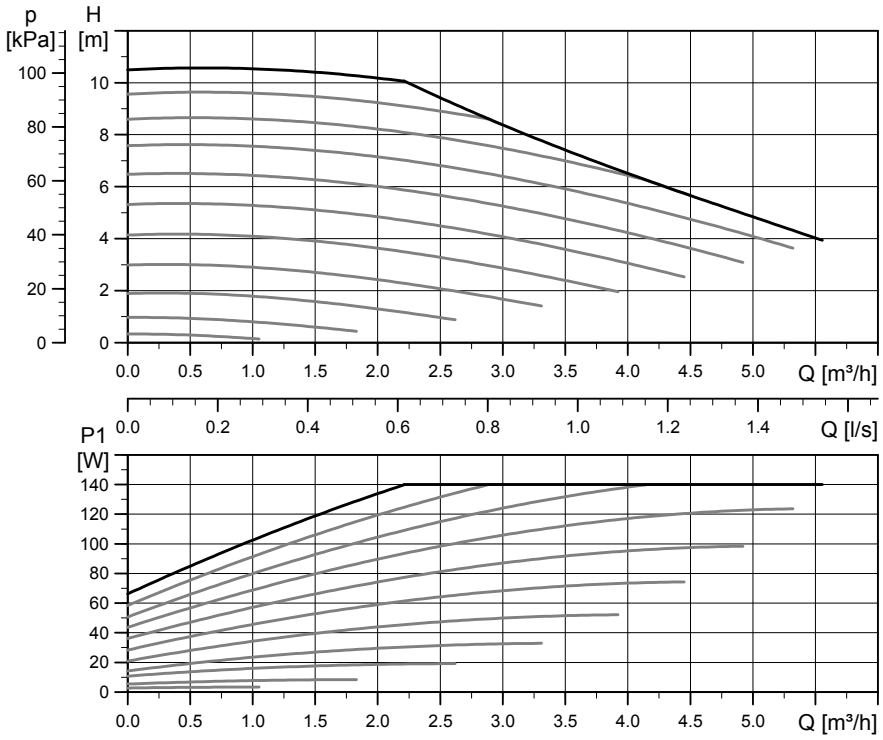
TM05 5123 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
UPML 25-105	180	3.5	131	95	50	64	38	104	G 1 1/2	2.5	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPML 32-105 180 PWM, 1 x 230 V, 50/60 Hz



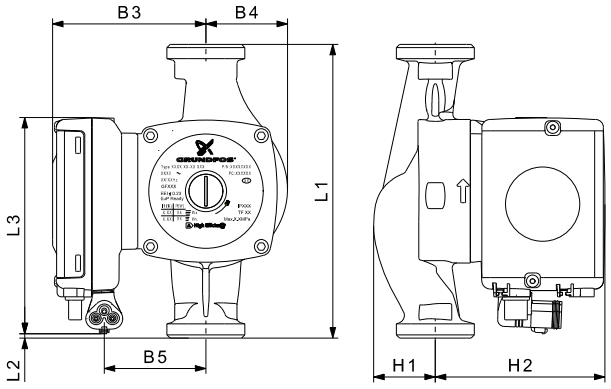
TM05 7251 0813

EEI ≤ 0.23

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.04
Max.	140	1.1

Dimensional sketches and control box positions



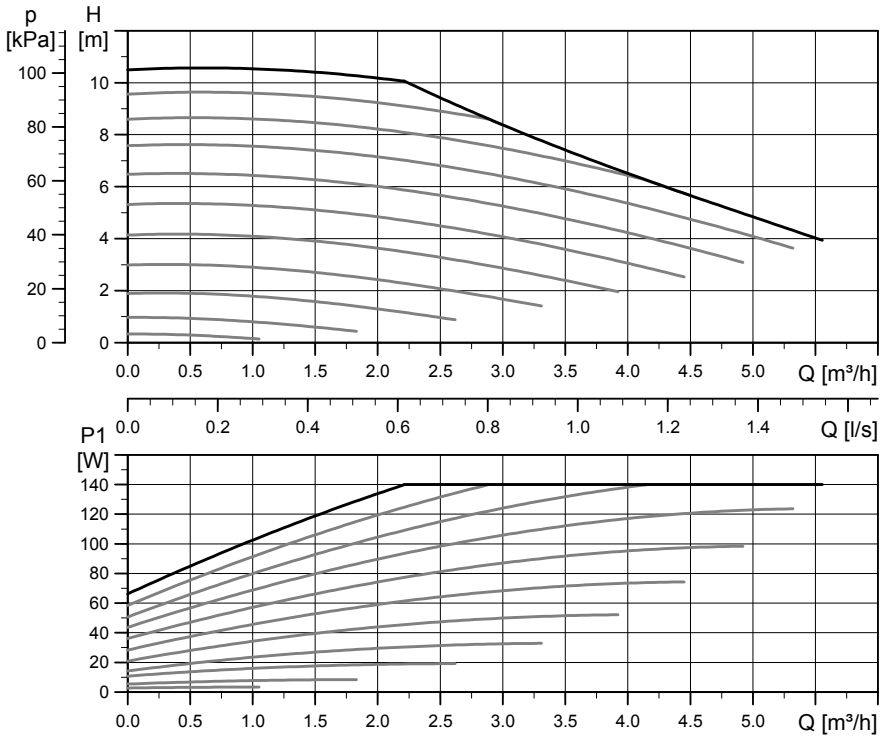
TM05 5123 3312

Pump type	Dimensions [mm]										
	L1	L2	L3	B3	B4	B5	H1	H2	Connection	Net weight [kg]	Quantity per pallet
UPML 25-105	180	3.5	131	95	50	64	38	104	G 2	2.7	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPML 25-105 180 N PWM, 1 x 230 V, 50/60 Hz



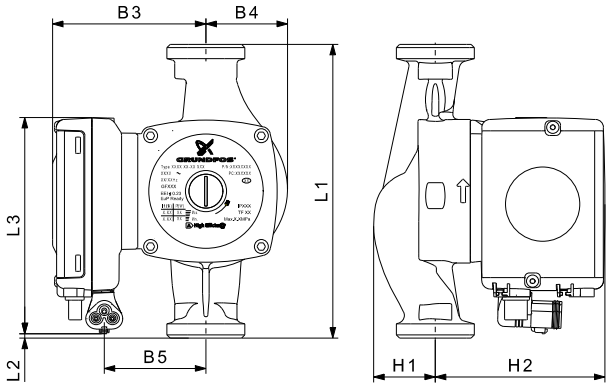
EEI ≤ 0.23

TM05 7251 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.04
Max.	140	1.1

Dimensional sketches and control box positions



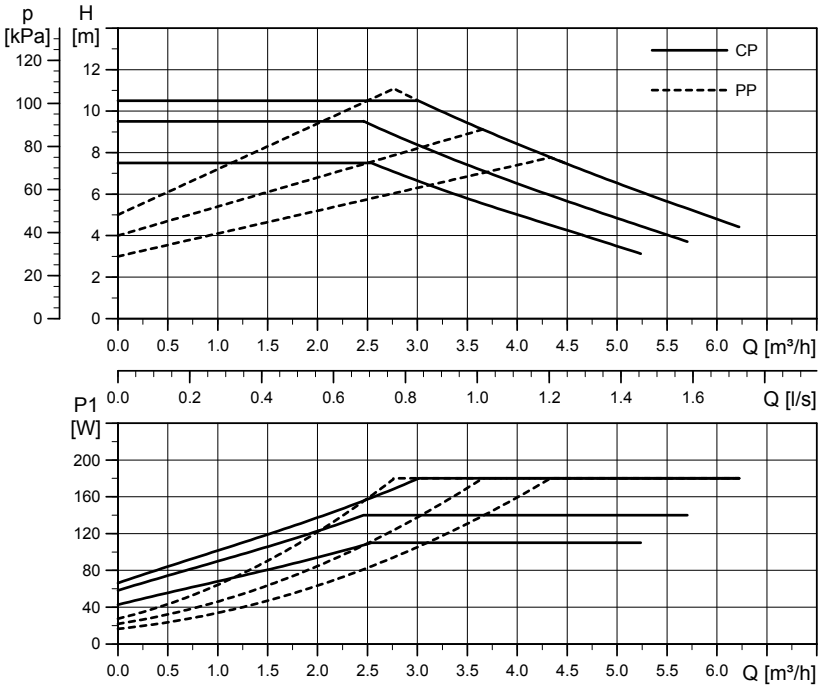
TM05 5123 3312

Pump type	Dimensions [mm]										
	L1	L2	L3	B3	B4	B5	H1	H2	Connection	Net weight [kg]	Quantity per pallet
UPML 25-105	180	3.5	131	95	50	64	38	104	G 1 1/2	2.6	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPMXL 25-105 130 AUTO, 1 x 230 V, 50/60 Hz



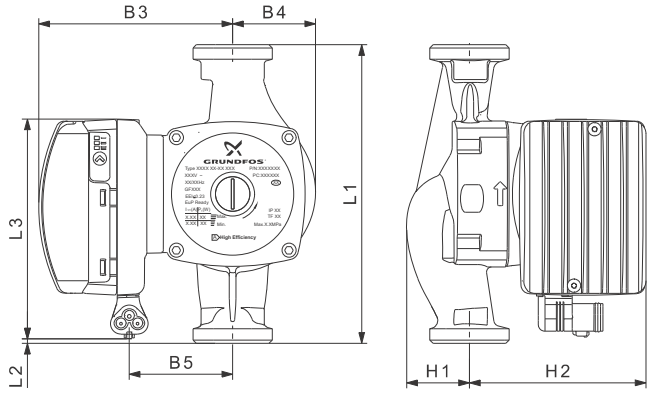
EEI ≤ 0.23

TM05 7961 1713

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	15	0.14
Max.	180	1.4

Dimensional sketches and control box positions



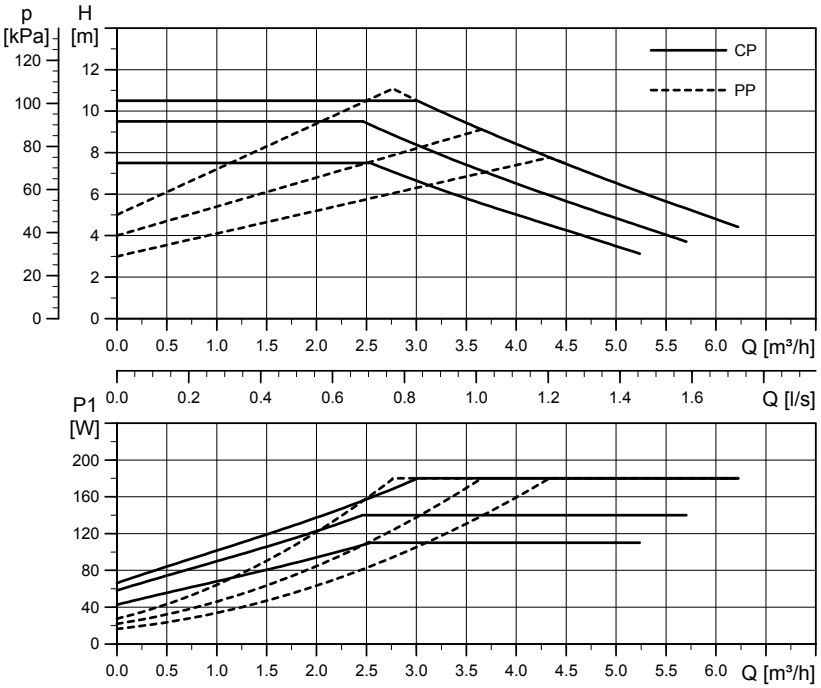
TM05 5598 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
UPMXL 25-105	130	22	131	117	50	64	27	112	G 1 1/2	2.6	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPMXL 25-105 180 AUTO, 1 x 230 V, 50/60 Hz



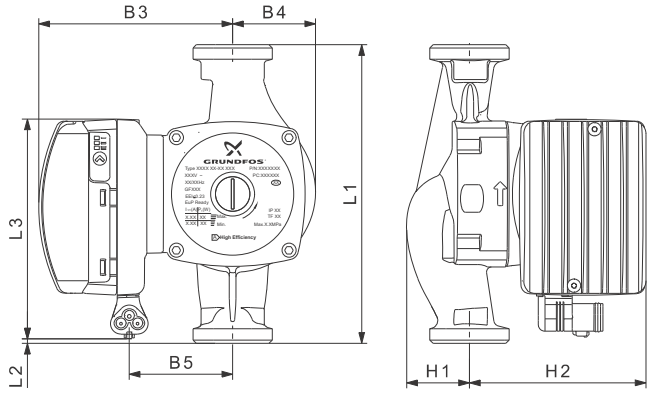
EEI ≤ 0.23

TM05 7961 1713

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	15	0.14
Max.	180	1.4

Dimensional sketches and control box positions



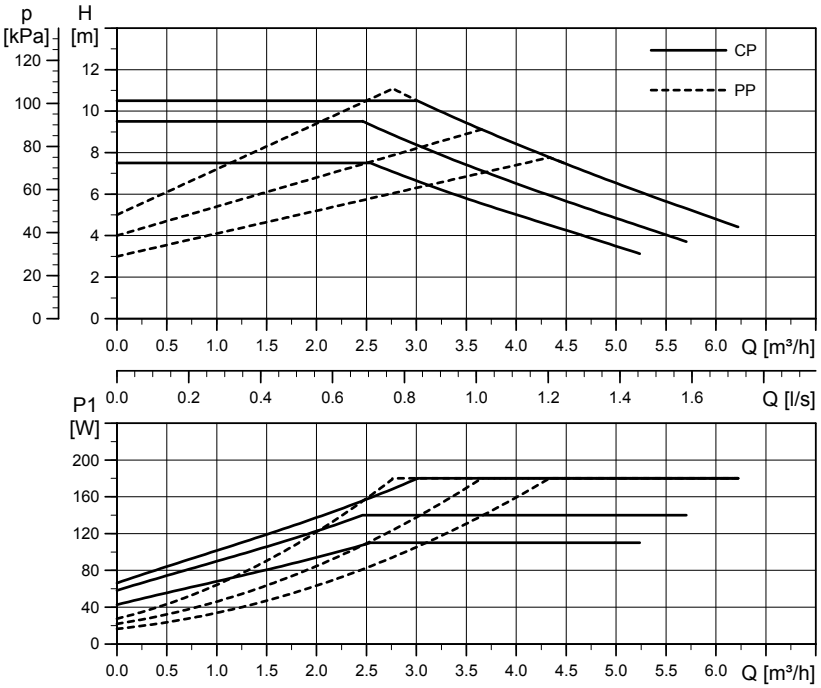
TM05 5598 3312

Pump type	Dimensions [mm]										
	L1	L2	L3	B3	B4	B5	H1	H2	Connection	Net weight [kg]	Quantity per pallet
UPMXL 25-105	180	3.5	131	117	50	64	38	104	G 1 1/2	2.7	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPMXL 25-105 180 N AUTO, 1 x 230 V, 50/60 Hz



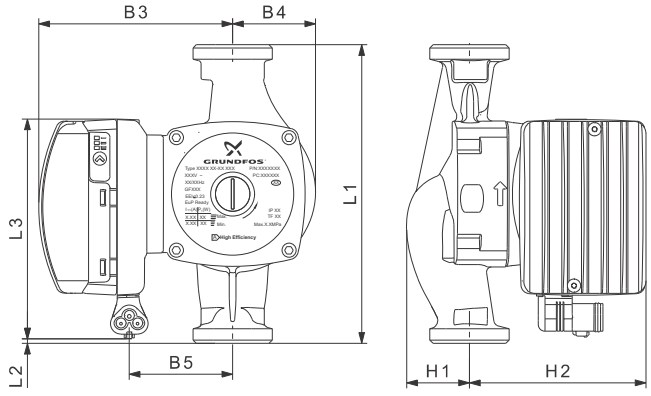
EEI ≤ 0.23

TM05 7961 1713

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	15	0.14
Max.	180	1.4

Dimensional sketches and control box positions



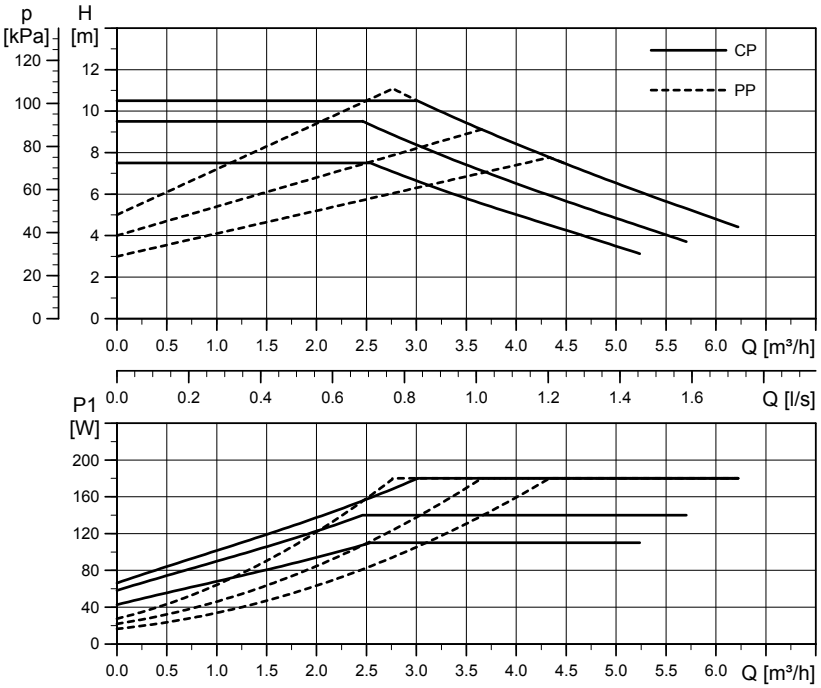
TM05 5598 3312

Pump type	Dimensions [mm]										
	L1	L2	L3	B3	B4	B5	H1	H2	Connection	Net weight [kg]	Quantity per pallet
UPMXL 25-105	180	3.5	131	117	50	64	38	104	G 1 1/2	2.7	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPMXL 32-105 180 AUTO, 1 x 230 V, 50/60 Hz



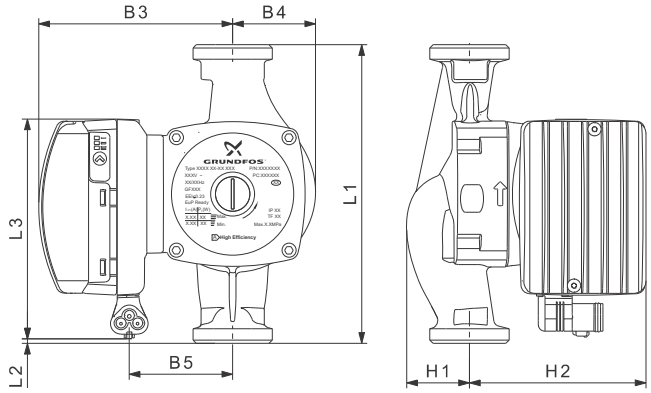
EEI ≤ 0.23

TM05 7961 1713

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	15	0.14
Max.	180	1.4

Dimensional sketches and control box positions



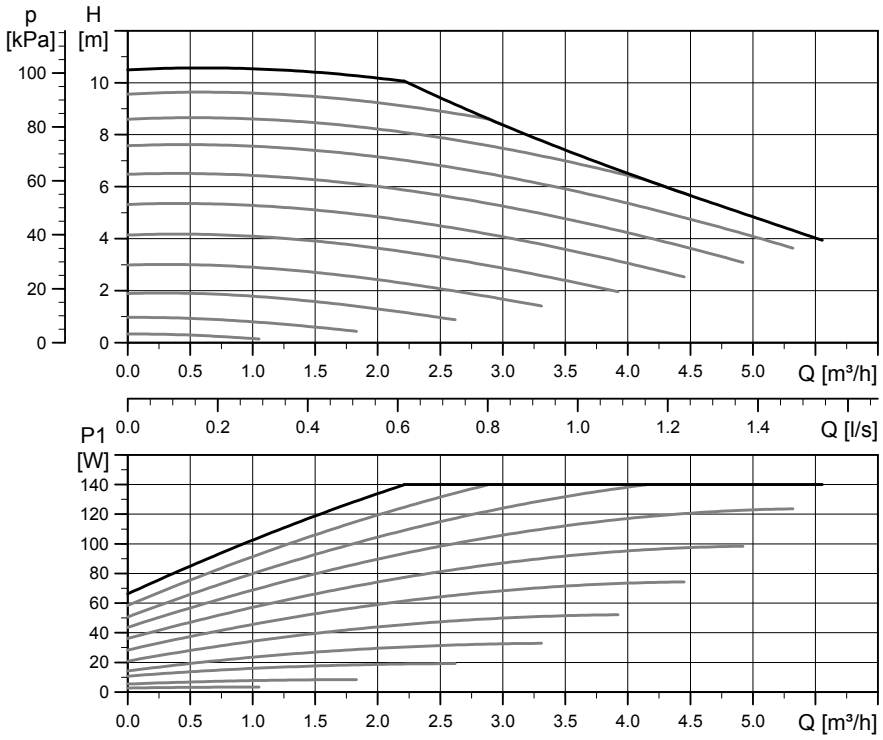
TM05 5598 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
UPMXL 32-105	180	3.5	131	117	50	64	38	104	G 2	2.9	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPML GEO 25-105 130 PWM, 1 x 230 V, 50/60 Hz



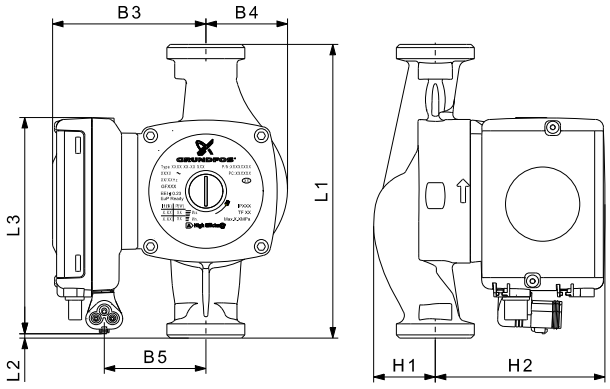
EEI ≤ 0.23

TM05 7251 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.04
Max.	140	1.1

Dimensional sketches and control box positions



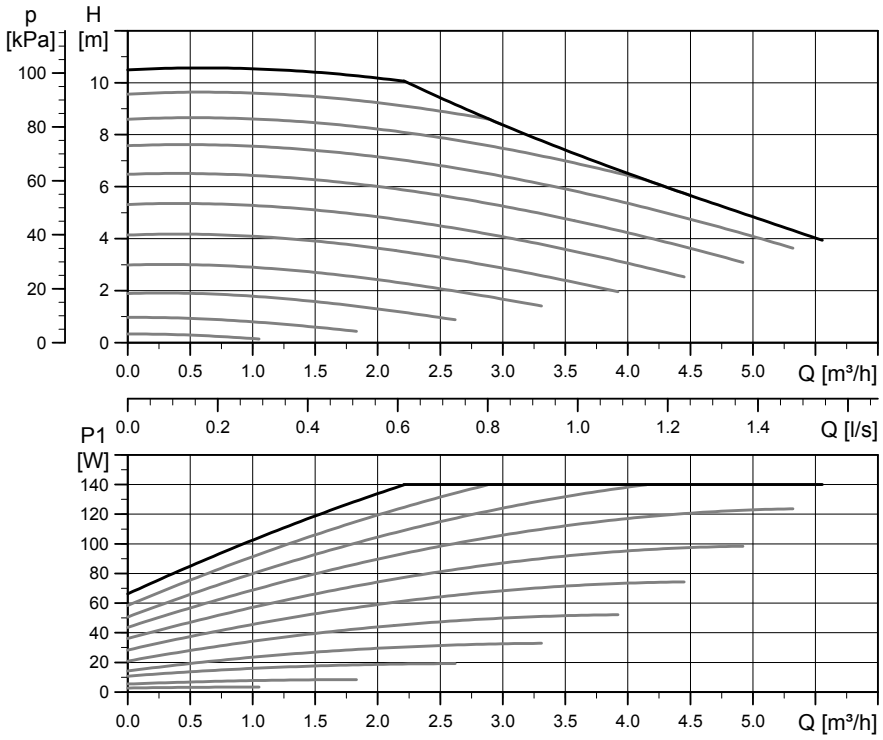
TM05 5123 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
UPML GEO 25-105	130	22	131	95	50	64	27	112	G 1 1/2	2.4	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPML GEO 25-105 180, PWM, 1 x 230 V, 50/60 Hz



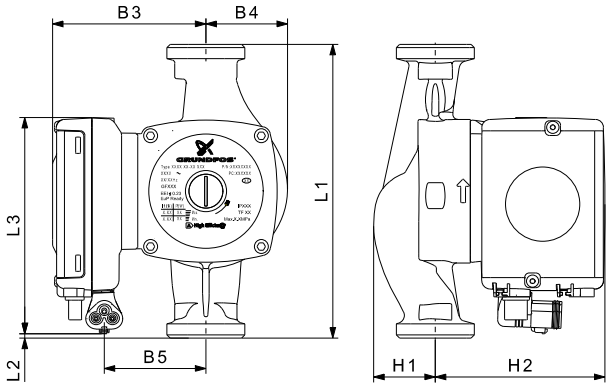
EEI ≤ 0.23

TM05 7251 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.04
Max.	140	1.1

Dimensional sketches and control box positions



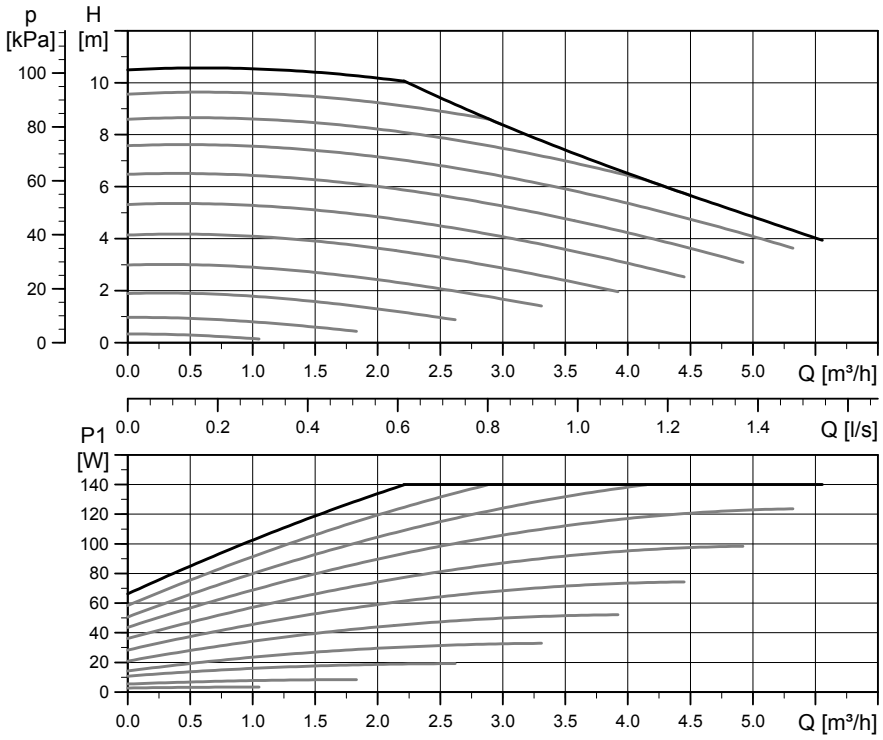
TM05 5123 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
UPML GEO 25-105	180	3.5	131	95	50	64	38	104	G 1 1/2	2.5	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPML GEO 25-105 180 N PWM, 1 x 230 V, 50/60 Hz



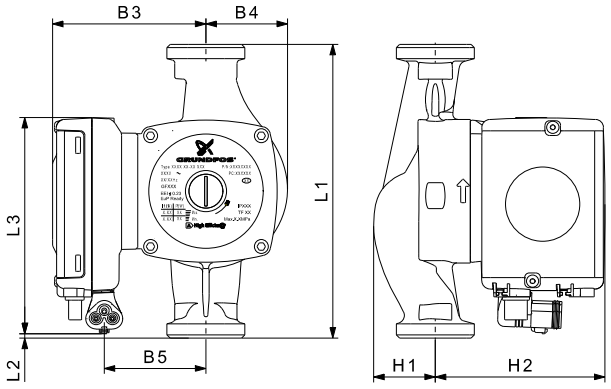
EEI ≤ 0.23

TM05 7251 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.04
Max.	140	1.1

Dimensional sketches and control box positions



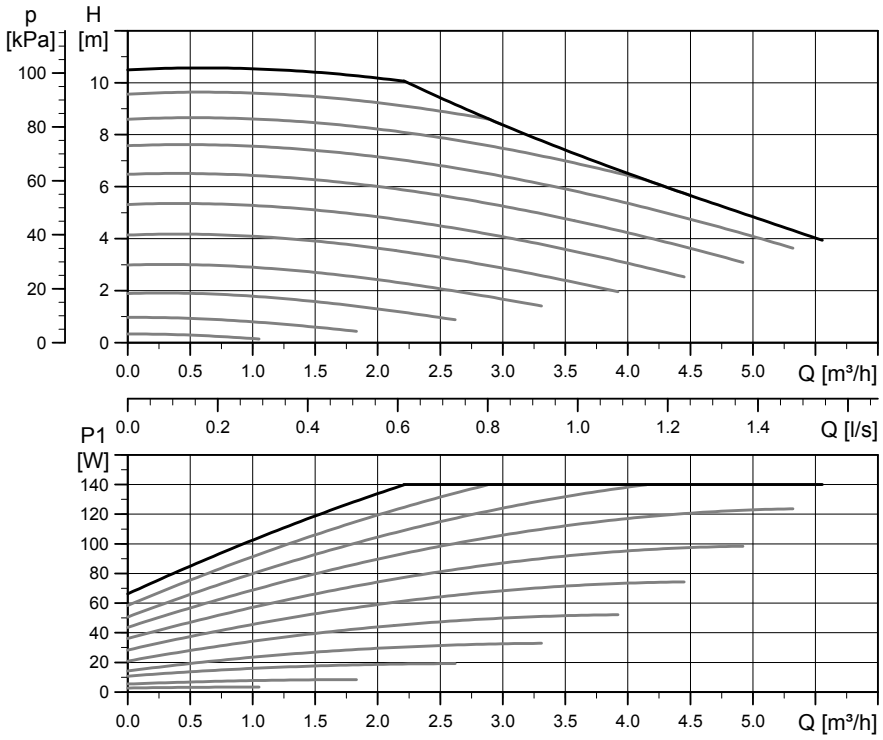
TM05 5123 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
UPML GEO 25-105	180	3.5	131	95	50	64	38	104	G 1 1/2	2.5	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPML GEO 32-105 180 PWM, 1 x 230 V, 50/60 Hz



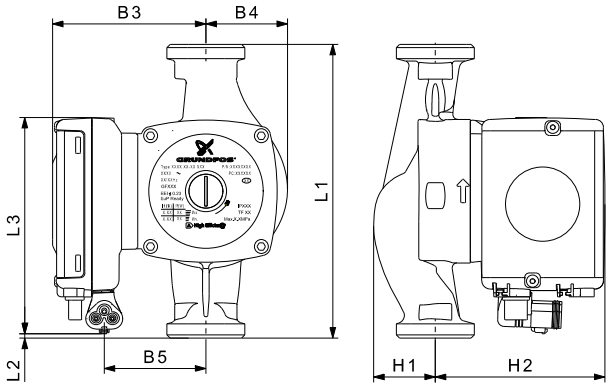
EEI ≤ 0.23

TM05 7251 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.04
Max.	140	1.1

Dimensional sketches and control box positions



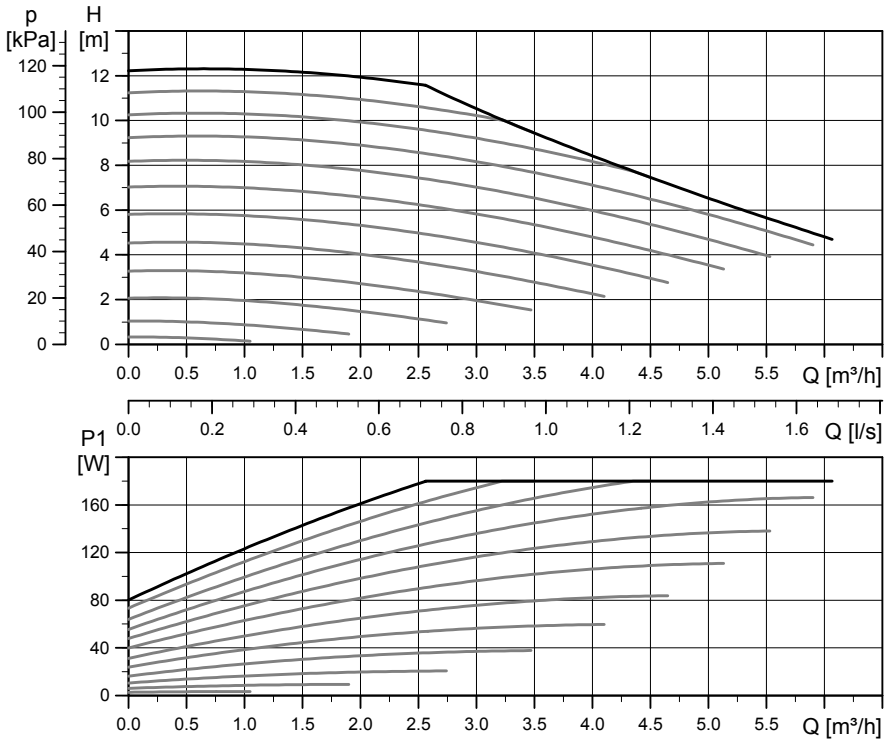
TM05 5123 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
UPML GEO 32-105	180	3.5	131	95	50	64	38	104	G 2	2.7	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPMXL GEO 25-125 130 PWM, 1 x 230 V, 50/60 Hz



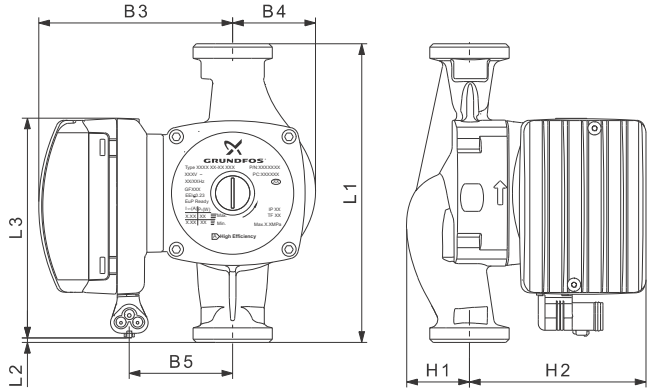
EEI ≤ 0.23

TM05 7252 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.06
Max.	180	1.4

Dimensional sketches and control box positions



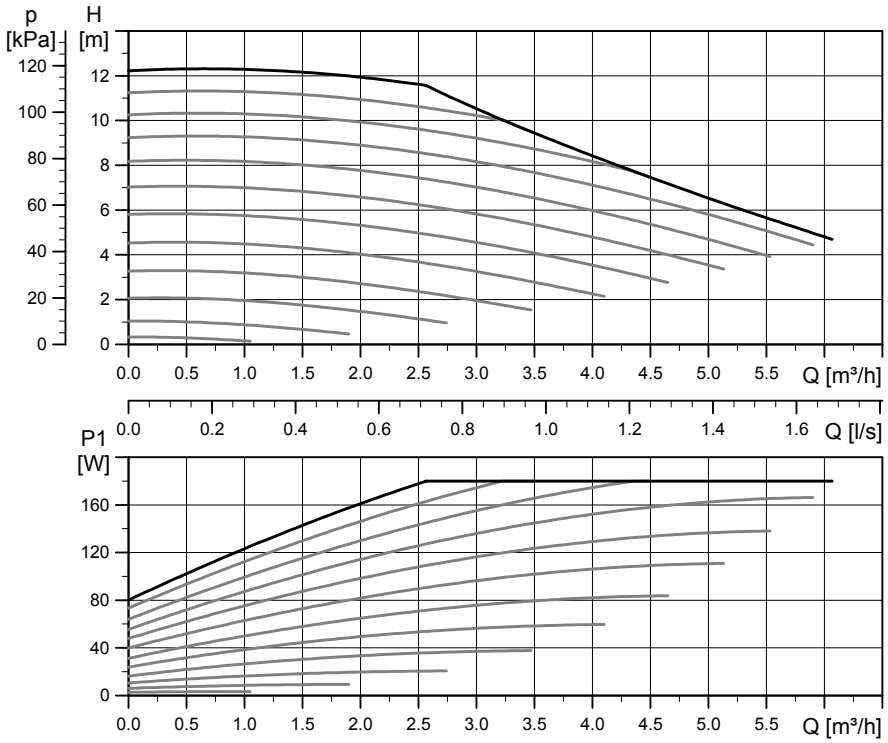
TM05 7428 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
UPMXL GEO 25-125	130	22	131	117	50	64	27	112	G 1 1/2	2.6	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPMXL GEO 25-125 180 PWM, 1 x 230 V, 50/60 Hz



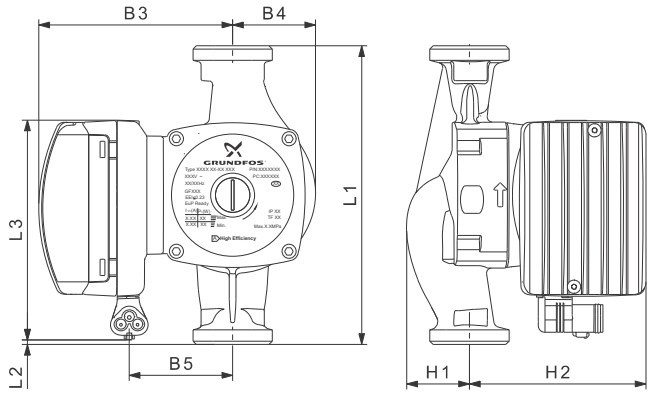
EEI ≤ 0.23

TM05 7252 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.06
Max.	180	1.4

Dimensional sketches and control box positions



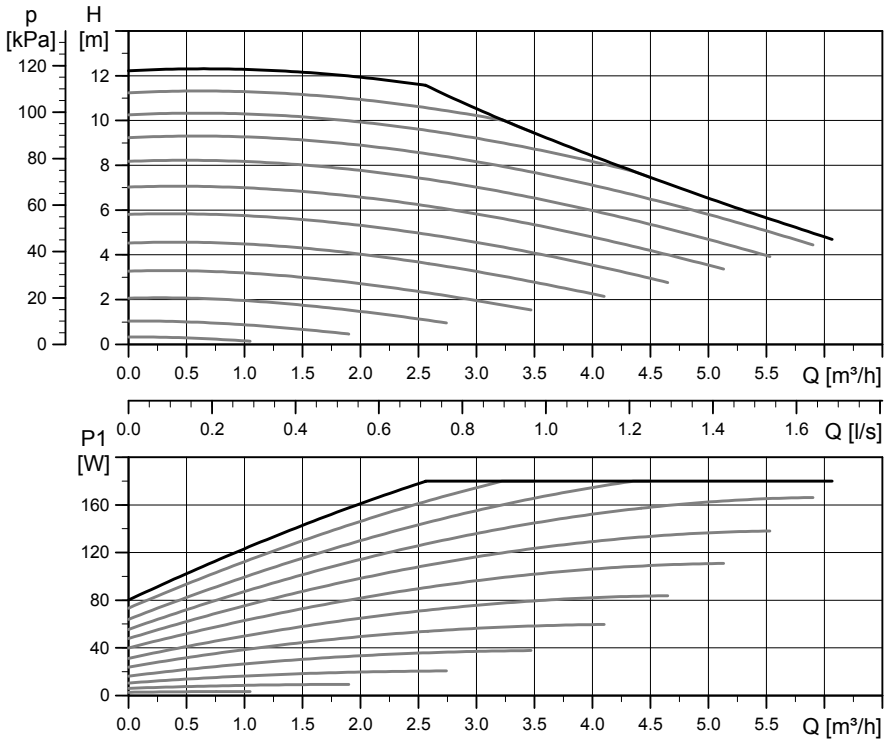
TM05 7428 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
UPMXL GEO 25-125	180	3.5	131	117	50	64	38	104	G 1 1/2	2.7	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPMXL GEO 25-125 180 N PWM, 1 x 230 V, 50/60 Hz



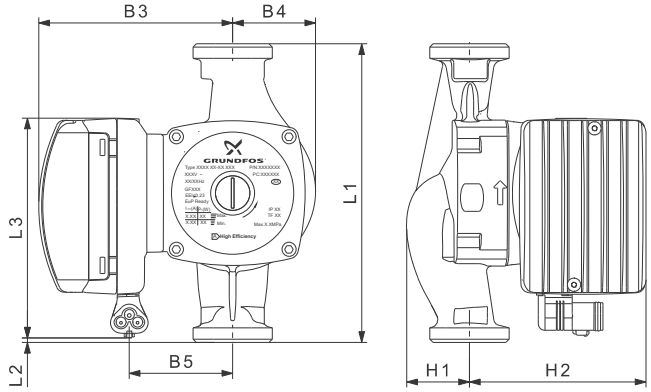
EEI ≤ 0.23

TM05 7252 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.06
Max.	180	1.4

Dimensional sketches and control box positions



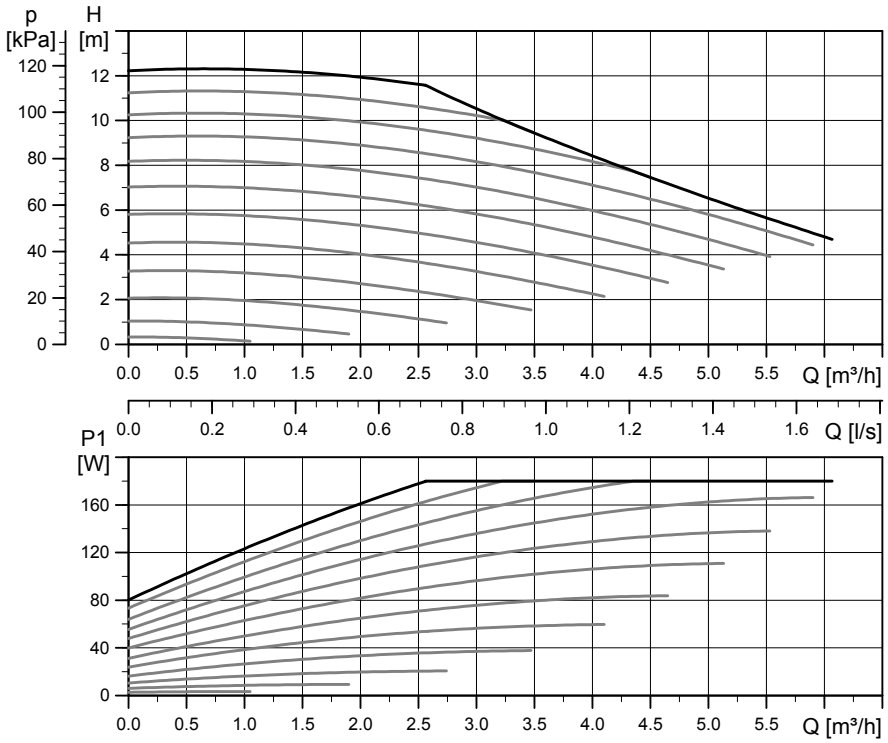
TM05 7428 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
UPMXL GEO 25-125	180	3.5	131	117	50	64	38	104	G 1 1/2	2.7	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

UPMXL GEO 32-125 180 PWM, 1 x 230 V, 50/60 Hz



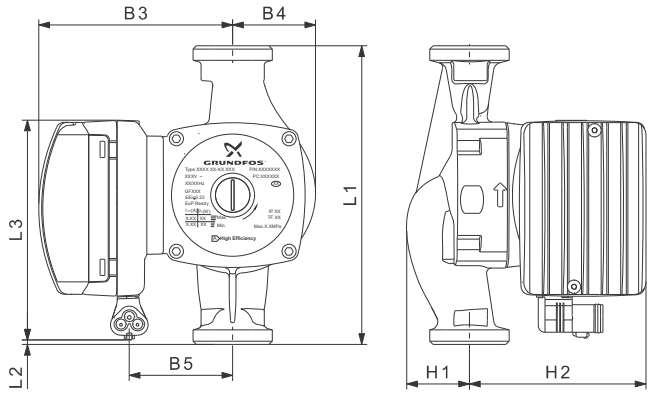
EEI ≤ 0.23

TM05 7252 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.06
Max.	180	1.4

Dimensional sketches and control box positions



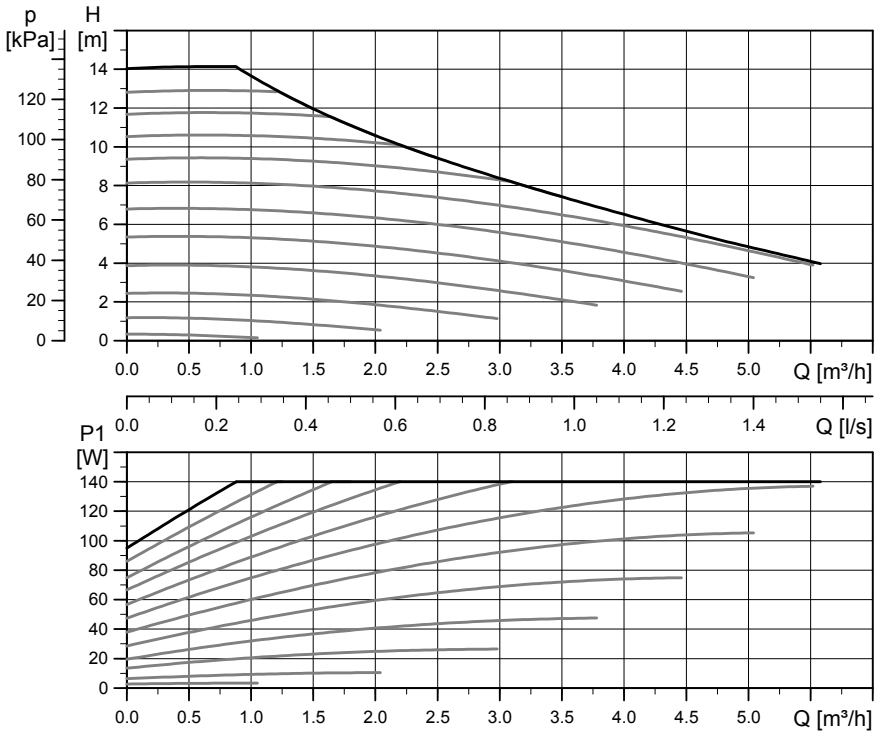
TM05 7428 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
UPMXL GEO 25-125	180	3.5	131	117	50	64	38	104	G 2	2.9	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

SOLAR PML 25-145 130 PWM, 1 x 230 V, 50/60 Hz



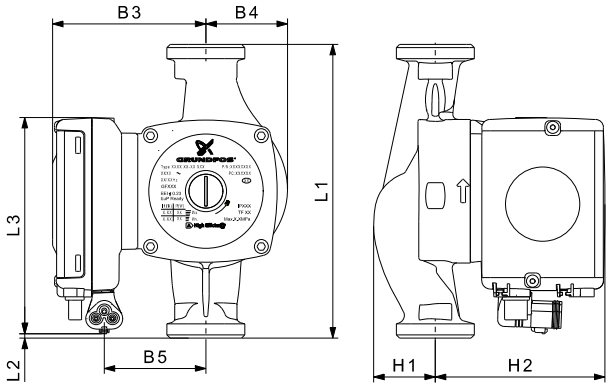
EEI ≤ 0.23

TM05 7253 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.06
Max.	140	1.1

Dimensional sketches and control box positions



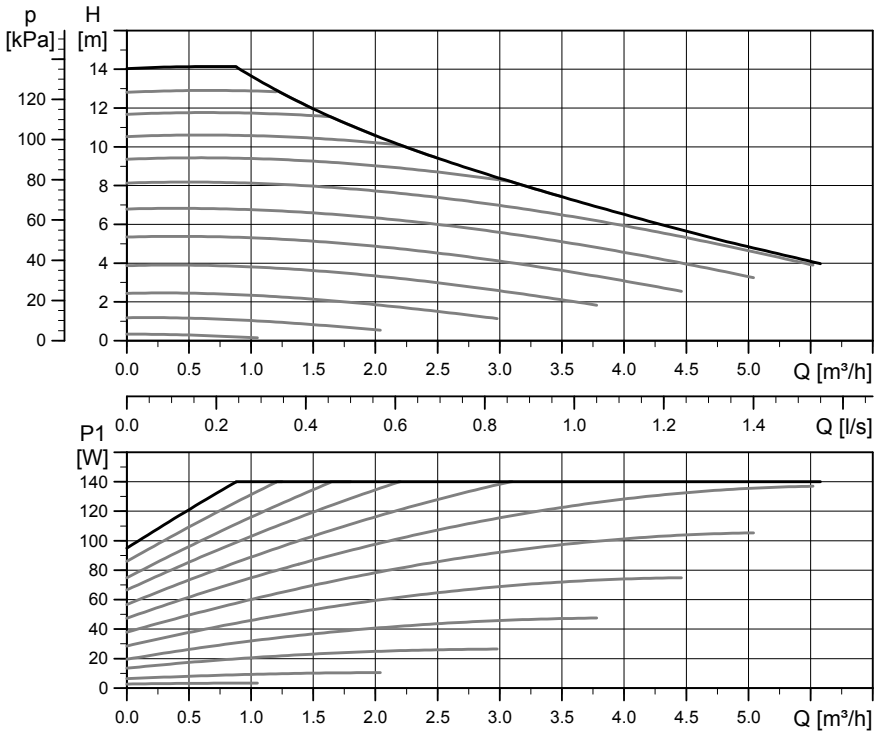
TM05 5123 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
SOLAR PML 25-145	130	22	131	95	50	64	27	112	G 1 1/2	2.4	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +110 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

SOLAR PML 25-145 180 PWM, 1 x 230 V, 50/60 Hz



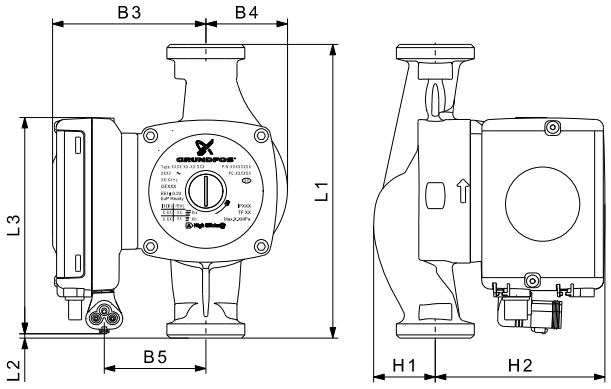
EEI ≤ 0.23

TM05 7253 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.06
Max.	140	1.1

Dimensional sketches and control box positions



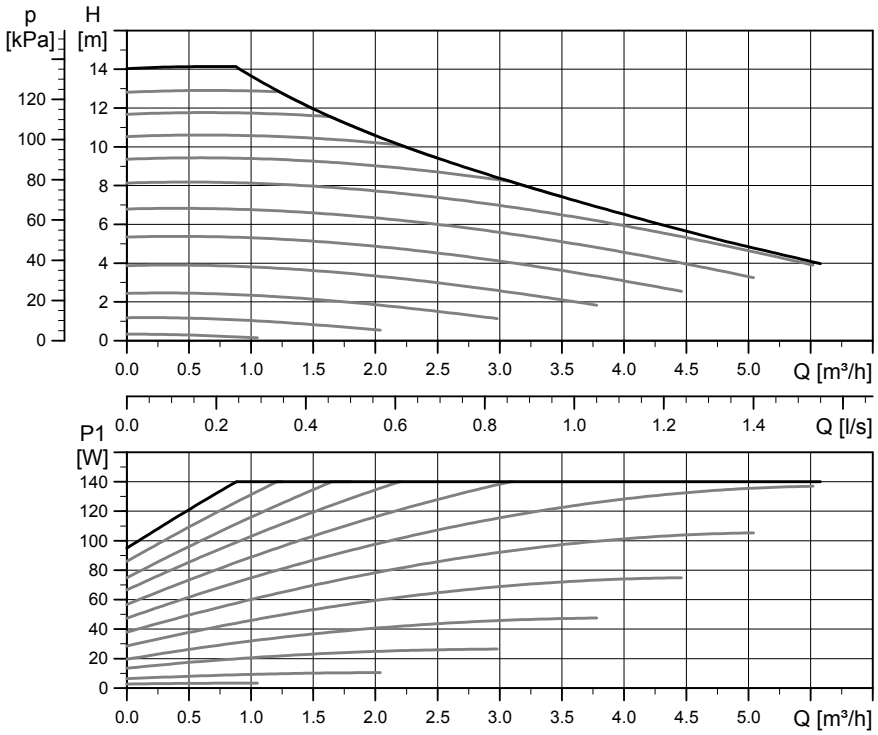
TM05 5123 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
SOLAR PML 25-145	180	3.5	131	95	50	64	27	104	G 1 1/2	2.5	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +110 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

SOLAR PML 25-145 180 N PWM, 1 x 230 V, 50/60 Hz



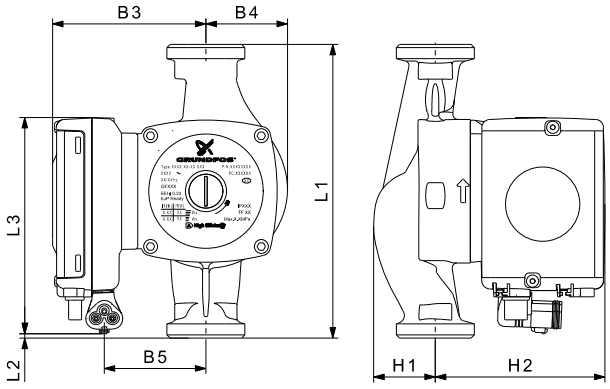
EEI ≤ 0.23

TM05 7253 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.06
Max.	140	1.1

Dimensional sketches and control box positions



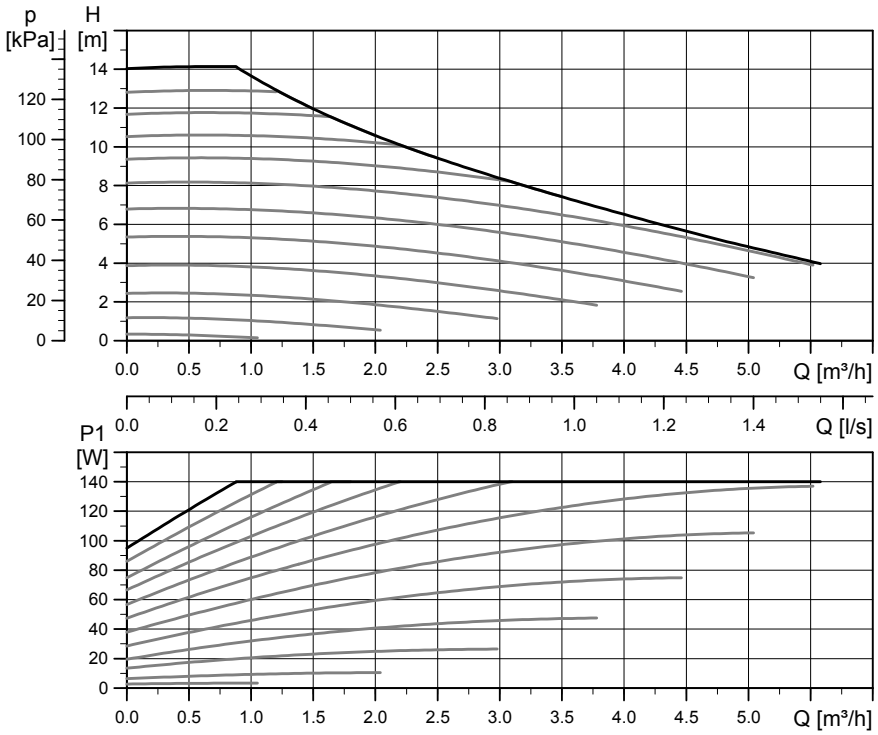
TM05 5123 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
SOLAR PML 25-145	180	3.5	131	95	50	64	27	104	G 1 1/2	2.5	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +110 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

SOLAR PML 32-145 180 PWM, 1 x 230 V, 50/60 Hz



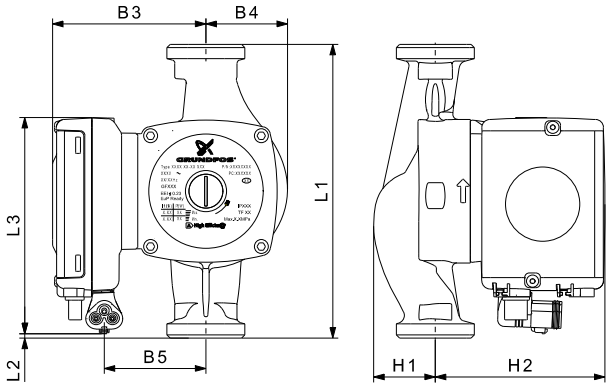
EEI ≤ 0.23

TM05 7253 0813

Electrical data, 1 x 230 V, 50 Hz

Speed	P_1 [W]	$I_{1/1}$ [A]
Min.	3	0.06
Max.	140	1.1

Dimensional sketches and control box positions



TM05 5123 3312

Pump type	Dimensions [mm]									Net weight [kg]	Quantity per pallet
	L1	L2	L3	B3	B4	B5	H1	H2	Connection		
SOLAR PML 32-145	180	3.5	131	95	50	64	38	104	G 2	2.7	-

Technical data

System pressure:	Max. 1.0 MPa (10 bar)	Enclosure class:	IPX2D
Minimum inlet pressure:	0.01 MPa (0.10 bar) at 95 °C liquid temperature	Insulation class:	H
Liquid temperature:	-10 °C to +95 °C (TF 95)	Equipment class:	I
Motor protection:	Overload protection	Approval and marking:	VDE, CE

9. Technical data

Supply voltage

1 x 230 V + 10 %/- 15 %, 45-65 Hz.

Motor protection

The pump requires no external motor protection

Enclosure class

IPX2D

Appliance class

Class I

Insulation class

H

Note ***The UPML GEO, UPMXL GEO are capable of handling a condensing environment.***

Ambient temperature

(Near pump surface)

Maximum +55 °C.

Temperature class

TF 95 according to EN 60335-2-51.

Liquid temperature

Maximum (continuously): +95 °C.

Short periods or low load: +110 °C.

Minimum: -10 °C (see validated temperature profile).

Ambient temperature [°C]	Liquid temperature, max. [°C]
0	+95 (+110)
20	+95 (+110)
30	+95 (+110)
35	+95
40	+95
55	+75

Storage temperature

Maximum 70 °C.

Maximum system pressure

1.0 MPa (10 bar).

EMC (electromagnetic compatibility)

- EN61000-6-2
- EN61000-6-3
- EN61000-3-2
- EN61000-3-3
- EN55014-1
- EN55014-2.

Overtemperature protection

UPML AUTO, UPMXL AUTO

To avoid overheating of the electronics inside the control box, the power will be derated by decreasing the speed, if necessary down to minimum speed without stopping the pump.

UPML, UPMXL PWM

In PWM pumps, an alarm will be sent with the feedback signal. At decreased temperature, the pump control will speed up again to normal operation.

Sound pressure level

The sound pressure level of the pump is lower than 38 dB(A).

Leakage current

The pump mains filter will cause a discharge current to earth during operation.

$I_{leakage}$ < 8 mA.

Standby loss

Lower than 3 W.

10. EC declaration of conformity

We, Grundfos, declare under our sole responsibility that the below-mentioned circulator pumps, to which this declaration relates, are in conformity with these Council directives on the approximation of the laws of the EC member states:

Products:

GFJXX UPML/XL pump types, including SOLAR PML.

The code is printed on the front nameplate.
X can have any alphabetic or numeric value.

Directives:

Low Voltage Directive (2006/95/EC)

Standards used: EN 60335-1:2012
EN 60335-2-51:2003 + A1.

EMC Directive (2004/108/EC)

Standards used: EN 61000-6-2:2005
EN 61000-6-3:2007
EN 55014-1:2006
EN 55014-2:1997.

Bjerringbro, 18th April 2013

Preben Jakobsen
Technical Manager
Grundfos HVAC OEM Division
Grundfos Holding A/S
Poul Due Jensens Vej 7
8850 Bjerringbro, Denmark

Person authorised to compile technical file and empowered to sign the EC declaration of conformity.

11. Approvals and certificates

VDE certificate

These pumps are certified by VDE.

Product code:

GFJNB:	UPML (GEO) xx-105 PWM, SOLAR PML xx-145 PWM
GFJNC:	UPML xx-95 AUTO
GFJOC:	UPMXL xx-105 AUTO
GFJOB:	UPMXL GEO xx-125 PWM
VDE certificate:	No. 40037291.

This approval forms the basis of the EC declaration of conformity and the CE marking by the manufacturer or his agent and proves the conformity with the essential safety requirements of the EC Low Voltage Directive (2006/95/EC) including amendments.

Complete REACH compliance

New European Regulation (EC) 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) entered into force.

One of the requirements of REACH is that manufacturers and importers have the duty to register chemical substances that they produce or import in quantities over 1 t/year. Another requirement is to inform our customers if our products contain substances from the candidate list in a concentration above 0.1 % (w/w).

Grundfos has a high global standard for human health and environmental awareness, and we declare to comply with the requirements of REACH.

Regarding Substances of Very High Concern (SVHC), Grundfos aims higher than REACH requires. We will strive to substitute all substances from the candidate list that are found in our products in a concentration above 0.1 % (w/w).

Grundfos policy is to be fully compliant with the REACH legislation and to work closely with suppliers and customers. This declaration is part of our policy of keeping our customers fully informed about our REACH commitment.

With kind regards,

Torben Brændgaard

Group Environment Manager

WEEE and RoHS directives

Statement regarding Grundfos' compliance with the WEEE and RoHS directives

Grundfos pumps and motors are not covered by the WEEE and RoHS directives as these products are not mentioned in the special Annex 1A to the WEEE directive. This annex mentions all the groups of products covered by the directives.

In spite of the fact that Grundfos has no legal obligation to comply with the WEEE and RoHS directives, Grundfos does find the thoughts and ideas behind the directives very important.

In regard to the RoHS directive, Grundfos is now in complete voluntary RoHS compliance. To ensure that this continues, we have launched the following initiatives:

- All suppliers to Grundfos are under contractual obligation not to deliver products that hold RoHS-restricted substances.
- Grundfos continuously audits our suppliers to ensure full contractual compliance, including RoHS compliance.
- Grundfos does not accept hazardous substances in our products. It is a standard task in our product developing projects to ensure that hazardous substances are not used.

In regard to the WEEE directive and its impact on pumps, Grundfos recommends reading the Euro-pump position paper of 16 December 2005 which can be found on: http://www. europump.org or http://publications.orgalime.org

Yours faithfully,

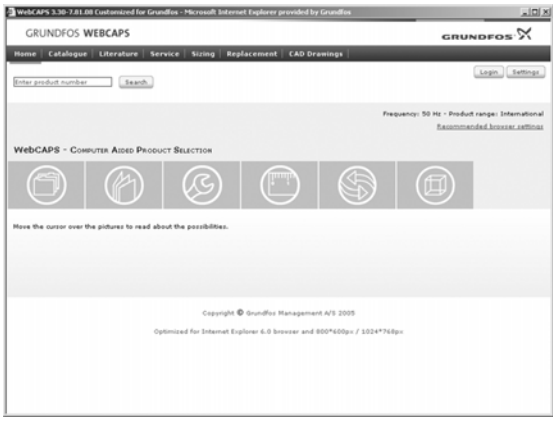
GRUNDFOS Management A/S

Carsten Bjerg

Group President

12. Further product information

WebCAPS

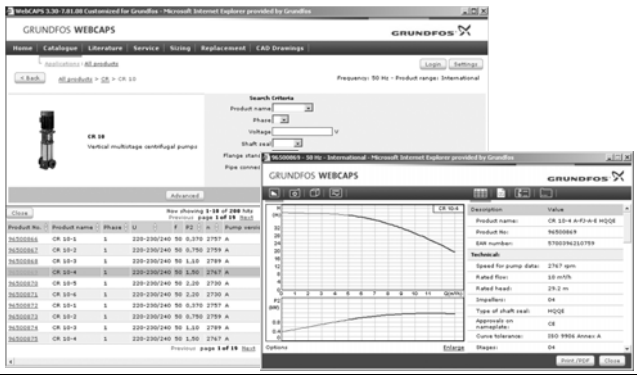


WebCAPS is a **Web**-based **C**omputer **A**ided **P**roduct **S**election program available on www.grundfos.com.

WebCAPS contains detailed information on more than 220,000 Grundfos products in more than 30 languages.

Information in WebCAPS is divided into six sections:

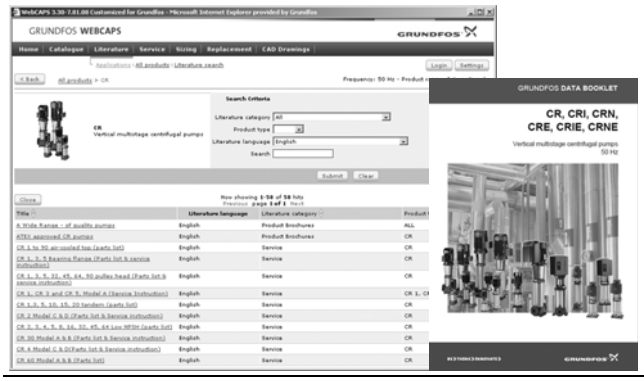
- Catalogue
- Literature
- Service
- Sizing
- Replacement
- CAD drawings.



Catalogue

Based on fields of application and pump types, this section contains the following:

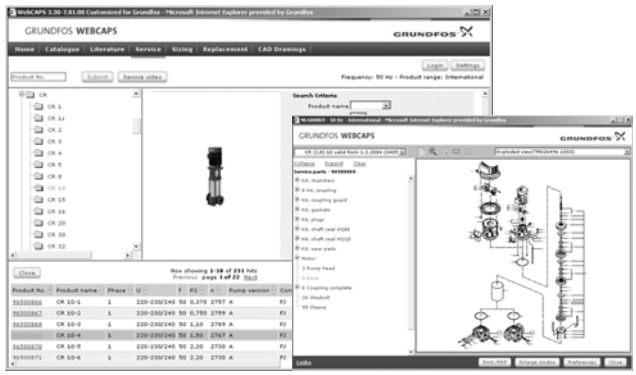
- technical data
- curves (QH, Eta, P1, P2, etc.) which can be adapted to the density and viscosity of the pumped liquid and show the number of pumps in operation
- product photos
- dimensional drawings
- wiring diagrams
- quotation texts, etc.



Literature

This section contains 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.



Service

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

Sizing

This section is based on different fields of application and installation examples and gives easy step-by-step instructions in how to size a product:

- Select the most suitable and efficient pump for your installation.
- Carry out advanced calculations based on energy, consumption, payback periods, load profiles, life cycle costs, etc.
- Analyse your selected pump via the built-in life cycle cost tool.
- Determine the flow velocity in wastewater applications, etc.

Replacement

In this section you find a guide to selecting and comparing 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. When you have specified the installed pump, the guide will suggest 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.

These 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

Fig. 27 WinCAPS DVD

WinCAPS is a **Win**dows-based **C**omputer **A**ided **P**roduct **S**election program containing detailed information on more than 220,000 Grundfos products in more than 30 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 DVD and updated once a year.

GO CAPS

Mobile solution for professionals on the GO!

CAPS functionality on the mobile workplace.

Available on the App Store

98465581 0413
ECM: 1111072

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