

SHIMGE[®]
----- *for better life*

SERVICE MANUAL
INTELLIGENT FREQUENCY CONVERSION
CIRCULATION PUMP

Model:APS



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

SHIMGE PUMP INDUSTRY GROUP CO., LTD.

APS Intelligent hot water circulating pump

Warranty Card

Dear Customer:

Thanks for purchasing this product and sincerely hope that you will enjoy more happiness and leisure for your choice.

Now, please read and fill out this Warranty Card carefully. You will obtain reasonable and reliable guarantee and at the same time enjoy high quality service during warranty period as a result.

Pump model : _____

Production batch
number: _____

Invoice number: _____

Date of purchasing: _____

Purchased in: _____

User name: _____

Address: _____

Postal code: _____

Seal:

(This card is valid when affixed with the seal of the sales store.)

VI. 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 light is off | | a) One fuse is burned in device. | Replace the fuse. |
| | | b) Breaker is off. | Put the breaker on. |
| | | c) Pump doesn't work. | Replace the pump. |
| 0(Push button for 2 seconds in 5 minutes) | E0 twinkle | a) Pump is blocked b) Pump doesn't work | Remove impurities Replace the pump |
| | E4 twinkle | Over voltage or undervoltage. | Check whether the power supply is within the specified range |
| | P5 twinkle | Pump doesn't work | Replace the pump |
| E2 | | Pump doesn't work | Replace the pump |



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.

CONTENTS

| | |
|--|-------|
| 1. Product Overview ----- | 2 |
| 2. Model Description ----- | 3 |
| 3. Installation and Use ----- | 3-7 |
| 4. Operation Instructions ----- | 8-16 |
| 5. Technical Data and Installation Dimensions ----- | 17-18 |
| 6. Trouble shooting ----- | 19 |
| 7. Warranty Card ----- | 20 |

Precautions

- Carefully read this operation manual before installation and use.
- 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.
- The installer and operator must observe the local safe regulations.
- 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.
- Never install the pump in damp place or where may be splashed with water.
- For easy maintenance, install a stop valve at both sides of the inlet and outlet of the pump respectively.
- During installation and maintenance, it needs to cut off the pump power supply.
- For circulating of domestic hot water, water pump made from brass or stainless steel must be used.
- 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.
- It is strictly forbidden to start the pump without pumping liquid.
- Some models cannot be used for drinking water.
- 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.
- 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.
- In summer or when it is very hot, please pay attention to ventilation in case of moisture condensation, causing electrical fault.
- 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.
- If the pump will not be used for a long time, please close the inlet valve and cut off pump power supply.
- If the flexible cable is damaged, it requires professional personnel to replace it.
- 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.
- 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.
- The product should be placed beyond reach of children and should be isolated after installation in case of being available to children.
- The product should be stored in dry, ventilated, shady and cool place under room temperature.

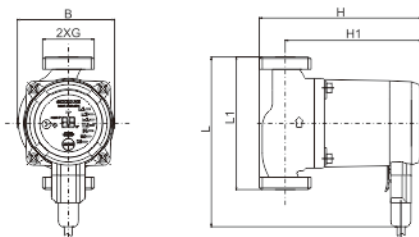
To prevent condensate water in the control box and the stator, the temperature of the pumping liquid in the pump must be higher than the ambient temperature.

| 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.

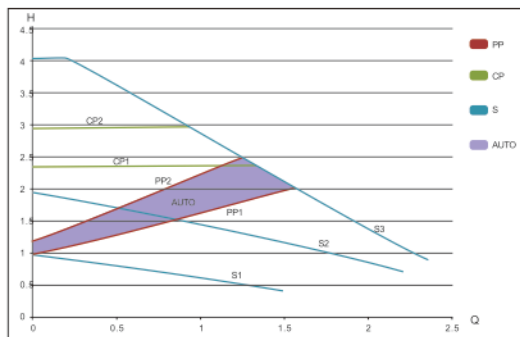
2. Installation dimensions

Dimensional sketch and dimensions table



| Type of pump | Dimension | | | | | | |
|-----------------|-----------|--------|-------|--------|-------|------|------------------------------|
| | H(mm) | H1(mm) | L(mm) | L1(mm) | B(mm) | G(°) | Weight (excluding cable) /kg |
| APS20-4/5/6-130 | 156.5 | 134 | 166.5 | 130 | 95.5 | 1° | 1.94 |
| APS25-4/5/6-130 | 158 | 134 | 166.5 | 130 | 95.5 | 1½° | 2.12 |
| APS25-4/5/6-180 | 158 | 134 | 191.5 | 180 | 95.5 | 1½° | 2.27 |
| APS32-4/5/6-180 | 164 | 134 | 191.5 | 180 | 95.5 | 2° | 2.46 |

(APSXX - 4 - XX)



V. Technical Data and Installation Dimensions

1. Technical Data

| | | |
|---------------------------|--|--|
| Supply voltage | 230V, -10 %/+ 6 %, 50Hz/60Hz, PE | |
| Motor protection | APS circulating pump doesn't need external motor protection | |
| Protection grade | IP 42 | |
| Insulation 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 | EN 61000-6-1 and EN 61000-6-3 | |
| 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 | |

I. Product Overview

1. APS IFC Circulating Pump

APS 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

APS 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.

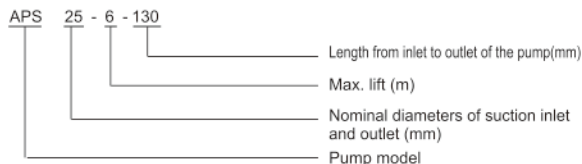
2. Features of APS IFC Circulating Pump

- 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 APS 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.
- ◀ IP42. Protection grade: IP42
- ◀ System pressure: Maximum 1.0 MPa(10 bar)

II. Model Description

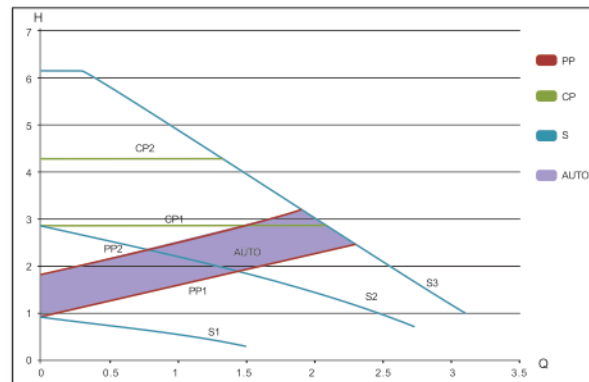


III. Installation and Use

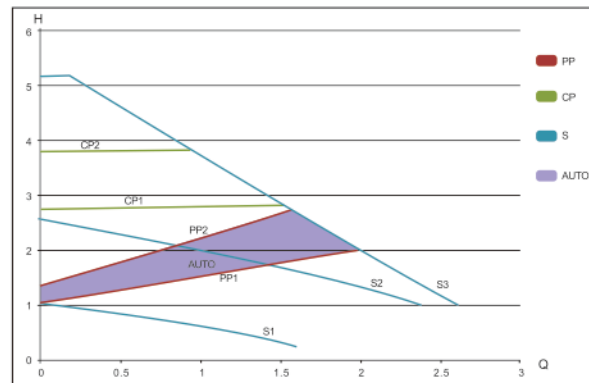
1. Installation Instructions

- 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 50MQ(MQ).
- 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

11. Performance curve (APSXX - 6 - XX)



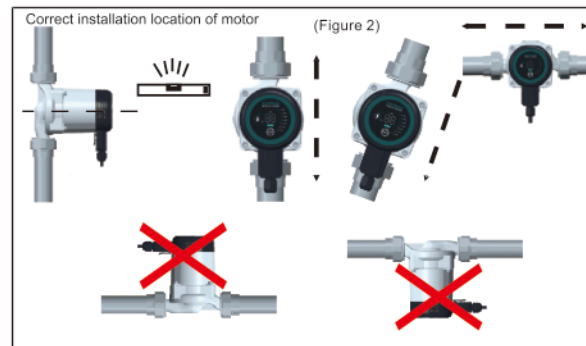
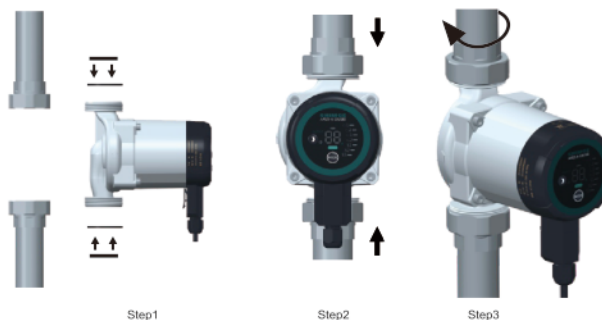
(APSXX - 5 - XX)



| Setting | Pump features | Function |
|-------------------------|--|---|
| AUTO Factory setting | Max. to Min. proportional pressure curve | Autoadaptation"mode, the performance of pump can be controlled within specified range automatically and pump performance can be adjusted as per system scale. |
| PP1 | Min. Proportional pressure curve | Adjust pump performance according to load change within a period. Under "Autoadaptation" mode, the pump is set to be proportional pressure control mode. The pump working point will move up and down at the Min. Proportional pressure curve according to flow demand of the system; when system flow demand increases, pump pressure increases. |
| PP2 | Max. Proportional pressure curve | The pump working point will move up and down at the Max. Proportional pressure curve according to flow demand of the system; when system flow demand decreases, pump pressure decreases; when flow demand increases, pump pressure increases. |
| CP1 | Min.constant pressure curve | According to the flow demand of the system, the pump working point will move back and forth at the Min.constant pressure curve. Pump pressure is constant and is irrelevant to flow demand. |
| CP2 | Max. constant pressure curve | According to the flow demand of the system, the pump working point will move back and forth at the Max..constant pressure curve. Pump pressure is constant and is irrelevant to flow demand. |
| III | speed III | APS will run at the constant curve at constant speed. In speed III mode, the pump is set to be running at the max.curve in any working conditions. |
| II | speed II | In short period, the pump is set to be speed I mode to drain the air in the pump.APS will run at the constant curve at constant speed. In speed II mode, the pump is set to be running at the medium curve in any working conditions. |
| I | speed I | APS will run at the constant curve at constant speed. In speed I mode, the pump is set to be running at the min. curve in any working conditions. |
| ② | ② | As long as specific conditions are met, APS will switch to auto night mode and run with lowest performance and power. |

2. Installation

2.1 Installation

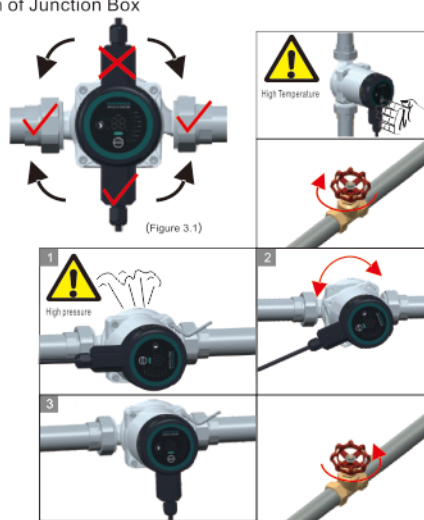


The arrows on the pump housing indicate the direction of liquid flowing through the pump.



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

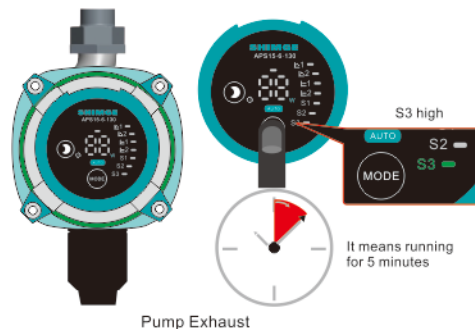
The junction box can be turned with 90° as a gear.

If necessary, it can change the installation location of the junction box, which might require allowable locations like Figure 3.1.

- Loosen it and take out four hex. Bolts that fixes the pump head. (Figure 1)
- Turn the pump head to the desired location. (Figure 2)
- Place back the four hex. bolts and tighten them in cross direction. (Figure 3)



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.



APS 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.

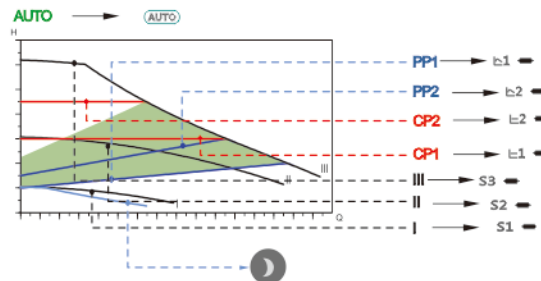
according to the system scale and structure, set the APS pump to be in speed III mode in short period so as to drain the air in the pump quickly. After that, the said noise disappears and set the pump as per the recommended instructions.

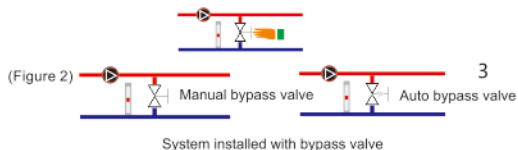


The pump cannot go idling without pumping liquid.
Do not start the pump for sytem exhausting.

10. Relation between pump setting and performance

Relation between pump setting and performance is indicated with curve.





8.2 Bypass valve

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.

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.

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 1)

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. (Figure 2)

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

2.4 Pump Body and System Heat Insulation



(Heat insulation of the pump body)

Restrict heat loss of the pump body and the pipeline.

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



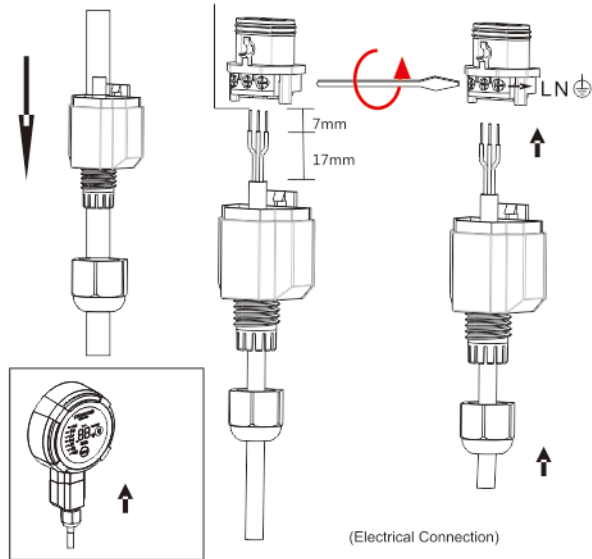
Do not insulate or cover the junction box and the control panel.

2.5 Electrical connection

Max. diameter is $\phi 10$ mm,
Min. diameter is $\phi 5$ mm

Insert cables and tighten them
in proper sequence

Cable is 0.75m²

**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.

- APS 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.

Note If speed I, speed II, or speed III are selected, auto night mode doesn't function.

Note If power supply is once cut off, it needs to restart the auto night mode.

Note 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, APS pump can be switched between the auto mode and auto night mode.

Switching between the auto mode and auto night mode by the APS 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, APS 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

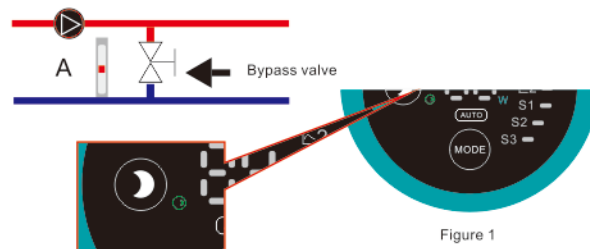


Figure 1

AUTO (Autoadaptation mode) is installed in the heating system and double pipeline system under the floor. "AUTO autoadaptation" 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 autoadaptation" mode at least one week before changing the pump settings.

If it chooses to change back to "AUTO autoadaptation" mode, APS pump can memorize the set point of "AUTO autoadaptation" 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.

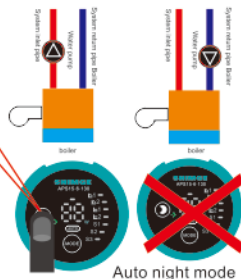
7.3 Auto night mode

Basic principle of auto night mode



Warning

APS pump installed in the heating system of the air boiler with small water capacity cannot be set to auto

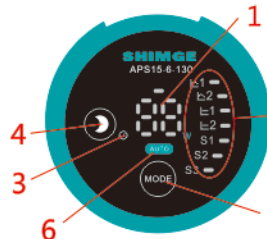


Auto night mode

IV. Operation Instructions

1. Operation Panel

1.1 Operation instructions for control panel



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

1.2 Description of side plate



| Location | Description | Location | Description |
|----------|---------------------------|----------|--|
| 1 | Series No | 7 | Rated current(A) Min. Mode Min. Current (A) Max. Mode Max. Current (A) |
| 2 | Temperature grade | 8 | Input power P1(Watt) Min. Mode Min. Input power P1(Watt) Max. Mode Max. Input power P1(Watt) |
| 3 | Insulation grade | 9 | Max. System pressure bearing(MPa) |
| 4 | Voltage(V) Frequency (Hz) | 10 | country of origin |
| 5 | Company name | 11 | Mark and certification mark |
| 6 | Company address | | |

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 " - -".
- 2.4 If failure displays, it has to cut off the power supply to troubleshoot. After troubleshooting, power on and start the pump.

3. Lighting area that shows pump settings

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



Eight Lighting Areas

| Pressing times | Lighting area | Description |
|----------------|-----------------------------|----------------------------------|
| 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 | III | Constant speed curve, speed III |
| 6 | II | Constant speed curve, speed II |
| 7 | I | Constant speed curve, speed I |
| 8 | AUTO | 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 4 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.

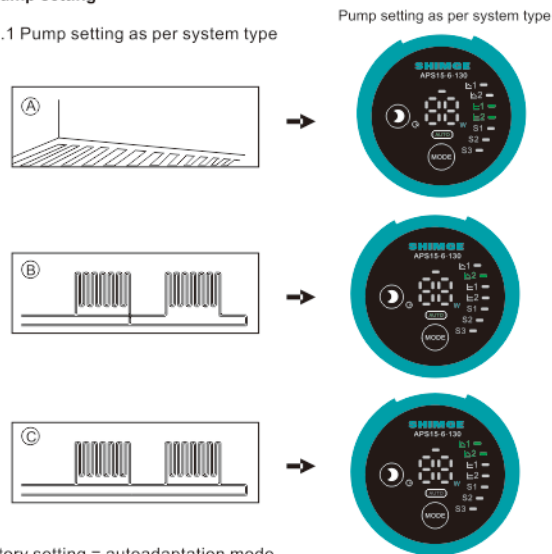
Factory setting: it doesn't set automatic night mode function. If APS pump is set to be speed I mode, speed II mode or speed III mode, it cannot choose automatic night mode.

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



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 Autoadaptation | Max. Constant pressure curve CP2 oder Min. Constant pressure curve CP1 |
| B | Double pipeline heating system | Autoadaptation | Max. proportional pressure curve PP2 |
| C | Single pipeline heating system | Min. proportional pressure curve PP1 | Max. proportional pressure curve PP2 |