



# KAISAI

KHP-2.4/D270

## AIR SOURCE HEAT PUMP WATER HEATER

Installation and service manual

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## Installation and service manual

KHP-2.4/D270

Thank you for choosing Air Source Heat Pump Water Heater, please read this owner's manual carefully before operation and retain it for future reference. If you have lost the Owner's Manual, please contact the local agent or visit [www.kaisai.com](http://www.kaisai.com).

Manufacturer reserves the right to interpret this manual which will be subject to any change due to product improvement without further notice and reserves the final right to interpret this manual.

**USER NOTICE**

In order to operate the product safely, please read this manual carefully before installation and operation and pay more attention for the notices for operation and maintenance. Meanwhile, please keep this manual well for future reference.

Air source water heater is a kind of professional household electric appliances. Improper installation may cause damage or risk. Therefore, the installation and maintenance must be conducted by the professional person. User can contact with the appointed local installation service center. Before installation, please read the part of installation on this manual carefully and then install the unit according to the instruction strictly. The interpretation for this manual is owned by the manufacturer, which is subject to change without prior notice.

The air source water heater is a kind of heat storage type water heater. When you are using the water, please turn on the cold water valve at first, adjust the flow volume of cold water and hot water and then adjust the water to the proper water temperature to prevent scalding. If you don't use this water heater for a short time in winter, please keep this unit is energized for 24hours a day. If you won't use this unit for a long time, please drain out the water inside water tank and pipeline to prevent damage.

This instruction manual is the operation and installation instruction manual for the vertical coil type air source water heater. As for the operation method for the wired controller, please refer to the equipped instruction manual for the wired controller.

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## 1 SAFETY INSTRUCTIONS AND RECOMMENDATIONS

### 1.1 Symbols used



indicates the prohibited operations



indicates instructions that must be followed



indicates instructions to which special attentions must be paid



Notice: The special attentions must be paid



Caution: Risk of material damage



Warning: Risk of dangerous situation causing slight physical injury

## 1.2 Safety instructions and recommendations

Before you use this product, please read the following instructions carefully.



**For any exceptions such as burning smells, please cut off the power supply and then contact authorized maintenance center.**

If an exception persists, the air source water heater may be damaged, which may even cause an electric shock hazard or cause a fire.



**Do not operate the water heater with wet hand.**

Otherwise, an electric shock hazard may be caused.



Before installation, check whether the voltage of the local power grid accords with the voltage on nameplate of the unit, and capacity of the power supply, power cord or socket is suitable for input power of this unit.



**Dedicated lines must be used for the power supply to prevent a fire.**

Do not use multipurpose sockets or mobile wiring boards to connect wires. Otherwise, overheating or even a fire may be caused.



Pull out the power plug and drain the main unit and water tank when water heater is not in use for a long time to prevent cracking caused by cold weather.



**Do not damage wires or use undesignated wires.**

Otherwise, overheating or a fire may be caused.



**Before cleaning, please cut off the power supply.**

Otherwise, an electric shock hazard may be caused.



**Use dedicated circuits with a leakage circuit breaker protection for the power supply and ensure sufficient capacity.**

Otherwise, overheating, a fire, or an electric shock hazard may be caused.



Do not change the power cord or socket without any consent. Wiring tasks must be completed by qualified electricians. Ensure proper grounding for the metal part of the unit, and do not change the grounding mode.



**The unit must be securely grounded! The grounding wire must be connected to a dedicated apparatus of the building.**

If the unit is not grounded, contact qualified personnel for installation. Do not connect the ground cable to the gas pipe, water pipe, drainage pipe, or any other places considered improper by professional personnel.



**Do not put any foreign matter into the unit. Otherwise, the unit may be damaged or cause hazards. Do not put your hands into the air outlet of the main unit.** Otherwise, hazards may be caused.



**Do not repair the unit by yourself.**

Improper repair may cause an electric shock hazard or a fire. For repair services, contact the appointed service center.



**Do not stand on the main unit or water tank, or place any object on it.**

Otherwise, the main unit or water tank may be deformed or damaged, or even hazards may be posed when a person or object falls off.



**To save energy more efficiently, install the main unit at a well-ventilated place. Do not block the air inlet or outlet of the main unit.**

Otherwise, energy efficiency may be reduced, and shutdown or even a fire may be caused.



**Keep chemical sprays, gas tanks at least 1 meter away from the main unit.**

Otherwise, fire hazards or explosions may be caused.



**Check whether the base of the main unit is damaged.**

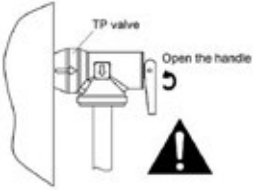
If the base is damaged and not fixed, the unit may fall off, causing hazards.



To improve durability of the water tank, a Magnesium rod is installed inside the water tank. The Magnesium rod has a lifespan of two to three years, and must be replaced by professional maintenance personnel if a replacement is required.

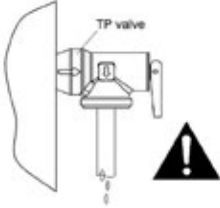


**When the water tank has no water or not full filled, do not power on the unit.** Otherwise, the unit may be damaged or a fire may be caused.

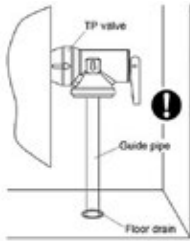


**Open the TP valve handle on a regular (about one month) basis to check whether it is blocked. Perform sewage disposal by following the guide on a regular (about once a year) basis.**

Notes: The TP valve provided by user.

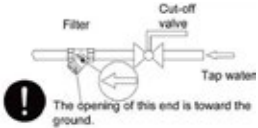


It is normal that the TP valve drips.

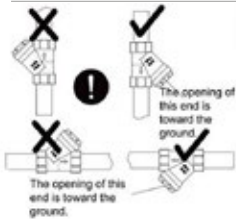


**The pressure relief opening of the TP valve must be connected to one end of a securely fixed guide hose, and the other end is connected to the floor drain.**

Ensure that the guide hose is not twisted or folded.



You are advised to install the filter horizontally after the main shutoff valve of the user's water pipe. Ensure that the direction indicated by the arrow on the filter must be the same as the water flow. If impurities inside the waterway need to be cleared, open the end cap of the filter.



When the filter is installed vertically, the direction indicated by the arrow must not be upward and the end cap must be placed slantwise downwards.



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 possibly to promote the sustainable reuse of material resources. To return you 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.



This unit contains fluorinated gas with greenhouse effect covered by the Kyoto Protocol. Maintenance and disposal must be carried out by qualified persons only.

Refrigerant gas R134a, GWP=1430.



The fuse model and rated value are in accordance with the corresponding controller or the silk screen attached on the protective tube.

## 2. TECHNICAL DESCRIPTION

### 2.1 General description

#### High-efficiency and energy-saving

This unit adopts the adaptive control of the electronic expansion valve, whose opening angle will be adjusted automatically according to the working condition of the unit. This unit is using the heat in the air to heat the domestic water. It will operate at the optimized condition all the time under the condition of ensuring reliability. The water tank adopts external winding microchannel heat exchanger, which is contacted with the inner port directly for ensuring high heat-exchanging efficiency and better pressure-bearing capacity. The high-efficiency heat-conducting materials are adopted between microchannel heat exchanger and inner port of water tank for better thermal conductivity.

#### Reliable and durable

Adopt the special compressor for the heat pump water heater, high temperature and high pressure resistant. The water tank adopts the advanced stainless steel inner port, equipping with the anticorrosive design for the super-long magnesium. The complete unit is with multiple kinds of protection.

#### Eco-friendly and safe

Adopt eco-friendly R134a refrigerant, no pollution to air and no risk of carbon monoxide poisoning for ensuring safety.

#### Convenient for installation

The installation is not limited by the environment, which can be installed at car barn, storage room, basement, balcony and so on. Not need person to take care of it. It's applicable for family and villa and other places, no circulating waterway system. It's very convenient for installation and maintenance.



**Deluxe configuration**

The unit is equipped with high-class touchable wired controller. There's hotwater, save, preset, night and electric heating five kinds of heating mode for free selection. The setting range for the water temperature is 35°C~70°C. You can select fast heating, timer ON and OFF, preset, i-know, disinfect and other functions.

**Intelligent defrosting**

The unit is with freeze prevention and auto defrosting functions, which can solve the problem of icing and frost.

**High water temperature**

The highest heating temperature for the heat pump can be up to 70°C, which can satisfy the requirement for different places and users.

**All-weather operation**

This unit can provide hot water all the year round.

**2.2 Main parts****2.2.1 Appearance**

Because of the product improvement, the actual product may be different from the skect map. Please refer to the actual product.



Fig. 2-1 Sketch map for the appearance

- 1 Compressor
- 2 Inspiration temperature sensor
- 3 Refrigerant-affusing nozzle
- 4 Wiring box
- 5 Controller
- 6 Faceplant nog
- 7 Wire hole
- 8 Water temperature sensor
- 9 Magnesium rod
- 10 Water temperature controller
- 11 Electric heating component
- 12 Water temperature sensor
- 13 Cold water inlet
- 14 Drain outlet
- 15 Microchannel heat exchanger
- 16 Hot water outlet
- 17 TP valve meatus (provided by user)
- 18 Condensate drain outlet
- 19 Fan
- 20 Fan groupware
- 21 Evaporator
- 22 Electronic expansion valve
- 23 Four-way valve
- 24 High pressure switch
- 25 Exhaust temperature sensor

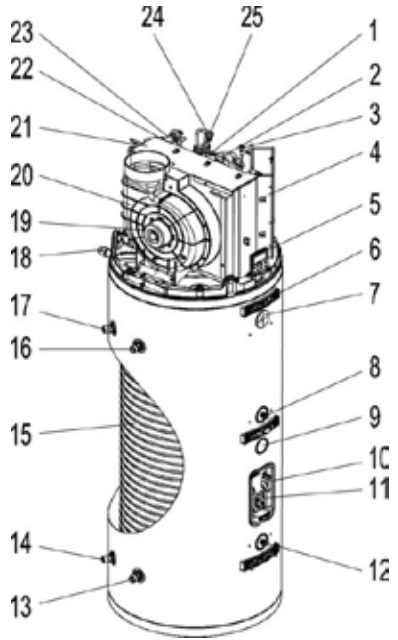


Fig. 2-2 Sketch map for main parts

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### 2.3 Operating principle

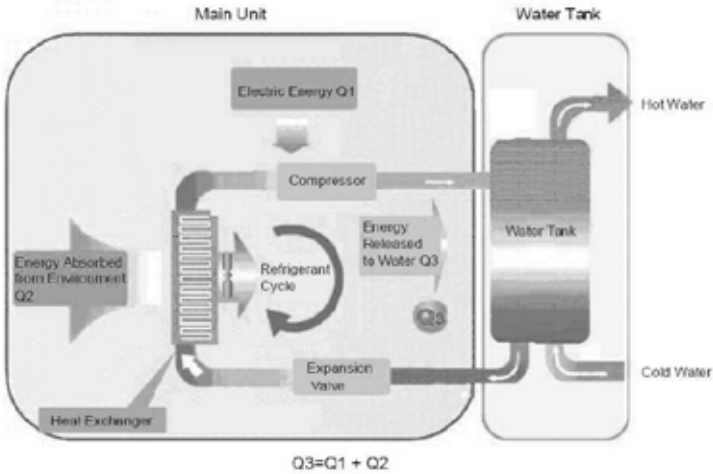


Fig. 2-3 Working principle diagram for the air source water heater

The air source water heater is driving the compressor by some part of electricity by using the heat pump principle. Through the thermal circuit, absorb the heat from the low-grade energy (air) in the surrounding environment, transmit it to the heat exchanger of water tank and then release it to the water inside the water tank for heating water.

The heating principle for air source water heater and heat pump air conditioner is the same. Heat pump air conditioner supplies the absorbed heat from natural environment to indoor air, while air source will use that heat to heat domestic water. Air source water heater is a kind of new, high-efficiency, energy-saving and eco-friendly water heater.

### 2.4. Technical specifications

Model		KHP-2.4/D270
Rated Heating Capacity <sup>(1)</sup>	W	2400
Rated Input Power <sup>(2)</sup>	W	685
COP <sup>(3)</sup>	W/W	3.50
Capacity	L	270

Load Profile	-	XL	
COPDHW <sup>(*)</sup>	W/W	2.61	
Energy Efficiency Class <sup>(**)</sup>	-	A	
Water Heating Energy Efficiency <sup>(**)</sup>	-	105%	
Annual electricity consumption (average climate conditions)	kWh	1594	
Maximum Input Power	W	1300+1500W (Electric Heater)	
Outlet Water Temperature	°C	Default: 55°C, 35°C~70°C	
Power Supply	-	220V-240V ~50Hz	
Insulation Level	-	I	
Protection of Ingression	-	IPX4	
Refrigerant	Name		R134a
	Charge	kg	1.10
Outline Dimensions	W x D x H	mm	660×667×1958
Package Dimensions	W x D x H	mm	813×813×2100
Gross/Net Weight	kg	See the nameplate	
Sound Power Level <sup>(***)</sup>	dB(A)	60	
Operating Range	°C	-7~45	

**Notes:**

(\*) Value obtained with the following conditions: Outdoor temperature: 20°C DB/15°C WB; Water tank temperature (start/end): 15°C /55°C.

(\*\*) Value obtained with an air temperature of 7°C and a water inlet at 10°C, as per EN16147-2011, (EU) No 814-2013.

(\*\*\*) Value obtained indoor placement, with 2m long suction and backflow conduits, as per EN 12102-2008, (EU) No 814-2013.

The installation of suction and backflow conduits on the heat pump lessens its performance. Under RAPID function, electric heater helps to heating water. Please always see the nameplate for the exact data as this table is subject to change.

### 3. INSTALLATION

#### 3.1 Important hint

1. The air source water heater must be installed by professional person according to national wiring regulation and this instruction manual.
2. Although the heat pump can operate when the ambient temperature is above  $-7^{\circ}\text{C}$  the water heater can only be put indoors and must be installed at the places where the ambient temperature is above  $0^{\circ}\text{C}$ . If the ambient air temperature falls lower than  $0^{\circ}\text{C}$ , the condensate water drainage may be freezing.
3. If it needs to install and move the air source water heater, please contact with KAISAI appointed local maintenance center. If the air source water heater is installed by unappointed unit, KAISAI won't take the responsibilities for the malfunction and other problems due to the installation.
4. If the users use the own prepared installation materials to install the air source water heater, KAISAI won't take any responsibilities for all the loss due to leakage of pipeline, drop of unit and poor installation.
5. The water quality for the air source water heater should comply with the local sanitation standard for the domestic drinking water.

#### 3.2 Basic requirement for the installation position

If the product is installed at below places, it may cause malfunction for the air source water heater. If it's unavoidable, please contact local KAISAI appointed maintenance center to purchase special models.

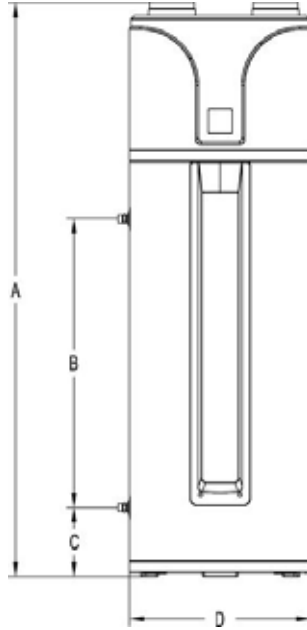
1. There are thermal sources, steam, flammable gas and explosive or volatile substances.
2. There are high-frequency equipments, such as welding machines, medical facilities.
3. Coastal places.
4. There's oil (machine oil) in the air.
5. There's sulfureted gas (sulfur spring).
6. Special places.

#### 3.3 Selection for installation positions

1. Suggest to install the unit indoors.
2. he noise and discharge air won't disturb neighbours, animals or plants.
3. Make sure the good ventilation for the water heater; air inlet and air outlet of water heater can't be blocked.
4. The installation position should bear the weight and vibration for the water heater.
5. Select the dry place. The unit can't be exposed at direct sunshine or strong wind.
6. Make sure the heat exchanger comply with the requirement of the installation drawing issue; the unit should be installed at the place where's convenient for maintenance and inspection.
7. Select the place where is beyond the children.

**3.4 Installation space requirement and installation drawing**

3.4.1 Main size



Model	KHP-2.4/D270
A (mm)	1958
B (mm)	984
C (mm)	235.5
D (mm)	620

Fig. 3-1 Sketch map for main size

3.4.2 Installation requirement

1. Do not point the air outlet of water heater at the upwind direction.
2. The water heater should be installed at the places where the ambient temperature is above 0°C. The distance between hot water outlet and the hot water using position can't be too long. Conduct heat treatment protection for the hot water pipeline to reduce heat loss.

3. The distance between water heater and surrounding wall or other shelter objects can't be too small. The installation space should satisfy the drawing requirement.
4. The water heater should be installed at the solid place uprightly. Fix the water heater with ground bolt if necessary.
5. There should be tap water pipe, joint of hot water pipe and floor drain nearby the water heater for water supply for water tank, hot water supply and water drainage.
6. Condensate water drainage: connect the drainage hose to the drainage hole on the unit according to the drawing tightly and then lead to drainage hose to proper place for discharge.

### 3.5 Water pipe connection

#### 1. Pipeline preparation

Adopt the special pipe for the hot water exit pipe of water heater. S2.5 series PPR pipe with the external diameter of dn20 are suggested. If adopt other similar insulated pipe materials, you can select it by referring to above external diameter and the pipe thickness. Aluminium pipe are not suggested to be adopted.

#### 2. Installation of water inlet pipe and water outlet pipe of water tank

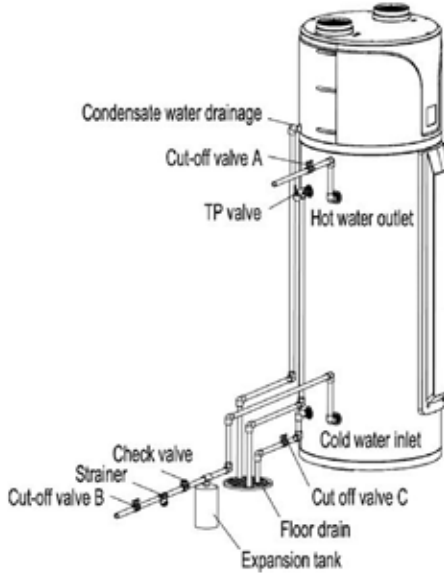
The water inlet pipe must be installed with safe device, strainer and cut-off valve, and the installation sequence must be the same with the sketch map of unit installation. A cut-off valve must be installed on the water outlet pipe.

For the convenience of drainage or clean for water tank, you are suggested to install a three-way valve and a cut-off valve at the water outlet of water tank.

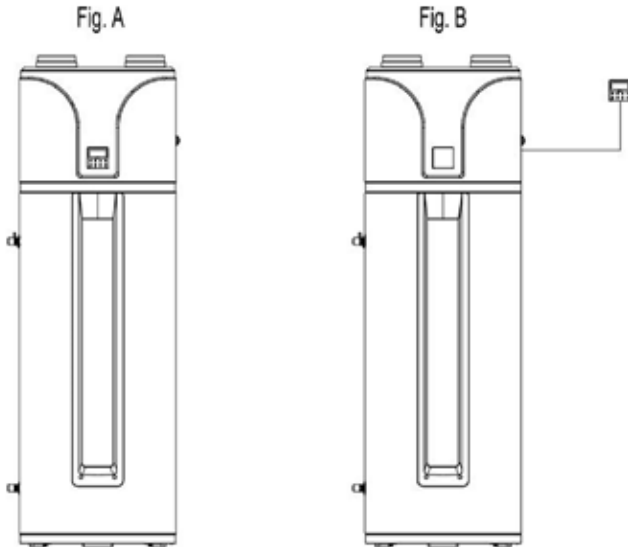
#### 3. Installation of drainage pipe

Take out the choke plug of drainage outlet, and then connect the drainage outlet and the floor drain with pipeline. The position for the connection end for drainage pipeline and floor drain should be lower than the bottom part of water tank; otherwise, the water can't drained completely. A cut-off valve must be installed at the drainage pipeline, and the cut-off valve must be installed at the position where is convenient for the operation.

**3.6 Installation sketch map**



**3.7 Installation Instruction of Wired Controller**





**1. Fig. A** is the standard installation way of wired controller. The wired controller is installed on the unit before ex-factory.

**2. Fig. B** is the detached installation way of wired controller. Long communication wire shall be equipped to install the wired controller on the wall. If this kind of installation way is adopted, please contact the after-sales installation personnel to select the communication cable with proper length.

### **Instructions for installing the wired controller on the wall:**

1. Remove the 6 fixing screws on the top cover.
2. Remove the top cover.
3. Remove the 6 fixing screws on the front outer case subassembly.
4. Remove the front outer case subassembly.
5. Remove the 3 fixing screws of the gland of wired controller.
6. Remove the gland and wired controller (please keep the gland of wired controller properly for future use).  
Please change the original short communication cable with long communication wire, which is led out from the cable-crossing hole of unit.
7. Install decoration cover.
8. Tighten the fixing screw of decoration cover.
9. Install the front outer case subassembly.
10. Tighten the 6 fixing screws of front outer case subassembly.
11. Install the upper cover.
12. Tighten the fixing screw of upper cover.
13. Connect the wired controller with long communication cable and then install the wired controller on the wall.

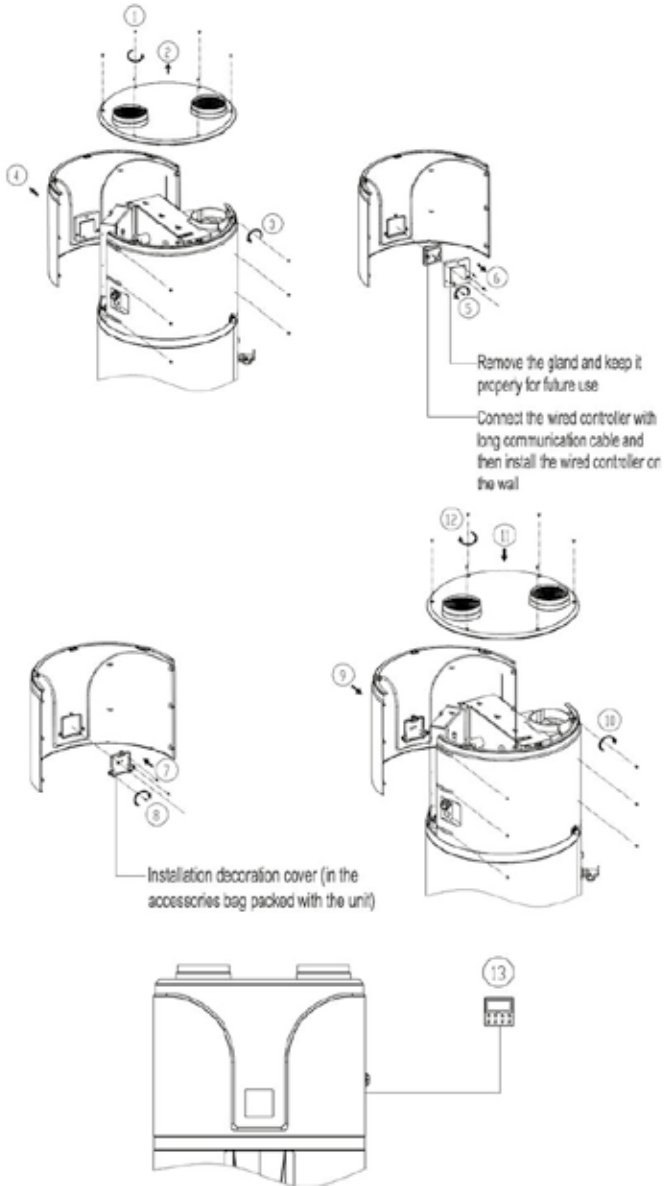


Fig. 3-2 Sketch map for Installation Instruction of Wired Controller

### 3.8 Wired Controller Installation

#### 3.8.1 Requirements for Wired Controller Installation Locations

1. Do not install the wired controller in a wet place or a place exposed to direct sunlight.
2. Do not install the unit or wired controller of the air source water heater in a place susceptible to electromagnetic interference.
3. Ensure that the communication line is connected to the correct interface. Otherwise, communication will be failure.

#### 3.8.2 Wired Controller Installation

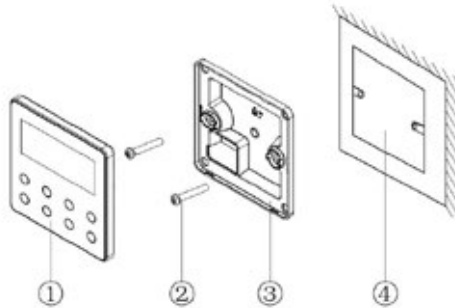


Fig. 3-3 Accessories of Wired Controller

No.	1	2	3	4
Name	Front panel of wired controller	Screw	Soleplate of controller	Socket's base box installed in the wall

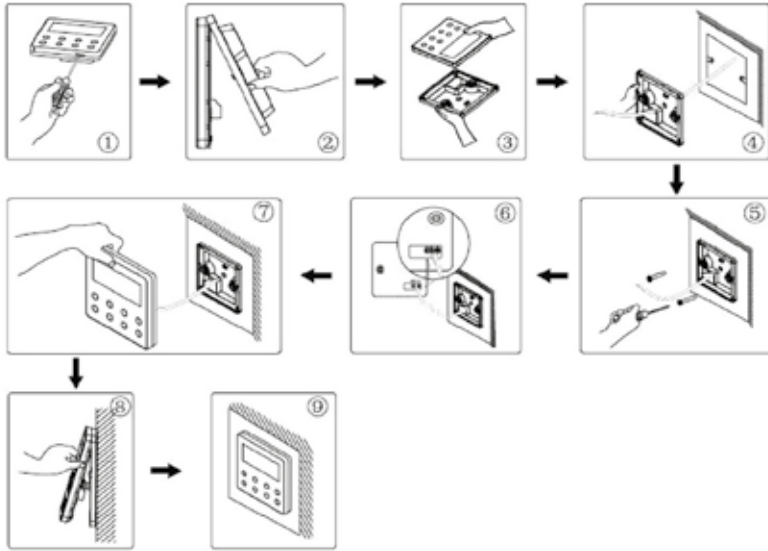


Fig. 3-4 Installation Diagram of Wired Controller

Fig. 3-4 is the installation diagram of wired controller. Cut off power supply of heavy-current wire embedded in mounting hole in the wall before installation. The installation method is as below:

Pry the removal port with straight screwdriver to separate the front panel and soleplate of wired controller.

Pull out the communication cable(4-core twisted pair wire) in the base box and then make the communication cable go through the hole of soleplate of wired controller.

Joint the controller's soleplate and base box with screws.

Insert the communication cable(4-core twisted pair wire) into controller's slot.

Buckle the front panel and soleplate of controller together.

**CAUTION**

During the following connections, pay special attentions to prevent malfunction due to electromagnetic interference:

The communications line of the wired controller and the line of the temperature sensor should be separated from the power cable, and the distance between them should be greater than 20 cm. Otherwise, the unit may not be able to communicate properly.

If the unit is installed in a place susceptible to electromagnetic interference, the communications line of the wired controller and the line of the temperature sensor must be used. Shielded twisted pair.

### 3.8.3 Rainproof Box Installation

If the wired controller is to be installed in outdoors or dank places, please install a rainproof box for wired controller. Pay attention to cut off the power supply of heavy current wire embedded in the installation hole of wall. The whole installation procedure shall be done without electricity. The installation method is as follows:

Separate the panel of wired control and bottom plate with a flat screwdriver.

Pull out the communication wire(4-core twisted pair wire) inside the installation box and make this wire go through the wire-crossing hole of rainproof box and wired controller bottom plate.

Secure the bottom plate of wired controller, rubber cushion, rainproof box at the installation box with screws; if there is no installation box in the wall, please drill hole on the wall and install plastic expansion pipe. Secure the bottom plate of wired controller, rubber cushion and rainproof box at the plastic expansion pipe with tapping screws(plastic expansion pipe and tapping screw are provided by our company).

Insert the communication cable(4-core twisted pair wire) into the groove of wired controller. Align the panel of wired controller with the bottom plate and then fasten them together.

Note: When disassembling the wired controller, please use the flat screwdriver carefully (As shown in Fig. 3-6).

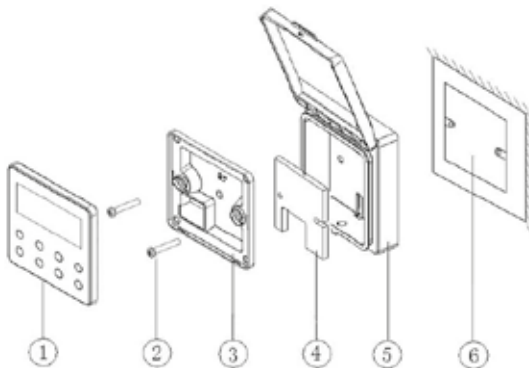


Fig. 3-5 Rainproof Box Accessories of Wired Controller

No.	Name	No.	Name
1	Panel of wired controller	4	Rubber cushion (rainproof box)
2	Screw	5	Rainproof box
3	Bottom plate of wired controller	6	Installation box inside the wall

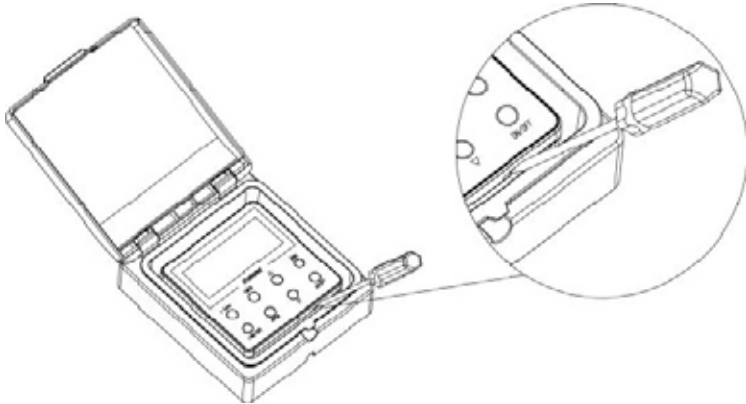
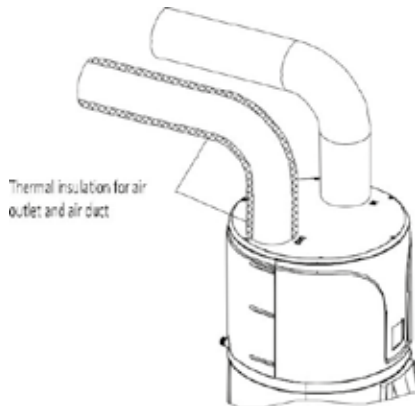


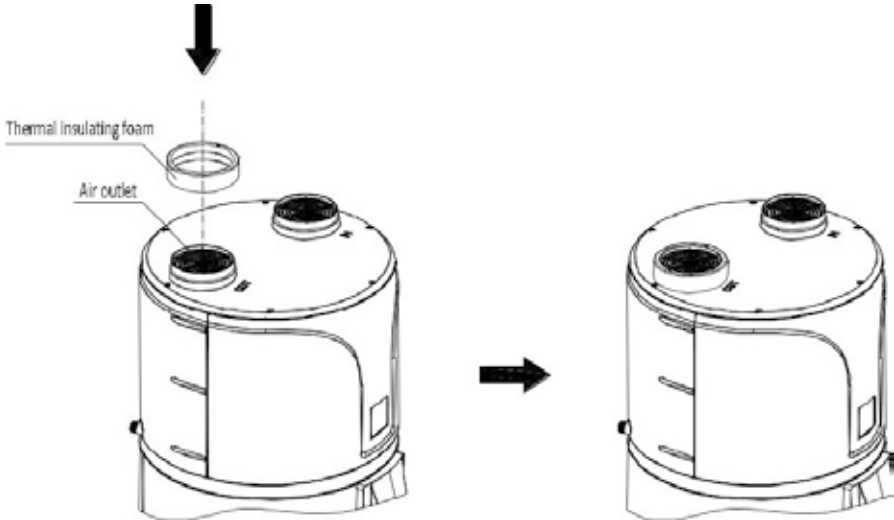
Fig. 3-6 Disassembly Diagram of Wired Controller

### 3.9 Thermal insulation for air outlet to prevent condensate water

1. When installing the unit with air duct, please conduct thermal insulation for air outlet and air duct to prevent condensate water.



2. When installing the unit without air duct, please install the equipped thermal insulating foam at the air outlet to prevent condensate water at air outlet. See below fig.



## 4. ELECTRIC INSTALLATION

### 4.1 Precautions on Safety

1. This air source water heater is class I appliance. Ensure that wire layout is performed by professional personnel according to national wiring rules.
2. Ensure that a switch for all-pole disconnection is available for the fixed lines and is directly connected to wiring terminals of the power supply. Ensure that contactor opening distance on all poles meets the disconnection requirements under overvoltage category III conditions.
3. Ensure that reliable earthing are taken. A dedicated grounding apparatus should be used.
4. Use the power supply with specifications provided in the nameplate, and use circuits dedicated for air conditioners.
5. Copper-conductor cables must be adopted for power cables, and the operating temperature should not greater than the stipulated value. The diameter of the cables should be large enough. For details, refer to Table 9-1. If the length of the power cable is greater than 15 meters, choose a power cable with a larger cross-sectional area to prevent problems caused overloading. Do not pull the power cable during the installation.

6. Use independent fixed socket for the supply. The structure of the socket must match the power plug of the water heater and be in line with relevant national standards. The socket should be placed in the safe position that is out of the reach of water and does not cause electric shock hazards. It must not be placed in the bathroom, kitchen, balcony, and other wet places.

7. Do not use the socket converter, extension cords, or wiring boards to adapt to the size of the plug of the water heater, and do not use another plug to for the socket. The water heater should use independent wires, and do not share a line with other appliances.

8. If the power flexible wire is damaged, it must be replaced by professional personnel of the vendor, maintenance center of the vendor, or relevant other department to avoid dangers.

Table 4-1 Power configuration table

Model	Power type	The minimum sectional area for power cord (mm <sup>2</sup> )			Switch (A)
		Live wire	Neutral wire	Earthing wire	
KHP-2,4/ D270	220V-240V ~50Hz	1.5	1.5	1.5	16

**4.2 Connection of electric wire**

If the unit is equipped with earth wire, please connect one end of earth wire to earthing screw of water tank, and the other end to the earthing screw of the wiring box for the right side plate of main unit.

Please select the proper power cord according to the power configuration table and then connect it to the main power.

Fix the heavy-current wire with wire-fixing clamp and reinstall the wiring box cover.

**5. DEBUGGING FOR THE COMPLETE UNIT**

When the waterway system and the electric wires for air source water heater are installed well, please check the unit according to below table.



Table 5-1 Check table for the unit

Check items	If the unit is not installed properly, it may cause below circumstances
Check whether the water heater is installed reliably?	The unit may rave about, vibrate or give out sound.
Check whether there're obstacles at the air inlet and air outlet?	The unit can't operate normally.
Check whether there's proper insulated pipeline for the pipe of water tank?	There may be the risk for safety.
Check whether the insulation measure is conducted well for the water pipeline?	It may affect the performance of unit and the pipeline damage be frozen up.
Check whether the power voltage is same as that on nameplate?	There may be malfunction for the unit or parts may be burnt out.
Whether the model of electric wire complies with the regulation?	There may be malfunction for the unit or parts may be burned out.
Check whether the water inlet pipeline is installed with safety device?	The operation pressure for the water tank is high and there's the risk of safety.
Check whether the water replenishing pressure for tap water is too high?	The operation pressure for the water tank is too high. If the unit is generating water successively, there will be abnormal sound.
When the water replenishing pressure is high, check whether the pressure stabilizeing valve is installed on the water inlet pipeline?	The operation pressure for the water tank is too high. If the unit is generating water successively, there will be abnormal sound.
Check whether the earth wire for the water heater is reliable?	There may be the risk of safety.

**When above items are OK, please debug the unit for the complete unit. The debugging procedure is as below:**

- Add water for the water tank: Add water for the water tank according to 9.1 or the mark on the water tank, and then check whether there's water leakage for the pipeline and joint. As for the initial installation,, It must be operates by installor. If user operates it again after discharging water, it also needs to add water before turning on the unit.
- Energize the complete unit: After be energized, the wired controller will give out a sound. Observe whether the display on the wired controller is normal. The wire controller is with memory function. For the first time be energized, wire controller may display OFF or stand-by.
- Engineering parameters setting on wire controller: System clock time setting, disinfection function setting, etc.
- Complete unit operation: After the unit is filled with water, check the water system. Confirm the faucet or the sprayer heat is turned off. Turn on the unit when the cut-off valve at the water inlet pipe and water outlet pipe is opened. When the wired controller is displaying the heating icon, check whether the unit operates normally. Determinant standard: the fan operates normally, the complete unit operates normally; there's no obvious vibration and abnormal sound; let users operate by themselves after the unit has operated normally for at least 20 min.

## 6. METHOD FOR ADDING OR DISCHARGING REFRIGERANT

### 6.1 Add refrigerant

Connect the middle hose from refrigerant manometer to the refrigerant tank, connect one end of blue hose of low pressure manometer to the refrigerant-affusing nozzle of gas valve (do not tighten it), open the valve of refrigerant tank, open valve next to the low pressure manometer to discharge air for 5S and then close it, and then tighten the hose joint on the nozzle of refrigerant-charging nozzle. When the low pressure needle on the manometer is decreasing slowly, twist off the valve next to the low-pressure manometer to add refrigerant.

### 6.2 Discharge refrigerant

To open the refrigerant-affusing nozzle of gas valve to discharge the refrigerant.

#### **Notice:**

This operation must be finished by professional persons. Do not operate it by yourself to avoid hazard. Refrigerant must be charged according to the volume indicated on the nameplate.

## 7. UNIT SPECIFICATION

### 7.1 Hot water generation capacity

During heating, the unit will absorb the heat from outdoor air constantly and then release the heat to water for heating the water inside the water tank. Once the outdoor temperature is decreased, the heating capacity will also be decreased. Please refer to the below curve for reference.

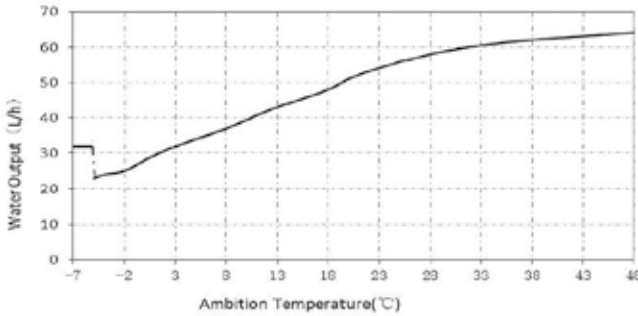


Fig. 7-1 Correction diagram of water generation capacity for KHP-2.4/D270

If pressing “RAPID” button on wired controller, the 1500W accessorial electric heating will be also started up; Compared with heating only with heat pump, water generation capacity will be increased 32L/h after starting up the accessorial electric heating.

## 7.2 Operation specification

### 1. Defrosting

If there’s defrosting phenomenon during hot water generation process, the unit will defrost automatically in order to improve the heating effect.

During defrosting running, the fan will stop operation.

If defrosting is activated under high temperature environment (>10°C) and the unit operates abnormally, please ask for maintenance.

### 2. Turn on the unit again when the unit is stopped for a long time.

If turn on the unit again when the unit stops operation for a long time (including turn on the unit for the first time), there may be turbid liquid flowing out of the faucet, which is the normal phenomenon. That phenomenon will disappear after for a while.

### 3. Power failure

If power failure occurs during operation period, all operation will be stopped.

The wired controller is with power-off memory function. If wrong action is resulted in by thunderbolt, wireless of the car, please cut off the power by hand. Energize the unit and turn on the unit again.

### 4. Memory function

Once power failure occurs for the water heater or the wired controller, the wired controller will memorize the status of the unit automatically. After energizing again, the wired controller let the unit operate at the set status before power failure.

## 8. NOTICES FOR THE OPERATION IN WINTER

1. If the temperature is low in winter and the unit hasn't been started up for a long time, energize the unit for at least 8h before turning on the unit.
2. If the outdoor temperature is low in winter, do not cut off the power if the unit stops operation for a short time. Otherwise, the auto freeze prevention protection will be invalid. Under the low temperature circumstances, the auto prevention protection will be active when the water temperature inside the water tank is closing to freezing point, and it will be stopped when the water temperature inside the water tank rises to the safe temperature. However, the auto freeze protection function for the water tank is not unavailable for water inlet pipe and water outlet pipe. If the temperature at the installation position for the unit is lower than 0℃, the antifreezing heating belt must be installed at the pipeline and it should be at the energized status. If the water tank must be installed at outside, the pipe at the outdoor side should be as short as possible, including the connection pipe of refrigerant and the water inlet pipe and water outlet pipe for the water tank; otherwise, the heat will be lost too much; What's more, too much will be lost and the water system will be frozen. Meanwhile, the connection position for the valve and bending position for the water pipe must be insulated well.
3. If the unit won't be used for a long time, please drain out the water inside the water tank and pipeline completely. Otherwise, the water system will be frozen. After water is drained out completely, if operate the unit again, fill up the water tank with water and then the unit can be turned on. Please refer to the water replenishing and water drainage for water tank for details.

### Warm hint:

If it's not convenient for operation or there's hazard, please contact the local appointed dealer or appointed service center directly. We will appoint profession persons to check, debug and clean the unit, and discharge water and fill the water tank with water for you.

## 9. MAINTENANCE

### 9.1 Water replenishing and water drainage for water tank.

#### 1. Water replenishing for water tank

- Cut off the power for the unit, open the cut-off valve on hot water exit pipe and the valve at the water using point.
- Open the cut-off valve on the water inlet pipe for tap water.
- Cut off the valve at the water using point when there's water flowing out from that point.
- When water supply is finished, put through the power.

#### 2. Water drainage for water tank

- Cut off the power for the unit and then cut off the cut -off valve the tap water inlet pipe.
- Cut off the cut-off valve on the hot water exit pipe and the valve at the water using point.
- Open the cut-off valve at the drain outlet.
- When the water inside the water tank is drained out, please close the cut-off valve at the drain outlet.

### 9.2 Periodical clean for the water tank

In order to ensure the hot water quality, please clean the water tank periodically by below procedures:

- Cut off the power.
- Close off the cut-off valve on the inlet pipe of water tank.
- Open the cut-off valve on the hot water exit pipe and the valve at the water using point.
- Open the cut-off valve on the drain outlet until the water is drained completely.
- Open the cut-off valve on the water inlet pipe of water tank, flush the water tank until the water drained from the drain outlet is clean, and then close the cut-off valve on the drain outlet.
- Fill the water tank according to water supply operation.
- Put through the power when the water is cleaned.

#### Notice:

In general, the water tank should be cleaned once every year. If the water quality is bad, please add the clean times.

### 9.3 Replacement of magnesium rod

As for ensuring the service life of water tank, magnesium rod is installed inside the water tank. In general, the service life for the magnesium rod is 2-3 years. If the water quality for the hot water is bad, the service life for the magnesium rod will be shortened. The process for replacing the magnesium rod is as below:

1. Drain out the water inside the water tank completely before disassembly.
2. Open the protection cover at the installation outlet of the magnesium rod of water tank.
3. Twist off the magnesium rod with inner hexagon, and then take it out carefully to prevent sillage of magnesium rod dropping into the inner pot of water tank.
4. Install the new magnesium rod and then fix it with inner hexagon wrench.
5. Close the protection cover and then fill the water tank with water according to water supply operation.

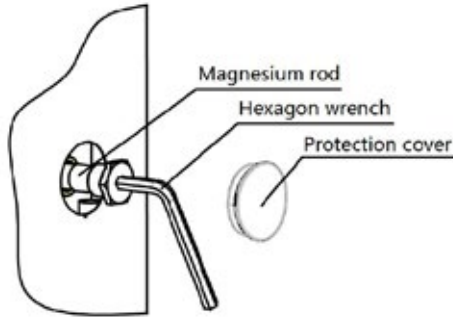


Fig. 9-1 Sketch map for the replacement operation for the magnesium rod

#### Notice:

The replacement for the magnesium rod must be conducted by the professional person. Do not replace it by yourself. Please contact KAISAI appointed local dealer or appointed service center.

### 9.4 Maintenance for the unit

1. Please check the air inlet and the air outlet for the main unit periodically to see whether there are blocked.
2. Please check the user side waterway, pipe joint and valve periodically to see whether there are damaged or blocked; check whether the joint is leaking and whether the strainer is blocked.

## 10. PRECAUTIONS FOR SAFETY USAGE

1. For comfort usage, it's suggested to use shower head with flow rate of 6~7L/min.
2. User should have regular check and maintenance for heat pump water heater, if there is abnormal condition, please immediately contact after-sales service for help so as to guarantee normal, safe and reliable unit operation.

Regular check and replace the magnesium bar is necessary. Customer can contact serviceman for replacement. Recommended replace period is 2~3 years.

3. Cut off the power supply prior to any maintenance or services. A non-professional personnel is not allowed to adjust or service the heat pump water heater.

4. Improper operation might cause scald due to hot water. Water heating without enough water might produce high-temperature steam or hot water, which might cause serious scald. Hence, guarantee the water tank is filled with water.

5. The water heater is equipped with safe relief valve for reliable operation, please don't change its location and never block its outlet. The pipe should be directly connected to floor drain.

6. Children bath should be supervised by adults.

7. Never drink the water inside the water tank.

8. This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

9. In order to prevent the hazard due to the invalidation if electric heating of water tank, the electric heating circuit is equipped with thermostat. If the water temperature is higher than 95°C, the thermostat will be activated to cut off the electric heating power. However, if the electric heating is abnormal, it needs to contact KAISAI service man to maintain or replace it.

10. The water inlet pressure for the water tank is 0.2bar~8bar. Before installation, please confirm the water pressure range. And the hose-sets should not be reused.

### Notes:

TP valve provided by user. Suggest to choose TP valve that the pressure is less than 8.8bar and the temperature is less than 99°C.

## 11. MALFUNCTION ANALYSIS

**Warning:**

Please do not maintain the air source water heater by yourselves; otherwise, it may cause electric shock or fire hazard. Please contact with appointed maintenance center for maintenance. Before asking for the maintenance, please check below items for saving your time and cost.

Table 11-1

“Malfunction”phenomenon	“Malfunction”analysis
The unit can't operate if turn on the unit immediately after stopping operation	In order to protect the unit, if turn on the unit immediately after stopping operation, the microcomputer will make the unit delay 5 min to operate.
There's water-flowing sound during operation process.	During the operation process, there will be the flowing sound of refrigerant. It's not the malfunction.
The condensate water is drained out from the water heater.	This is the normal phenomenon for the unit, not the malfunction. Please feel free to operate it. Please connect the drainage pipe to the proper drainage outlet by referring to Installation sketch map.
There's water drainage from the TP valve.	During heating process, when the inner port of water tank operates at ultrahigh pressure, there will be a little water drainage from the TP valve for releasing pressure, which is the normal phenomenon. If there's too much water drainage and there's vibration, please contact the appointed maintenance center.

Table 11-2

“Malfunction”phenomenon	“Malfunction”analysis
Wired controller displays freeze prevention	When the unit operate in winter, the freeze prevention protection will be activated, which is the normal phenomenon.
Hot water flowing from sprayer head is too short	The water flowing volume for the sprayer head is too big, which is the normal phenomenon. Replace it with the sprayer head with the rated flow volume of 6~7L/min.

EN

EN



Wired controlled displays L6 and water temperature	Ambient temperature is too low, which is higher than the operation range for the main unit of the water heater. Or the set temperature for the unit is too high, which exceeds the aximum heating temperature for the heat pump.
During water generation process, there's frosting phenomenon for the unit	If the unit is generating water for a long time, there will be frosting phenomenon, which is the normal phenomenon. In order to improve the heating effect, the unit will defrost automatically.
During defrosting process, the unit will blow fan and the motor stops operation.	The fan won't be started up during defrosting process, which is the normal phenomenon.
If turn on the water heater when it hasn't been used for a long time, there will be turbid flowing out of the faucet in the beginning.	It's the normal phenomenon. After for a while, this phenomenon will disappear.

Table 11-3

If there's below circumstances, please contact appointed maintenance center.	
"Malfunction"phenomenon	"Malfunction"analysis
The water heater stops operation and the wired controller displays E1	High pressure protection for the system.
The water heater stops operation and the wired controller displays E3	Refrigerant-lacking protection.
The water heater stops operation and the wired controller displays E4	Discharge protection.
The water heater stops operation and the wired controller displays E6	Communication malfunction
The water heater stops operation and the wired controller displays EH	Binding protection for accessorial electric heater.
The water heater stops operation and the wired controller displays F3	Malfunction of outdoor ambient temperature sensor.
The water heater stops operation and the wired controller displays F4	Malfunction of discharge temperature sensor

The water heater stops operation and the wired controller displays F6	Malfunction of tube temperature sensor for outdoor heat exchanger
The water heater stops operation and the wired controller displays Fd	Malfunction of suction temperature sensor
The water heater stops operation and the wired controller displays FE	Malfunction of upper temperature sensor of water tank
The water heater stops operation and the wired controller displays FL	Malfunction of lower temperature sensor of water tank
The water heater stops operation and the wired controller displays L6	Unit's capacity is insufficient
There's harsh sound during operation; There's off-flavor during operation; Air switch or leakage protection switch breaks off frequently.	There may be risk for the safety. Please stop operation immediately and cut off the power.
The unit will be defrosted if the ambine temperature is high (>10°C)	Abnormal operation for the unit
After-sales service	
<p>If there's quality or other problems for the KAISAI products, please contact with local appointed maintenance center. If this manual is lost, please contact with local appointed dealer.</p>	

# **CONTROLLER FOR THE AIR SOURCE HEAT PUMP WATER HEATER**

Owner's Manual

XK64

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## 1. APPEARANCE



## 2. BUTTON DESCRIPTIONS



1	I-KNOW button	2	TIMER button	3	FUNCTION button	4	RAPID button
5	Mode button	6	Up button	7	On/Off button	8	Down button

### 3. INTRODUCTION TO LCD ICONS



1	Display of Common Operation Modes: HOTWATER, SAVE, PRESET and NIGHT mode.	6	Display of defrost, antifreeze running, and e-heater running (or display of the Special E-HEATER Mode).
2	Display of RAPID and I-KNOW function.	7	Display of hot water volume (this function is unavailable to models with single temperature sensor).
3	Display of CYCLE, STERILIZE, SUNFLOWER, ABSENCE, VACATION, and ONCE function (the STERILIZE function may not work for models without an electrical heater).	8	Display of operating/standby.
4	Display of Keypad Lock function.	9	Display of actual water temperature, temperature setpoint, error codes, and running parameters.
5	Display of system time, preset time, timer setting and running parameters.	10	Display of the sub-controller. (This function is reserved.)

### 4. OPERATION MODES

#### 4.1 Common Modes

Mode Name	Description
HOTWATER	In the standard hot water mode, the unit will start or stop based on the difference between the temperature setpoint and the actual water temperature. If the temperature setpoint is higher than that can be achieved by the heat pump, only the electrical heater will be used for heating when the heat pump is unavailable.)

SAVE	<p>This mode is similar to the HOTWATER mode. However, this mode allows only the heat pump but not the electrical heater for heating.</p> <p><b>Note:</b> The SAVE mode requires proper temperature setpoint. It is recommended that this mode is adopted when the required water temperature is not higher than 50°C. If the temperature setpoint is too high or the ambient temperature is too low and when the capacity of the heat pump is insufficient, the error code L6 will be displayed and heating will be stopped. In this case, decrease the temperature setpoint to a value which is lower than the actual water temperature. Then, L6 will disappear automatically.</p>
PRESET	<p>This mode enables time presetting for using the hot water. The unit determines when to start based on the ambient temperature and the difference between the preset water temperature and the actual water temperature. When the preset period elapses, one hour later, the unit will stop. Once setup, this mode runs circularly every day.</p>
NIGHT	<p>The unit will start or stop at the fixed period from 00:00-06:00 based on the difference between the temperature setpoint and the actual water temperature. Beyond this period, the unit keeps off. Once setup, this mode runs circularly every day.</p>

#### 4.2 Special Modes

Mode Name	Description
E-HEATER	<p>Only when the heat pump is faulty, this mode is recommended to be adopted. In this mode, only the electrical heater is used for heating and determines when to start and stop based on the difference between the temperature setpoint and the actual water temperature.</p>

### 5. FUNCTIONS

Mode Name	Description
TIMER	<p>The unit starts and stops as the timer setting. Once setup, this function works circularly every day.</p>
RAPID	<p>The electrical heater is started to prepare hot water rapidly to meet the urgent need for hot water. This function is available only when the water tank equipped with the auxiliary electrical heater.</p>
I-KNOW	<p>The unit simulates the user's habitual operation by collecting and analyzing water data in some period and then realizes the automatic operation. And it will remain medium water temperature when the user does not require large amount of hot water.</p>

CYCLE	The water pipe is preheated duly to ensure that hot water is provided any time. Provision of hot water does not require exhausting of cold water in the water pipe, which is different from conventional water heaters.
STERILIZE	Water is heated to 70°C or higher (when the temperature can be set to be higher than 70°C), to sterilize the water tank.
SUNFLOWER	By detecting the ambient temperature around a day, the water heater enables the unit to run when the ambient temperature is relatively high, which enables higher efficiency of the unit. At a lower ambient temperature, the water temperature is kept at medium level to meet users' basic requirements.
ABSENCE	This function can be adopted when the user is absent for a short time. This prevents frequent start-up of the unit and saves heat and electricity.
VACATION	During the vacation set by the user, the unit keeps the water temperature at a relatively low level to save heat and electricity. The STERILIZE function is started one day before the vacation is over and hot water is prepared by advance.
ONCE	The unit stops automatically after heating a tank of water. This saves energy to the most extent when a tank of hot water is available to the user.

**FUNCTIONS SUPPORTED BY DIFFERENT OPERATION MODES:**

FUNCTION MODE	RAPID	STERILIZE	CYCLE	I-KNOW	SUNFLOWER	ABSENCE	VACATION	ONCE	TIMER
HOTWATER	√	√	√	√	√	√	√	√	√
SAVE	√	√	√	√	√	√	√	√	√
PRESET	√	√	√	X	X	X	√	X	X
NIGHT	√	√	√	X	X	X	√	X	X
E-HEATER	X	X	√	X	X	X	X	X	√



## 6. OPERATION INSTRUCTIONS

### 6.1 On/Off Setting

The unit will be started or stopped by pressing the “On/Off” button.

**Note:** After energization and under normal communication, the LCD will display the water temperature, time, and hot water volume (for models with dual temperature sensor) under both On and Off states of the unit. It means the Off state if the LCD does not display the running mode, as shown in the following figure.



### 6.2 Common Modes Setting

In the On state of the unit, press the **MODE** button to switch the operation modes in the following sequence:



The HOTWATER mode is shown in the following figure.



### 6.3 Special Modes Setting

If the heat pump of a water heater equipped with an electrical heater is faulty, users can press and hold **MODE+RAPID** for 5 seconds in any mode under the On state to enter the E-HEATER mode.

**Note:** The E-HEATER mode can be used only when the heat pump is faulty. In this case, contact the aftersales service immediately.



The E-HEATER mode is shown in the following figure.

In the E-HEATER mode, users can press the MODE button to switch to the HOTWATER mode. Note that the E-HEATER mode will be cancelled automatically and the HOTWATER mode will be started upon restart of the water heater in the case of blackout.

### 6.4 Water Temperature Setting

In the On state, press ▲ to increase or press ▼ to decrease the temperature setpoint. The water temperature will increase or decrease continuously by 1°C when the button is pressed and held.

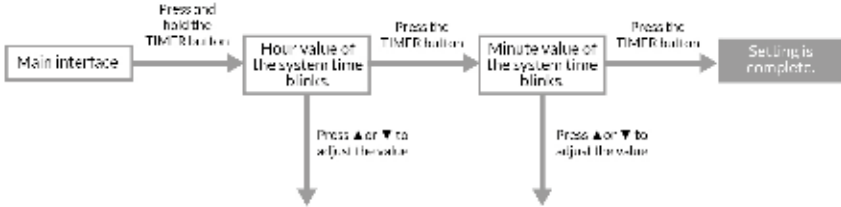
The minimum temperature setpoint for all models is 35°C. The maximum temperature setpoint can be set to 55°C, 58°C, or 70°C. For details, see the Integrated Unit User Manual.

### 6.5 Time Setting

#### 6.5.1 System Time Setting

In the main interface, press and hold the **TIMER** button for 5 seconds. The system time setting interface is displayed. The clock icon is on and the hour value blinks. Press ▲ or ▼ to adjust the hour value and press the **TIMER** button to confirm setting. Then the minute value flickers. Press ▲ or ▼ to adjust the minute value and press the **TIMER** button to confirm setting. After system time setting is saved, the main interface is displayed. In the setting process, if no button is pressed within 15 seconds, the main interface will be displayed and setting will not be saved.

The system time ranges from 00:00 to 23:59. Each time you press ▲ or ▼, the time increases or decreases by 1 hour or 1 minute. When the button is pressed and held, the time increases or decreases continuously by 1 hour or 1 minute. The setting process is shown in the following figure.

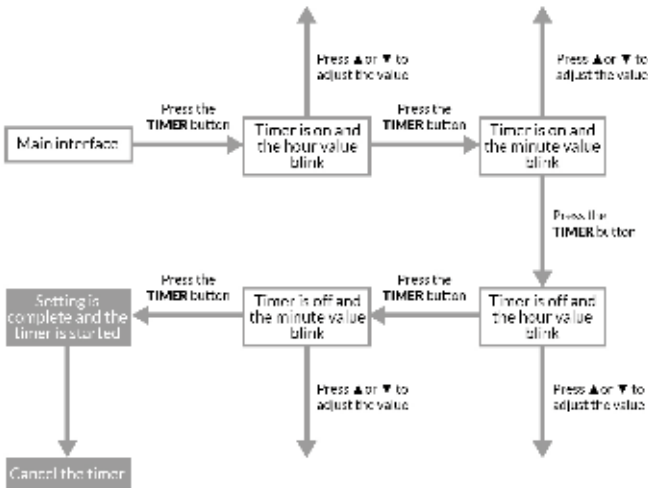


### 6.5.2 Timer Setting

**Timer setting:** Under the HOTWATER or SAVE mode or under the Off state, press the **TIMER** button to enter the timer setting interface. The **TIMER** and **ON** icons are on and the hour value blinks. Press ▲ or ▼ to adjust the hour value and press the **TIMER** button to confirm setting. Then the minute value flickers. Press ▲ or ▼ to adjust the minute value and press the **TIMER** button to confirm setting. Then the **OFF** icon is on and **ON** icon is off. The hour value blinks. Press ▲ or ▼ to adjust the hour value and press the **TIMER** button to confirm setting. Then the minute value flickers. Press ▲ or ▼ to adjust the minute value and press the **TIMER** button to confirm setting. After the scheduled on/off time setting is saved, the main interface is displayed. In the setting process, if no button is pressed within 15 seconds, the main interface will be displayed and setting will not be saved.

**Timer cancelling:** After the scheduled on/off time is set, press the **TIMER** button to cancel it.

**Note:** The scheduled on time and off time cannot be the same; otherwise, the LCD switches to the interface for resetting the timer.



### 6.5.3 Preset Time Setting

In the PRESET mode, hot water is prepared in advance by the preset time.

In the main interface of the PRESET mode, press the **TIMER** button to enter the selection interface. PRESET 1 blinks while PRESET 2 and PRESET 3 are not displayed. Press **▲ or ▼** and the LCD blinks circularly in the flowing sequence: PRESET 1 – PRESET 2 – PRESET 3 – PRESET 1.

**Preset time setting:** Press the **TIMER** button to select PRESET 1. Then the PRESET 1 icon is on and the hour value blinks. Press **▲ or ▼** to adjust the hour value and press the **TIMER** button to confirm setting. Then the minute value flickers. Press **▲ or ▼** to adjust the minute value and press the **TIMER** button to confirm setting. After time setting for PRESET 1 is saved, the main interface is displayed.

**PRESET 2 or PRESET 3 setting:** Press the **TIMER** button to select PRESET 2 and then the ON icon blinks. Press **▲ or ▼** to switch the ON and OFF icons. When the ON icon blinks, press the **TIMER** button. Then the PRESET 2 icon is on and the ON icon is off. The hour value blinks. Press **▲ or ▼** to adjust the hour value and press the **TIMER** button to confirm setting. Then the minute value flickers. Press **▲ or ▼** to adjust the minute value and press the **TIMER** button to confirm setting. After time setting for PRESET 2 is saved, the main interface is displayed. The method for setting PRESET 3 is the same as that for PRESET 2. (After setting is saved, the ON and OFF icons are not displayed in the main interface as these icons are available in the setting process.)

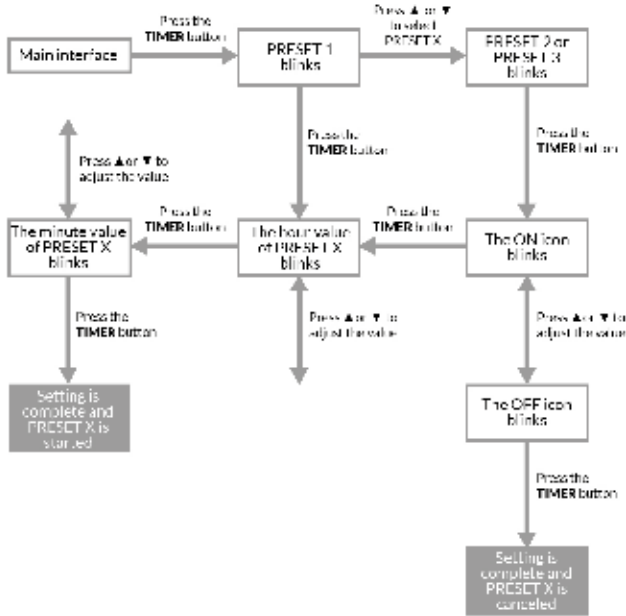
In the time presetting process, if no button is pressed within 15 seconds the preset interface will switch to the main interface automatically and setting will not be saved.

If the time preset for PRESET 1, PRESET 2, and PRESET 3 is the same, it is regarded as one timer.

The preset time can be memorized. If the preset time does not need to be reset, users only need to select on or off.

**Preset time cancelling:** After time is preset for PRESET 2 or PRESET 3, users can press the **TIMER** button to display the selection interface. The icon of PRESET 2 blinks. Press **▲ or ▼** and the LCD blinks circularly in the flowing sequence: PRESET 2 – PRESET 3 – PRESET 1 – PRESET 2. Select PRESET 2 and press the **TIMER** button. Select to cancel PRESET 2. Then the PRESET 2 icon is on and the ON icon blinks. Press **▲ or ▼** to select OFF. Press the **TIMER** button to confirm cancelling and return to the main interface. The method for cancelling preset time for PRESET 3 is the same as that for PRESET 2. Preset time for PRESET 1 cannot be cancelled. If users select PRESET 1, the time setting interface will be displayed.

The PRESET mode runs circularly. The water heater starts to heat up water based on the preset time and ambient temperature and stops one hour after the preset time.



## 6.6 Function Setting

### 6.6.1 I-KNOW

In the On state, press the i-know button to select the I-KNOW function. To cancel this function, press the i-know button again.

### 6.6.2 RAPID

In the On state, press the RAPID button to select the RAPID function. The electrical heater is started for heat up. To cancel this function, press the RAPID button again. Then electrical heater is stopped.

Under the E-HEATER mode, users can press the RAPID button to switch to the HOTWATER mode. To return to the E-HEATER mode, press the RAPID button again.

### 6.6.3 CYCLE, SUNFLOWER, ABSENCE, and ONCE

In the On state, press the FUNCTION button to enter the interface for selecting among the CYCLE, SUNFLOWER, ABSENCE, and ONCE functions. When a function is selected, the corresponding icon blinks. Then users can press ▲ or ▼ to start or cancel this function. If no operation is performed within 5 seconds, it will be regarded that this function is not required. If this function is started, the function icon is displayed without blinking. If this function is cancelled, the function icon will not be displayed. If no function is selected in setting interface for 5 seconds, the interface switches back to the original status.

### 6.6.4 STERILIZE

The STERILIZE function is available under four common modes. However, after this function is set, the unit runs as under the HOTWATER mode. The water heater controls startup and shut-down of the unit based on the difference between the actual water temperature and that required for sterilization.

In the On state and in a common mode, press the FUNCTION button to enter the function selection interface. When the STERILIZE function is selected, the corresponding icon blinks. At the same time, the preset circular sterilization duration is displayed as d:XX, as shown in the following figure.



During this period, the following operations can be performed:

1. Press **▲** or **▼** to start or cancel the STERILIZE function. If this function is started, the STERILIZE icon is displayed without blinking. Sterilization will be performed circularly by the preset d and h value; If this function is canceled, the STERILIZE icon is not displayed. If no operation is performed within 5 seconds, it will be regarded that this function is not required. After this function is started and when sterilization is being performed, the function icon blinks.
2. Press the TIMER button to enter the sterilization parameter setting interface. Press **▲** or **▼** to select the d value and then press the TIMER button to confirm the value. When the confirmed d value is not 0, the h value setting interface is displayed. Press **▲** or **▼** to select the h value and then press the TIMER button to confirm the value. When the STERILIZE icon is displayed, the STERILIZE function is started. If the STERILIZE icon blinks, the preset h value (time point for sterilization) is achieved and sterilization is being performed.

Sterilization Parameter	Meaning	Range
d value	Day interval for circular sterilization	0-10 days; 0 indicates sterilization for once only and the sterilization function will be canceled after being performed
h value	Time point for circular sterilization	00:00-23:00

**Circular sterilization:**

Sterilization is performed circularly by the d value. Once the circular sterilization conditions are met, sterilization is performed regardless of on/off status of the controller and beyond limit of common modes and functions except VACATION. However, users can stop sterilization under process by pressing the **ON/OFF** button to shut it down. (But it can only stop sterilization for this time without affecting circular sterilization, the preset circular sterilization function still works.)

**OFF reminder for sterilization failure:**

If the OFF icon is displayed at the clock position after the STERILIZATION function is started, sterilization fails and the water temperature required for sterilization cannot be reached. The OFF reminder can be canceled when any button is pressed.

The OFF reminder only indicates that sterilization fails for this time without affecting circular sterilization. The OFF reminder is shown in the following figure.



**Note:**

1. When time goes from 23:59 to 00:00, the system enters a new day, which is the basis for increasing the number of days.



2. Every time after the STERILIZE function is started or sterilization parameters are adjusted in the sterilize function setting interface, sterilization will be performed for once immediately and the day interval for sterilization will be recalculated accumulatively. Even when sterilization is being performed, operations such as sterilize function resetting and day interval adjusting for sterilization will also cause recalculation of the day interval.
3. After the circular sterilization function is set, the water heater can still precisely calculate the day interval for sterilization accumulatively and the circular sterilization function can still work in the case of short-term power failure. If the time point for sterilization is within the power failure duration, sterilization will be made up once power is provided again. In addition, the day interval for sterilization will be recalculated accumulatively based on this sterilization and next sterilization will be calculated accordingly.
4. Ensure that there is no long-term power failure; otherwise, the clock of the water heater will malfunction and the STERILIZE function will not work properly.
5. Under the E-HEATER mode, the STERILIZE function is unavailable.

### 6.6.5 VACATION

In the On state, press the FUNCTION button to enter the function selection interface. When the VACATION function is selected, the corresponding icon blinks. At the same time, the preset number of vacation days is displayed at the clock position, as shown in the following figure.



During this period, the following operations can be performed:

1. Press ▲ or ▼ to start or cancel the VACATION function. After this function is started, the VACATION icon will be displayed without blinking and the water heater runs based on the preset number of vacation days; If this function is canceled, the VACATION icon will not be displayed. If no operation is performed within 5 seconds, it will be regarded that this function is not required.



2. Press the TIMER button to set the number of vacation days. Press ▲ or ▼ to select the number of vacation days from 3 to 120 days and press the TIMER button to confirm setting. Then press ▲ or ▼ to start or cancel the VACATION function.

When the VACATION function is started under the On state, the water heater calculates the number of vacation days accumulatively. And the STERILIZE function will be started to sterilize the water tank one day before the vacation is over. In addition, hot water is prepared by advance in the HOTWATER before the vacation is over.

**Note:**

1. When time goes from 23:59 to 00:00, the system enters a new day, which is the basis for increasing the number of days.

2. Every time after the VACATION function is started or the number of vacation days is adjusted in the vacation function setting interface, the number of vacation days will be recalculated accumulatively. Even when the VACATION function is being performed, operations such as vacation function resetting and vacation day adjusting will also cause recalculation of the number of vacation days.

3. After the VACATION function is set, the water heater can still precisely calculate the number of vacation days accumulatively in the case of short-term power failure. But ensure that there is no long-term power failure; otherwise, the clock of the water heater will malfunction and the VACATION function will not work properly.

### 6.6.6 CYCLE

The water pipe between the water tank and the water acquisition position is preheated duly when hot water is available in the water tank. This enables immediate provision of hot water without requiring exhausting of cold water in the water pipe, which is different from conventional water heaters. This function requires installation of the water return system during unit installation. The water returning system consists of the water return pump, water return pipe, check valve for the water return pipe, and cycle temperature sensor for the water return pipe.

The CYCLE function enables both automatic and manual control. The later one is adopted by default. For details on the setting method, see description on manual and automatic switchover of the water return pump in section 6.7.3.

**Manual control:** After the water return system is installed and manual control is set on the wired controller, press the **FUNCTION** button on the wired controlled before hot water is needed by the user. The CYCLE icon blinks. Press ▲ or ▼, the CYCLE icon keeps on and then blinks if the manual return function is started. The unit preheats the water pipe with hot water in the water tank. This method requires manual operation but minimizes energy consumption.

**Automatic control:** Within the scheduled duration for automatic water return, the unit preheats the water pipe based on the pipe temperature. This method does not require manual operation but consumes more energy.

**Steps of setting scheduled time for automatic water return are as follows:**

(The automatic control mode needs to be set. For details on the setting method, see description on manual and automatic switchover of the water return pump in section 6.7.3.)

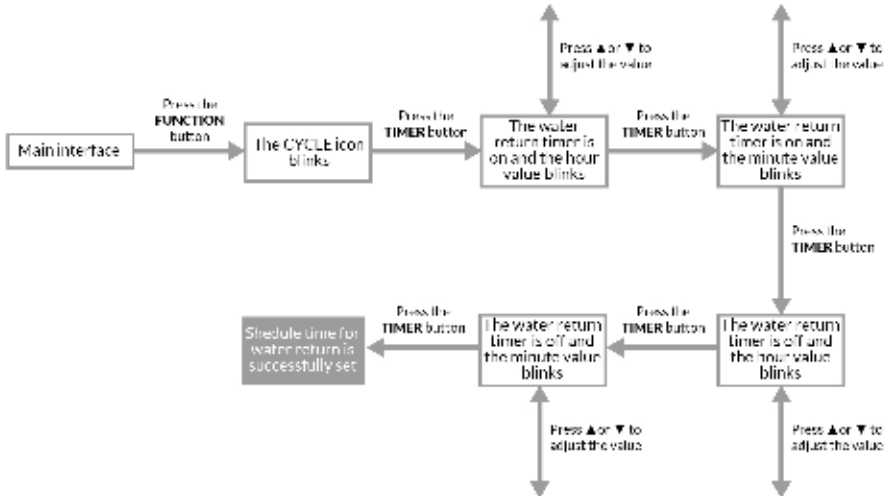
Step 1: Press the FUNCTION mode to select the CYCLE function. The CYCLE icon blinks.

Step 2: Press the TIMER button to enter the scheduled time setting interface for water return. The TIMER character, time value, and ON character are displayed at the time position, which together indicate the scheduled start-up time. When the hour value for scheduled start-up blinks, it can be set by pressing ▲ or ▼.

Step 3: After the hour value is set, press the TIMER button to switch to the minute value for scheduled start-up. When the minute value blinks, it can be set by pressing ▲ or ▼.

Step 4: After the minute value is set, press the TIMER button. The ON character disappears and the OFF character is displayed. Meanwhile, the hour value blinks, indicating that the scheduled shutdown time can be set by pressing ▲ or ▼.

Step 5: After the hour value is set, press the TIMER button to switch to the minute value for scheduled shutdown. When the minute value blinks, it can be set by pressing ▲ or ▼.



Step 6: Press the TIMER button to switch back to the CYCLE function selection interface. If the CYCLE character blinks, the scheduled time for water return is successfully set to a new value.

Step 7: When users press any button except the TIMER, FUNCTION, ON/OFF, and ▲/▼ buttons shortly or stay in the selection interface for 5 seconds, the current interface exits automatically and whether the CYCLE character is displayed is determined based on the scheduled time for water return.

## 6.7 Special Function

### 6.7.1 Keypad Lock

In normal status of the unit, press and hold ▲+▼ for 5 seconds. The LOCK icon is displayed on the controller and all buttons become unavailable. The LOCK icon blinks when any button is pressed. To cancel the Keypad lock function, press and hold ▲+▼ for 5 seconds again. Then the LOCK icon disappears.

If the unit is faulty, the lock function becomes invalid and all buttons are available again. The Keypad lock function will resume after the error is rectified. In addition, the lock status before power failure is memorized.

### 6.7.2 Cleaning (available to circular models only)

In the Off state of a normal unit, press and hold MODE+▲ for 5 seconds. The unit starts the cleaning function and HOTWATER, SAVE, PRESET, and NIGHT icons are displayed on the LCD. To cancel the cleaning function, press and hold MODE+▲ for 5 seconds again.

The cleaning process lasts for 30 minutes at the most and it will stop automatically 30 minutes after the cleaning function is started. When the cleaning function is started, the ON and OFF buttons become unavailable. If the unit is faulty, the cleaning function is canceled automatically. This function is used for cleaning circular air source water heaters and for exhausting air in the water system during debugging.

### 6.7.3 Manual/Automatic switchover for the water return pump

In the Off state of the wired controller, press and hold MODE+▲ on the main interface for 5 seconds to enter the query interface. Then the query code 00 is displayed, press and hold MODE+▲ for 5 seconds to display the configurable parameter codes and values. Press ▲ or ▼ to select P0 and press the **MODE** button. Then item value 00 blinks under the parameter code P0. Press ▲ or ▼ to select the item value and press the MODE button to confirm setting (00 indicates manual control and 01 indicates automatic control). After that, press the **FUNCTION** button to return to the main interface. If no operation is performed with 15 seconds, it will switch back to the main interface automatically.

**Note:** Other parameters cannot be modified; otherwise, operation exception will be caused.

### 6.7.4 Temperature unit setting (°C/°F)

In the Off state of the wired controller, press and hold MODE+▲ on the main interface for 5 seconds to enter the query interface. Then the query code 00 is displayed, press and hold MODE+▲ for 5 seconds to display the configurable parameter codes and values. Press ▲ or ▼ to select P5 and press the **MODE** button. Then item value 00 or 01 blinks under the parameter code P5. Press ▲ or ▼ to select the item value and press the **MODE** button to confirm setting (00: °C and 01: °F). After that, press the **FUNCTION** button to return to the main interface. If no operation is performed with 15 seconds, it will switch back to the main interface automatically.

**Note:** Other parameters cannot be modified; otherwise, operation exception will be caused.

### 6.7.5 Temperature sensor setting for ON/OFF control

In the Off state of the wired controller, press and hold MODE+▲ on the main interface for 5 seconds to enter the query interface. Then the query code 00 is displayed, press and hold MODE+▲ for 5 seconds to display the configurable parameter codes and values. Press ▲ or ▼ to select PJ and press the MODE button. Then item value 00, 01 or 02 blinks under the parameter code PJ. Press ▲ or ▼ to select the item value and press the MODE button to confirm setting. After that, press the FUNCTION button to return to the main interface. If no operation is performed with 15 seconds, it will switch back to the main interface automatically.

**Value instruction:**

Value	0	01	02
INSTRUCTION	Bottom temperature sensor controls the ON/OFF of unit	Top temperature sensor control the ON/OFF of unit	Top temperature sensor controls the startup of unit; the bottom temperature sensor control the stop of unit
EFFECT	Can improve the hot water volume appropriately	Can save power	The hot water volume and the electricity is between 00 and 01

**Note:** Other parameters cannot be modified; otherwise, operation exception will be caused.

### 6.8 Errors Display

When some errors occur during operation, the error codes will be displayed on the controller. Meanwhile, the unit is in the Off state and the controller supports only the on/off and query functions. If multiple errors occur to the water heater simultaneously, the corresponding error codes will be displayed circularly. If the controller displays a error, shut down the water heater and contact qualified personnel for maintenance. The following figure shows a communication error. For details on error codes, see the table attached at the end of this manual.



## 7. PRECAUTIONS

- Do not perform operations to the controller with wet hands.
- Do not install the wired controller at a wet place.
- Do not beat, throw, or frequently disassemble and assemble the wired controller.

The water outlet temperature of the water tank is set to 50°C before delivery. Users can adjust the temperature as required when the unit is running. However, if the temperature is too high, the coefficient of performance (COP) decreases.

When the temperature setpoint is achieved, the unit stops automatically and the wired controller displays the KEEP icon. If the water temperature at the water acquisition position or at the bottom of the water tank decreases by 5°C to 10°C, the unit will start to heat up water again.

## APPENDIX: ERRORS AND SYMPTOMS

Please contact the KAISAI appointed service center in case of any of following conditions.	
The unit is shut down and one of below symptoms is displayed on the controller.	Errors
E1	High pressure protection
E4	Discharge protection
E5	Compressor overload protection
E6	Communication error
C5	Outdoor jumper error
F3	Outdoor temperature sensor error
F4	Discharge temperature sensor error
F6	Outdoor heat exchanger coil temperature sensor error
Fd	Suction temperature sensor error
FE	Upper Water temperature sensor error
FL	Middle Water temperature sensor error
L6	Insufficient unit capability
PL	Compressor DC busbar under voltage protection
PH	Compressor DC busbar over voltage protection
PA	Compressor AC current protection (input side)
H5	Compressor IPM module protection
HC	Compressor PFC abnormality
Lc	Compressor PFC abnormality
Ld	Compressor Missing phase
P0	Compressor Drive module resetting
P5	Compressor current protection
LF	Compressor power protection
Pc	Compressor Current sensor malfunction
H7	The compressor motor in loss of synchronization

P6	Malfunction from Compressor driving part to main-control communication
P8	Overheat protection of Compressor radiator
P7	Compressor radiator sensor malfunction
ee	Compressor Drive Memory chip malfunction
PU	Compressor Charge circuit malfunction
PP	Compressor AC input voltage abnormality
PF	Compressor driver board environment temperature sensor malfunction
P9	Compressor AC contactor protection or input zero crossing error
AL	Fan DC busbar under voltage protection
AH	Fan DC busbar over voltage protection
AA	Fan AC current protection (input side)
A1	Fan IPM module protection
AF	Fan PFC abnormality
AC	Fan startup failure
Ad	Fan Missing phase
A0	Fan Drive module resetting
UL	Fan current protection
UP	Fan power protection
AE	Fan Current sensor malfunction
AJ	The Fan motor in loss of synchronization
A6	Malfunction from Fan driving part to main-control communication
A8	Overheat protection of Fan radiator
A9	Fan radiator sensor malfunction
An	Fan Drive Storage chip malfunction
AU	Fan Charge circuit malfunction
AP	Fan AC input voltage abnormality
Ar	Fan driver board environment temperature sensor malfunction
U9	Fan AC contactor protection or input zero crossing error
EE	Main-control Memory chip malfunction
Harsh voice; Disagreeable smell; Air switch or circuit breaker tripping frequently	There is probably the potential security hazard and it is high recommended to stop and unplug the unit.
After-sales Service	
If the air source water heater you purchase from KAISAI encounters quality problems or other problems, contact your local maintenance centers authorized by KAISAI.	



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