

8. Fault checklist

Before preparing for any maintenance and repair work on the electric pump, ensure that the power supply is disconnected and not accidentally connected.

Panel display	Fault cause	Troubleshooting method
no display	There is a fuse burnt out in the equipment	Unplug the water pump plug, troubleshoot the main circuit, and replace the fuse; There is no fault in the main circuit, replace the pump
	Circuit breaker disconnected	
	Electric pump not working	Eliminate the main circuit fault and replace the pump
E1/(E-)	Electric pump rotor stuck	Disassemble the pump body to eliminate mechanical jamming and remove dirt or scale. Or replace failed parts or electric pumps
E2	Phase deficiency	Troubleshooting, replacing faulty parts or electric pumps
E3	Voltage too high or too low	Check if the power supply is within the specified range and adjust the power supply voltage
E4	Short circuit/overcurrent	Troubleshooting, replacing faulty parts or electric pumps
E5	temperature protection	IPM temperature is too high, troubleshoot, repair or replace the electric pump
E6	hardware failure	Troubleshooting, replacing the drive board or electric pump
E7	Idle protection	The system is short of water or the water pump has been running at no load for more than 1 minute. Check the pressure at the water inlet of the water pump

GPM Series Intelligent Frequency Converter Circulation pump Installation and Operation Manual



* Picture is for reference only, please prevail in kind.

Please read the instructions carefully before installation, and keep it for reference

CONTENT

1. Product Overview	-----	1
2. Model Description	-----	2
3. Installation instructions	-----	2~6
4. Operating instructions	-----	7~15
5. Technical parameters and installation dimensions	-----	16~17
6. External control modes and signals	-----	18~21
7. GPM control mode, user interface, and settings	-----	21~25
8. Fault checklist	-----	26

PWM settings

When the circulating pump is connected to the external control system and there is a PWM input signal, the water pump automatically enters PWM mode P1 (heating type), and can be switched to PWM mode P2 (solar type) by short pressing the shift button (as shown in Figure 17). P1 and P2 are displayed on LED4, with periodic display of PWM mode and real-time power values.

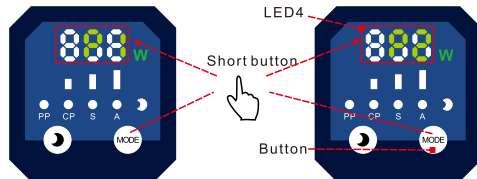


Fig.17

PWM signal connection

Standard configuration: three wire immersion tin at both ends;
Non standard: Customizable according to customer needs.

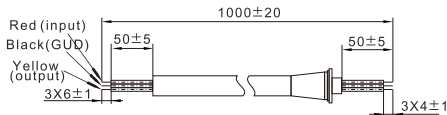


Fig.18

Luxury

The external control mode of this water pump is controlled by external control signals of PWM1 or PWM2, and there are four internal control modes.

Proportional pressure

Proportional pressure	LED PP	LED CP	LED S	LED A	LED N	LED 1	LED 2	LED 3
PP1	•					•		
PP2	•						•	
PP3	•							•

Constant pressure

Constant pressure	LED PP	LED CP	LED S	LED A	LED N	LED 1	LED 2	LED 3
CP1		•				•		
CP2		•					•	
CP3		•						•

Constant speed

Constant speed	LED PP	LED CP	LED S	LED A	LED N	LED 1	LED 2	LED 3
S1			•			•		
S2			•				•	
S3			•					•
Night mode					•			

PWM1(Heating type)

PWM1	LED PP	LED CP	LED S	LED A	LED N	LED 4

PWM2(Solar powered)

PWM2	LED PP	LED CP	LED S	LED A	LED N	LED 4

- Read and follow all instructions.

- Warning Risk of Electric Shock , the pump must be connected to grounding type receptable protected.

- The pump is to be supplied by an isolating transformer or supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA.

- A suitable fuse (fuse protector) must be installed on the return circuit of pumps, the current of the fuse selected should be 1.5 times of the current marked on the name plate.

- All the wiring should be installed according to the local standard or low by professional electrician who hold the Electrician Skill Certificate. Pump must be reliably earthed.

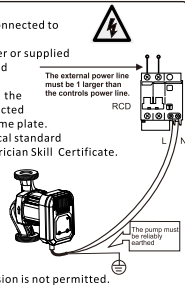
- To reduce the risk of electrical shock, do not permit children to use this product.

- Power connection can not be buried in the ground, wire positioning is necessary as to avoid damage from mowing or other machine.

- To reduce the risk of electrical shock, once damaged cable is found and must be changed immediately.

- To reduce to risk of electrical shock, any cable extension is not permitted.

- No pumping flammable, explosive liquid.



1.Product Overview

GPM series intelligent frequency circulating pump (hereinafter referred to as electric pump), this product adopts a shielded structure motor, the motor stator is completely shielded, the rotating parts are immersed in the conveying liquid, and the liquid plays a role in cooling the motor and lubricating the bearings. The product has the characteristics of leak free, ultra quiet, energy-saving and efficient, and easy installation. This product is pre-set at the factory and is best suited for the following systems: floor heating system, single pipe heating system, and double pipe heating system.

Product Features

- ◆ The product uses a permanent magnet motor, and the control box is tightly integrated with the motor, with a compact structure;
- ◆ The noise of the electric pump and system is very low;
- ◆ Equipped with adaptive control mode, it can meet the needs of most applications;
- ◆ Combining control of two different types of systolic blood pressure differences (special and constant pressure control);
- ◆ Display the actual power consumption (P1), expressed in watts (W);
- ◆ Automatically set night mode;
- ◆ Intelligent frequency conversion;

Application conditions

◆System Type

- ① Require the working point of the electric pump to be set to the optimal constant flow system or variable flow system;
- ② Variable pipeline temperature system;③ Equipped with night mode system.

◆Pumped liquid

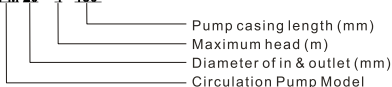
- ① A liquid that is clean, thin, non corrosive, non flammable and explosive, does not contain solid particle fibers, and does not contain mineral oil;
- ② In the heating system, the pumped liquid must meet the requirements of the qualified water quality standards related to the heating system;
- ③ In household hot water systems, it is suitable for water with a temperature of +2 °C~+110 °C.

◆Protection level: IP42

◆System pressure: maximum 1.0MPa

2. Model Explanation

GPM 20 - 4 - 130



3. Installation instructions

1. Installation instructions

Before installing the electric pump, it is necessary to check whether the pipeline system is reliably connected and ensure that impurities such as welding slag and dirt in the pipeline have been cleaned up; The power frequency is 50/60Hz, the voltage is single-phase 220~240V, and the voltage fluctuation value should be within $\pm 10\%$;

1.2 The electric pump should be installed in a dry and ventilated place to avoid short circuits due to moisture and splashing by water, and the installation should be convenient for future maintenance and replacement;

1.3 When installing electric pumps in the open air, protective covers should be added. When installing indoors, water splashing should be avoided to avoid electric shock. Do not install in the bathroom to prevent water vapor or water from entering the junction box and causing leakage;

Constant pressure

Constant pressure	LED PP	LED CP	LED S	LED A	LED N	LED 1	LED 2	LED 3
CP1		•				•		
CP2		•					•	
CP3		•						•

Constant speed

Constant speed	LED PP	LED CP	LED S	LED A	LED N	LED 1	LED 2	LED 3
S1			•			•		
S2			•				•	
S3			•					•
Night mode					•			

PWM type

This water pump has two external control modes: PWM1 or PWM2, which are controlled by external control signals.

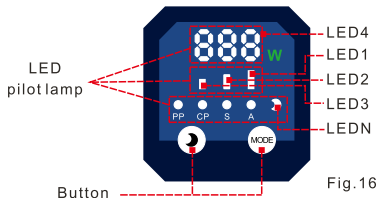
PWM1(Heating type)

PWM1	LED PP	LED CP	LED S	LED A	LED N	LED 4
						P1

PWM2(Solar powered)

PWM2	LED PP	LED CP	LED S	LED A	LED N	LED 4
						P2

3. User interface



User interface display

- Performance View (Work)
- Operating status
- Alarm status · Set view (after pressing the button)

During the operation of the water pump, the screen displays as a performance view, and if the button is pressed, it switches User interface view or select run settings mode.

4. Settings

User interface control mode

All GPM models can be managed through a button and an LED interface. The following operating modes can be selected through buttons. The user interface displays blinking LEDs in the combination described in the table below.

GPM regular type

The circulating pump has 4 internal control devices with adaptive function.

Portional pressure

Proportional pressure	LED PP	LED CP	LED S	LED A	LED N	LED 1	LED 2	LED 3
PP1	•					•		
PP2	•						•	
PP3	•							•

- 1.4 After the installation of the electric pump is completed, connect the power supply and conduct a test run. Place the mode switch in the rated high speed gear S3 to check if the start is normal;
- 1.5 In order to facilitate the maintenance of the electric pump in the future, it is recommended to install independent shut-off valves at the inlet and outlet of the electric pump;
- 1.6 The power plug should be strictly grounded, and the grounding pin of the plug should be reliably connected to the grounding hole of the power socket. It is not allowed to change the power grounding plug without authorization;
- 1.7 When the electric pump is working, eye-catching safety warning signs should be established on the site of use to prevent accidents;
- 1.8 Regularly check the insulation resistance of the electric pump, and the cold insulation resistance should not be less than 100M Ω;
- 1.9 If the cable is damaged, it must be replaced with a dedicated cable or by purchasing a dedicated component;
- 1.10 Clean, thin, non corrosive, non flammable and explosive, and free from solid particle fibers Liquid without mineral oil;

2. Installation

2.1 Installation



The arrow on the electric pump body indicates the direction in which the liquid flows through the pump body



Fig.2



- ① When installing the electric pump and pipeline, the two sealing gaskets provided must be installed (as shown in step 1 of the figure);
- ② When installing, the motor shaft should be in a horizontal position (as shown in Fig.2);

2.2 Location of Control Box

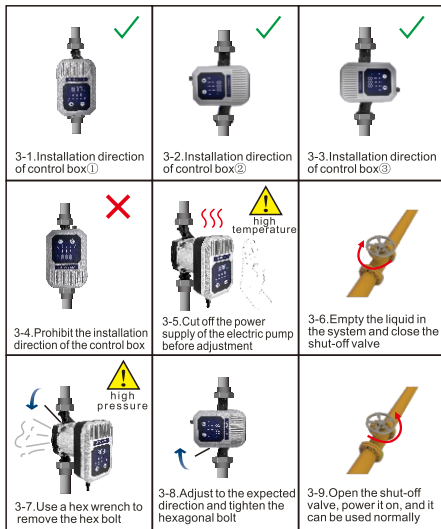


Fig.3



The pumped liquid may be high-temperature or high-pressure liquid. Before removing the Allen screw, the hot water in the system should be drained and the shut-off valves on both sides of the electric pump should be closed.

PWM output signal (%)	Appraisal time (s)	Pump status	Cancel identification time (s)	Priority
95	0	PWM standby (stop)	0	1
90	30	alarm stops, malfunctions (pump blocked)	12	2
85	0-30	alarm stops, electrical malfunction/trouble	1-12	3
75	0	Warning	0	5
0-70	/	6m: 0-80W (slope 7/8% PWM/W) 8m: 0-120W (slope 7/12% PWM/W) 12m: 0-180W (slope 7/18% PWM/W)	/	6
Frequency	75Hz±5%			

7. GPM control mode, user interface, and settings

1. GPM control mode and curve The GPM model has a maximum of five control modes, each with four curves for different max. heads.

internal controls		
Proportional pressure	Constant pressure	Constant curve
Curve 1	Curve 1	Curve 1
Curve 2	Curve 2	Curve 2
Curve 3	Curve 3	Curve 3
Auto	/	Curve 4

2. GPM model

These setting options can be provided as pre configured models

Option	Application	Function	Control mode and curve	
			external control	internal controls
Common	Supporting domestic hot water circulation system	In all self-control modes and curve operation	/	PP1-3 CP1-3 CS1-3
PWM type	Heating/or solar system	Run with PWM1 configuration or PWM2 configuration	PWM1 PWM2	/
Luxury	Any HVAC system	Run in the available modes and curves used	PWM1 PWM2	PP1-3 CP1-3 CS1-3

1.2.2 PWM2 input signal (solar powered)

When the PWM signal percentage (duty cycle) is low, if the input signal fluctuates up and down at the conversion point, hysteresis can prevent the circulating pump from starting and stopping. When there is no PWM signal percentage, for safety reasons, the circulating pump will stop. If the signal is lost, such as due to cable damage, the circulating pump will stop to avoid overheating of the solar thermal system.

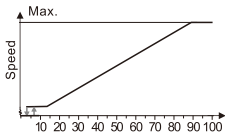


Fig.14 PWM input signal(%)

PWM input signal(%)	Electric pump status
$0 < \text{PWM} \leq 5$	Standby mode: Stop
$5 < \text{PWM} \leq 8$	Hysteresis zone: start/stop
$8 < \text{PWM} \leq 15$	Minimum speed: IN
$15 < \text{PWM} < 90$	Variable speed: min.to max.
$90 < \text{PWM} \leq 100$	Maximum speed: max.

1.2.3 The alarm PWM2 feedback signal is made into a 5V rectangular wave pulse width form, isolated by optocoupler, and the meaning of each duty cycle at a fixed frequency of 75Hz for the circulating pump is tentatively determined as follows:

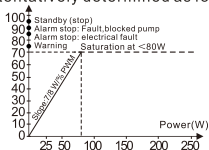


Fig.15 Feedback logic diagram

2.3 Changing the position of the control box

The control box can rotate according to the correct position shown in the figure; When needed, you can Change the installation position of the control box;

- ① Loosen and remove the four hexagonal socket bolts that secure the pump head (Fig.3-7);
- ② Rotate the pump head to the desired position (Fig.3-8);
- ③ Replace the four hexagonal socket bolts and tighten them in a cross direction sequence (Fig.3-8);



After changing the position of the control box, the system must be filled with pumped liquid and the shut-off valve must be opened before the electric pump can be started and operated.

2.4 Thermal Insulation of Motor Pump Body

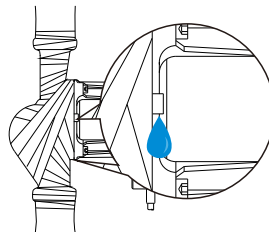


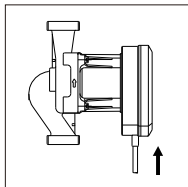
Fig.4 Thermal Insulation of Pump Body

Insulate the pump body and pipeline of the electric pump to reduce heat loss of the pump and pipeline.



Do not isolate or cover the control box and control panel

2.5 Electrical connections



0.75m² cable
 Cable outer diameter:
 Max. ϕ 10mm
 Min. ϕ 5mm

Fig.5 Electrical connections

- !** ① The electric pump must be connected to a ground wire \oplus ;
 ② The electric pump must be connected to an external power switch, with a minimum gap of 3mm between all electrodes.

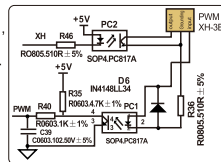
- ◆ The electric pump does not require external motor protection;
- ◆ Check if the power supply voltage and frequency match the values marked on the nameplate of the electric pump;
- ◆ The indicator light on the control panel lights up to indicate that the power has been turned on;
- ◆ To connect to the power supply of the electric pump, a 1A fuse needs to be installed.

1.1.3 Basic control logic

When the PWM signal is connected, the operation of the water pump is controlled through the PWM signal. When there is no PWM signal, the operation of the water pump is controlled according to internal control logic.

PWM speed control logic:

The PWM input signal controls the working state of the electric pump through a logical relationship with the rotational speed; The PWM feedback signal monitors the actual working status of the electric pump through its logical relationship with power and related faults.



1.2 PWM input signal function definition:

1.2.1 PWM1 input signal (heating type)

When the PWM signal percentage (duty cycle) is high, if the input signal fluctuates up and down at the conversion point, hysteresis can prevent the circulating pump from starting and stopping.

When the PWM signal percentage is low, the speed of the circulating pump is high for safety reasons. If the cables in the gas boiler system are damaged, the pump will continue to operate at maximum speed to transfer heat from the primary heat exchanger. This is also suitable for heating the circulating pump to ensure that the pump can transmit heat in the event of cable damage.

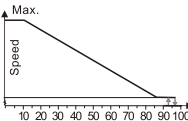


Fig.13 PWM input signal(%)

PWM input signal(%)	Electric pump status
$PWM \leq 10$	Maximum speed: maximum
$10 < PWM \leq 84$	Variable speed: minimum to maximum
$84 < PWM \leq 91$	Minimum speed: IN
$91 < PWM < 95$	Hysteresis zone: start/stop
$95 < PWM \leq 100$	Standby mode: Stop

6. External control modes and signals

1. Control principle The GPM intelligent variable frequency circulating pump is controlled by a digital low voltage pulse width modulation (PWM) signal, and its operating speed depends on the input signal. It can be set as internal or external control, and the preset configuration curve of the water pump determines the rate of change of the water pump speed. These communication signals are standardized in VDMA Standard Table 24224 "Wet Running Circulating Pump PWM Control Signal Specification".

1.1 Control signals

1.1.1 Definition of PWM signal characteristics

Optocoupler isolation	Correct
PWM input frequency	1000~1500Hz
Input high voltage U_{iH}	4.0~24.5V
Input low voltage U_{iL}	<0.7V
Input Current I_H	Max3.5mA@47000hms Max10mA@1000hms
PWMAadjustable range	0~100%
Polarity	Regular
Signal line length	<3m
Rising and falling edge time	<T/1000

1.1.2 Duty cycle

$$d\% = 100x_{t/T}$$

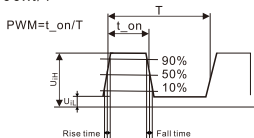


Fig.11 PWM waveform

4. Operating instructions

1. Operation panel

1.1 Control Panel Operation Instructions

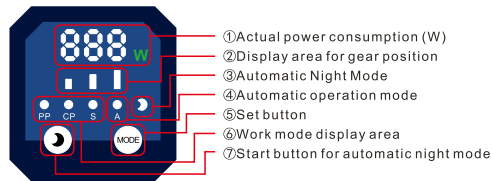


Fig.6

2. Display Description

2.1 After the power is turned on, the display area of position ① lights up:

2.2 During the working period, the displayed value is in 1W, indicating the actual power consumption of the electric pump;

2.3 If the electric pump fails to work properly (such as sticking), the display will display asE (X) "(X is 1 or 2);

2.4 If there is a fault display, the power supply must be disconnected for troubleshooting. After troubleshooting, reconnect the power supply and start the electric pump.

3. Display the lighting area set by the electric pump

The GPM series intelligent variable frequency circulating pump has eight mode settings that can be selected using buttons. The mode settings are explained in eight different display areas, as shown in the table below:

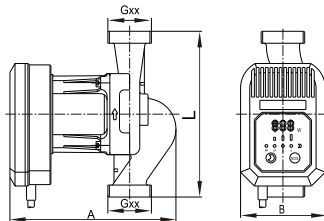
4-6m panel display area

Number of buttons pressed (MODE)	Gear position light display	Gear Description
0	A(Factory settings)	Automatic adaptation
1	PP+	Min. proportional pressure curve (low speed)
2	PP+	Max. proportional pressure curve (high speed)
3	CP+	Min. constant pressure curve (low speed)
4	CP+	Max. constant pressure curve (high speed)
5	S+	Constant speed curve, speed I (low speed)
6	S+	Constant speed curve, speed II (medium speed)
7	S+	Constant Speed Curve, Speed III (high speed)
8	A	Automatic adaptation

8~12m panel display area

Number of buttons pressed (MODE)	Gear position light display	Gear Description
0	A(Factory settings)	Automatic adaptation
1	PP+	Min. proportional pressure curve (low speed)
2	PP+	Med. proportion pressure curve (medium speed)
3	PP+	Max. proportional pressure curve (high speed)
4	CP+	Min. constant pressure curve (low speed)
5	CP+	Med. constant pressure curve (medium speed)
6	CP+	Max. constant pressure curve (high speed)
7	S+	Constant speed curve, speed I (low speed)
8	S+	Constant speed curve, speed II (medium speed)
9	S+	Constant Speed Curve, Speed III (high speed)
10	A	Automatic adaptation

2. Installation Dimensions and Performance Parameters



Model	Max. Flow (m ³ /h)	Max. Head (m)	Power P1(W)	(V/Hz)	(Amps)	Dimension(mm)			
						L	A	B	G
GPM20-4-130	3	4	22	220~240V 50/60Hz	0.17	130	163	92	G1
GPM20-5-130	3.4	5	32		0.25	130	163	92	G1
GPM20-6-130	3.7	6	38		0.31	130	163	92	G1
GPM25-4-130	3	4	22		0.17	130	163	92	G1.5
GPM25-5-130	3.4	5	32		0.25	130	163	92	G1.5
GPM25-6-130	3.7	6	38		0.31	130	163	92	G1.5
GPM25-4-180	3	4	22		0.17	180	166	97	G1.5
GPM25-5-180	3.4	5	32		0.25	180	166	97	G1.5
GPM25-6-180	3.7	6	38		0.31	180	166	97	G1.5
GPM25-8-180	5.8	8	80		0.72	180	181	94	G1.5
GPM25-10-180	6.8	10	120	1.08	180	181	94	G1.5	
GPM25-12-180	7.6	12	180	1.55	180	181	94	G1.5	
GPM32-4-180	3	4	22	0.17	180	169	97	G2	
GPM32-5-180	3.4	5	32	0.25	180	169	97	G2	
GPM32-6-180	3.7	6	38	0.31	180	169	97	G2	
GPM32-8-180	5.8	8	80	0.72	180	181	94	G2	
GPM32-10-180	6.8	10	120	1.08	180	181	94	G2	
GPM32-12-180	7.6	12	180	1.55	180	181	94	G2	

5. Technical parameters and installation dimensions

1. Technical data

Power supply	1x220~240V, ±10%, 50/60Hz, PE	
Motor protection	The pump needs no external protection	
Degree of protection	IP 42	
Insulation Class	H	
Relative humidity	≤95%	
System Load Bearing	Max. 1.0 MPa, 10 bar	
Suction pressure	Liquid Temperature	Minimum inlet pressure
	≤+75°C	0.05 bar, 0.005MPa, 0.5m
	+90°C	0.28 bar, 0.028MPa, 2.8m
	+110°C	1.08 bar, 0.108 MPa, 10.8m
EMC standard	EN IEC 55014-1 EN IEC 61000-3-2	EN IEC 55014-2 EN 61000-3-3
Sound Pressure Class	≤43dB(A)	
Ambient Temperature	0°C ~+40°C	
Temperature Grade	TF110, GB 4706.71/IEC60335-2-51	
Surface Temperature	The maximum surface temperature is not higher than +125°C	
Liquid Temperature	+2°C to +110°C	
EEI	≤0.20 (4~6m)	
	≤0.23 (8~12m)	

To prevent condensation in the junction box and rotor, the temperature of pumping liquid of the motor pump must be always higher than 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 suggested that water temperature should remain below 65°C to reduce scaling.

4. Lighting area in automatic night mode

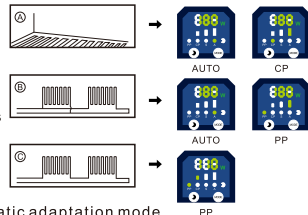
When the light is on (Ⓜ), it indicates that the automatic night mode function has been activated.

5. Button to activate night mode

- This button (Ⓜ) (position 7) activates or disconnects the automatic night mode function;
 - The automatic night mode function is only applicable to heating systems with this function;
 - When the automatic night mode function is activated, the display area light is on (position 3);
- Factory settings: The automatic night function mode is not set to constant speed curve I and constant speed curve II. Curve III of constant speed, that is, the electric pump is set to constant speed mode I, constant speed mode II, and constant speed mode A. At III, the automatic night mode function cannot be selected.

6. Select the button for setting the electric pump (Ⓜ) Every time the

- mode setting button is pressed, the electric pump mode setting changes one way;
- Ⓜ Every eight presses constitute one cycle (or ten).



7. Electric pump settings

- #### 7.1 Setting the electric pump according to the system type

Factory setting=automatic adaptation mode

Recommended and optional electric pump settings are shown in the table below.

Position	System type	Electric pump settings	
		Optimal Setting	Optional Settings
A	Floor heating system	AUTO	Max. constant pressure curve or min. constant pressure curve
B	Double pipe heating system	AUTO	Max. proportional pressure curve
C	Single pipe heating system	PPI Min. proportional pressure curve	Max. proportional pressure curve

AUTO (automatic adaptation mode) is installed in the underfloor heating system and dual pipeline system, which automatically adjusts the performance of the electric pump according to the actual heat demand of the system. Due to the gradual adjustment of performance, it is recommended to keep the electric pump in "AUTO" mode for at least one week before changing its settings. If you choose to switch back to the "AUTO automatic adaptation mode", the electric pump can remember its previous one. Continue to automatically adjust performance by setting the "auto adapt" mode for the second time. Electric pump settings Changing from the optimal setting to other optional settings for the heating system is a "slow" system, not the optimal operating mode may be reached within minutes or hours. If the optimal setting of the electric pump fails to achieve ideal heat distribution in each room, the electric pump setting should be changed to other optional settings.

7.2 Control of electric pumps

During the operation of the electric pump, according to the principle of "proportional pressure control" (PP) or "constant pressure control" (CP) controls the electric pump. In these two control modes, the performance and corresponding power consumption of the electric pump are adjusted according to the heat demand of the system. Proportional pressure control: In this control mode, the pressure difference between the two ends of the electric pump is controlled by the flow rate. The proportional pressure curve is represented by PP I and PP II in the Q/H diagram. Constant pressure control: In this control mode, the pressure difference between the two ends of the electric pump remains constant, independent of flow rate. The constant pressure curve, represented by CP I and CP II in the Q/H diagram, is a horizontal performance curve.

7.3 Automatic Night Mode

◆ Automatic Night Mode

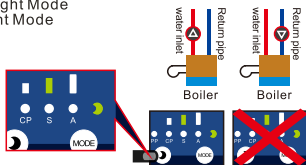
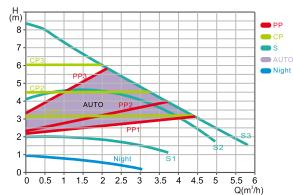


Fig.8 The basic principle of automatic night mode

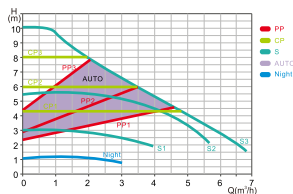


Pumps installed in gas fired boiler heating systems with small water capacity cannot be set to automatic night working mode.

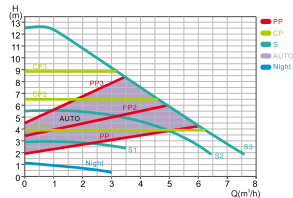
GPMxx-8-180



GPMxx-10-180

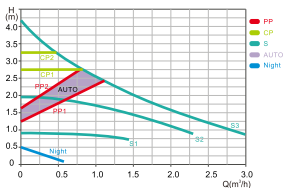


GPMxx-12-180

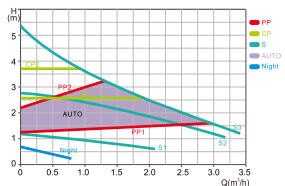


11. Performance curve

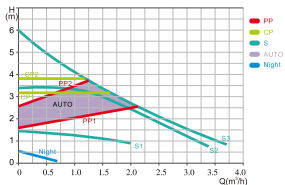
GPMxx-4-xxx



GPMxx-5-xxx



GPMxx-6-xxx



Note: ① If constant speed mode is selected, the automatic night mode function is useless;
 ② If the power has been disconnected, the automatic night mode function must be restarted;
 ③ If the heating system is "under heating" and the heat is insufficient, it is necessary to check whether it has Activate the automatic night mode function. If so, disconnect the automatic night mode function; To ensure that the automatic night mode function reaches its optimal state, the following conditions must be met:
 a. The electric pump must be installed in the inlet pipeline of the system and close to the outlet end of the boiler;
 b. If the electric pump is installed in the return water pipeline of the system, the automatic night mode function is not available;
 c. The system (boiler) must have automatic control of liquid temperature. Press button to activate automatic night mode; The indicator light is on , indicating that it has been started Automatic night mode function.

◆ Automatic night mode function

- ① Once the automatic night mode is activated, the electric pump will be in automatic adaptation (AUTO) mode and Automatic switching between night modes;
- ② The electric pump operates between automatic adaptation (AUTO) mode and automatic night mode Conversion depends on the temperature in the system inlet pipeline (non return pipeline);
- ③ The temperature in the system inlet pipeline is greater than 10-15 °C for approximately two hours, The pump will automatically switch to automatic night mode, and the temperature drop must reach at least 0.1 °C/Minutes;
- ④ When the temperature of the system flow pipeline increases by approximately 10 °C, it switches to automatic adaptation (AUTO) Mode (independent of time).

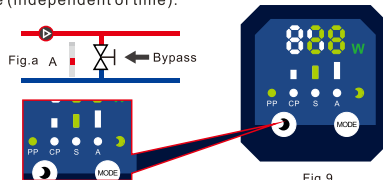


Fig.9

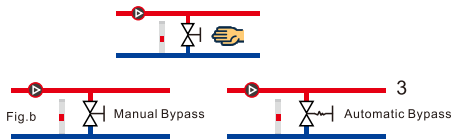


Fig. 10

8.2 Bypass valve

8.2.1 Function of bypass valve: When the temperature control valves of the underfloor heating circuit/or radiator are all closed, the bypass valve can ensure the distribution of thermal heat in the boiler.

8.2.2 Components in the system Bypass valve; Flow meter A (as shown in Figure a). When all valves are closed, it is necessary to ensure the minimum flow rate. The setting of the pump depends on the type of bypass valve, namely manual bypass valve or temperature controlled bypass valve (as shown in Fig. 10).

8.3 Manual bypass valve

The operation is as follows:

When adjusting the bypass valve, ensure that the water pump is set to speed 1 mode and always maintain the minimum flow rate of the system, as shown in Figure 9. After adjusting the bypass valve, set it according to the aforementioned water pump settings.

8.4 Automatic bypass valve (temperature controlled bypass valve) refers to the following: When adjusting the bypass valve, ensure that the water pump is set to speed 1 mode and always maintain the minimum flow rate of the system. After adjusting the bypass valve, set the water pump to the minimum or maximum constant pressure mode.

9. Start

9.1 Before startup Before starting the electric pump, it is necessary to ensure that the system is filled with liquid and the gas has been drained (S3 mode runs for 5 minutes). The inlet of the electric pump must meet the required minimum inlet pressure.

9.2 Electric pump exhaust



The electric pump has a self exhaust function, and there is no need to exhaust before starting. The gas in the electric pump may cause noise, which disappears after a few minutes of operation. According to the system scale and structure, setting the electric pump to constant speed mode in a short period of time can quickly remove gas from the electric pump. After the exhaust of the electric pump, i.e. after the noise disappears, follow the recommended instructions to set the electric pump.

10. Relationship between electric pump settings and performance Represent the relationship between the electric pump mode setting and the performance of the electric pump in the form of a curve.

