



# 619-F

**Intelligent Controller for All-in-one  
Pressure Solar Water Heater**

## User Manual



Please read the instructions  
carefully before using the product

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# 1. Safety Guide

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We have checked the text and pictures in this manual to ensure the best description of our product and provide the best understanding for our clients. However, unexpected mistakes or errors are inevitable. We will not be held responsible for any incorrect or incomplete information and its consequences.

## 1.1 Installation & commissioning

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- When wiring, ensure NOT to damage any fire facilities of the building.
- Do Not install the controller in a room with flammable or explosive gases.
- Do Not install the product in a location exceeding the permitted environmental conditions.
- Ensure the power supply meets product specifications before powering the product on.
- All devices connected to the controller must be compatible with the technical parameters of the controller.
- Power off the system first before performing any manual operations on the controller. All operations on the circuit should be in full compliance with relevant safety rules. All operations such as connecting or opening the controller (such as replacing the fuse) must be performed by professionals.

## 1.2 Exclusion of liability

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We are not able to track whether the installation, operation, use, and maintenance of the controller are in accordance with the instructions and requirements listed in this manual. Incorrect installation and faulty operations can cause damages to materials and personnel. We will not be held responsible for any loss caused by the previous mistakes. The product, technology and installation described in this manual could be subject to change. For any changes, we will not make notifications.

In case of fault (such as breakdown) occurring during the operation, please switch the controller off first to avoid any further safety issues.

## 1.3 Description of signs

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**Safety Tips:** The safety sign is a triangular with a warning sign, which means the operation could cause physical injury and has safety risks.

**Operations:** Follow the operations indicated by the sign ►.

**IMPORTANT:** The above sign contains important information for operations and functions.

## 2. Product Functions & Features

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### **Functions:**

The new controller for pressure solar water heater contains two temperature sensors (for tank water temperature and pipe temperature respectively), which has the function of heating water to certain temperature with electricity through heating time control, back water pump output, water flow signal input, and electric pipe heating as well as output.

### **The main features of this product include:**

1. Temperature display & control: display tank water and pipe temperature.
2. Display solar heating related information based on weather conditions.
3. Back water circulating pump control: time or water flow switch control mode, ensuring effective operation of back water pump and avoiding water waste.
4. Electric heating control: Manual/automatic (AUTO)/customized mode.
5. Anti freeze for pipes: Double protection from electric pipe heating and circulating pump.
6. Independent control panel: Sleek and stylish.
7. Tank water high temperature warning: When unused for a long time, tank water temperature might be very high, and an alarm signal will be generated.
8. Antifreeze water tank.
9. Temperature unit can be switched between Celsius and Fahrenheit.
10. Others: Real-time clock; controller status held at power-down; switch on/off.
11. Child safety lock: Prevent change in settings caused by accidental operations.



## 3. Installation

### 3.1 Controller installation

Note: The controller should be installed at a location with adequate safety protections.

### 3.2 Wiring

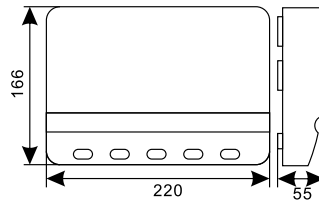
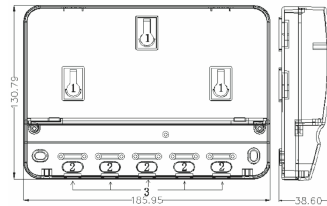
The wires for power supply box can go through the holes (2) at the back cover or the bottom (3) of the front cover.

Note: The wire should be fixed with the clamp (located above hole 2).

#### Power box installation:

(Figure 2.2.1)

- ▲ Choose a suitable location
- ▲ Punch hole (1) for upper fixation
- ▲ Tighten the screws
- ▲ Hang the power box



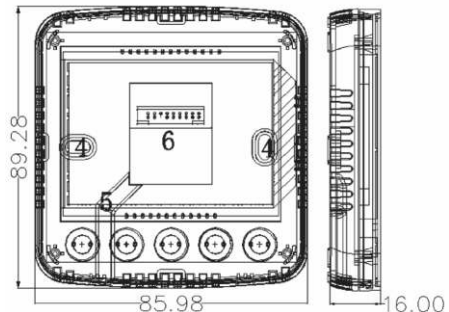
(Figure 2.2.1)

The wires for control box can go through back cover (6) or via wiring casing (5).

#### Control box installation:

(Figure 2.2.2)

- ▲ Choose a suitable location
- ▲ Fix points 4 to suitable spots
- ▲ Wire for control box can go through back cover (6) or via wiring casing (5)




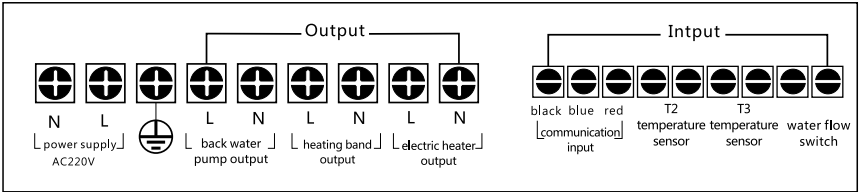
(Figure 2.2.2)

- ▲ The socket for controller must be grounded properly.

# 3. Installation


## 3.3 Terminals connection


 Power off the device before opening the box and ensure the full compliance with local power supply rules.



## 3.3 Terminals connection

**Power input:** 10A power supply (L-live wire; N-null line).

 is the terminal for ground, which should be connected correctly.

▲Before powering on the device, please fill the water tank first in order to prevent the risk of heating an empty water tank with electricity. 

### Output settings

**For electric heating output:** 30A relay. For safety reason, a safety margin is necessary and the load should be smaller than 2000W.

**For back water pump output:** 10A relay. For safety reason, the inductive load should be smaller than 400W.

### Input settings


The communication connection between the display and controller: follow the diagram to connect the terminals with the same colour (do NOT change the orders).

Temperature sensor T2: Tank temperature sensor (NTC10K, B=3435,  $\leq 105^{\circ}\text{C}$ ).

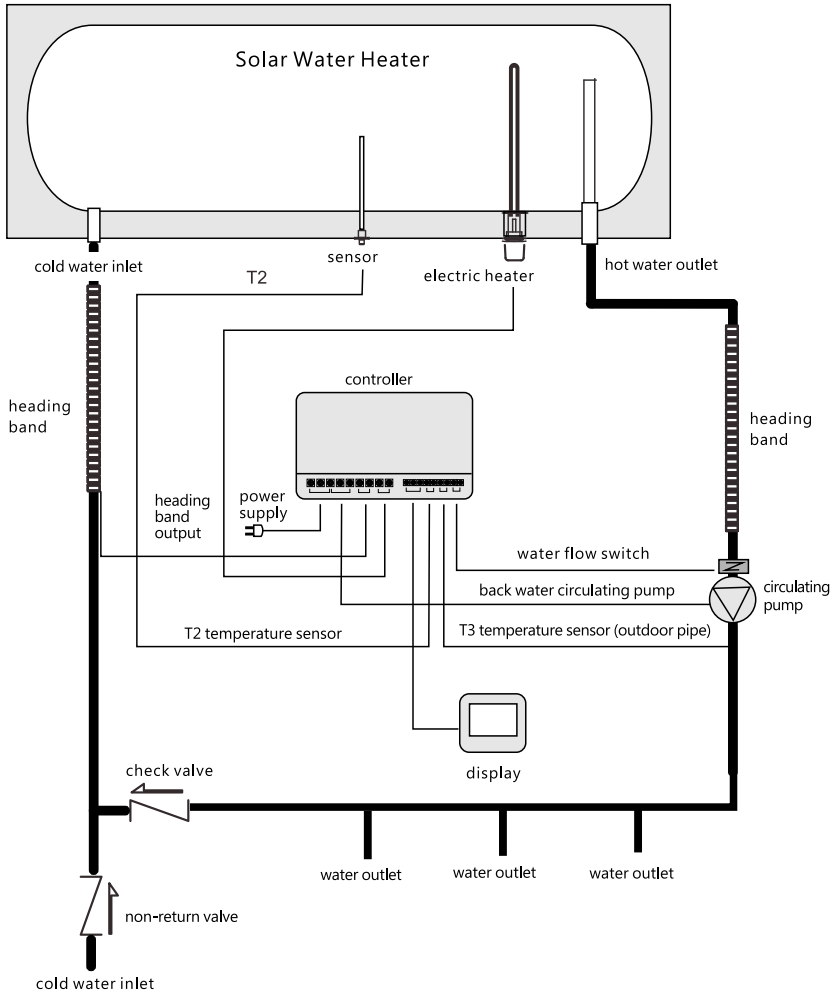
Temperature sensor T3: Sensor for back water pipe (NTC10K, B=3435,  $\leq 105^{\circ}\text{C}$ ) (optional).

For water tank, only temperature sensor with NTC10K and B=3435 is allowed (positive and negative terminals can be swapped). It is highly recommended to use original temperature sensor. We will not be responsible for the problems caused by using other types of sensors.

The wires for the sensors and communication carry low-voltage signals. In order to avoid crosstalk, they should be kept away from cables with over 200 voltage (minimum distance should be 100mm).

 Before connecting the main power supply, connect the sensors and communication wires to the input; then connect the electric heater, the back water pump, and heating band to the output. When the controller is powered on, the system time and controller parameters can be set.

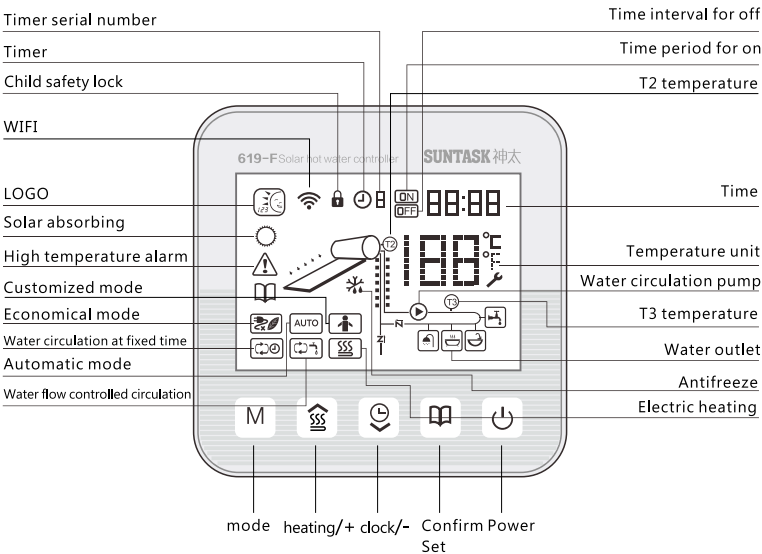
## 4. System Diagram





- Note:** 1. When outdoor temperature is below zero, the outdoor pipes should be equipped with an auxiliary heater and protected with insulating tube.  
2. Temperature sensor T3 should be installed on outdoor pipes (within the insulating tube).

# 5. Product Operations & Settings

## 5.1 Signs on the display & buttons




Usually, temperature from T2 is shown on the screen (temperature of water in tank). Press  to switch the display between the temperature of T2 (temperature of water in tank) and T3 (temperature of pipe). When it is absorbing solar energy, the sign  blinks.





## 5. Product Operations & Settings

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### 5.2 Switching ON/OFF

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Press  to switch the device ON or OFF. When it is switched on, the current status of the system will be displayed. When switched off, only "OF" and real time will be displayed.

When switched off, electric heating will be activated, and the circulating back water pump and heating band will stop working. Press and hold  for three seconds, and then the buttons will be locked with  sign displayed; press and hold  for three seconds to unlock the buttons, and the  sign will disappear.







### 5.3 Screen protection

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If no button has been pressed for 10 minutes, the back light of the screen will be off automatically. In order to perform any operations when the back light is off, activate the back light first to enable the buttons.

### 5.4 Setting time

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After pressing , hours of the time will flash, and press  to change the hours. Then press  again to select minutes, and press  to adjust it. Press  again to quit time setting. Hold button  to increase the number rapidly. After all the above operations, the time setting will be saved.







### 5.5 Settings for electric heating

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When the solar energy is not able to provide a temperature that is high enough, auxiliary electric heater can be activated. When the water temperature in the tank (T2) is over 5 degrees (setting temperature-temperature difference) lower than the set temperature, the electric heater will be enabled until the water temperature reaches the set temperature.

#### 5.5.1 Set temperature for activating electric heater

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Press  to set the temperature and the number of set temperature will flash. Press button  or  to change the set temperature (press  once to increase 1 °C and  to decrease 1 °C. Hold it for over 0.5 seconds to increase or decrease the number rapidly). After the temperature has been set, press  to quit the setting (if no operation has been performed for over 6 °C, the setting process will quit automatically, subject to user's confirmation). When the controller has detected that water temperature is lower than (set temperature-temperature difference), the electric heater will be activated until the water temperature reaches the set temperature. The set temperature can be between 10°C and 75°C. However, considering the life span of the components, it is recommended to set it under 60°C.

## 5. Product Operations & Settings

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### 5.5.2 Forced activation of electric heater



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At any working mode, hold  button for three seconds, and then the  sign and the parameter of temperature will flash. At this moment, set the temperature by pressing  or . If no button has been pressed for over 6 seconds or press , electric heater will be started automatically. Once it has been started, hold  button for three seconds to stop the electric heater. Manually forced activation of electric heater can only be performed once. When the water temperature has reached the set temperature or the electric heater has been stopped manually, electric heating will be cancelled.


### 5.5.3 Settings for electric heating













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
Press the button  to select "economical mode", "automatic mode" or "customized mode", which are represented by the signs of ,  and  respectively.

 **Economical mode:** Electric heater is disabled, and it can only be activated by holding the  button.

 **Automatic mode:** If solar energy is unable to heat the water to the set temperature, electric heater will be activated automatically (factory setting for sampling time is 16:00) until it reaches the set temperature. When the water temperature drops to 5 degrees lower than the set temperature, electric heater will restart. In the automatic mode, hold  button to disable automatic mode for that day.

 **Customized mode:** Three time periods for activating electric heater can be set based on personal preference. The setting process is:

Hold button  for three seconds, and then  1 and  will blink, which means it is ready to set the first time period. Press  button and then the sign  will be on, which means start time can be set now. Hours can be set by pressing button  or  and minutes can be set by pressing  button. Then press  again and the sign  will be on, which means stop time can be set now. For  2 and  3, repeat the above operations to set the corresponding time periods. During these time periods, when the water temperature reaches the set temperature, the electric heater will stop working; when the temperature drops to five degrees lower than the set temperature, the heater will start work again.

To disable one or two time periods, set both the start time and stop time to "00:00". When the electric heater has been activated, hold  button for three seconds to disable it for this time period.

## 5. Product Operations & Settings

### 5.6 Back water circulation-instant hot water from tap

To improve user experience, this controller adopted a function which provides instant hot water from the tap.

Two ways of controlling back water pump:

Fixed time control and tap control (water flow control, which is the factory setting)






#### **Water circulation at fixed time point and temperature:**

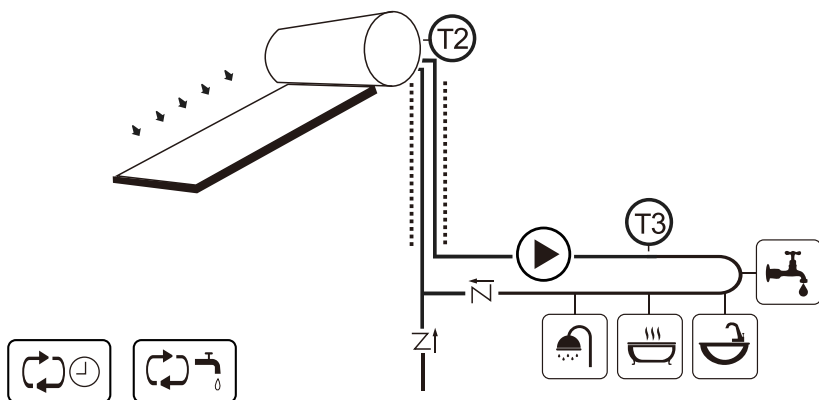
The circulating pump can be activated with certain time interval, which can be set based on your habit. This allows you to get instant hot water from the tap during certain time periods while the pump will not be activated out of these time periods, saving hot water.



#### **Water flow control mode:**

When hot water is needed, turn the tap on for 2 seconds and then turn it off (the digital signal of water flow is input into the controller). Then the circulating pump will be activated for a period of certain time (default: 90 seconds, which can be adjusted) after a time interval (default: 10 minutes, which can be adjusted). During the interval, the digital signal of water flow is input into the back water pump without starting water circulation. Out of the intervals, the digital input signal of water flow activates the pump again (Such control mode only allows the activation of the pump when hot water is needed, so it is energy efficient! When the back water pump has stopped, the  sign will blink during the interval, which means the water in the pipe is hot; however, the  sign will stop blinking out of the time interval, which means there is no hot water in the pipe).

When the circulating pump is working, the sign  blinks.



## 5. Product Operations & Settings

### Change the circulating mode:

Press and hold (M) button for 5 seconds to select the control mode. Then the (C) sign will flash. By pressing button (▲) or (▼) to switch between (C) and (D), and press (M) to confirm your selection.

### 1. Fixed time point and temperature control mode (C)

Press and hold (M) button for 5 seconds. Then press button (▲) (▼) and the sign (C) will flash. Press button (H) and the sign (1) will blink, which means you can set the time period 1 now. Press button (H) to turn the sign (ON) on to set the start time. Hours can be set by pressing button (▲) or (▼) and minutes can be set by pressing (H) button. Then press (H) again and the sign (OFF) will be on, which means stop time can be set now. Select (2) and (3), and repeat the above operations to set the other two time periods. To disable one or more time periods, set both the start time and stop time to "00:00". After the above operations, press button (H), and the value of temperature will blink. At this moment, press button (▲) or (▼) to set the temperature for the pipe. Then press button (H) to quit and save the above settings (For example, if the temperature is set to 36 °C, when the pipe temperature reaches 36°C, the pump will stop work; when the pipe temperature is 5 degrees lower than the set temperature, the circulating pump will start to work again. If pipe temperature still can't reach the set temperature after the pump has been on for 10 minutes, the pump will not be started again within this time period). The three time periods of factory settings are 6:00~8:00, 16:00~18:00 and 21:00~00:00 respectively. The default set temperature of T3 (pipe temperature) is 36 degrees (it can be set between 10 and 60°C with a step at 1°C). When pipe temperature is not lower than set temperature for over 5 degrees, the (E) sign will blink slowly, which means the water in the pipe is warm.

### 2. Water flow control mode (D)

Set the start time and stop time for the circulating pump: In order to save energy, the activation time period for the pump is determined by the length of the pipe (default time period: 1 minute and 30 seconds). Hold (M) button for 5 seconds and then press button (▲) (▼) to select the water flow controlled mode (the (D) sign will blink). Press button (H) to turn the sign (ON) on and press button (▲) or (▼) to increase or decrease the length of time period for 10 seconds (If ON1:30 is displayed, it means the activation time period for the pump is 1 minute and 30 seconds). Then press button to turn the sign on and press or to increase or decrease 1 minute for the interval between two activation period (If OFF10:00 is displayed, it means the time interval between two activations is 10 minutes). Time interval can be set between 1 and 30 minutes. Finally, press (H) to save and quit the settings. When fixed time point and temperature control mode is selected, if T3 sensor is open or disconnected (E3 will be displayed as the T3 temperature, which means T3 sensor is not connected. If T3 sensor has been connected, but it still displays E3, please check whether there is fault in sensor T3), the pump will still work based on the above activation time period and time interval.




## 5. Product Operations & Settings

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### 5.7 Antifreeze for pipes

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In the very cold days, even when the tank water temperature is warm enough for shower, if the pipe is frozen, we still can't get hot water from the taps at home. Therefore when the pipe temperature T3 is lower than 5 degrees, the controller will enable the heating band to prevent the pipe from freezing. When the heating band is switched on, its corresponding sign will blink and the antifreeze sign ❄️ will be on. When fault occurs to the heating band or it is not available, if pipe temperature T3 is lower than 2°C, the circulating pump will be forced to start until the pipe temperature reaches 10°C.

Disable heating band: Hold button  for 5 seconds until the sign ::::: disappears.

Enable heating band: Hold button  for 5 seconds until the sign ::::: is on.

The heating band is enabled in factory settings.



### 5.8 Antifreeze for tank

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When tank water temperature drops to lower than 5 °C in the cold days due lack of sunshine or disabled electric heater, electric heater will be forced to start until water temperature reaches 15°C.



### 5.9 Temperature unit switching

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Hold the  and  buttons at the same time for 5 seconds to select Celsius or Fahrenheit.

### 5.10 Parameter restoration

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Press   icon for 5 seconds at meantime to reset the original data, and show all the icon information on the display screen.

# 6. Warnings & Troubleshooting

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## 6.1 High tank water temperature alarm

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If there is adequate sunshine and the water in the tank hasn't been used for a long time, its temperature will become very high. When the tank water temperature reaches 85°C, the sign  and the number of the temperature will flash until measures have been taken and the water temperature drops below 85°C.

## 6.2 Fault signal

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Fault code	Failure to solve	The solution
 SSS	The icon keeps flashing, water temperature does not rise during the electric heating	Electric heating failure, need to be replaced
E2	T2 sensor failure or open circuit	Replace sensor T2
E3	T2 sensor failure or open circuit	Replace sensor T2
E4	Onboard temperature sensor failure	Check the sensor
E5	The load temperature is too high	Disable electric heater to allow the temperature to drop, and then the electric heater can be restarted
E6	The communication of the controller fails	Check the communication wires to ensure all the connections are properly done.
Ld	Leakage of electricity from the electric heater	Replace the electric heater

# 7. Quality Warranty

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We provide a 12-month warranty from the date of purchase. We guarantee our clients rights through the provisions of the purchase contract.

## Warranty

1-year

Name			
Seller			
Agent Code		Installation Date	
Installer Signature		Agent Telephone	

## 8. Specifications

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Dimensions	Power box:186x131x39mm; Controller box: 86x89x16mm
Power supply	AC220V±10%
Power consumption	≤6W
Temperature accuracy	±1%
Temperature Range	0~99℃ (32~199°F)
Electric heater	≤1500W , ≤3000W(custom made)
Heating band	≤500W
Circulating pump	≤250W
Sensor type	B=3435, 1%, 10K/25℃
Current leakage	8-15ma/0.2s
Ambient Temperature	Temperature -10℃~50℃, maximum 85℃, no condensation

## 9. List of Items in Package



Controller	1
Power supply cable	1
User Manual	1
Temperature sensor (5*45mm, with a 3m long)	2
Plastic expansion pipe	2
Cable cover (5, with 10 3*6mm screws)	Install on the external of the plastic power box
Screws for 86-type switch box (M4*40mm)	2

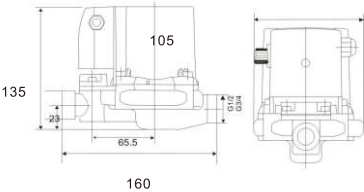
## Optional items

### Integrated intelligent circulating pump with water flow signal



- Water flow signal output interface
- Three-speed power adjustable
- Copper pump body base

Power	Voltage	Rotation speed	Discharge size	Maximum discharge flow
Threelevels (W)	AC	R/MIN	M	L/MIN
130/120/60	220	2800	9	45





Our products are subject to constant upgrade. In case of anything changes in design or specifications, we will not make any notifications. We reserve all the rights to interpret any possible misprint.

(SKEN190612-1000)