



High Efficiency Circulation Pump

Model:WP-APM



Warning

Ground motor before connecting to power supply.
Do not touch the pump while it is running.
Do not run the pump without water.



Dear Customer:

Thanks for purchasing Westbridge control products, to avail of your 24 months warranty please complete the Warranty Card below. Note Warranty valid for 24 months from the date of purchase.

Pump model: _____

Production batch number: _____ Invoice

number: _____ Date of

purchasing: _____ Purchased in:

_____ User name:

_____ Address:

_____ Postal code: _____

Seal:
(please complete and return to Precision Heating Ltd,
504 Northwest Business Park, Mitchelstown Road, Ballycoolin D15 W97V, Ireland.

EC Declaration of Conformity

We,

Precision Heating Ltd. Address: Unit 504B Northwest Business Park, Phase 2, Mitchelstown Road, Ballycoolin, Dublin 15.

Declare under our sole responsibility that below mentioned product is in conformity with the relevant safety and health requirements of the EC guidelines specified below in its design and construction and in the version which we introduced to the market.

Brand: Westbridge controls

Product: WB-APE, WB-APM, WB-APF circulating pumps

Applied harmonized European Standards:

Description: Circulation Pump

Model: APM 20-4-130, APM 20-6-130, APM 25-4-130, APM 25-6-130, APM 25-4-180, APM 25-6-180, APM 32-4-180, APM 32-6-180, APF 20-4-130, APF 20-6-130, APE 25-4-130, APE 25-6-130, APE 25-8-130, APF 25-4-180, APF 25-6-180, APF 25-8-180, APF 32-4-180, APF 32-6-180, APF 32-8-180, AMP 32-12-180, APM 25-12-180

Relevant EC directives: Machinery Directive 2006/42/EC

Low Voltage Directive
2014/35/EU Electromagnetic
Compatibility 2014/30/EU
Ecodesign Directive
2009/125/EC

Applied harmonized European Standards:

EN ISO 12100: 2010

EN 809:1998+A1 :2009+AC:2010

EN 60204-1:
2006+A1:2009+AC:
2010 EN 60335-
1:2012+A13:2017

EN 60335-2-
51:2003+A2:
2012 EN
62233:2008+
AC:2008

EN 60034-1:2010+AC:2010

EN 55014-1:2017

EN 55014-2:2015

EN 61000-3-2:2014

EN 61000-3-3:2013

Technical documentation kept by Precision Heating Ltd. Address: Unit 504B Northwest Business Park, Phase 2, Mitchelstown Road, Ballycoolin, Dublin 15.

Printed Name: Philip Bassett

Title: Managing Director

Signature:



VIII. Trouble shooting



Warning
 Ensure that the power supply is cut off and will not be accidentally switched on before preparing any maintenance and repair of the pump.

Control panel	Causes	Troubleshooting method
Indicator lights off	a) One fuse is burned.	Replace the fuse.
	b) Breaker is off.	Put the breaker on.
	c) Pump doesn't work.	Replace the pump.
	d) Overvoltage or undervoltage	Check whether the power supply is within the specified range.
E1	Pump is blocked	Remove impurities
E2	Lacking phase	Replace the pump
E3	Overvoltage or undervoltage	Replace the pump
E4	Short circuit	Replace the pump

Note: When the pump is running, the display panel will go out after 10s no operating, and then press any button to display again.



Correct Disposal of this product

This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

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Precautions

1. Carefully read this operation manual before installation and use.
2. Personal injuries might be caused if one fails to observe what has been indicated by the safe warning marking. Should pump be damaged or losses be caused to other properties, the manufacturer will not take any responsibilities or compensate.
3. The installer and operator must observe the local safe regulations.
4. The user must ensure that: the product shall only be installed and maintained by the qualified personnel fully comprehend this manual and with professional qualification certification.
5. Never install the pump in damp place or where may be splashed with water.
6. For easy maintenance, install a stop valve at both sides of the inlet and outlet of the pump respectively.
7. During installation and maintenance, it needs to cut off the pump power supply.
8. For circulating of domestic hot water, water pump made from brass or stainless steel must be used.
9. Non-softened water mustn't be frequently replenished inside the heating pipeline in case of increasing calcium in circulating water of the pipeline to block the impeller.
10. It is strictly forbidden to start the pump without pumping liquid.
11. Some models cannot be used for drinking water.
12. The pumping liquid might be of high temperature and high pressure, it has to drain the liquid inside the pump or close the stop valves at both sides of the pump before moving and dismantling the pump to prevent from scalding.
13. High temperature and high pressure liquid might flow out when exhausting bolt is removed, it has to be sure that the liquid flowed out will not cause damage to people or other parts.
14. In summer or when it is very hot, please pay attention to ventilation in case of moisture condensation, causing electrical fault.
15. In winter, if the pump system doesn't run or it is below 0°C, it should drain the liquid inside the pipeline system in case of frost crack of pump head .
16. If the pump will not be used for a long time, please close the inlet valve and cut off pump power supply.
17. If the flexible cable is damaged, it requires professional personnel to replace it.
18. If the motor is hot and abnormal, immediately close the water inlet valve, cut off pump power supply and contact the local dealer or service center at once.
19. If troubleshooting cannot be achieved as per this manual, immediately close the water inlet valve, cut off pump power supply and contact the local dealer or service center at once.
20. The product should be placed beyond reach of children and should be isolated after installation in case of being available to children.
21. The product should be stored in dry, ventilated, shady and cool place under room temperature.

PWM P1(heating)

PWM P1	LED PP	LED CP	LED S	LED A	LED N	LED 4
P1 1						•
P1 2						•
P1 3						•
P1 4(max)						•

PWM P2(solar)

PWM P2	LED PP	LED CP	LED S	LED A	LED N	LED 4
P2 1						•
P2 2						•
P2 3						•
P2 4(max)						•

PWM setting

When the circulation pump is connected to the external control system and there is a PWM signal input, the pump automatically enters the PWM mode P1 (heating type), and short presses the shift button to switch to the PWM mode P2 (solar type). P1 and P2 are displayed on LED4, and the PWM mode and real-time power value are periodically switched and displayed.

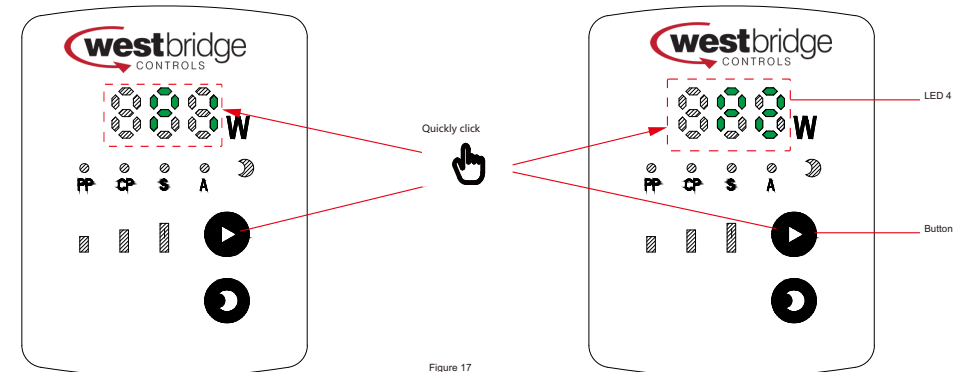


Figure 17

PWM signal connection

Standard configuration: three-line immersion tin at both ends; non-standard: can be customized according to customer needs.

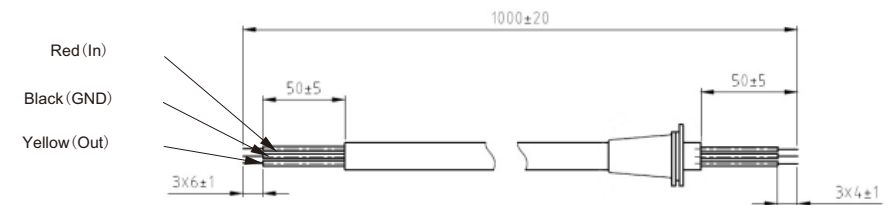


Figure 18

PWM
This pump external control mode has P1 or P2 PWM external control signal control, two control modes.
PWM P1(heating)

PWM P1	LED PP	LED CP	LED S	LED A	LED N	LED 4
P1 1						.
P1 2						.
P1 3						.
P1 4(max)						.

PWM P2(Solar)

PWM P2	LED PP	LED CP	LED S	LED A	LED N	LED 4
P2 1						.
P2 2						.
P2 3						.
P2 4(max)						.

PLUSH
This circulating pump can be externally controlled with P1 or P2 external PWM signals or internally controlled by four 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	.							.
PPA				.				
Night					.			

Constant pressure

Constant pressure	LED PP	LED CP	LED S	LED A	LED N	LED 1	LED 2	LED 3
CP1		.				.		
CP2		.					.	
CP3		.						.
CPA				.				
Night					.			

Constant speed

Constant speed	LED PP	LED CP	LED S	LED A	LED N	LED 1	LED 2	LED 3
S1			.			.		
S2			.				.	
S3			.					.
SA				.				
Night					.			

I. Product Overview

1. IFC Circulating Pump

series IFC Circulating Pump is the high quality, mute and energy saving circulating pump especially designed for domestic heating system and domestic hot water system. It is most innovative product in Shimge with easy installation, which is preset when delivered and best applies to the following systems:

- Floor heating system
- Single pipeline heating system
- Double pipeline heating system

series adopts permanent magnet motor and combines frequency conversion technology which can run automatically according to user demand so as to reach energy saving effect.

2. Features of IFC Circulating Pump

- 1) Simple structure and close contact between the control box and the pump;
- 2) With adaptive control mode and it meets application on most occasions
- 3) Combine control over two different compression pressure differences (special and constant pressure control);
- 4) Display actual consumption power (P1) indicated in watt;
- 5) Low noise of pump and system;
- 6) Setting of auto night mode;
- 7) Permanent magnet motor and compact design of stator;
- 8) Intelligent frequency conversion;
- 9) Energy conservation to achieve European Class A energy efficiency requirements.

3. Application of IFC Circulating Pump

◀ System Type:

- 1) It requires the working point of the water is set to be optimum constant flow system or variable flow system
- 2) Pipeline temperature variation system
- 3) With night mode system

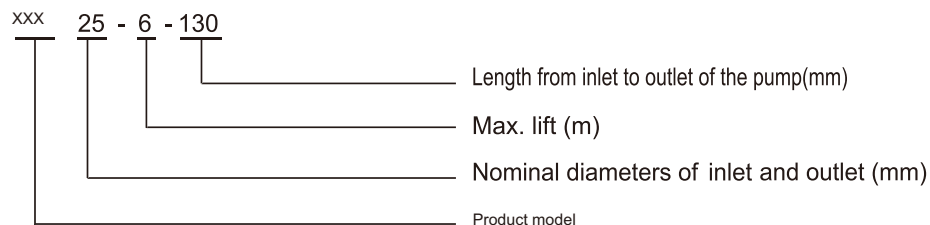
◀ Pumping liquid

- 1) Clean, thin, non-corrosive, non flammable combustible and explosive liquid without solid fiber or mineral oil;
- 2) In heating system, the pumping liquid should meet the water quality standard involved in heating system
- 3) In domestic hot water system, water with active medium and temperature is between +0°C~110°C.

◀ Protection grade: IP42

◀ System pressure: Maximum 1.0 MPa(10 bar)

II. Model Description



III. Installation and Use

1. Installation Instructions

- 1.1 Before installing the pump, it needs to check whether the piping system is reliable and ensure that the impurities, slag, dirt and etc. in the pipeline have been removed; the power frequency is 50Hz/60Hz with voltage of 230V and voltage fluctuation value between -10% ~ +6%.
- 1.2 The pump should be stored in dry and ventilated area in case of short circuit due to humidity or being splashed with water, moreover, installation should facilitate future repair and change.
- 1.3 When the pump is installed in the open air, protection cover should be added; for indoor installation, it should prevent from splashing, which might cause electric shock. Never install the pump in the bathroom in case that the water vapor or water enters the junction box and causes electric leakage;
- 1.4 After installing the pump, carry out test running with power on. Then set the speed control switch to the rated high gear S3 and check whether it starts normally.
- 1.5 To facilitate repair of the pump, it is suggested to install separate stop valves at the outlet and inlet of the pump respectively.
- 1.6 The power plug should be strictly grounded, the ground pin of the plug should be reliably connected to the ground hole of the power socket. Never change the power ground plug without authorization;
- 1.7 When the pump runs, set up marked safety warning sign at the application site to prevent accident.
- 1.8 Regularly check the insulation resistance of the pump and the cold insulation resistance should not be less than 50MΩ(MΩ).
- 1.9 If cable is damaged, it has to replace with special cable or special components.
- 1.10 Pumped medium should be thin, clean, non-corrosive, non-explosive liquid without solid fiber or mineral oil

User interface display

- Performance view (working)
 - Operating status
 - Alarm status
- Setting view (after pressing the button)

During the run, the screen displays the performance view. If the button is pressed, the user interface switches views or runs the setup selection mode.

4. Settings

User interface control mode

Manage all operating modes with 2 buttons and 1 LED interface

The following operating modes can be selected via the button.

The user interface displays the combined LED lighting as described in the table below.

AUTO

This circulator has four internal control modes with adaptive function.

Proportional pressure

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

Constant pressure

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

Constant speed

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

VII Control mode, user interface and settings

1. Control mode and curve

The type have up to five control modes, each with four curves for different maximum heads.

External control		Internal Control		
PWM P1	PWM P2	Proportional pressure	Constant pressure	Constant speed
curves 1	curves 1	curves 1	curves 1	curves 1
curves 2	curves 2	curves 2	curves 2	curves 2
curves 3	curves 3	curves 3	curves 3	curves 3
curves 4	curves 4	Auto	Auto	curves 4

2. Type

These setup options are available as pre-configured models.

Option	Application	Function	control mode and curve	
			External control	Internal Control
AUTO	Domestic hot water system heating assembly	Run in all self-control mode s and	/	PP1~3 CP1~3 CS1~3
PWM	heating/Solar system	Run with PWM P1 or PWM P2 configuration.	PWM P1 PWM P2	/
PLUSH	Any HVAC system	Run in all available modes and curves	PWM P1 PWM P2	PP1~3 CP1~3 CS1~3

3. User interface

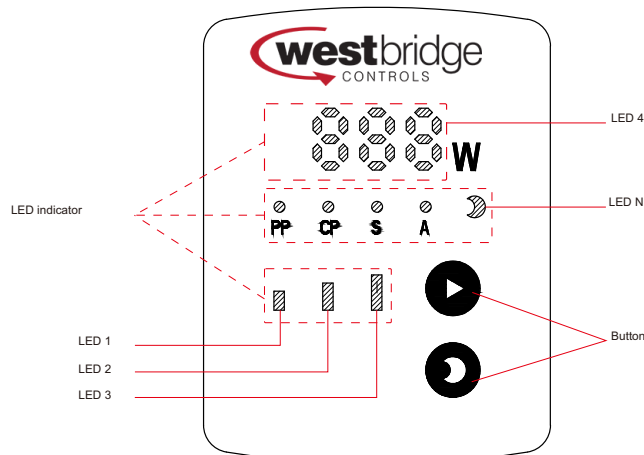


Figure 16

2. Installation

2.1 Installation

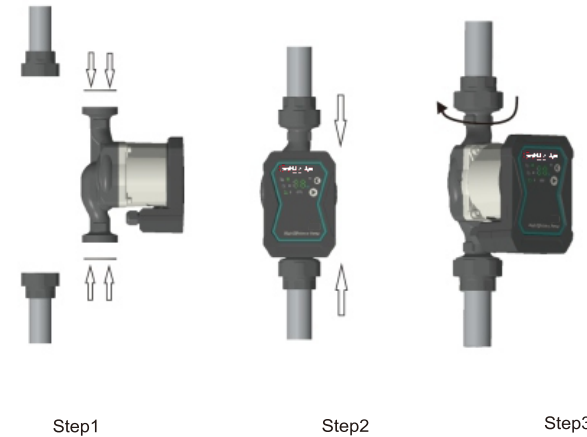


Figure 1

Correct installation location of motor

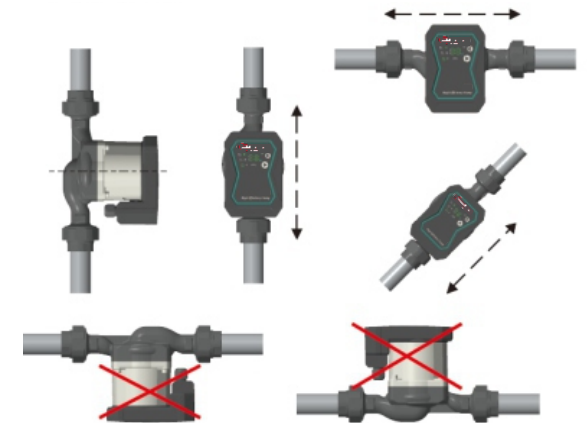


Figure 2



1. When installing the pump in the pipeline, it needs to install the two sealed gaskets provided.(as steps in Figure 1)
2. When installing, the motor shaft should be horizontal(as steps in Figure 2)

2.2 Location of Junction Box

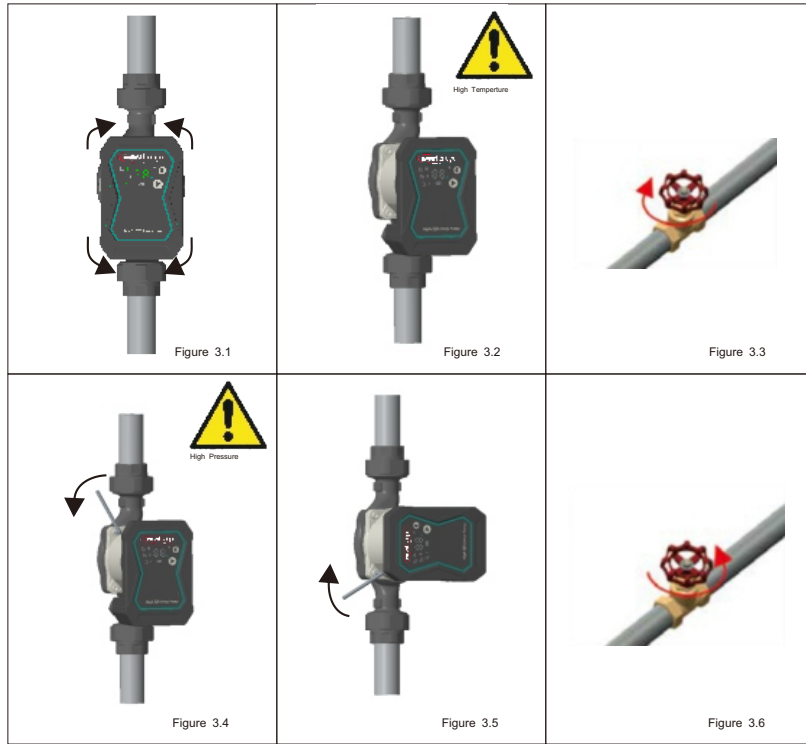


Figure 3

Warning



The pumping liquid might be high temperature and high pressure liquid. It needs to drain the system or close the stop valves at both sides of the pump before removing the inner hexagon bolt.

2.3 Change Location of Junction Box

If necessary, the junction box can be turned with 90° as gear like Figure 3.1

- Loosen it and take out four hex. Bolts that fixes the pump head. (Figure 3.4)
- Turn the pump head to the desired location. (Figure 3.5)
- Place back the four hex. bolts and tighten them in cross direction. (Figure 3.6)



After changing the location of the junction box, the pump can be started only after injecting pumping liquid to the system or opening the stop valve.

1.2.3 Alarm

The PWM feedback signal is made into a 5V rectangular wave pulse width form, which is isolated by optocoupler. The duty cycle of the circulating pump fixed at 75Hz frequency is tentatively defined as follows:

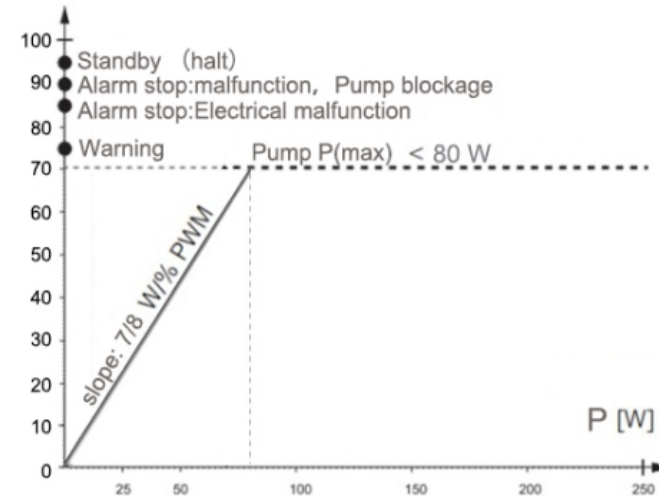


Figure 15

PWM output signal(%)	QT (s)	Pump information	DT(s)	priority
95	0	PWM signal standby (stop)	0	1
90	30	Alarm/stop/blocking error	12	2
85	0-30	Alarm / shutdown / electrical error (phase loss over current)	1-12	3
75	0	Warning (overvoltage, undervoltage)	0	5
0-70	/	0—80W(Slope7/18PWM/W) 0—120W(Slope7/12 %PWM/W) 0—180W (Slope7/18 %PWM/W)	/	6
Output frequency	75Hz±/5%			

NOTE Q=Identification time

DT=Cancel identification time

PWM input signal (%)	Electric pump status
0	The electric pump is switched to non-PWM mode (internal control) operation, and the system has no PWM signal input by default.
$0 \leq PWM \leq 5$	Electric pump runs at maximum speed
$5 < PWM \leq 84$	Electric pump linearity decreases from maximum speed to minimum speed
$84 < PWM \leq 85$	Electric pump operates at minimum speed
$85 < PWM \leq 95$	If the input signal fluctuates near the shift point, the will start and stop according to the hysteresis principle.
$95 < PWM \leq 100$	Standby, the pump stops running

1.2.2 PWM input signal P2 (solar)

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

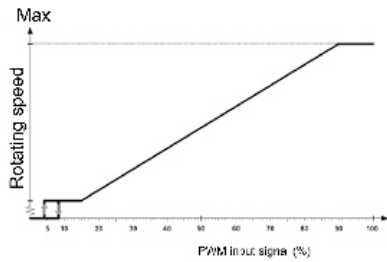


Figure 14

PWM input signal (%)	Electric pump status
$0 \leq PWM \leq 5$	Standby, the pump stops running
$5 < PWM \leq 8$	If the input signal fluctuates near the shift point, the pump will start and stop according to the hysteresis principle.
$8 < PWM \leq 15$	Electric pump operates at minimum speed
$15 < PWM \leq 90$	Electric pump linearly rises from minimum speed to maximum speed
$90 < PWM \leq 99$	Electric pump runs at maximum speed
100	The electric pump is switched to non-PWM mode (internal control) operation, and the system has no PWM signal input by default.

2.4 Pump Body and System Thermal Insulation

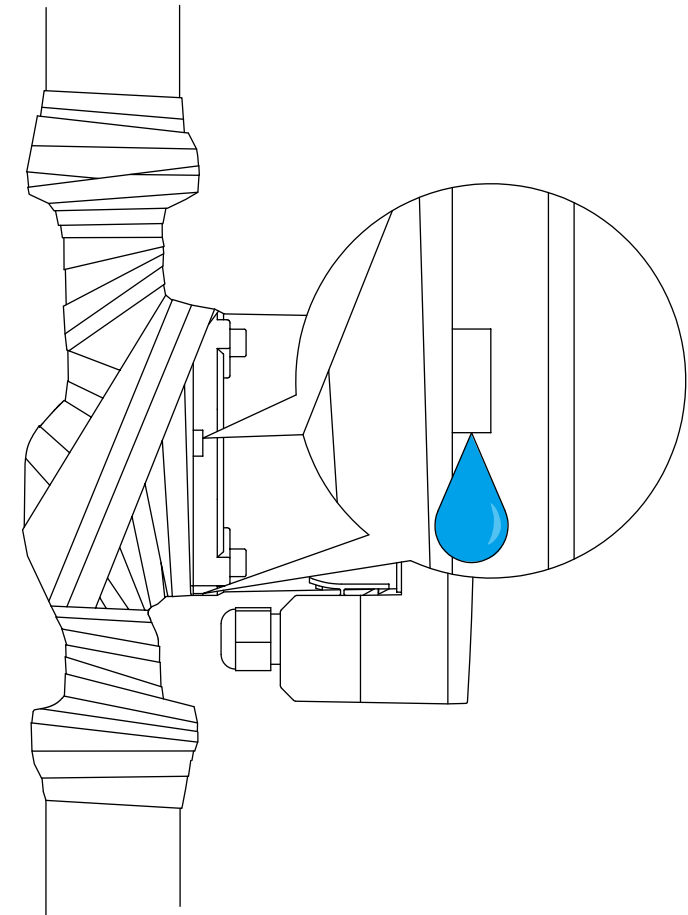


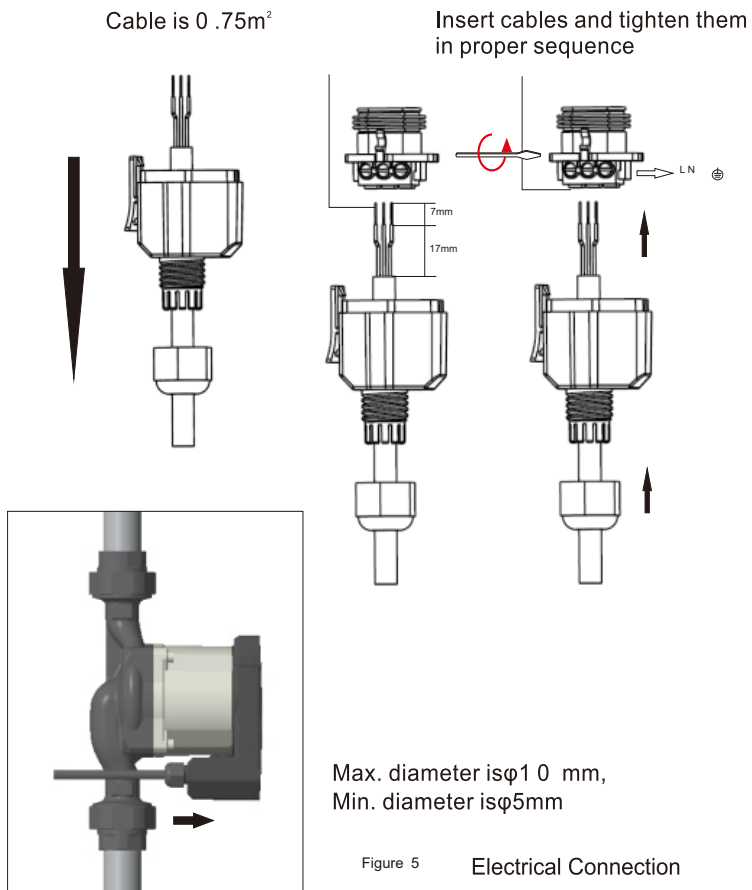
Figure 4 Heat insulation of the pump body

If the unit is fitted with thermal insulation, make sure the condensation drainage holes in the motor housing are not closed up or obstructed in any way.




Do not insulate or cover the junction box and the control panel.

2.5 Electrical connection



Warning

Pump must be connected to the ground wire 
The pump must be connected to an external power switch and the minimum clearance between the electrodes should be 3mm.

- pump doesn't need external motor protection.
- Check whether the power supply voltage and frequency are consistent with values of the pump designation plate.
- When the indicator light on the control panel is on, it means it is powered on.
- Power connected with the pump needs 1A fuse.
- Wire end at cable 3 needs to be tinned or fixed with wiring harness.
- If the supply cord is damaged, it must be replaced by a special cord or assembly available from the manufacturer or its service agent.

1.1.3. Basic control logic

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

PWM speed control logic:

The PWM input signal is controlled by the logic relationship with the rotational speed to control the working state of the electric pump;

The PWM feedback signal passes the logic relationship with the power and related faults to realize the monitoring of the actual working state of the electric pump.

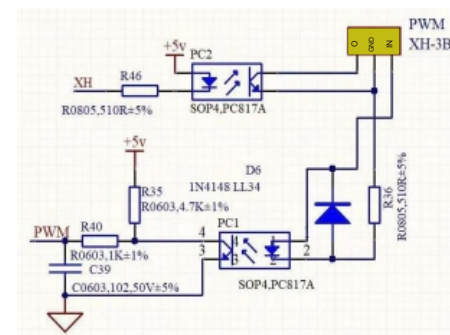


Figure 12

1.2 PWM input signal function definition

1.2.1 PWM input signal P1 (heating)

When the PWM signal percentage (duty cycle) is high, the hysteresis prevents the circulation pump from starting and stopping if the input signal fluctuates up and down at the transition point. When the percentage of the PWM signal is low, the rotational speed of the circulating pump is high for safety reasons. If the cable in the gas boiler system is 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 circulation pump to ensure that the pump can transfer heat when the cable is damaged.

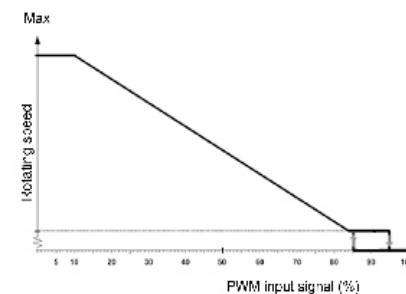


Figure 13 PWM input P1 (heating)

VI External control modes and signals

1. Control principle

The 8/10/12 meter circulating pump is controlled by a digital low voltage pulse width modulation (PWM) signal whose speed depends on the input signal. Which are controlled internally or externally and can be set to internal or external control. The configuration curve of the pump prefabrication determines the rate of change of the pump speed.

1.1. control signal

1.1.1. Digital low voltage PWM signal

Optocoupler isolation	YES
PWM input frequency	1000—1500Hz
Input voltage high level U_{IH}	4.0—24.5V
Input voltage low level U_{IL}	<0.7V
High level input current I_H	Max3.5mA@4700Ohms Max10mA@100Ohms
PWM adjustable range	0—100%
Signal polarity	Fixed
Signal line length	<3m
Rising and falling edge time	<T/1000

1.1.2. Duty cycle

$d\% = 100 \times t/T$

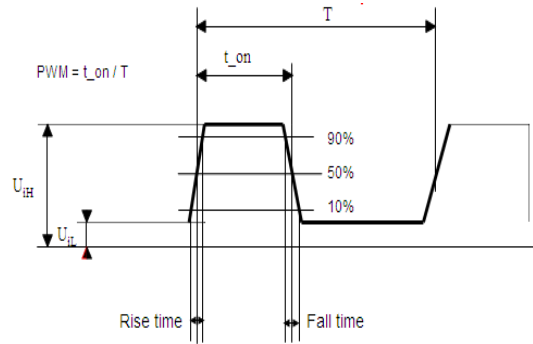


Figure 11 PWM waveform

IV. Operation Instructions

1. Operation Panel

1.1 Operation instructions for control panel



Figure 6

- 1 Display that shows the actual consumption power in watt.
- 2 Indicate lighting areas in automatic night mode.
- 3 Button to start the automatic night mode.
- 4 Button to select pump settings.
- 5 Automatically run and display light area.
- 6 Indicate seven lighting areas set in the pump.

1.2 Description of side plate

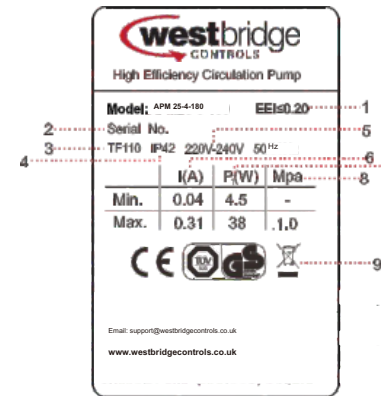


Figure 7 Name plate

Location	Description	Location	Description
1	Energy Efficiency Index	7	Input power, P1(Watt) Min. Mode Min. Input power P1(Watt) Max. Mode Max. Input power P1(Watt)
2	Series No	8	Max. System pressure bearing(MPa)
3	Temperature grade	9	Mark and certification mark
4	Insulation grade		
5	Voltage(V) Frequency (Hz)		
6	Rated current(A) Min. Mode Min. Current (A) Max. Mode Max. Current (A)		

2. Displayer description

- 2.1 After power on, displayer in location 1 works.
- 2.2 During operation, the display value is in 1 w and it indicates the actual consumption power of the pump.
- 2.3 Failure that disables normal running of the pump (such as stagnation) will be displayed as "E(X) (X is 1 or 2)".
- 2.4 If failure displays, it has to cut off the power supply to troubleshoot. (Page19)
After troubleshooting, power on and start the pump.

3. Lighting area that shows pump settings

IFC Circulating Pump has eight ^(ten) settings, which can be achieved through buttons. Pump setting is indicated by eight ^(ten) different lighting areas

For 4-6m **Eight Lighting Areas**

Pressing times	Lighting area	Description	Displayer icon
0	AUTO (Factory setting)	Autoadaptation	
1	PP1	Min. proportional pressure curve	
2	PP2	Max. proportional pressure curve	
3	CP1	Min. Constant pressure curve	
4	CP2	Max. Constant pressure curve	
5	I	Constant speed curve, speed I	
6	II	Constant speed curve, speed II	
7	III	Constant speed curve, speed III	
8	AUTO	Autoadaptation	



For 8-12m Ten **Lighting Areas**

Pressing times	Lighting area	Description	Displayer icon
0	A (Factory setting)	Autoadaptation	
1	PP1	Min. proportional pressure curve	
2	PP2	Medium proportional pressure curve	
3	PP ³	Max. proportional pressure curve	
4	CP1	Min. Constant pressure curve	
5	CP2	Medium Constant pressure curve	
6	CP ³	Max. Constant pressure curve	
7	I	Constant speed curve, speed I	
8	II	Constant speed curve, speed II	
9	III	Constant speed curve, speed III	
10	A	Autoadaptation	

4. Lighting area that indicates automatic night mode

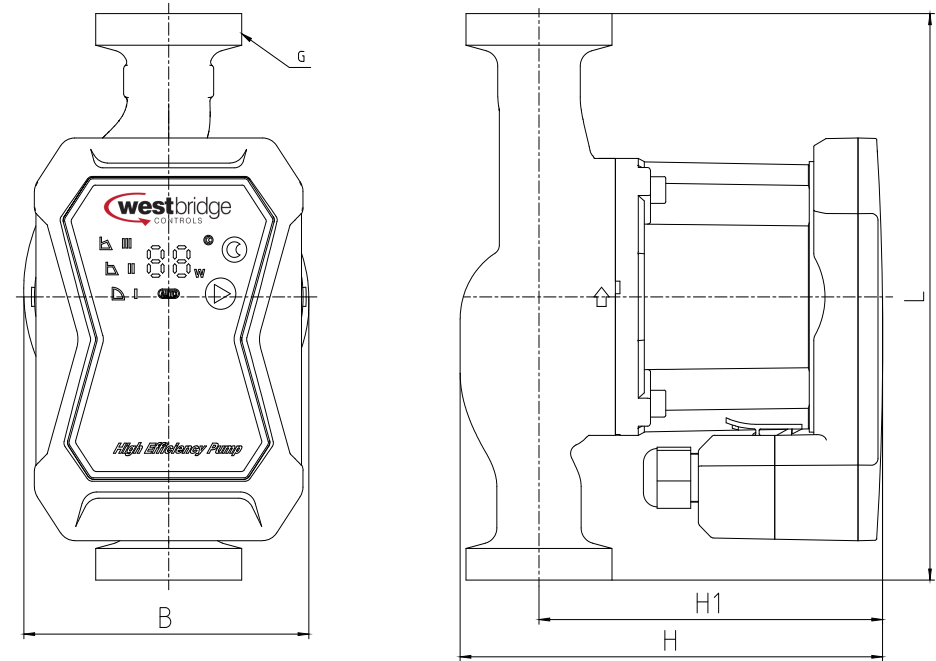
If indicated by  when it is on, it means it has enabled automatic night mode .

5. Button for enabling automatic night mode

- The button  located in ³ will start /stop automatic night mode.
- Automatic night mode is only applicable to the heating system with the said function. (Refer to Section 8 of Chapter 4)
- When automatic night mode is started, the lighting area  located in 3 is on.

2. Installation dimensions

Dimensional sketch and dimensions table



Type of pump	Dimension					Weight (excluding cable) /kg
	H (mm)	H1 (mm)	L (mm)	B (mm)	G (")	
20-4/6-130	138	112	130	93	1"	1.94
25-4/6-130	138	112	130	93	1 1/2"	2.12
25-4/6-180	138	112	180	93	1 1/2"	2.27
32-4/6-180	142	112	180	93	2"	2.46
25-8-180	185	133	180	99	1 1/2"	4.80
25-10/12-180	185	133	180	99	1 1/2"	5.00
32-8-180	185	133	180	99	2"	4.85
32-10/12-180	185	133	180	99	2"	5.05

V. Technical Data and Installation Dimensions

1. Technical Data

Supply voltage	230V, -10 %/+ 6 %, 50Hz, PE	
Motor protection	This circulating pump doesn't need external motor protection	
Protection grade	IP 42	
Isulation grade	F	
Relative ambient humidity	Max. 95%	
System pressure bearing	Max. 1.0 MPa, 10 bar, 102m water column	
Suction inlet pressure	Liquid temperature	Min. Inlet pressure
	≤ +75 °C	0.05 bar, 0.005 MPa, 0.5m water column
	+90°C	0.28 bar, 0.028 MPa, 2.8m water column
	+110°C	1.08 bar, 0.108 MPa, 10.8m water column
EMC Standard	GB4343.2 GB/T17626.4 IEC61000-4-4	
Sound pressure level	The sound pressure level of the pump is less than 43 Decibel	
Ambient temperature	0°C to +40 °C	
Temperature grade	TF110	
Surface temperature	Max. Temperature is below +125°C	
temperature	+2°C to +110 °C	
Declared EEI	≤Ø20 (4-6m)	
	≤Ø3 (8-12m)	

To prevent condensate water in the control box and the stator, the temperature of the pumping liquid in the pump must 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

in domestic hot water system, it is recommended to keep the water temperature below 65°C in order to reduce scale.

If pump is set to be speed I mode, speed II mode or speed III mode, it cannot choose automatic night mode.

6. Button for selecting pump settings

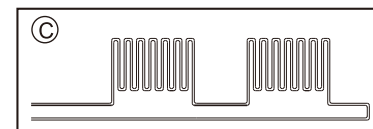
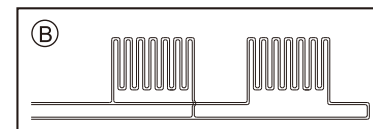
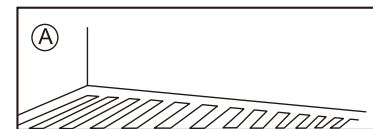
Press button once, and it only changes one type of pump setting.

Pressing eight times is a cycle.

7. Pump setting

7.1 Pump setting as per system type

Pump setting as per system type



Factory setting = autoadaptation mode

The recommended and available pump settings should be referred to the previous Figure.

Location	System type	Pump setting	
		Optimum setting	Other available settings
A	Floor heating system	AUTO	CP
B	Double pipeline heating system	AUTO	PP2
C	Single pipeline heating system	PP ¹	PP2

AUTO (Autoadaptation mode) is installed in the heating system and double pipeline system under the floor. "AUTO autoadaption" mode adjusts pump performance automatically according to the actual heat demand of the system. Due to the fact that the performance is adjusted gradually, it is suggested to enable the pump to be in "AUTO autoadaption" mode at least one week before changing the pump settings.

If it chooses to change back to "AUTO autoadaption" mode, APM pump can memorize the set point of "AUTO autoadaption" mode last time and continues to adjust performance automatically. The pump setting changes from the optimum setting to other available setting. The heating system is "slow" system and cannot reach optimum running mode in several minutes or several hours. If the optimum setting fails to achieve ideal heat distribution in every room, change the pump setting to other available settings.

7.2 Control of pump

During operation, exert control over the pump as per , Proportional pressure control " (PP)" or Constant pressure control " (CP)".

Under the abovementioned two control modes, the pump performance and corresponding consumption power shall be adjusted according to the heat loss of the system.

- Proportional pressure control

Under this control mode, the pressure difference at both ends of the pump is controlled by the flow. In Q/H diagram of proportional pressure curve, indicate with PP1 and PP2.

- Constant pressure control

Under this control mode, the pressure difference at both ends of the pump keeps stable and is irrelevant to the flow.

Constant pressure curve is indicated by CP1 and CP2. In Q/H, it is a horizontal performance curve.

7.3 Auto night mode

Basic principle of auto night mode

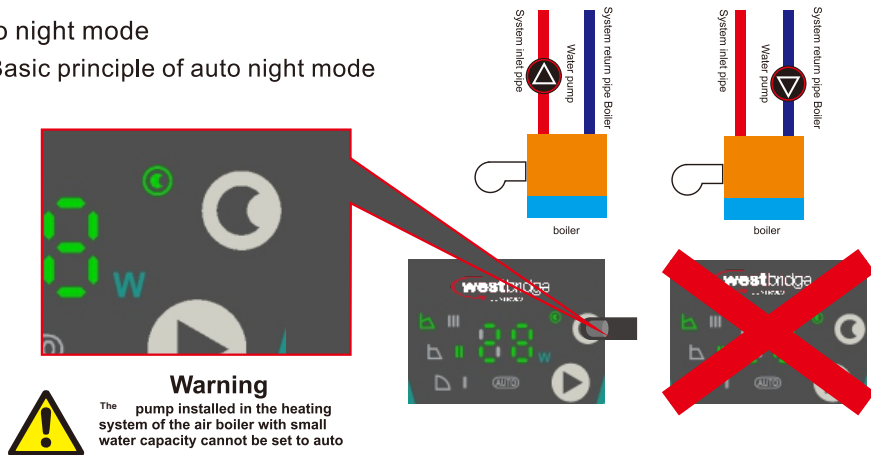
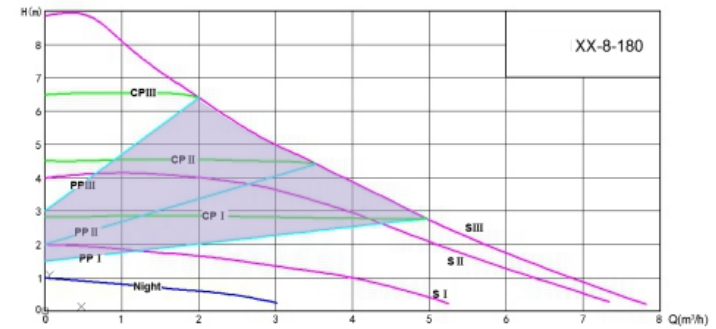
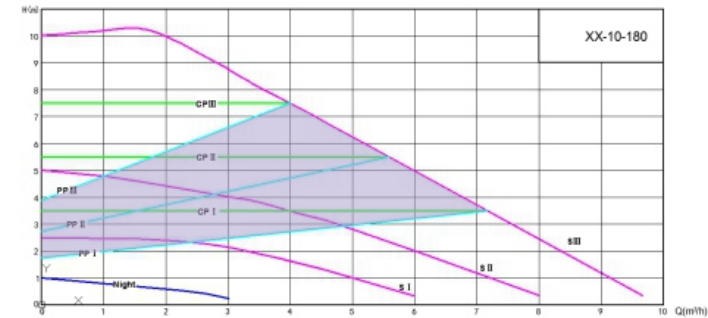


Figure 8 Auto night mode

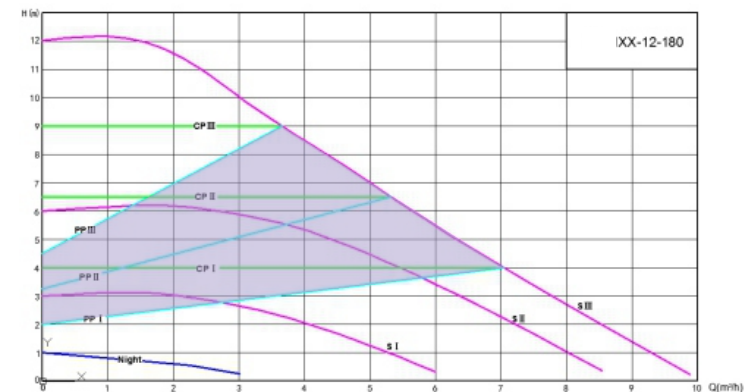
(XX - 8 - XX)



(XX .10 - XX)

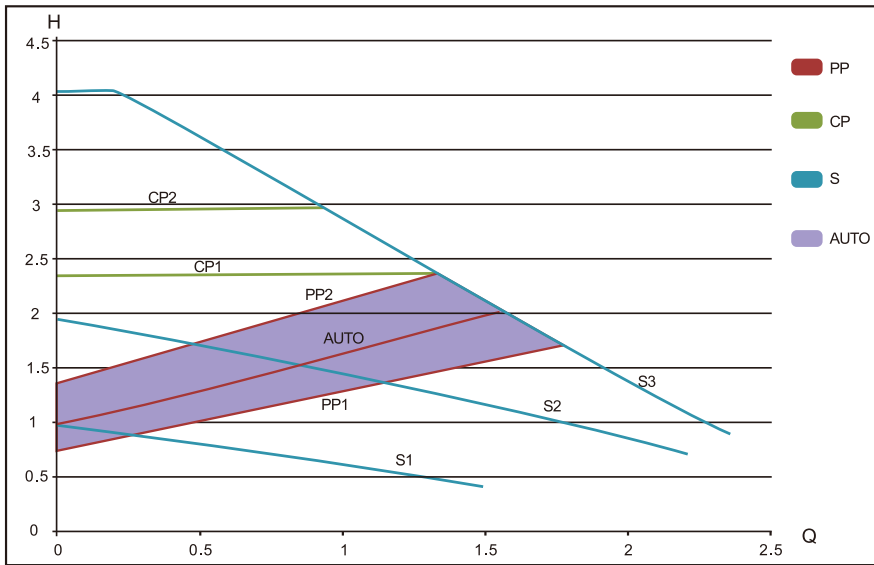


(XX .12 - XX)

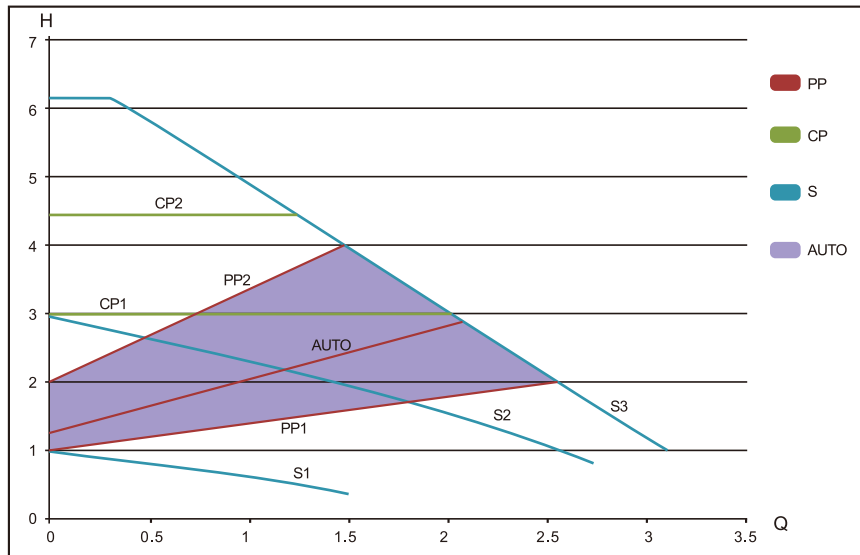


11. Performance curve

(XX-4-XX)



(XX-6-XX)



Note If speed I, speed II, or speed III are selected, auto night mode doesn't function.
 If power supply is once cut off, it needs to restart the auto night mode.
 If the heating system is providing "Insufficient heat" (lack of heat), it needs to check whether auto night mode has been enabled.
 If so, disable auto night mode.

To ensure optimum status of auto night mode, the following conditions must be met:

- The pump must be installed in the inlet pipeline of the system and be close to the outlet of the boiler.
- If the pump is installed in the return water pipeline of the system, auto night mode doesn't function.
- The system (boiler) must have auto control over liquid temperature.
 Press button to start the auto night mode.
 The indicator is on, which means that auto night mode has been enabled.

Auto night mode

- Once ^Auto night mode is enabled, ^{APM} pump can be switched between the ^Auto mode and ^Auto night mode.
- Switching between the ^Auto mode and ^Auto night mode by the ^{APM} pump is depending on temperature in inlet pipeline (non-return water pipeline) of the system.
- If the temperature drop in the inlet pipeline of the system is over 10-15°C within about two hours, ^{APM} pump will automatically switch to ^Auto night mode. Such temperature drop must at least reach 0.1°C/minute. When the flowing pipeline temperature of the system rises by about 10°C, it will switch to the ^Auto mode (irrelevant to time)

8. pipeline and return water pipeline

8.1 Function of the bypass valve

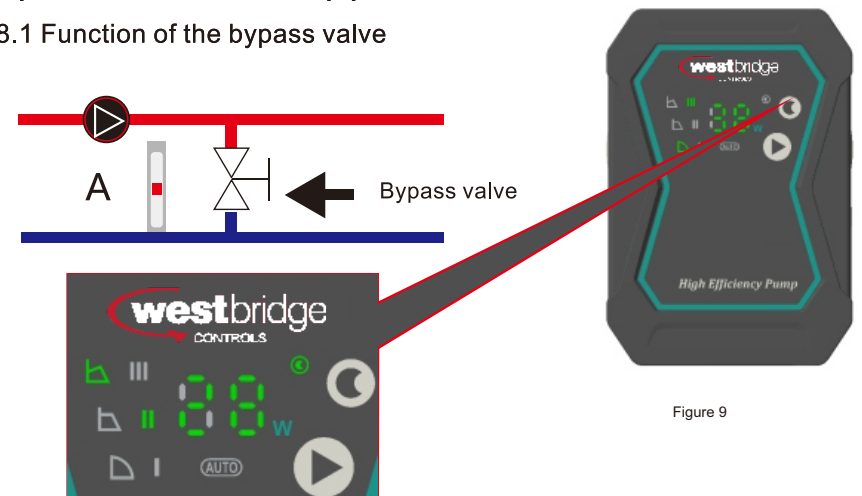


Figure 9

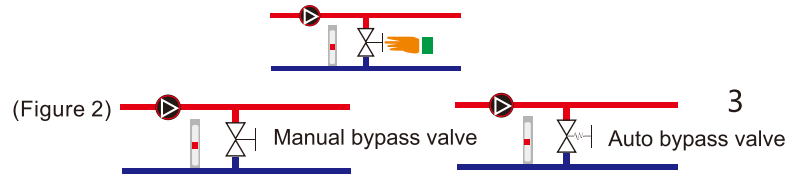


Figure 10 System installed with bypass valve

8.2 Bypass valve

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

8.2.2 Components in the system.

Bypass-valve

A Flowmeter, located in A

When all valves are closed, it needs to guarantee the minimum flow.

Pump setting depends on the type of bypass valve equipped, namely manually -operated bypass valve or temperature-controlled bypass valve. (Figure 10)

8.3 Manually-operated bypass valve

Do as follows:

8.3.1 When adjusting the bypass valve, ensure that the pump is in setting I speed I mode. (Figure 9)

It has to keep the minimum flow ($Q_{min.}$) of the system always. Refer to the instructions of the bypass manufacturer.

8.3.2 When the bypass valve is adjusted, set the pump as per Chapter 7 of Pump Settings.

8.4 Auto bypass valve (temperature-controlled bypass valve)

Do as follows:

8.4.1 When adjusting the bypass valve, the pump should be setting I (speed I mode)

It has to keep the minimum flow ($Q_{min.}$) of the system always. Refer to the instructions of the bypass manufacturer.

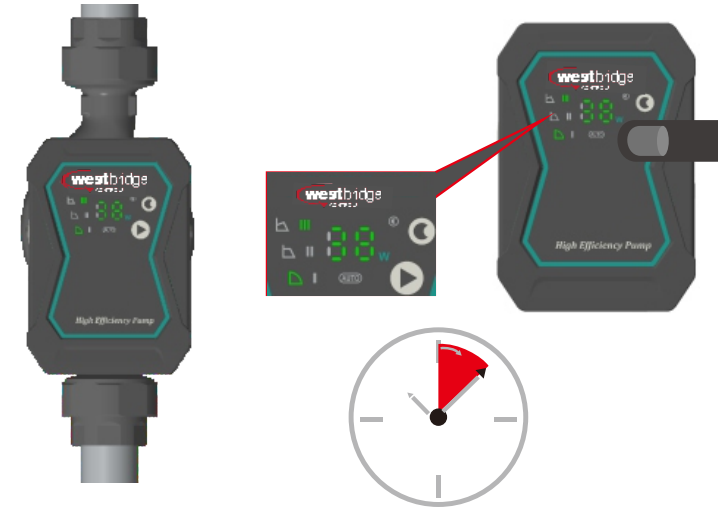
8.4.2 When the bypass valve is adjusted, set the pump to the min. or max. constant pressure mode.

9. Start

9.1 Before starting

9.1.1 Before starting the pump, it must be sure that the system is filled with liquid and air is drained out. The pump inlet must reach the min. inlet pressure required.

9.2 Exhaust the pump



The Pump boasts self-exhausting function. Before starting, exhausting is not required. The air in pump might cause noise, which will disappear after running for several minutes.

according to the system scale and structure, set the pump to be in speed III mode in short period so as to drain the air in the pump quickly. After that, the said noise disappears and set the pump as per the recommended instructions.



The pump cannot go idling without pumping liquid. Do not start the pump for system exhausting.

10. Relation between pump setting and performance

Relation between pump setting and performance is indicated with curve.

