

Installation guide

P331 Electronic circulator GPA 25-70 III



CONTENTS

IMPORTANT SAFETY AND INSTALLATION INSTRUCTIONS	3
1. DESCRIPTION OF THE SYMBOL.....	4
2. OVERVIEW.....	4
2.1. Advantages of pump installation	4
3. CONDITIONS OF SERVICE	5
3.1. Ambient temperature	5
3.2. Relative humidity (RH).....	5
3.3. Temperature of the medium (transport liquid).....	5
3.4. System Pressure.....	5
3.5. Protection Level	5
3.6. Inlet Pressure	5
3.7. Liquid Pumping	5
4. INSTALLATION.....	6
4.1. Junction Box Position.....	6
4.2. Pump body thermal insulation.....	8
5. ELECTRICAL CONNECTION	9
6. CONTROL PANEL CONTROLS.....	11
6.1. Fault code display status.....	11
6.2. Illuminated area to view pump settings.....	12
6.3. Button to select pump settings.....	13
7. PUMP SETTING	13
7.1. The command on the pump	14
7.1.1. Proportional pressure control	14
7.1.2. Constant pressure control.....	14
8. PWM SIGNAL CONTROL MODE.....	15
8.1. Control and Signal	15
8.2. Interface.....	15
8.3. PWM Input Signal	16
8.4. PWM Feedback Signal	17
8.5. How to use signals.....	18



9. USING THE BYPASS VALVE 18
9.1. Bypass valve with manual operation 19
9.2. Automatic bypass valve (temperature control type)..... 19

10. START..... 19
10.1. Before Starting 19
10.2. Discharging the Motor Pump..... 20
10.3. Heating system gas discharge..... 20

11. PUMP SETTINGS AND PERFORMANCE..... 21
11.1. Relationship between pump settings and its performance 21

12. PERFORMANCE CURVE22
12.1. Performance Curve Guide.....22
12.2. Curve conditions.....22
12.3. Performance Curve22

13. FEATURES.....23
13.1. Identification plate description.....23
13.2. Model explanation 24

14. TECHNICAL PARAMETERS AND INSTALLATION DIMENSIONS.....25
14.1. Technical data.....25
14.2. Installation Dimensions 26

15. FAULT CHECKLIST.....27

IMPORTANT SAFETY AND INSTALLATION INSTRUCTIONS

1. Before installation and use, read the installation manual carefully.
2. Failure to observe the contents marked by the safety warnings may cause personal injury, damage to the pumps and loss of property, for which the manufacturer assumes no responsibility or compensation.
3. The installer, operator and user must comply with local safety regulations.
4. The user must bear in mind that the installation and maintenance of the product must be carried out by personnel experienced in the instructions and in possession of certificates of professional qualification.
5. The pumps must not be installed in humid environments or in places exposed to water splashes.
6. To facilitate maintenance, a shut-off valve must be installed on each side of the pump inlet and outlet.
7. The pump's power supply must be disconnected during installation and maintenance.
8. For the circulation of domestic hot water it is necessary to install a pump with a copper or stainless steel body.
9. The heat supply pipe must not be frequently supplemented with non-softened water to avoid an increase in limescale in the circulation water of the pipe, so as not to clog the impellers.
10. It is forbidden to start the pump in the absence of pumping liquid.
11. Some models cannot be used for drinking water.
12. The pumping liquid can be at high temperature and pressure, therefore the liquid in the system must be drained or the shut-off valves on both sides of the pump must be deactivated to avoid burns before moving and removing the pump.
13. In summer or when the ambient temperature is high, care should be taken with ventilation to prevent moisture from condensing and causing electrical failure.
14. In winter, if the pumping system does not work or if the ambient temperature is below 0 °C, the liquid in the piping system must be emptied to avoid causing frost cracks to the pump body.
15. If the pump is not used for a long period of time, turn off the duct valves at the pump inlet and outlet and disconnect the pump's power supply.
16. If the flexible cable is damaged, contact the service center to have it replaced together with the connector.
17. If abnormal motor overheating is found, immediately close the valve at the pump inlet and disconnect the pump's power supply, then immediately contact your supplier or local service center.
18. If the pump fault cannot be resolved using the description in the instructions, immediately close the valve at the pump inlet and disconnect the pump's power supply; then, immediately contact the supplier or local service center.
19. The product must be placed out of the reach of children and, after installation, isolation measures must be taken to prevent children from touching it.
20. The product must be placed in a dry, ventilated and cool place and kept at room temperature.
21. This appliance may be used by children aged 8 years and over and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge, provided they have received supervision or instructions on the safe use of the appliance and understand the hazards involved. Children must not play with the appliance. Cleaning and maintenance by the user must not be carried out by children without supervision.



Warnings

Before starting the installation, you must carefully read the Instructions for Installation and Use of the device. The installation and use of the device must comply with local regulations and follow the specifications of good operation.



Warnings

Personnel with physical decline, dysesthesia or poor mental capacity and lacking experience and knowledge in the field (including children) must use the pump under the supervision and guidance of people able to take charge of their safety.

1. DESCRIPTION OF THE SYMBOL

Before installation, read these instructions for installation and operation. Installation and operation must also comply with national regulations and accepted codes of good practice.

	<u>Warnings</u> Failure to comply with this safety statement may result in personal injury!
WARNING	Failure to comply with this safety statement may result in equipment failure or damage!
NOTE	Notes or instructions that facilitate work and ensure operational safety.

2. OVERVIEW

The GPA III series circulation pump (also called "pump" for short) is mainly used for water circulation in domestic heating and domestic hot water systems.

The pump is particularly suitable for the following uses:

- Stable variable flow heating system
- Variable pipe temperature heating system
- Industrial circulation system
- Domestic heating and domestic hot water supply system

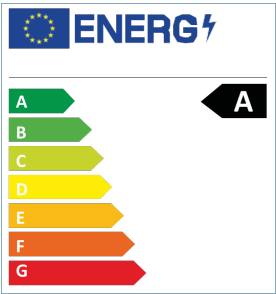
The pump is equipped with a permanent magnet motor and a differential pressure regulator that can adjust the performance of the electric pump automatically and continuously to meet the actual needs of the system.

The pump is equipped with a control panel on the front side, convenient for users to operate.

2.1. Advantages of pump installation

Easy installation and start-up

- The pump has an automatic adjustment AUTO mode (factory settings). In most cases, you can start the pump without having to make any adjustments and adjust it automatically to meet the actual needs of the system.
- Increased comfort
- The operating noise of the pump and the entire system is low.
- Low energy consumption
- Compared to the conventional circulation pump, its energy consumption is very low. The minimum power consumption of the pump can reach 5W.





3. CONDITIONS OF SERVICE

3.1. Ambient temperature

Ambient temperature: 0 °C ~ +70 °C

3.2. Relative humidity (RH)

Maximum humidity: 95%

3.3. Temperature of the medium (transport liquid)

Liquid transport temperature +2 °C ~ 110 °C.

To prevent the control unit and stator from accumulating condensate, the temperature of the pump transport liquid must always be higher than the ambient temperature.

3.4. System Pressure

The maximum is 1.0 MPa (10 bar).

3.5. Protection Level

IP 44

3.6. Inlet Pressure

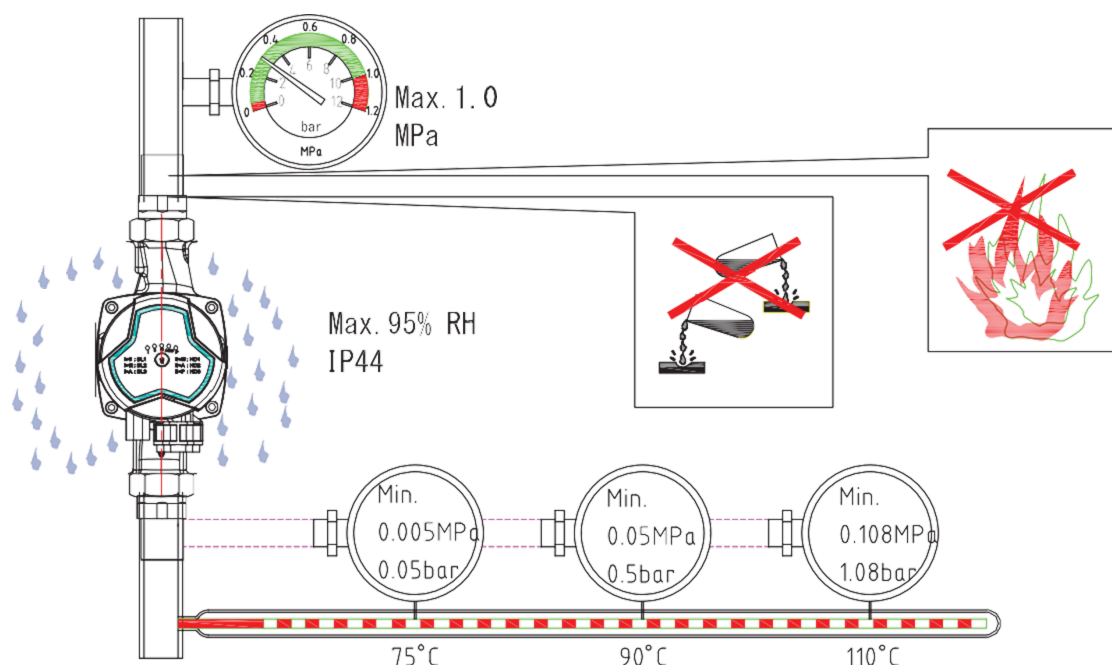
To avoid damage to the pump bearings caused by cavitation noise, the following minimum pressure must be maintained at the pump inlet:

Liquid temperature	< 75 °C	90 °C	110 °C
Inlet Pressure	0.05 bar	0.5 bar	1.08 bar
	0.5 m from the head	5 m from the head	10.8 m from the head

3.7. Liquid Pumping

The thin, clean, non-corrosive and non-explosive liquid does not contain solid particles, fibres or mineral oil; the pump must absolutely not be used for the transport of flammable liquids such as vegetable oil and petrol. If the circulation pump is used in case of high viscosity, the performance of the pump is reduced; therefore, when choosing a pump, it is necessary to consider the viscosity of the liquid.

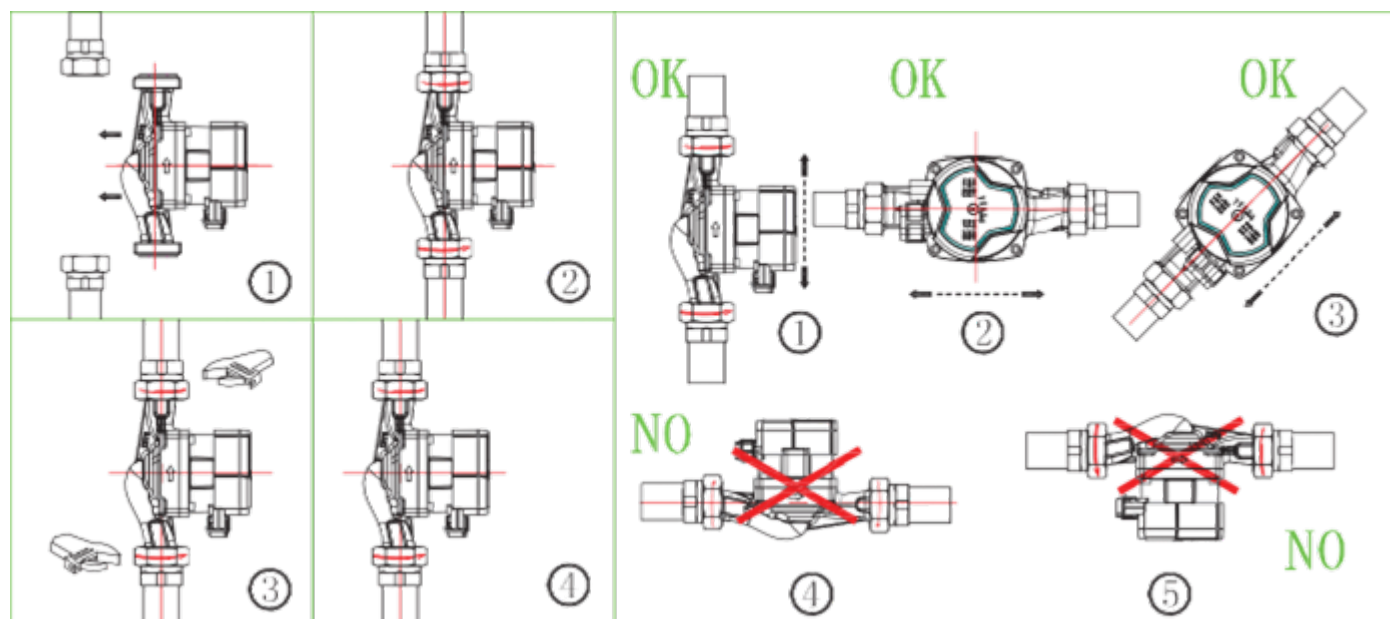
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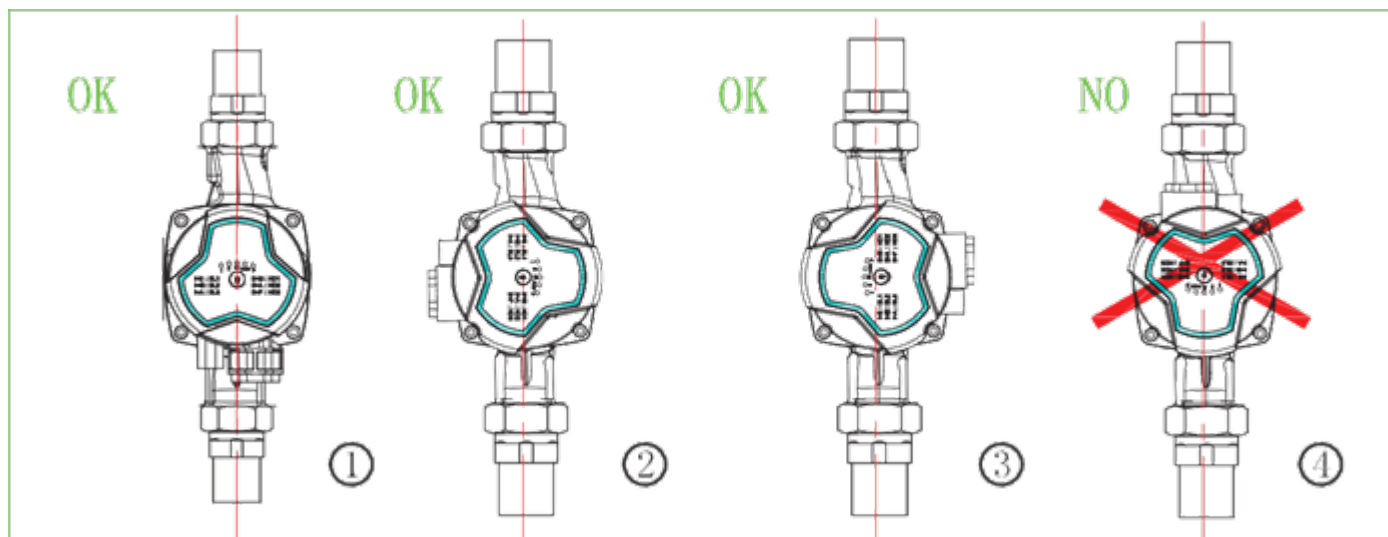
4. INSTALLATION

- Install the pump, the arrows on the pump housing indicate the direction of liquid flow through the pump body.
- When the pump is installed on the pipe, the inlet and outlet must be installed with the two leather seals supplied.
- During installation, the pump shaft must be in a horizontal position

4.1. Junction Box Position

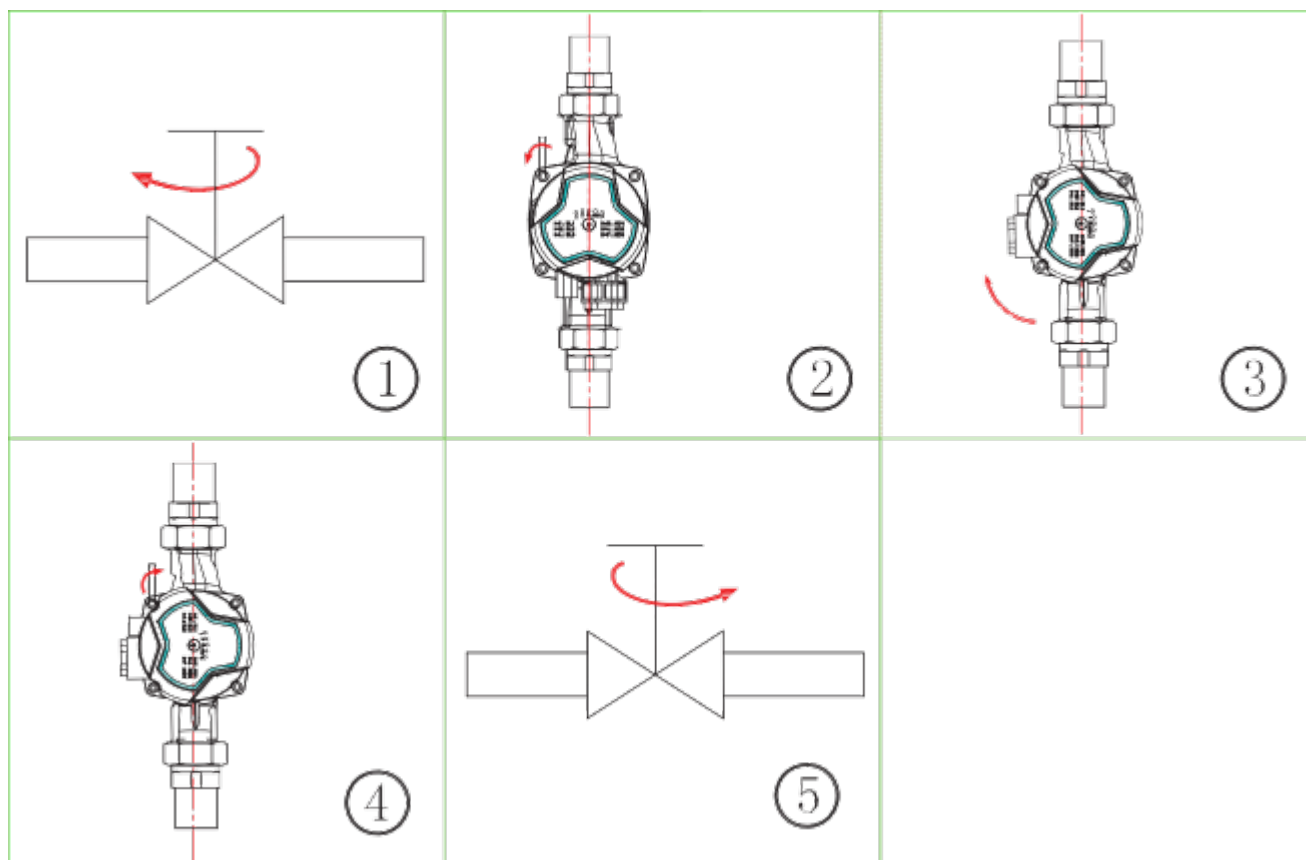


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The junction box can rotate by 90°. To change the junction box position, follow the instructions below:

1. Invert the inlet and outlet valves and proceed with decompression;
2. Loosen and remove the four cylindrical head screws that secure the pump body;
3. Rotate the motor to the desired position and match up the four screw holes;
4. Replace the four cylindrical head screws and tighten them in a cross pattern;
5. Open the inlet and outlet valve.



**Warnings**

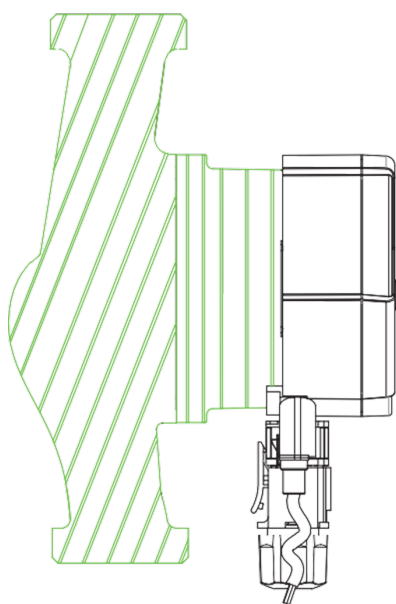
The pumping liquid can be at high temperature and pressure, therefore the liquid in the system must be drained or the shut-off valves on both sides of the pump must be deactivated before moving the cylindrical head screws.

WARNING

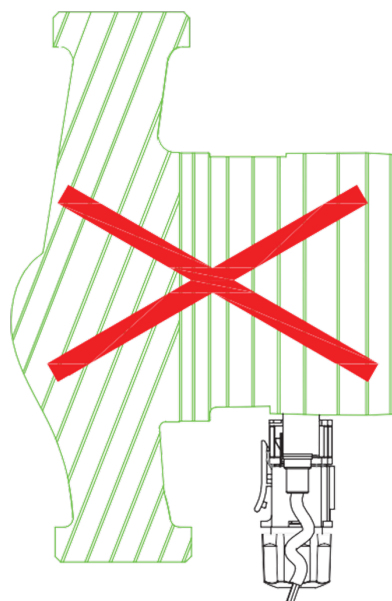
If the junction box position is changed, the pump must not be started until the system has been filled with pumping liquid or the valves on both sides of the pump are open.

4.2. Pump body thermal insulation

OK



NO

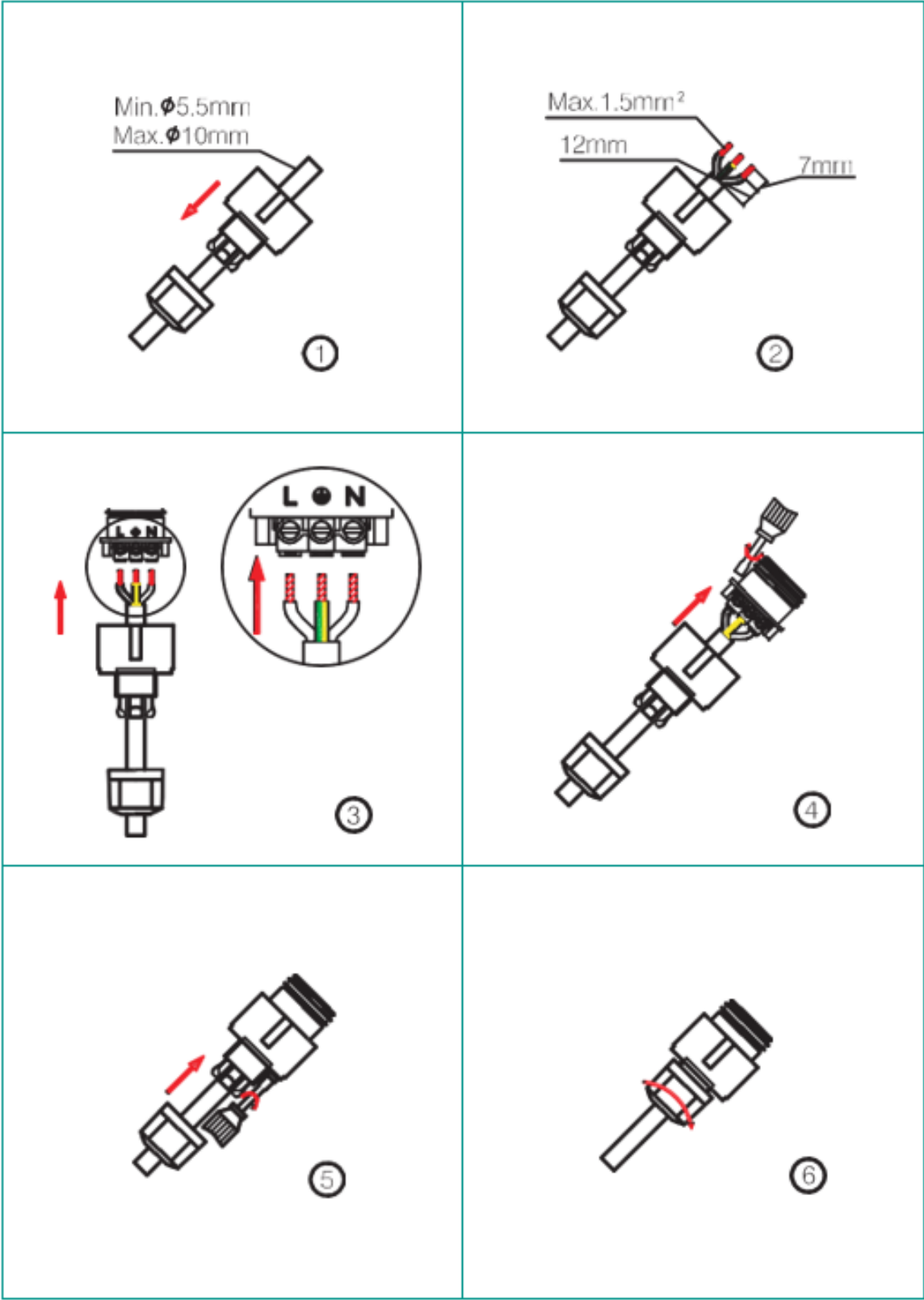
**NOTE**

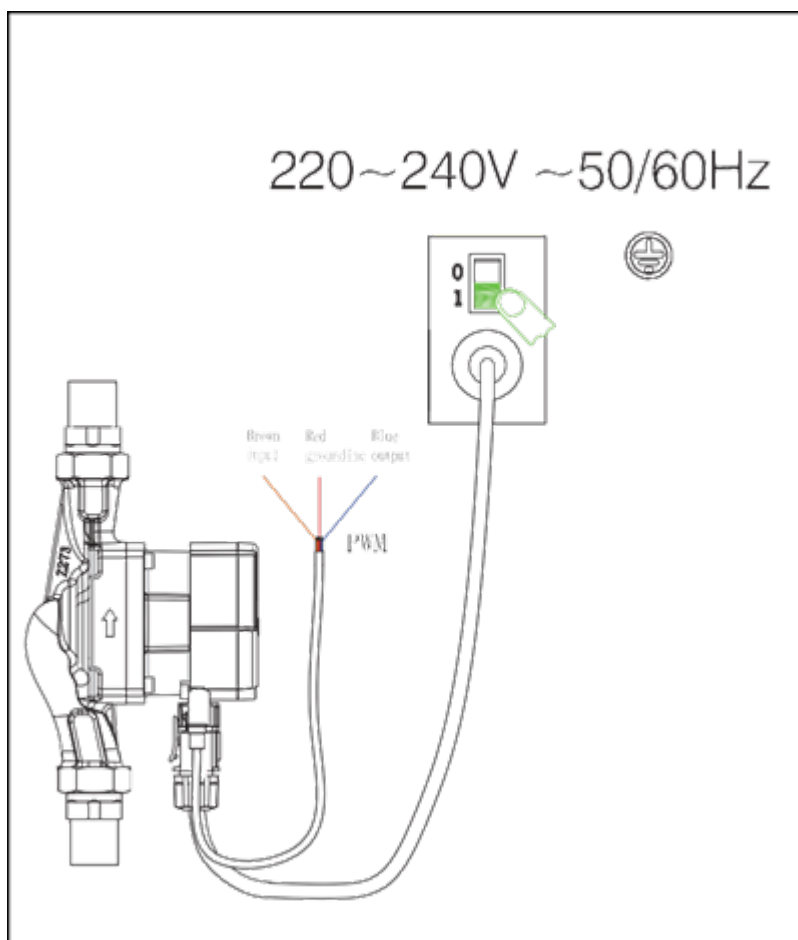
Limit the thermal losses of the pump body and the pipe. Carry out the thermal insulation of the pump body and the pipe in order to reduce the thermal losses of the pump and the pipe.

WARNING

It is not permitted to insulate or cover the junction box and control panel

5. ELECTRICAL CONNECTION





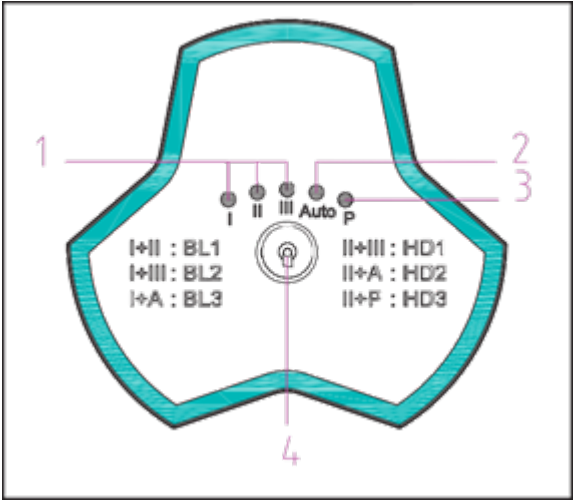
Electrical connection and protection must be carried out in accordance with local regulations.

**Warnings**

The pump must be connected to a ground cable 
The pump must be connected to an external power switch;
the minimum gap between all electrodes is 3 mm.

- The pump does not require external motor protection.
- Check whether the supply voltage and frequency correspond to the parameters indicated on the pump identification plate.
- Use the plug associated with the pump to connect the power.
- If the indicator light on the control panel comes on, it means that the power is on.

6. CONTROL PANEL CONTROLS



NO.	Explanation
1	Pump gear display I, II, III
2	Automatic pump gear display (AUTO)
3	Pump PWM gear Display
4	Pump gear change button

Special note:

1. If I and II are displayed at the same time, it means BL1. If I and III are displayed at the same time, it means BL2. If I and Auto are displayed at the same time, it means BL3.

2. If II and III are displayed at the same time, it means HD1. If II and Auto are displayed at the same time, it means HD2. If II and P are displayed at the same time, it means HD3.

6.1. Fault code display status

After switching on, the illuminated area of position 6 displays the status. During operation, the gear display light is constantly on. When the electric pump cannot work properly, the running light flashes continuously; the corresponding faults are indicated below:

Fault code	Fault description
The light of gear 1 flashes	Over-voltage protection, restart after the voltage has returned to normal (low voltage protection value 270 +5V)
The light of gear 2 flashes	Under-voltage protection, restart after the voltage has returned to normal (low voltage protection value 165 + 5V)
The light of gear 3 flashes	Over current protection, restart after 5S
The light of gear 4 flashes	Under-load protection, restart after 5S
The light of gear 5 flashes	Over phase current protection, restart after 5S
The lights of 1+2 gears flash	Rotor lock protection, restart after 5S
The lights of 1+3 gears flash	Failure to start (asymmetrical motor parameters), restart after 5S
The lights of 1+4 gears flash	Overheating protection, power reduced to half of the maximum power, restoration of the ambient temperature in the range of use, restoration of the maximum power.
The lights of 1+5 gears flash	Over-temperature protection, restart after restoring the room temperature to 5S in the range of use

6.2. Illuminated area to view pump settings

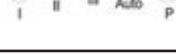
For circulators with a serial number starting with "24" or lower*, the pump has 9 types of settings, that can be selected using the buttons.

The pump setting is indicated by the light on in 10 positions:

Key position	Number of turns of the key	Area of light on continuously	Explanation
4	0	AUTO	Automatic adjustment
	1-2-3	BL1/BL2/BL3	Proportional pressure curve
	4-5-6	HD1/HD2/HD3	Constant pressure curve
	7-8-9	HS1/HS2/HS3	Constant speed curve

For circulators with a serial number starting with "25" or higher*, the pump has 12 types of settings that can be selected using buttons.

The pump setting is indicated by the light on in 13 positions:

Button-press sequence for changing gear	Area of light on continuously	Explanation	Icon
0	AUTO (factory settings)	Automatic adjustment	
1	PWM1	Control PWM1	
2	PWM2	Control PWM2	
3	HS1	Curve at constant speed at low speed	
4	HS2	Curve at constant speed at medium speed	
5	HS3	Curve at constant speed at high speed	
6	BL1	Proportional pressure curve at low speed	
7	BL2	Proportional pressure curve at medium speed	
8	BL3	Proportional pressure curve at high speed	
9	HD1	Constant pressure curve at low-speed	
10	HD2	Constant pressure curve at medium speed	

11	HD3	Constant pressure curve at high-speed	
12	AUTO (factory settings)	Automatic adjustment	

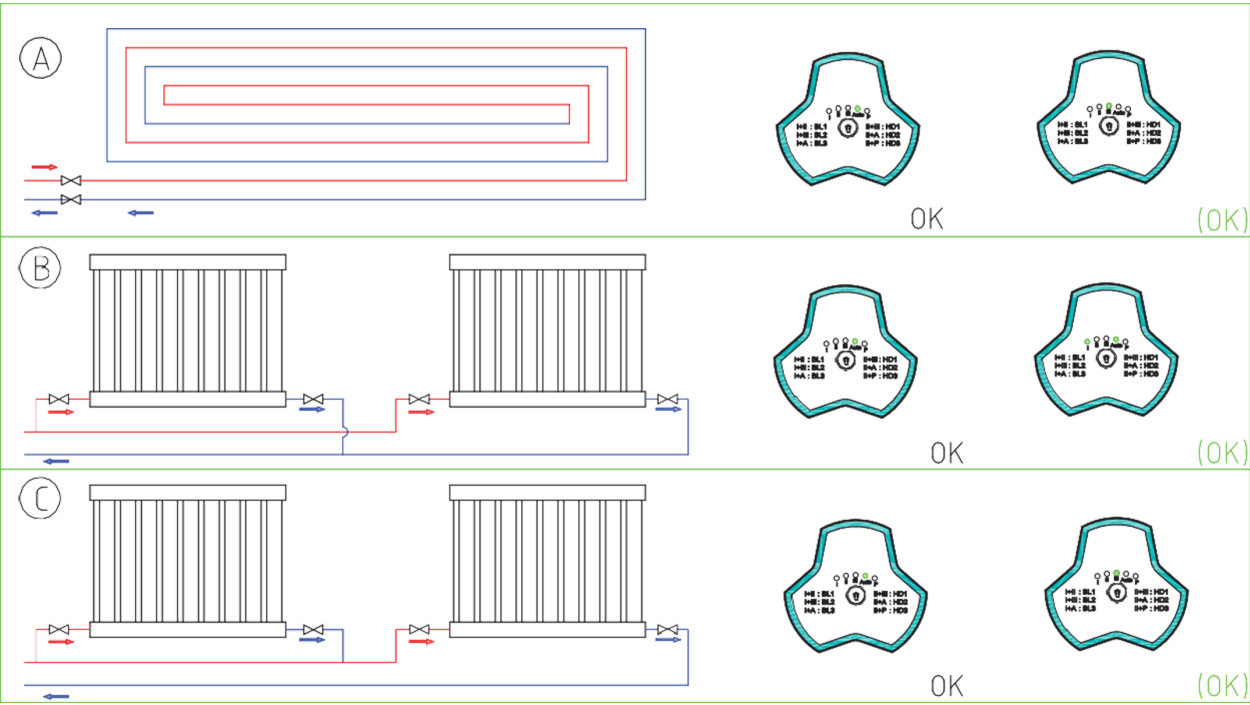
*for location of serial number see “13. FEATURES”

6.3. Button to select pump settings

Pressing the button once at 2-second intervals, changes the pump setting mode once. A cycle consists of nine presses of the button. For details, see the “6.2. Illuminated area to view pump settings”

7. PUMP SETTING

The pump must be set according to the type of system



Factory settings = AUTO (auto-adjust mode) Recommended and available pump settings

Position	System Type	Pump settings	
		Optimal settings	Or other optional settings
TO	Underfloor heating system	AUTO	HS3
B	Double Pipe Heating System	AUTO	BL3
C	Single Pipe Heating System	AUTO	HS3

- AUTO mode (automatic adjustment) automatically regulates pump performance based on the actual heat demand of the system. Since the performance is adjusted gradually, it is recommended to leave the pump in AUTO mode (automatic adjustment) for at least one week before changing its settings.
- If you choose to return to AUTO mode (automatic adjustment), the pump can remember the set points of the previous AUTO mode and continue to automatically adjust performance.
- The pump settings change from optimal to other optional settings, the heating system is a slow system, it is impossible to reach the optimal operating mode in a few minutes or hours. If the optimal pump settings fail to achieve an ideal heat distribution for each room, it is necessary to change the pump settings with other settings.
- For the relationship between the pump settings and the performance curve, refer to the "11. PUMP SETTINGS AND PERFORMANCE"

7.1. The command on the pump

During operation of the pump, set it according to the principle of "proportional pressure control" (BL) or "constant pressure control" (HD).

In these two control modes, the performance of the pump and its energy consumption must be adjusted according to the heat demand of the system.

7.1.1. Proportional pressure control

In this control mode, the pressure difference at both ends of the pump will be controlled by the flow rate. The proportional pressure curve in the Q / H diagram is represented by BL1/BL2/BL3 (Section 11).

7.1.2. Constant pressure control

In this control mode, the pressure difference at both ends of the pump remains constant, having nothing to do with the flow rate. In Figure Q / H, the constant pressure curve is a level yield curve, represented by HD1/HD2 ("11. PUMP SETTINGS AND PERFORMANCE").

8. PWM SIGNAL CONTROL MODE

8.1. Control and Signal

1. Control Principle The pump is controlled by a digital LV PWM (Pulse Width Modulation) modulated signal, which means that the change in speed depends on the external input signal. Speed variance is one of the functions of input control.

2. Pulse Width Modulation (LV PWM) Digital Signal Design Frequency Range of Square Wave PWM Signal: 40 Hz~4000 Hz; the PWM input signal (PWM IN) is used to impart the speed commands and adjust the speed commands by adjusting the PWM duty cycle. The PWM output signal (PWM OUT) is the pump feedback signal and the PWM frequency is set to 75 Hz.

3. Duty Cycle (d%)

$d\% = t/T$

For example:

$T = 2\text{ ms (500 Hz)}$

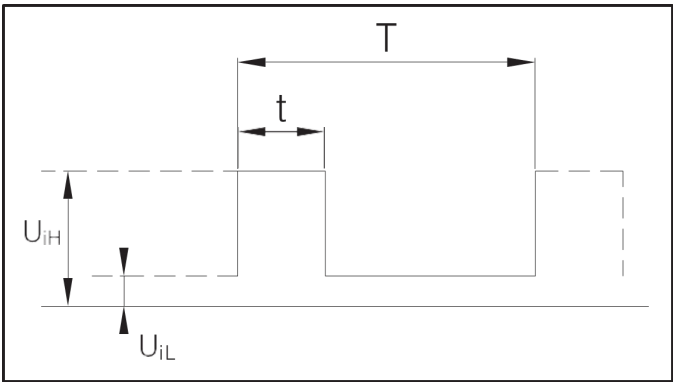
$t = 0.6\text{ ms}$

$d\% = 100 \times 0.6/2 = 30\%$

$U_{iH} = 4\sim24V$

$U_{iL} \leq 1V$

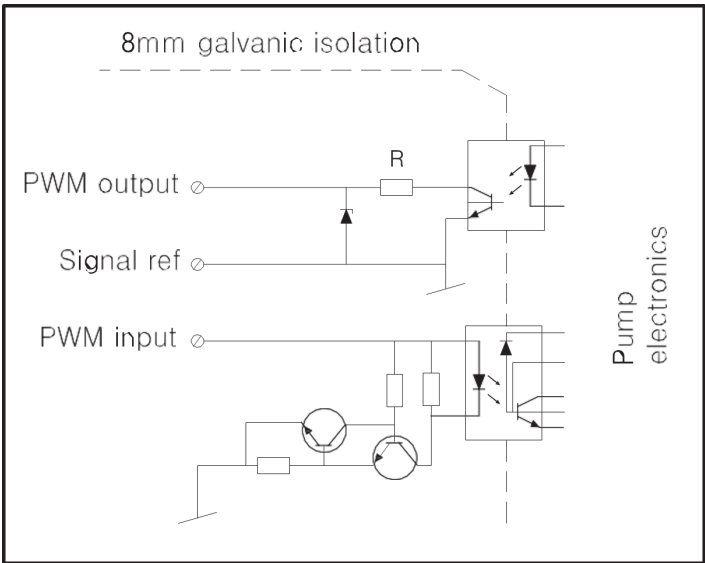
$I_{iH} \leq 10\text{ mA}$



Code	Description
T	Cycle
d	Duty cycle
U _{iH}	High input voltage
U _{iL}	Low input voltage
I _{iH}	Input Current

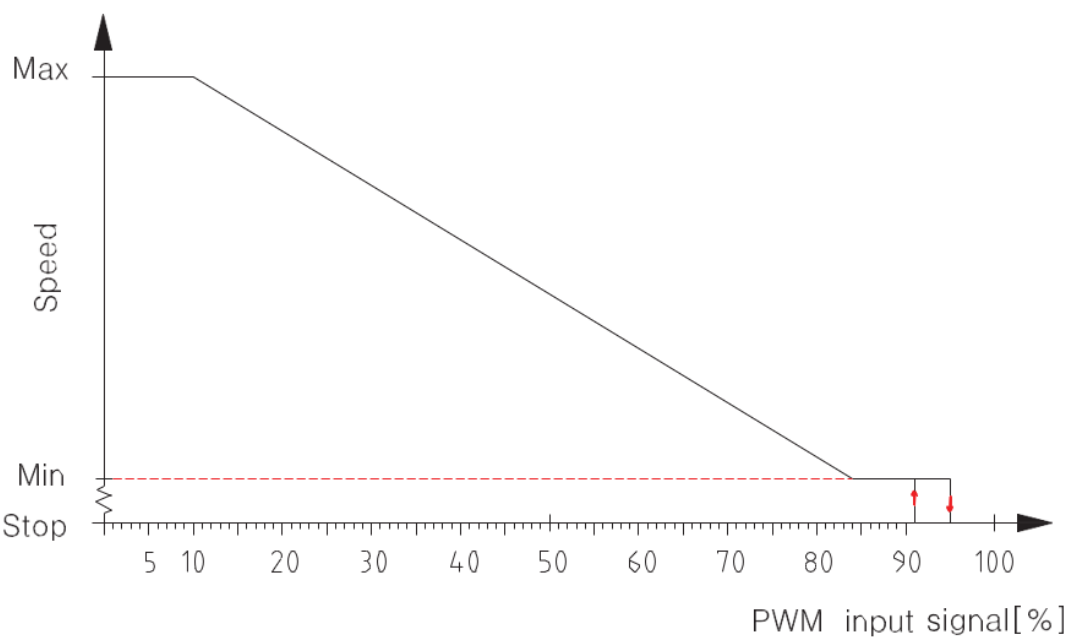
8.2. Interface

The pump is controlled by external electrical elements and components through interfaces. The interfaces convert external signals into signals that can be recognised by the pump's microprocessor. In addition, when the pump is powered with 230V voltage, the interfaces can ensure that users do not run the risk of high-voltage electric shock when they come into contact with the signal cable.



8.3. PWM Input Signal

- In the high duty cycle PWM signal area, when the input signal fluctuates at the critical point, there will be a delay area to avoid frequent pump stops and starts.
- In the presence of a low duty cycle PWM signal, the pump operates at high speed to ensure the safety of the system. For example, when the signal cable of the gas boiler system is damaged, the pump will continue to operate at maximum rotational speed and transfer heat through the main heat exchanger. This also applies to the heat pump, ensuring continuous heat transfer in the event that the pump signal cable is damaged, and ensuring the safety of the system.
- When the PWM input signal is 0% or 100%, the pump switches to non-PWM mode (normal mode) and the default system will have no PWM input signal.



PWM Input Signal (%)	Pump Status
0	The pump switches to non-PWM mode (normal mode) and the default system will have no incoming PWM signal.
<10	The pump runs at maximum speed
10 ~ 84	The pump curve will drop from the highest value to the lowest value
85 ~ 91	The pump runs at the lowest speed
91 ~ 95	If the variation point of the speed of the input signal fluctuates, it will block the start and stop of the pump according to the principle of magnetic hysteresis
96 ~ 99	Stand-by, the pump stops
100	The pump switches to non-PWM mode (normal mode) and the default system will have no incoming PWM signal.

NOTE

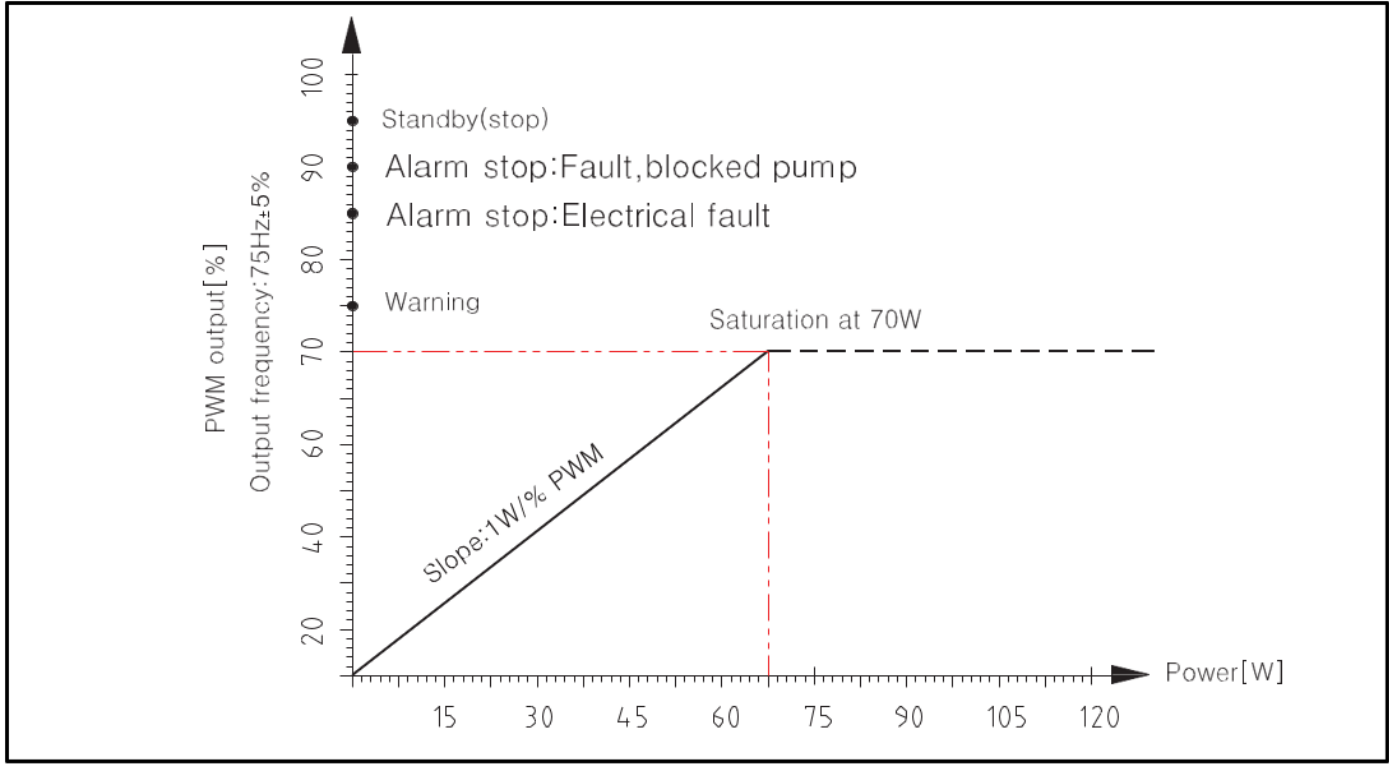
For circulators with a serial number starting with "24" or lower*, this system adapts to automatic switching of PWM and non-PWM mode. In the presence of an input PWM signal, the system enters PWM mode. While for circulators with a serial number starting with "25" or higher*, it will be necessary to press the pump gear change button once to switch to PWM mode (as indicated in "6.2. Illuminated area to view pump settings")

* for location of serial number see "13. FEATURES".

8.4. PWM Feedback Signal

The PWM feedback signal can provide the operating status of the pump, such as power loss or all types of alarm/warning.

The PWM feedback signal provides unique alarm information. If the supply voltage detects under-voltage signal values, its output signal will be set to 75%. If in the hydraulic system there is a waste build-up causing rotor blockage, the output signal duty cycle is set to 90%, the alarm will have the highest priority.

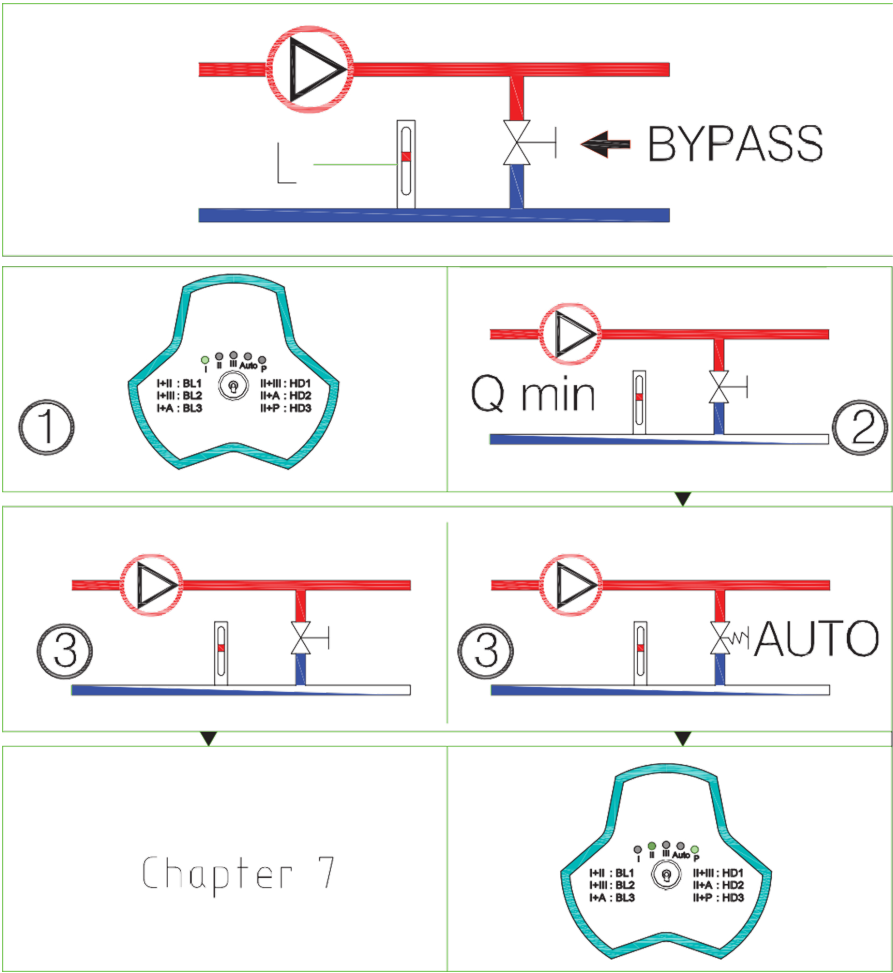


PWM Output Signal (%)	Pump Status	Description
95	Standby	The pump stops
90	Alarm stop, malfunction (pump blocked)	The pump does not work and will restart only after the problem is resolved
85	Alarm stop, electrical fault/ malfunction	The pump does not work and will restart only after the problem is resolved
75	Warnings	The pump is working, the problem has been detected in this situation but it is not critical and the pump can still work.
0 - 70	0 - 70W (slope 1 W/% PWM)	

8.5. How to use signals

The signal can be used to measure the power consumption of the pump. The pump signal can be used to detect the actual operating point of the system rather than to measure the current controlled by the system. The signal is also applicable to the comparison between the speed setting value and the feedback.

9. USING THE BYPASS VALVE



Art. P331



Bypass valve

The role of the bypass valve is: when all the valves of the underfloor heating circuit or the radiator temperature control valve are closed, it is possible to ensure the allocation of heat from the boiler.

Elements of the system:

- Bypass valve
- Flowmeter, position L.

The minimum flow must be guaranteed when all valves are closed.

The settings of the pump depend on the type of bypass valve it is equipped with, i.e. manually operated bypass valve or temperature controlled bypass valve.

9.1. Bypass valve with manual operation

Follow the steps below:

1. When adjusting the bypass valve, the pump must be in the HSI setting (constant gear I mode). The minimum flow rate of the system (Q_{min}) must always be guaranteed. Refer to the manufacturer's manual of the bypass valve.
2. Once the bypass valve is adjusted, set the pump by referring to "13" on page 23 Pump Setting.

9.2. Automatic bypass valve (temperature control type)

Follow the steps below:

1. When adjusting the bypass valve, the pump must be in the HSI setting (constant gear I mode).
2. The minimum flow rate of the system (Q_{min}) must always be guaranteed. Refer to the manufacturer's manual of the bypass valve.
3. Once the bypass valve is adjusted, set the pump to constant pressure mode. For the relationship between the pump settings and the performance curve, refer to page 23. Pump Settings and Performance

10. START

10.1. Before Starting

Before starting the pump, make sure that the system is full of liquid, that the gas has been vented and that the inlet pressure of the pump reaches the minimum required inlet pressure (see "3. conditions of service").

10.2. Discharging the Motor Pump

The pump is equipped with an automatic gas discharge function. There is no need to discharge the gas before starting. The presence of gas in the pump may cause noise.

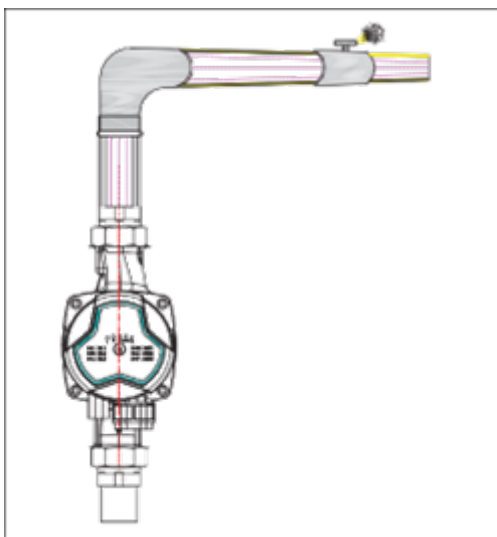
The noise will disappear after operating the appliance for a few minutes. Set the pump promptly to HS3 mode according to the size and structure of the system, so that the gas in the pump is expelled quickly. After the pump is free of gas, i.e. after the noise has disappeared, set the pump according to the recommended instructions. Refer to "7. PUMP SETTING"

WARNING

Pump must not run without water

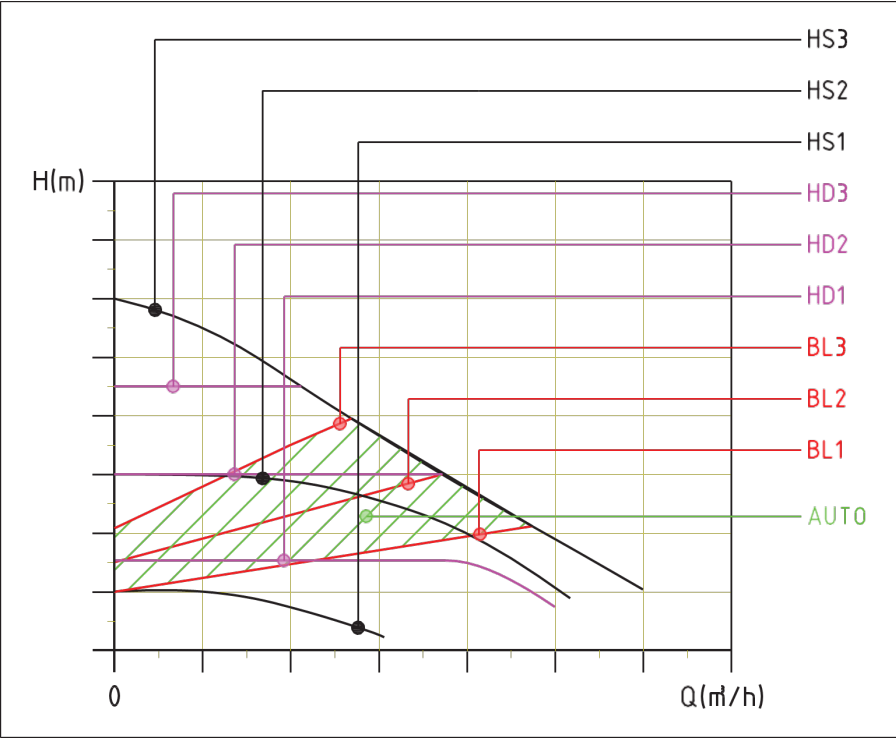


10.3. Heating system gas discharge



11. PUMP SETTINGS AND PERFORMANCE

11.1. Relationship between pump settings and its performance



Setting	Pump Characteristics Curve	Functions
AUTO (factory settings)	Proportional Pressure Curve from Maximum to Minimum	The "automatic adjustment" function automatically checks the pump performance within the specified range. ·Adjust the performance of the pump according to the size of the system; ·Adjust the performance of the pump according to the variation of the load over a certain period of time; In the "Automatic adjustment" mode, the pump is set to the proportional pressure control mode.
BL (1-3)	Proportional Pressure Curve	The working point of the pump moves up and down the proportional pressure curve according to the flow rate requirements of the system; when the flow rate demand is reduced, the supply pressure of the pump decreases, while when the flow rate demand increases, it also increases.
HD (1-3)	Constant Pressure Curve	The working point of the pump moves back and forth on the constant pressure curve according to the flow rate requirements of the system. The pump supply pressure remains constant, having nothing to do with the flow request.
HS (1-3)	Constant speed curve	Travel the constant curve at constant speed. In HS speed mode (1-3), the pump is set to run on the maximum curve in all working conditions. By setting the pump to HS3 mode in a short time, the gas in the pump will be expelled quickly.

12. PERFORMANCE CURVE

12.1. Performance Curve Guide

Each pump setting will have a corresponding performance curve (Q / H curve). While the automatic adjustment AUTO mode covers a range of performance. The input power curve (curve P1) belongs to each Q / H curve. The power curve represents the energy consumption (P1) of the pump in watts on the given Q / H curve.

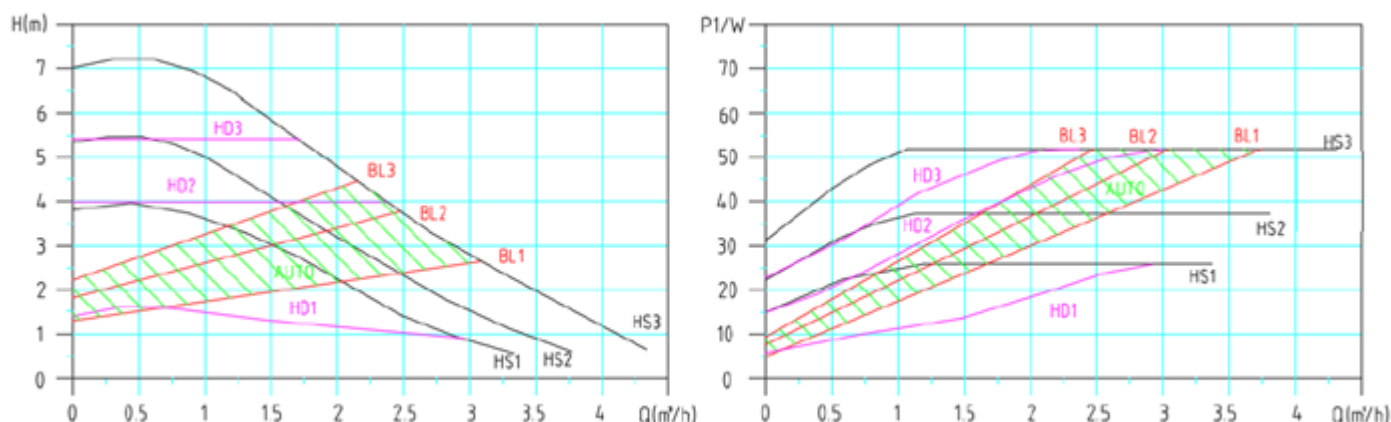
12.2. Curve conditions

The following description applies to the performance curves in the GPA III Series manual:

- Test liquid: gas-free water.
- The applicable density of the curve $\rho = 983.2$ kg/cubic meter and the liquid temperature is +6 °C.
- All values expressed by the curves are averages, they cannot be considered as guaranteed curves. If a specific performance is required, the measurement must be carried out separately. Applicable kinematic viscosity of curve $\mu = 0.474$ mm² / s (0.474 CcST)

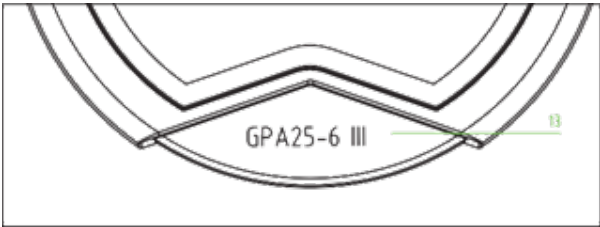
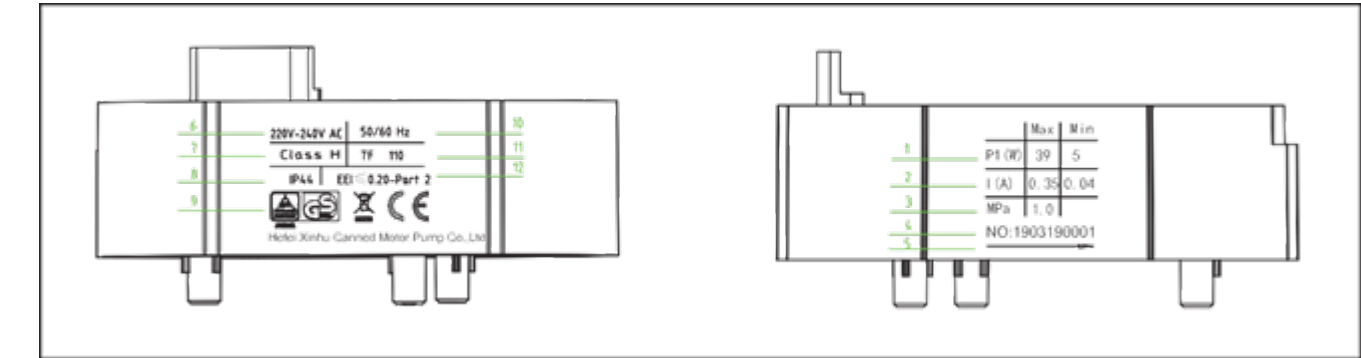
12.3. Performance Curve

P331



13. FEATURES

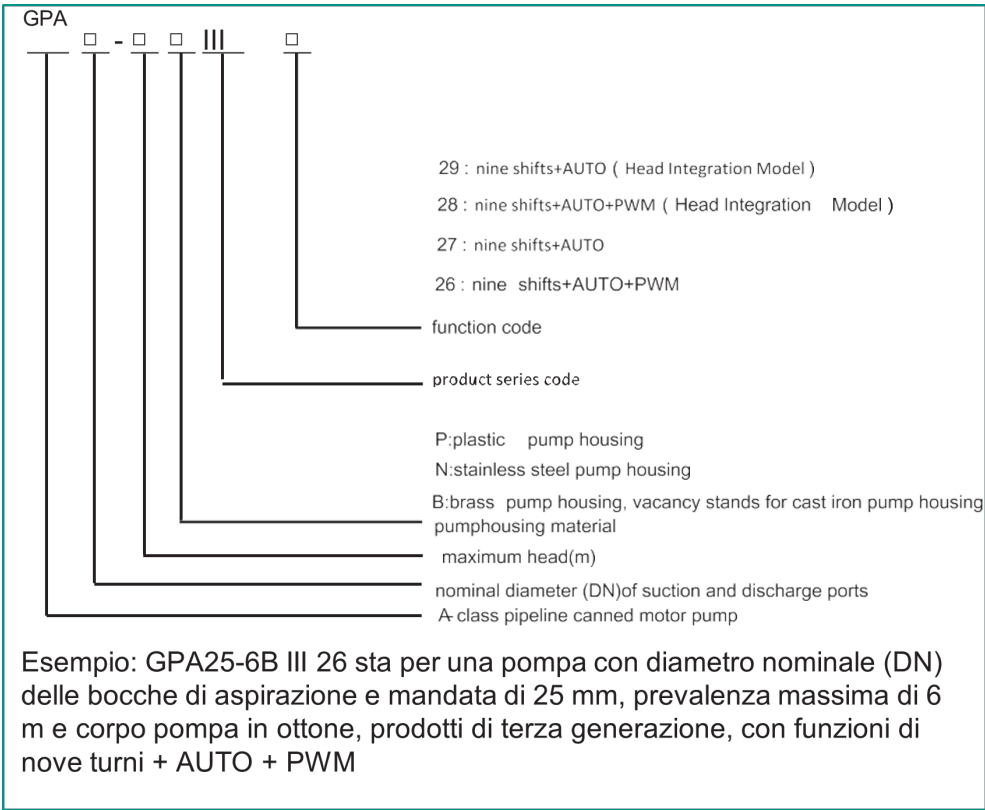
13.1. Identification plate description



N. Explanation		
1	Power	Maximum mode maximum power
		Minimum mode minimum power
2	Current	Maximum mode maximum current
		Minimum mode minimum current
3	Maximum pressure supported by the system (Mpa)	
4	Serial No.	
5	Engine Steering	
6	Voltage (V)	
7	Insulation class	
8	Protection Lever	
9	Certification mark	
10	Frequency (Hz)	
11	Temperature degree	
12	Energy efficiency label	
13	Model	

13.2. Model explanation

The pump model is composed of upper Latin letters and Arabic numerals, the meaning of which is as follows:



14. TECHNICAL PARAMETERS AND INSTALLATION DIMENSIONS

14.1. Technical data

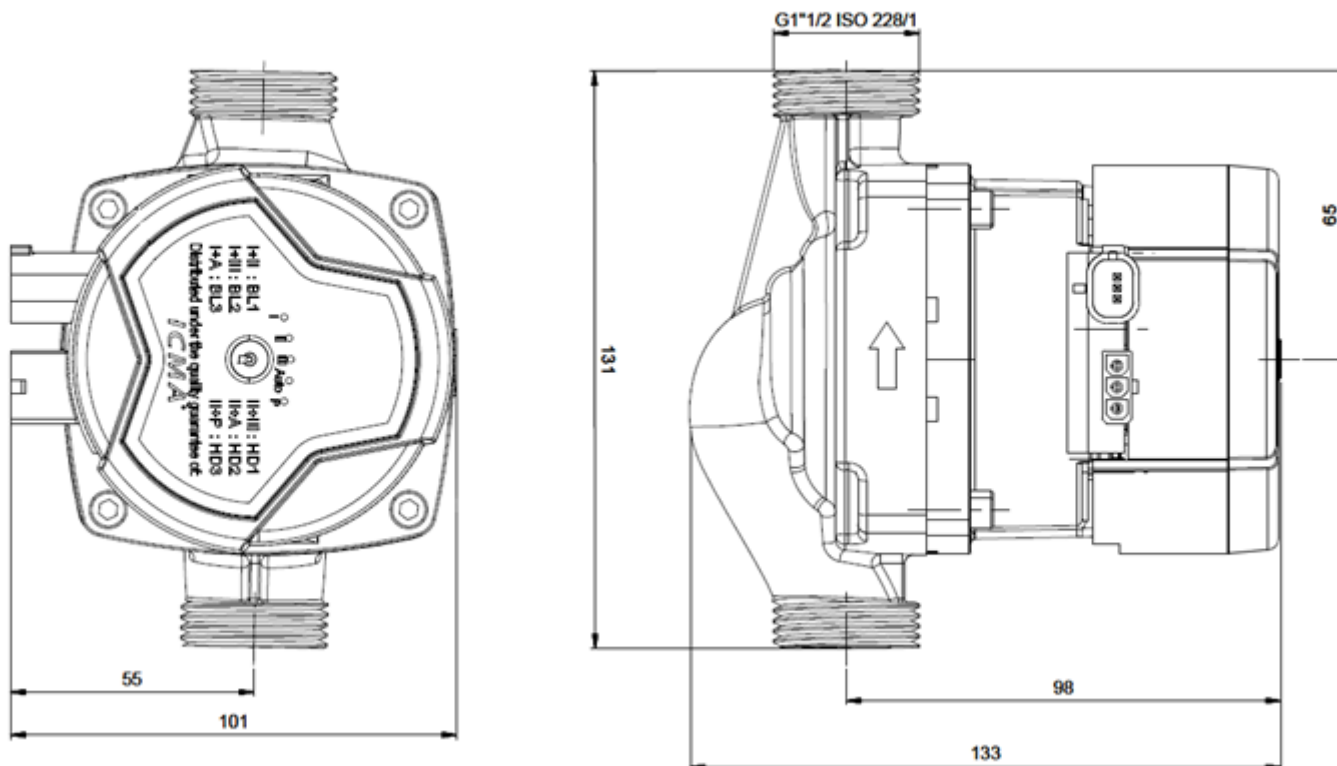
Supply Voltage	220 ~ 240V, 50 / 60 Hz	
Motor Protection	The pump does not require external protection	
Protection Level	IP44	
Insulation Class	H	
Relative Humidity (RH)	Max 95%	
System load	1.0 MPa	
Suction Inlet Pressure	Liquid Temperature	Minimum Inlet Pressure
	≤ +75 °C	0.005 MPa
	≤ +90 °C	0.028 MPa
	≤ +110 °C	0.100 MPa
EMC Standard	EN61000-6-1 and EN61000-6-3	
Sound Pressure Level	The sound pressure level of the pump is less than 42 dB(A)	
Ambient Temperature	0 ~ +70 °C	
Temperature Degree	TF110	
Surface Temperature	Maximum surface temperature should not exceed +125 °C	
Liquid Temperature	+2 ~ +110 °C	

To prevent the control unit and the stator from accumulating with condensate, the temperature of the pump transport liquid must always be higher than the ambient temperature		
Ambient Temperature (°C)	Liquid Temperature	
	Min. (°C)	Max. (°C)
0	2	110
10	10	110
20	20	110
30	30	110
35	35	90
40	40	70
For domestic hot water, it is recommended to keep the water temperature below 65 °C in order to reduce limescale deposits.		

Art. P331



14.2. Installation Dimensions



15. FAULT CHECKLIST



Warnings

Before carrying out any maintenance and repair work on the electric pump, make sure that the power supply is disconnected and that it cannot be accidentally switched on.

Problem	Control panel	Cause	Corrective Action
Motor pump failed to start	Indicator light "Off"	Equipment fuse blown	Replace the fuse
		The current or voltage control circuit breaker flips	Connect the circuit breaker
		Motor pump failure	Return to factory maintenance
	The light of gear 1 flashes	High voltage	Check if the power supply is in the specified range
	The light of gear 2 flashes	Under voltage	Check if the power supply is in the specified range
	The light of gear 3 flashes	Over-current protection	Return to factory maintenance
	The light of gear 4 flashes	Absence of water in the pump	Open the valve and supply water to the pump
	The light of gear 5 flashes	Over-phase protection, the motor coil is damaged or the motor is not connected properly	Return to factory maintenance
	The lights of 1+2 gears flash	Locked rotor	Remove the pump body and remove the rotor cleaning
	The lights of 1+3 gears flash	Motor resistance parameters do not match	Return to factory maintenance
	The lights of 1+4 gears flash	Overheat protection	Room temperature reduction
	The lights of 1+5 gears flash	Over-temperature protection	Room temperature reduction
Noise in the system		Air is present in the system	Vent the system
		Excessively high flow rate	Lower the inlet pressure of the pump
Noise in the motor pump		Air is present in the motor pump	Vent the system
		Excessively low inlet pressure	Increase inlet pressure
Insufficient heat		Poor pump performance	Increase pump inlet pressure

Art. P331



Meaning of crossed-out wheeled bin:

Do not dispose of electrical appliances as undifferentiated municipal waste, but use specialised collection facilities.

For information on available collection systems, please contact your local administration.

If electrical appliances are disposed of in landfills, hazardous substances can leak into groundwater and enter the food chain, damaging the health and well-being of citizens. In case of replacement of old appliances with new ones, the dealer is obliged by law to collect the old appliance to dispose of it at least free of charge.