Air Source Heat Pump Water Heater

Owner's Manual

Models:
CH-HP3.0SWHK

- 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.cooperandhunter.com or send email to info@cooperandhunter.com or electronic version.
- C&H reserves the right to interpret this manual which will be subject to any change due to product improvement without further notice.

User Notice

Thanks for purchasing the C&H air source heat pump water heater. In order to make the best use of this unit, prior to installation and operation, please read this manual carefully, pay attention to the operation and maintenance instructions provided in this manual, and keep it properly for future reference. The air source heat pump water heater shall be installed and maintained by skilled personnel, as it is an appliance that may be damaged or cause hazards when improperly installed and maintained. Please contact the appointed local service center for installation and maintenance, and strictly observe instructions in this manual. C&H reserves the rights to interpret this manual which will be subject to any change without prior notice.

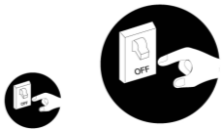
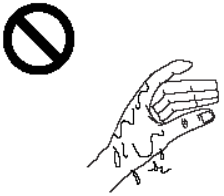
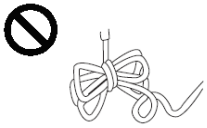
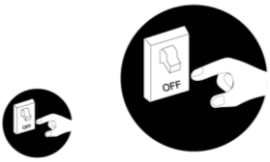
The air source heat pump water heater is thermal storage water heater. When using water, please open the cold water valve first, and then adjust the cold and hot water volumes to a proper temperature to prevent scald. When you do not use the heater for a short period in cold seasons, ensure that this unit is energized all day long. When you do not use it for a long period, ensure that its water system is drained to prevent cracking caused by cold weather. For any problem, please contact the sales representative or the service center that can provide professional services, including inspection, water drainage, water charging, and cleaning.

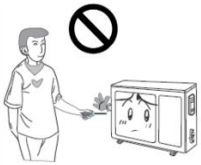
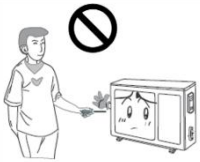
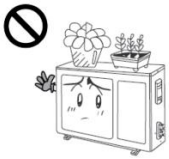
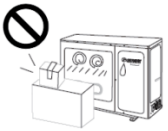
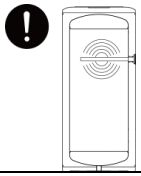
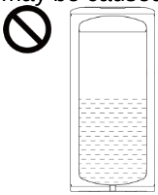
This manual serves as installation and use guides for vertical coil type air source water heaters. For details about how to use the wired controller, refer to the wired controller guide delivered with the unit.

Contents

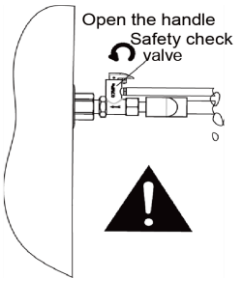
1 Precautions for Use

indicates the prohibited operations. indicates instructions that must be followed. indicates instructions to which special attentions must be paid.

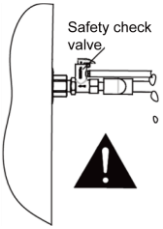
<table>
<tr><td colspan="3">Before you use this product, please read the following instructions carefully:</td></tr>
<tr><td colspan="3">Caution</td></tr>
<tr>
<td>★ For any exceptions such as burning smells, please cut off the power supply and then contactC&H authorized maintenance center.
 
If an exception persists, the air source water heater may be damaged, which may even cause an electric shock hazard or cause a fire.</td>
<td>★ Do not operate the water heater with wet hand.
 
Otherwise, an electric shock hazard may be caused.</td>
<td>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.</td>
</tr>
<tr>
<td>★ 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.</td>
<td>★ 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.
  </td>
<td>★ Do not damage wires or use undesignated wires.
 
Otherwise, overheating or a fire may be caused.</td>
</tr>
<tr>
<td>★ Before cleaning, please cut off the power supply.
 
Otherwise, an electric shock hazard may be caused.</td>
<td>★ 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.</td>
<td>★ 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.</td>
</tr>
</table>

★ The unit must be securely grounded! The grounding wire must be connected to a dedicated apparatus of the building.  I f 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 theC&H 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 Mg-Stick is installed inside the water tank. The Mg-Stick 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. 

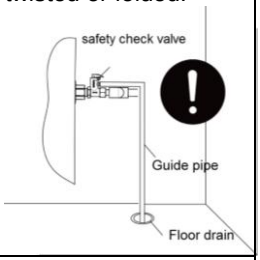
★ Open the safety check valve handle on a regular (about one month) basis to check whether it is blocked. Perform sewage disposal by following the guide on a regular (about once a year) basis.



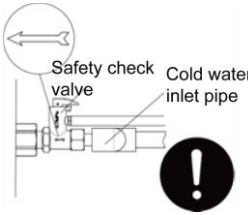
★ It is normal that the safety check valve drips.



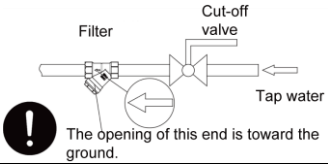
★ The pressure relief opening of the safety check valve must be connected to one end of a securely fixed guide hose, and the other end is connected to the floor drain. Ensure that the guide hose is not twisted or folded.



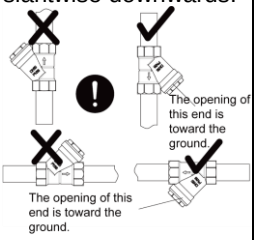
★ The installation direction of the safety check valve must be correct; that is, the direction indicated by the arrow on the safety check valve must be the same as the flow direction of cold water.



★ 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.

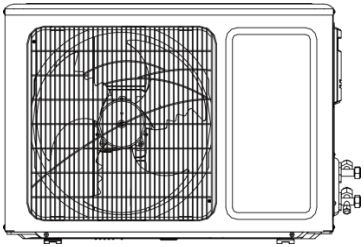


★ The fuse model and rated value are in accordance with the corresponding controller or the silk screen attached on the protective tube.

2 Models and Technical Specifications

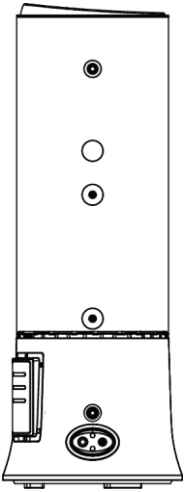
The air source water heater consists of an outdoor unit, a water tank, wired controller, a refrigerant pipe, and a water pipe. It provides hot water to users for household use.

The appearance of the main parts is shown in Figure 2-1. Actually, the appearance of the product may not be exactly the same as that shown in the figure. For the actual appearance, refer to the product delivered.



Outdoor unit

Wired controller



Water tank

Figure 2-1 Appearance of the main parts

This installation guide provides guidance on installation of the following model.

Table 2-1 Mapping between the main unit and the water tank

Outdoor unit model	Water tank model
CH-HP3.0SWHK	WT200SW1.5EHK

During the installation, please comply with the model mapping in the preceding

table. Otherwise, a fault may occur because the main unit mismatches the exchanger capacity of the water tank.

Table 2-2 Unit Model and Specification

Model			CH-HP3.0SWHK
Rated Heating Capacity(1)		W	2800
Rated Input Power(1)		W	700
Load Profile		-	L
COP(2)		W/W	2.90
Energy Efficiency Class(2)		-	A
Water Heating Energy Efficiency(2)		-	110%
Maximum Input Power		W	1180+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	1.20
Outline Dimensions	W x D x H	mm	848×320×540
Package Dimensions	W x D x H	mm	881×363×595
Gross/Net Weight		kg	See the nameplate
Sound Power Level(3)		dB(A)	61
Operating Range		°C	-15~45°C

Notes:

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

② (2) Value obtained with an air temperature of 7°C and a water inlet at

10℃, as per EN16147, (EU) No 814/2013.

③ (3) Value obtained as per EN 12102-2008.

④ Under fast water heating mode, electric heater helps to heating water.

⑤ Please always see the nameplate for the exact data as this table is subject to change.

Table 2-3 Water Tank Model and Specification

Model		WT200SW1.5EHK
Capacity	L	185
Power Supply for Electric Heater	-	220V-240V~50Hz
Input Power for Electric Heater	W	1500
Outline Dimensions(W x D x H)	mm	545 x 545 x 1919
Package Dimensions(W x D x H)	mm	2009 x 656 x 625
Water Tank Gross/Net Weight	kg	See the nameplate
Outer Size of Connection Pipe	mm	Φ6, Φ9.52

Notes: Please always see the nameplate for the exact data as this table is subject to change.

3 Working Principles and Advantages

3.1 Schematic Diagram of the Air Source Water Heater

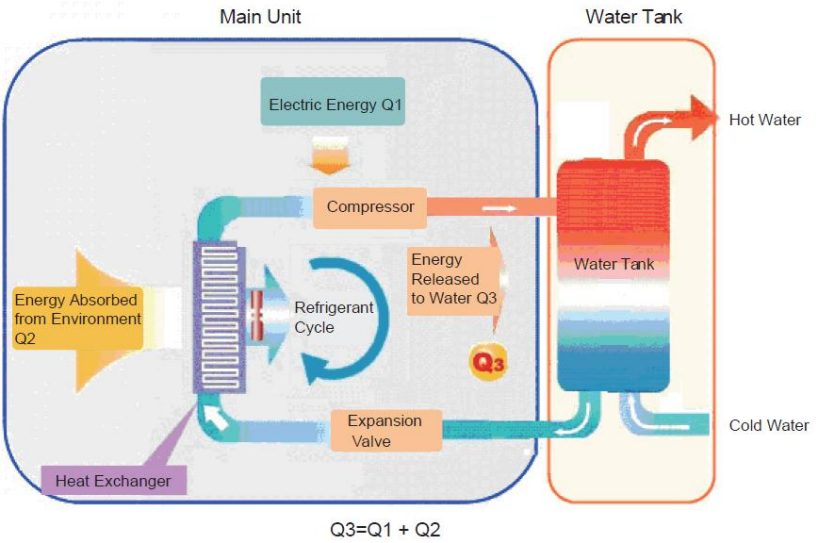


Figure 3-1 Schematic diagram of the air source water heater

3.2 Brief Introduction to Principles

The air source water heater unit is designed based on the heat pump principles. It consumes a part of electric energy as a supplement, and by using the thermodynamic cycle, absorbs heat from the low-grade energy (air source) environment, and transfers the heat to a condenser through a compressor, and releases it to the water inside the water tank. In this way, the water is heated up.

The working principles of an air source water heater are the same as those of a heat pump air conditioner. A heat pump air conditioner absorbs heat from the natural environment and transfers it to the indoor air; however, the air source water heater uses the absorbed heat to heat up domestic water. The air source water heater is a novel, efficient, energy-saving, and environment-friendly heater product.

3.3 Advantages

- Efficient and Energy-Saving

The outdoor unit of this product adopts an electronic expansion valve for adaptive control. It automatically adjusts its opening size based on the unit operating conditions, and uses the heat in the air to heat up domestic water, so that the unit always runs at optimal performance as well as ensuring reliability. The water tank adopts an externally wrapped microchannel heat exchanger, and is in planar contact with the inner container, which features higher efficiency in heat exchange and a high pressure-bearing capability. Effective thermally-conductive materials are used between the microchannel heat exchanger and the inner container of the water tank to enhance heat transfer.

In testing conditions of the unit, the coefficient of performance (COP) reaches up to 2.9, and the operating costs are more economical than conventional heaters.

- Reliability and Durability

The unit adopts a dedicated compressor, which can withstand high temperature and high pressure. The water tank adopts a stainless steel inner container made based advanced technologies and is equipped with a long-lifespan Mg-Stick to prevent corruption. The entire unit has multi-level protection to ensure durable and reliable use.

- Environment-Friendly and Safe

The unit uses the environment-friendly R134a refrigerant, which has no atmospheric pollution and has no potential safety hazards such as monoxide poisoning to for safety purposes.

- Simple and Convenient Installation

The installation is not subject to any environmental limitation. The unit can be installed in the kitchen, bathroom, balcony, garage, storage room, or basement according to actual living conditions, and requires no special care. It applies to places such as household use and villa suites. It is a no-loop waterway system, and can be easily and conveniently installed.

- Luxury Configurations:

The unit is equipped with a high-end ultra-thin touch-wired controller, which provides four heating modes: hot water, saving, preset, and night modes. The unit provides a proper water temperature range from 35°C to 70°C. It provides functions such as fast heating, timer switch, and "i-KNOW."

- Intelligent Defrosting

The unit provides the antifreeze and automatic defrosting functions, which effectively solve the problems such as heat exchanger freezing, frosting, and sewage caused by defrosting.

- Intelligent Water Return

The unit has the intelligent water return function (water return system required), which allows users to always use hot water as long as the water tank has hot water in the case of multi-point water use or a long water pipe. This avoids a waste of cold water.

- High Water Temperature

The heat pump can heat up water to a maximum temperature of 70°C. The high-temperature hot water is more hygienic and can be used for various users for various purposes.

- All-Weather Applicable

Supplies hot water all year round regardless of nights or rainy weather.

4 Installation Precautions

4.1 Importance Notes

(1) The air source water heater must be installed by professional personnel by abiding by the national wiring code and following the instructions in this guide.

(2) For installation or migration of the air source water heater, please contact your local service centers authorized by C&H. In the case of an air source water heater installed by any party not authorized or designated by C&H, Cooper&Hunter shall not undertake any responsibility for any fault or problems caused the air source water heater.

(3) If the user installs the air source water heater using self-prepared installation materials, C&H shall not undertake any responsibility for any loss caused by improper running and use of the air source water heater due to pipe leakage, fall-off, or insecure installation.

(4) The quality of water heated by the air source water heater meets the local drinking water health standards. If well water, groundwater, and seawater are used, the depletion of the Mg-Stick in the water tank may be accelerated, thereby shortening the lifespan of the unit.

(5) The water processed by the ion exchange water softener accelerates the depletion of the Mg-Stick in the water tank. Therefore, you are advised not to connect the water inlet of the air source water heater to a water softener.

4.2 Basic Requirements for Installation Sites

The following sites for installing the air source water heater may be prune to become faulty. If the following sites cannot be avoided, please consult your local service centers authorized by C&H to customize special models.

(1) Environments that are exposed to strong heat sources, steam, flammable gases, or volatile substances.

(2) Places where there are high-frequency facilities, such as welding machines or medical equipment.

(3) Seaside saline areas.

(4) Places where the air contains oil (such as machine oil).

(5) Places where the air contains sulfide gases (such as sulfide hot springs).

(6) Other special environments.

5 Main Unit Installation

5.1 Location for Installing the Main Unit

The main unit must be installed at a location where:

(1) The noise and air flow generated by the air outlet do not affect neighbors, animals, and plants.

(2) Good ventilation of the main unit can be ensured, and there are no obstructions nearby that hinders the air intake or output of the unit

(3) The installation position is able to withstand the weight and vibration of the main unit, and the installation can be safely performed.

(4) The place is dry and not exposed to direct sunlight or strong winds.

(5) The installation dimension diagram of the main unit can be complied with, and it is convenient to maintain and check the unit.

(6) The main unit is out of the reach of children.

(7) It does not hinder public aisle or affect city appearance.

5.2 Space Requirement for Main Unit Installation and Installation Diagram

(1) The installation requirements of the water heater's main unit are the same as those of the outdoor unit of an air conditioner. The main unit can be installed in the exterior walls, roof, balcony, or ground. The air outlet should avoid the wind direction. The dimension diagram of the main unit structure is shown in Figure 5-1 (unit: mm).

(2) The distance between the main unit and the walls or other obstructions must not be too small, and the space for installing the main units must meet the requirements provided in Figure 5-2.

(3) If a canopy is to be installed for the water heater main unit, note that the heat dissipation and absorption should not be affected.

(4) The main unit must be installed in the host places a solid foundation, and ensure that the main unit is installed upright, and fastened with foundation bolts. If the vibration is strong, add rubber gaskets to prevent vibration.

(5) Condensate drain of the outdoor unit: buckle snap the drainage joint of the outdoor unit into the drainage hole located in the middle of the chassis, as shown in Figure 5-3, and ensure reliable and tight fitting. Then, connect the drainage pipe to the drainage mouth, and guide the drainage pipe to a proper place for drain.

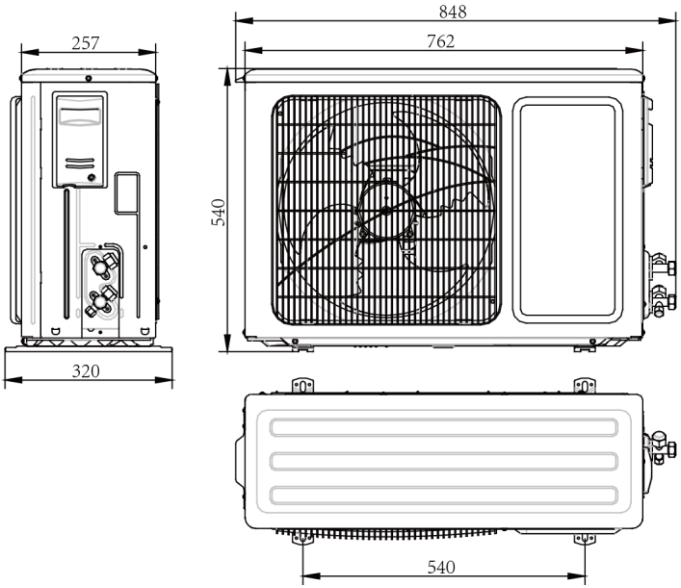


Figure 5-1 Dimension diagram of the main unit structure

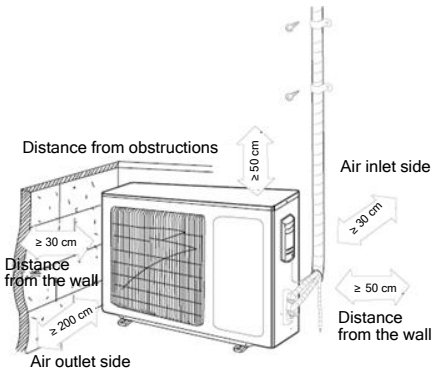


Figure 5-2 Space requirements for installation

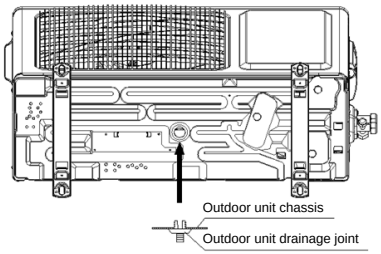


Figure 5-3 Drainage pipe connection

6 Installation of the Water Tank

(1) The water tank can be installed outdoors with the main unit, for example, installed in the balcony, roof, or ground. It can also be installed inside the room. Try to install it in an environment where the temperature is higher than 0°C. The hot water outlet should not be too far away from the locations for use. Lay out the pipes in a centralized manner, and take thermal insulation measures on hot water piping to reduce heat loss.

(2) The water tank must be placed upright with all feet touching the ground. It must be installed on a solid foundation. During water tank installation, consider the weight bearing capability of the foundation. Figure 6-1 shows the installation diagram.

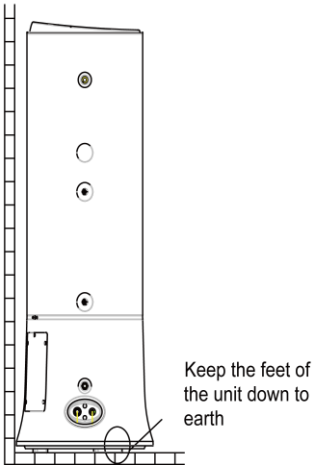


Figure 6-1 Fastening of the water tank

Note: The water tank must also be fastened to the wall using a tank mounting hoop or plate to prevent fall-off the water tank due to exceptions.

(3) There should be water pipes, hot water interfaces, and floor drains to facilitate water replenishment for the water tank, hot water supply, and drainage.

7 Pipeline Connection

7.1 Refrigerant Pipe Connection

(1) If the water tank and the main unit need to be connected by punching through a wall, a hole of Φ 55 mm must be drilled in the wall and the hole should be inclined toward the exterior wall, as shown in Figure 7-1. Protective sleeves need to be put on both sides of the hole.

(2) Bind up the connecting pipes, power cable, water temperature sensing package, and communication lines (if necessary) of the wired controller with thermal insulation bands, and then lead them through the hole.

(3) Remove the refrigerant pipe joint from the water tank and the sealing nuts from the small and large valves of the outdoor unit, and add refrigerant oil on the joint and valve cones.

(4) Remove the sealing caps of the connecting pipe. Align the center of the bell mouth with the pipe joint and valve cone, and screw up the conical nut with your hand and then with a wrench, as shown in Figure 7-2.

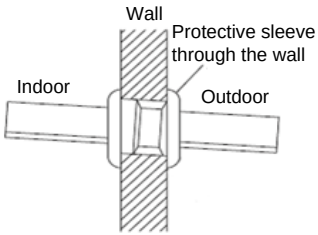


Figure 7-1 Refrigerant connecting pipe through the wall

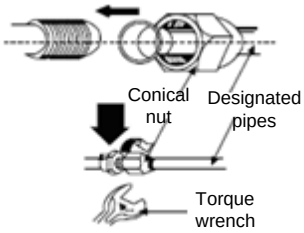


Figure 7-2 Fastening the connecting pipe

Caution: Perform pipe layout and bending carefully. Do not damage connecting pipes. Do not screw up the nut too tight to damage to the nut, its corners,

or the bell mouth, or too loose to cause leakage. Table 7-1 shows the tightening torque.

Table 7-1 Recommended tightening torque

Hex nut	Φ 6	Φ 9.52
Tightening torque (N•m)	15-20	31-35

7.2 Exhaust Methods

Table 7-2 Exhaust methods

Length of Connection Pipe	Air Exhaust Method	Refrigerant Charge Volume
Not greater than 10 m	Use a refrigerant in the outdoor unit	/
10 to 20 m	Use a vacuum pump	+20g/m

Note: The unit capability and energy efficiency decreases when length of the connecting pipe increases. Therefore, take thermal insulation measures on the connecting pipe when it needs to be extended.

(1) Use a refrigerant in the outdoor unit:

① Remove the valve cap and the fluoride injection mouth nut from the fluid valve and the air valve.

② Use a hex key to slightly unscrew the valve plug of the fluid valve, and use a screwdriver to jack up the valve core of the air valve. Then, the air is discharging.

③ Discharge the air for about 15 seconds. When there is refrigerant gas discharged, close the valve core and tighten the fluoride injection mouth nut.

④ Fully open the valve cores of the fluid valve, and the air valve, as shown in Figure 7-3.

⑤ Tighten the valve cap, and then use a leak detector or soapy water to check whether the pipes for connecting the outdoor unit and the water tank leak.

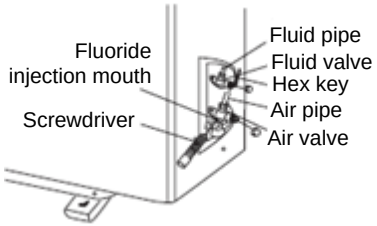


Figure 7-3 Opening the fluid valve and air valve

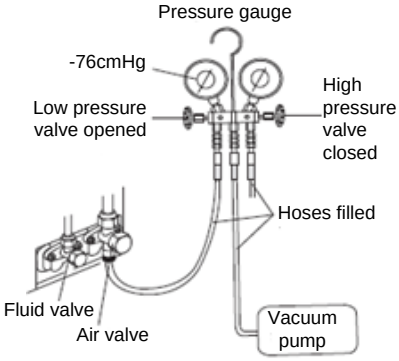


Figure 7-4 Vacuum pump connection diagram

(2) Vacuum pump:

① Connect the filling hose to the fluoride injection mouth of the air valve. Ensure that the valve cores of the air valve and fluid valve are tightly closed.

② Connect the joint of the filling hose to the vacuum pump, as shown in Fig. 7-4.

③ Fully open the low pressure valve of the pressure gauge.

④ Start the vacuum pump to vacuumize the air for 20 minutes or more, and ensure that the pressure gauge pointer points to -1.0 x 105 Pa (-76cmHg). Close the low pressure valve, and stop running the vacuum pump. Wait 2 minutes. If the number indicated by the pressure gauge pointer does not rise, the vacuumization and piping are successful. If the number indicated by the pressure gauge pointer rises, it indicates that air is entering the system. In this case, check the piping for leaks, and vaccumize the air again.

⑤ Remove the filling pose from the air valve.

⑥ Fully open valve cores of the gas valve and fluid valve.

⑦ Tighten the valve caps of the air valve and fluid valve, and the fluoride injection mouth nut.

⑧ Tighten the valve caps, and then use a leak detector or soapy water to check whether the pipes for connecting the outdoor unit and the water tank leak.

7.3 Water Pipe Connection

（1）Preparing of water pipes

Hot water tank hot water pipes must be selected out of the tube, it is recommended to use a nominal outside diameter of dn20, S2.5 series PPR pipe. Such as the use of other similar insulated pipe, can refer to more than the outside diameter and wall thickness to choose, do not recommend the use of plastic pipe and other fast heat pipe.

（2）Installing water outlet and inlet pipes for the water tank

The safety check valve, filter, and cut-off valve must be installed for the water inlet pipe, and the installation order must be consistent with that shown in the unit installation diagram. At least a cut-off valve must be installed for the water outlet pipe.

In order to facilitate water tank emptying or cleaning, you are advised to add a tee joint and a cut-off valve at the water outlet of the water tank. They must be installed if the water tank is far away (the hot water pipe is longer than 20 m) from the location for water use or all locations for water use are lower than the hot water tap of the water tank.

（3）Installing the safety check valve

Use a PPR pip to connect the safety check valve delivered with the unit to the water inlet of the water tank (note: the direction indicated by "→" should point to the water tank) by following Figure 7-5. The other end of the safety check valve is connected to the tap water for water replenishment. To ensure safe use, please strictly follow the installation order shown in Figure 7-5. A guide pipe must be installed for the safety check valve, and the connection must be securely fastened to prevent it from loosening. The guide pipe must be connected to the floor drain and must not be folded to prevent blocking.

（4）Installing the outfall pipe

As shown in Figure 7-5, remove the outfall plug. Then, use an outfall pipe to

connect the outfall to the floor drain, and ensure that the outfall pipe and the joint of the floor drain are lower than the bottom of the water tank. Otherwise, the water cannot be drained. In addition, the cut-off valve must be installed in the position at which the user can conveniently operate it.

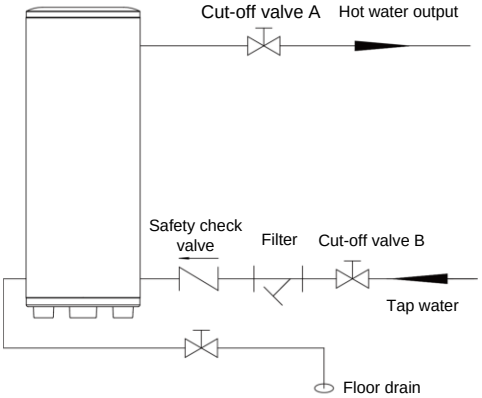


Figure 7-5 Safety check valve and outfall pipe installation

（5）Installing freeze-proof bands

If the water tank is inevitably to be installed in a place where ambient temperatures are below 0 °C, in order to avoid pipe freezing caused by poor waterway thermal insulation, freeze-proof bands must be used and installed around the water outlet and inlet pipes. For details about how to install freeze-proof bands, refer to the freeze-proof band installation guide.

Caution：

In order to ensure water safety, both the water inlet and outlet must be connected to a PPR pipe for each to insulate electricity. The length L of the PPR pipe is calculated by the following formula: $L \geq 70 \times R^2$, of which L is the length of the PPR pipe (unit: cm), and R is the inner radius (unit: cm) of the PPR pipe. In addition, take thermal insulation measures, and do not directly use metal pipes.

To ensure safety and reliability, use dedicated accessories (PPR pipe joints, safety check valves, and filters) delivered with the unit, and do not use accessories from third-party vendors or replace any parts by the user. C&H shall not undertake any responsibility for personal injuries, or any loss caused by improper running and use of the air source water heater.

8 Installation Diagram of the Unit

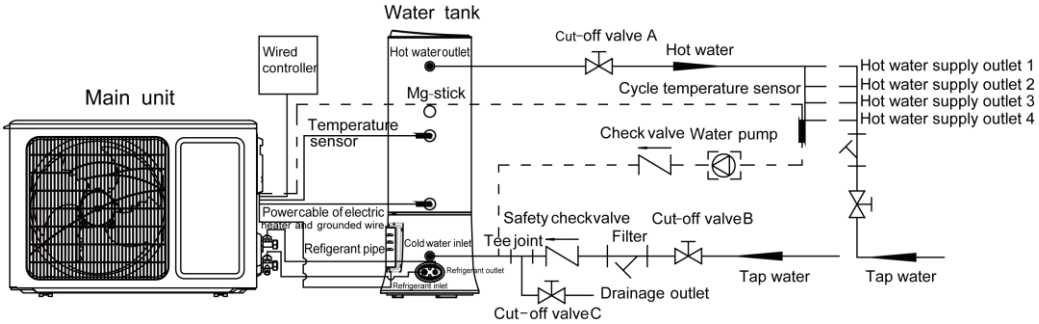


Figure 8-1 Installation diagram of the unit

Table 8-1 Dimensions and specifications

Name	Interfacing Pipe Screw Thread
Hot water outlet of the water tank	G1/2
Cold water inlet of the water tank	G1/2

In the installation diagram of the unit, the dotted lines indicate the installation diagram for installing the preheating water return function. With this function, it is ensured that the water in the pipe between the water tank and the location for water use is hot. That is, the user can always use hot water when opening the tap. This does not require the user to drain the cold water for use of hot water. This function requires the installation of a water return system (water return pump, water return pipes, and water return check valve and temperature sensor for water return pipes) during the installation of the unit. Wilo RS15/6 is recommended for the water return pump. If other pumps are used, the requirements are as follows: flow ≥ 1 m^{3}·; lift ≥ 6 m. A length of about 10 m is recommended for the water return pipe, and a resistance of 50 kΩ is recommended for the cycle temperature sensor.

Caution

(1) Prepare materials according to the preceding dimensions and specifications. If the cut-off valve is installed outdoors, PPR pipes are recommended to prevent freezing caused by low temperature.

(2) Install the piping system only after the unit is fastened. Prevent dust and other foreign matters form entering the piping system during pipe connection or installation.

(3) After all pipes required are installed, check leakage first, and then take thermal insulation measures on the waterway system. Particularly, note the following:

Take thermal insulation measures on the valves and pip joints. A thickness of not less than 15 mm is recommended for the thermal insulation cotton.

(4) The thermal insulation and pressure-bearing water tank can supply hot water only when the tap water is available.

(5) When using hot water, ensure that cut-off valve of the cold water inlet of the water tank is open.

9 Wiring

9.1 Wire Layout

(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 grounding measures 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 installation conditions on site change, consider using cables whose reduced capacity can still meet site requirements, based on the specifications of the power cables and air circuit breakers provided by the vendor.

(9) 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 9-1 Power configuration table

Model	Power Supply	Minimum Sectional Area (mm^2) of Power Cables			Air Circuit Breaker Capacity (A)
		Firing Line	Zero Line	Ground Line	
CH-HP3.0SWHK	220V-240V ~50Hz	1.5	1.5	1.5	16

9.2 Wire Connections

(1) Unscrew the screw on the connection box cover on the right side panel of the main unit to open the connection box cover. Figure 9-1 shows the external wiring.

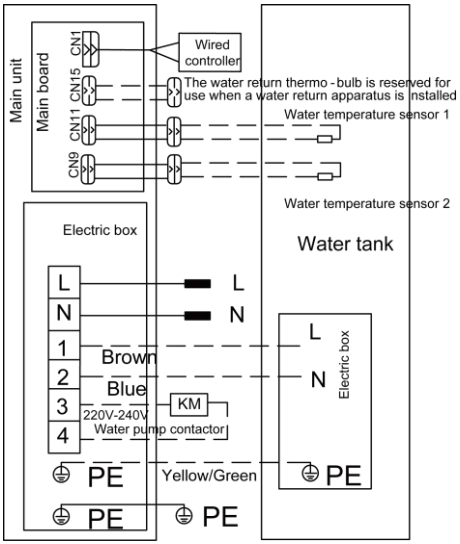


Figure 9-1 External wiring for CH-HP3.0SWHK mapping WT200SW1.5EHK

(2) If the unit is equipped with a grounding cable, connect one end of the ground cable to the grounding screw of the water tank, and the other end to the grounding screw in the connection box on the right panel of the main unit.

(3) Select an appropriate power cable (with a leakage circuit breaker)

according to the power configuration table, and connect it to the main power supply.

(4) Connect the interface of the temperature sensor delivered with the water tank to the interface coming from the connection box of the main unit according to the identifiers (“TOP” for “TOP” and “BOTTOM” for “BOTTOM”) on the line of the temperature sensor. Put the temperature sensor inside the connection box. The line of the temperature sensor must be clamped tightly. Check whether the temperature sensor is securely fastened. The interface marked "CYCLE" coming from the main unit interconnects with the cycle temperature sensor only during installation of a water return system.

(5) Use wire clips to clamp the strong wires, and install the connection box to the original place.

(6) Fasten the wired controller, and connect it to with the communications line coming from the main unit.

(7) 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. Strong wires and weak wires need to be separately sheathed.

(8) For a project involving with installation of a water return pump, if the current of the water return pump current is less than or equal to 1 A, the water return pump can be directly connected to the wiring board of the unit; if the current is large, an AC contactor must be installed.

Note: This unit has the intelligent water return function. If this function is needed, a water return pump (the size of its AC contactor depends on the pump used), pump connection cables, and a pump temperature sensor are needed.

10 Wired Controller Installation

10.1 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 controlled of the air source water heater in a place susceptible to electromagnetic interference.

(3) Ensure that the communications line is connected to the correct interface. Otherwise, communication will failure.

10.2 Wired Controller Installation

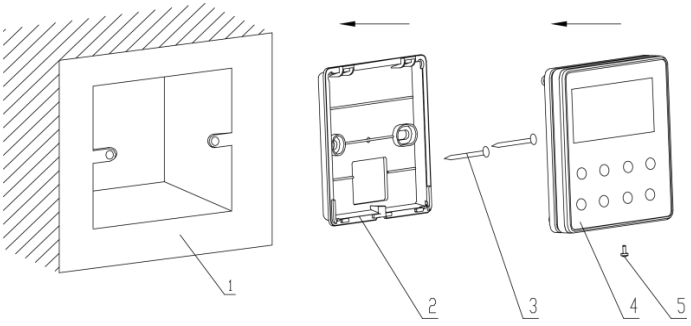
Figure 10-1 is a simple diagram for installing the wired controller. Note the following issues for installation:

（1）Before the installation, cut off the power supply to which the strong wires buried in mounting holes of the wall are connected. The power supply must be cut off during the entire installation process.

（2）Pull out the 4-core twisted pair from the mounting hole of the wall, and lead the 4-core twisted pair through the rectangular hole behind the baseplate of the wired controller.

（3）Attach the baseplate of the wired controller to the wall, and use an M4X25 screw to fasten the baseplate to the mounting hole of the wall.

（4）Insert the 4-core twisted pair that passes through the hole into the slot on the wired controller, and buckle the wired controller panel and the wired controller baseplate together.



No.	1	2	3	4	5
Name	Socket bottom box installed inside the wall	Wired controller baseplate	Screw M4x25	Wired controller panel	Screw ST2.2x6.5

Figure 10-1 Wired controller installation diagram

Caution

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

（1）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.

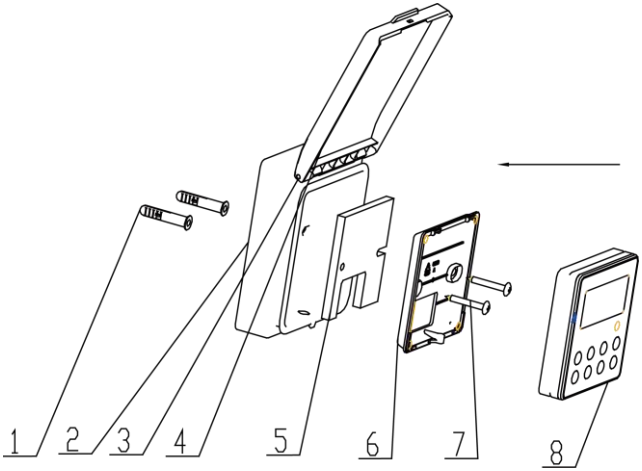
（2）If the unit is installed in a place susceptible to electromagnetic interference, the communications line of the wired controller and the line of the temperature sensor must be used. Shielded twisted pair.

10.3 Weatherproof Box Installation

If the wired controller is inevitably to be installed outdoors or in a humid place, a weatherproof box must be installed for the wired controller, Figure 10-2 shows the installation diagram of the wired controller for the wired controller. For the installation procedure and cautions, refer to the wired controller installation method and note the following issues:

（1）If no socket bottom box is installed inside the wall, wall plugs need to be mounted on the wall. In this case, use the screws delivered with the unit to screw up the bottom shell (weatherproof box), rubber cushions (weatherproof box), and the baseplate of the wired controller in the wall plugs.

（2）Insert the 4-core twisted pair that passes through the hole into the slot on the wired controller, and buckle the wired controller panel and the wired controller baseplate together.



No.	Name	No.	Name
1	Wall plug	5	Rubber cushions (weatherproof box)
2	Bottom shell (weatherproof box)	6	Wired controller baseplate
3	Spindle (weatherproof box)	7	Self-drilling self-tapping screw ST4.8×38
4	Top cover (weatherproof box)	8	Wired controller panel

Figure 10-2 Installation diagram of the weatherproof box for the wired controller

11 Commissioning

After the main unit, water tank, wired controller, waterway system, fluorine circulation system, and electrical wiring are installed, check the unit based on the following checklist.

Table 11-1 Checklist for the installation

Check Item	Possible Symptoms Caused by Improper Installation
Are the main unit and water tank securely fastened?	The main unit and the water tank may fall, or vibration or noise may be caused.
Are there any obstructions to the air outlet and inlet of the main unit?	The unit does not work properly.
Is the connection pipe of the water tank properly insulated?	Potential hazards may exist.
Are thermal insulation measures taken on the waterway pipes?	The performance of the unit may be affected or the pipes may be frozen and damaged.
Is the power voltage consistent with the voltage indicated in the nameplate?	The unit may become faulty or the parts may be burnt.
Does the wire model comply with specifications?	The unit may become faulty or the parts may be burnt.
Is a safety check valve installed for the water inlet pipe?	If the water tank bears high pressure, safety hazards exist. The water may be returned if water supply stops.
Is the tap water replenishment pressure too high?	If the water tank bears high pressure, the safety check valve discharges water and abnormal noise is caused.
Is a pressure reduction valve installed for the water inlet pipe when the water replenishment pressure is too high?	If the water tank bears high pressure, the safety check valve discharges water and abnormal noise is caused.
Is the ground wire of the water tank reliable?	Potential hazards may exist.

Is the temperature sensor securely connected?	Performance of the water tank is affected.
Is the temperature sensor inserted to the bottom of the water tank?	The water temperature displayed in the wired controller is different from the actual temperature. The unit is protected from high pressure.

Perform the following commissioning steps only after all the preceding check items are passed:

(1) **Water replenishment:** Follow the instructions in section 16.1 or the installation notes on the water tank to replenish water for the tank water tank, and check whether the pipes or joints for leaks. For initial installation, this step must be performed by installation and commissioning personnel. If a drain operation is performed before use of the unit, replenish water before starting the unit.

(2) **Power-on of the unit:** After the unit is powered on, "beep" can be heard from the wired controller buzzer. Observe whether the wired controller is displayed properly. If there is no fault code, the unit is normal. The wired controller has a power memory function. However, if the wired controller is power on for the first time, it may indicate power-on, power-off, or standby. **Note that the unit can be powered on only after the water tank full filled with water, and do not power on the unit before the water replenishment.**

(3) **Wired controller parameter settings:** provide settings such as enabling the water return function and correcting the system time.

(4) **System operating:** After the water tank is full filled with water, check the waterway system to ensure that the tap or sprayer is closed and cut-off valves of the inlet and outlet pipes of the water tank are open before starting the unit. When the heating icon is displayed on the wired controller, check whether the unit runs properly. The unit runs properly if the following criteria are met: The fan runs properly; the unit runs smoothly without shaking or abnormal sound. Hand over the unit to the user after the unit runs properly at least for 20 minutes.

12 Methods for Replenishing or Discharging Refrigerants

12.1 Refrigerant Replenishment

Refrigerants can be replenished for the source water heater only in specific mode.

First, connect the hose in the middle of the pressure gauge to the refrigerant bottle, and connect (but do not tighten) one end of the blue hose of the low pressure gauge to the fluoride injection mouth of the air valve on the unit. Then, open the valve of the refrigerant bottle. Open the valve next to the low pressure gauge for 5 seconds and close it, and immediately tighten the hose interface on the fluoride injection mouth.

In normal hot water mode, press and hold MODE+▲ for 5 seconds to enter the query status. When the temperature display area displays 00, press and hold MODE+▲ for 5 seconds. Then, 00 changes to P0. Press the ▲ or ▼ button to switch to the P3. Then, press the MODE button for settings. Press the ▲ or ▼ button again to change 00 in the time display area to 01. Press MODE to confirm and complete the settings. After the settings are complete, when the low pressure gauge pointer declines, you can loosen the valve next to the low pressure gauge for refrigerant replenishment ((Figure 12-1 shows the diagram for refrigerant replenishment).

12.2 Refrigerant Discharging

Open the air valve using a hex key to discharge the refrigerant (Figure 12-2 shows the refrigerant discharging diagram).

Caution

This operation can be performed only by professional personnel to avoid hazards. Inject refrigerants based on the nominal amount indicated on the nameplate when charging refrigerants.

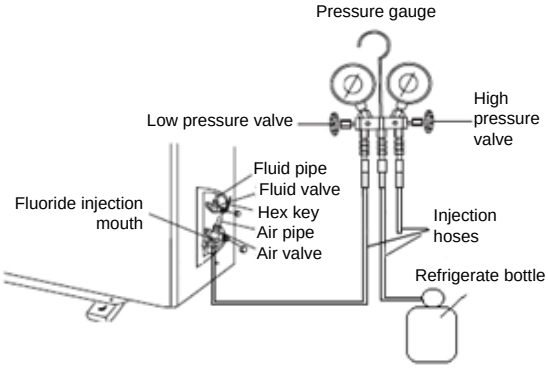


Figure 12-1 Refrigerant replenishment diagram

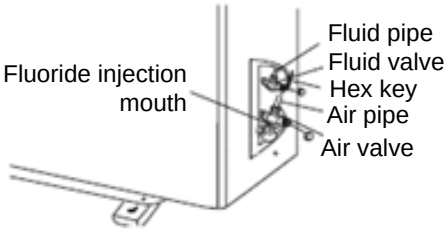


Figure 12-2 Refrigerant discharging diagram

13 Method for Refrigerant Reclamation

Refrigerants can be reclaimed for the source water heater only in specific mode.

In normal hot water mode, press and hold MODE+▲ for 5 seconds to enter the query status. When the temperature display area displays 00, press and hold MODE+▲ for 5 seconds. Then, 00 changes to P0. Press the ▲ or ▼ button to switch to the P3. Then, press the MODE button for settings. Press the ▲ or ▼ button again to change 00 in the time display area to 01. Press MODE to enter the defrosting mode, and complete the settings for refrigerant reclamation settings. After the settings are complete, first close the fluid valve (smaller valve), and when the there is cold air blowing out from the outlet, immediately close the air valve (larger valve). After it is closed, immediately shut down the unit

⚠ Caution

Refrigerant reclamation must be promptly completed, so as not to cause any

damage to the unit. If refrigerant reclamation is required, please contact the professional personnel to perform refrigerant reclamation.

14 Performance of the Unit

14.1 Heating Capacity

During heating, the unit continuously absorbing heat from outdoor air, and then released it into the water to heat up the water in the water tank. When the outdoor temperature drops, the heating capacity decreases. The following figure shows the chart of the heating capability for reference.

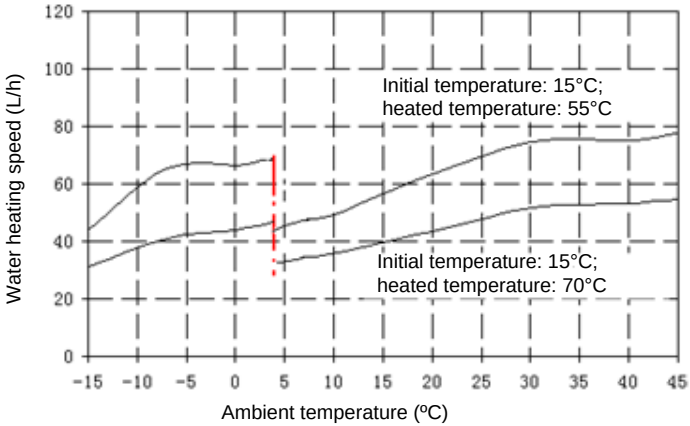


Figure 14-1 Water heating capability of the CH-HP3.0SWHK unit

If you press the Fast button on the wired controller, auxiliary electric heating with 1500 W starts to heat up water together with the heat pump. In this case, the water heating speed will increase by 32 L/h.

14.2 Operating Performance

(1) Defrosting

① If frosting appears during water heating, the unit automatically enables the defrosting function to improve the heating effect.

② When defrosting runs, the unit stops running the fan;

③ If defrosting runs in high ambient temperatures (> 10 °C), the unit is running improperly. In this case, please report for repairing.

(2) Starting the unit after long-time shutdown

If the unit is not used for a long time, turbid fluid may come out from the tap when the unit is started again (or started for the first time). This is a normal phenomenon. Wait a moment, the turbid fluid will disappear.

(3) Power outage

① If an outage occurs when the unit is running, all tasks are stopped.

② The wired controller has a power memory function.

③ If a malfunction occurs due to lightning or car radio, manually cut off the power switch, and then power on the unit again.

(4) Power memory function

Every time before the power of the water heater or wired controller is cut off, the wired controller automatically memorize the power switch status of the unit. After the power is restored, the wired controller sends power-on/power-off signals to the water heater according to the status memorized before the power is cut off. This ensures that the unit can run according to the original status after the power is restored.

15 Notes on Winter Use

(1)temperatures in Winter are low. If the unit is not used for a long time, before starting the unit, connect it with electricity for at least 8 hours.

(2)Outdoor temperatures in Winter are relatively low, do not disconnect the unit from electricity if it needs to be shut down for a short time. Otherwise, the automatic freeze-proof protection function will fail. At low ambient temperatures, the automatic freeze-proof protection function enables the unit to heat the water before water temperature approaches the freezing point. When the water temperature rises to a safe temperature, the function is disabled. However, this function does not apply to the water inlet and outlet pipes of the water tank. If the ambient temperature is below 0°C, freeze-proof bands must be installed. In addition, ensure that they are energized. If the water tank is inevitably installed outdoors, reduce the outdoor part of pipes including the refrigerant connecting pip and water inlet and outlet pips of the water tank. Otherwise, the heat loss is large, power consumption increases, and the water system is vulnerable to freezing. In addition, pay attention to thermal insulation of special positions such as valve joints and pipe bends. Otherwise, these positions are vulnerable to freezing.

(3)If the unit is not used for a long time, drain the water in the water tank and the pipes by following drain operations. Otherwise, the water system may be frozen and damaged. Use the unit after the water is drained and then the water tank is full filled with water.

Tips: If it is inconvenient or dangerous to perform the preceding operations, directly contact your local dealer or authorized service center ofC&H, andC&H will dispatch professional personnel to provide inspection, drainage, water replenishment, commissioning, cleaning, and maintenance services.

16 Servicing and Maintenance

16.1 Water Replenishment for the Water Tank

(1) Water replenishment procedure

① Cut off the power supply of the unit, and open the cut-off valve of the hot water outlet pipe and the valve at the location for water use.

② Open the cut-off valve of the tap water inlet pipe.

③ When the water comes out from the location for water use, close the valve at the location for water use.

④ Complete water replenishment, and switch on the power supply.

(2) Water tank drainage procedure

① Cut off the power supply of the unit, and close the cut-off valve of the tap water inlet pipe;

② Open the cut-off valve of the hot water outlet pipe and the valve at the location for water use.

③ Open the cut-off valve of the outfall;

④ After the water tank is drained, close the cut-off valve of the outfall. The drainage operations are complete.

16.2 Regular Cleaning for the Water Tank

To ensure the quality of hot water you use, follow the following steps to regularly clean the water tank:

（1）Cut off the power supply of the unit.

（2）Close the cut-off valve on the water inlet pipe of the water tank.

（3）Open the cut-off valve of the hot water outlet pipe and the valve at the location for water use.

（4）Open the cut-off valve of the outfall until the water tank is drained.

（5）Open the cut-off valve on the water inlet pipe of the water tank to clean the water tank. Close the cut-off valve of the outfall until the water discharged from the outfall becomes clean.

（6）Replenishment water for the water tank by following the water replenishment operations.

（7）After the water tank is cleaned, switch on the power supply.

Note: Under normal conditions, the water tank can be cleaned once a year. If the water quality is poor, you need to shorten cleaning frequency.

16.3 Mg-Stick Replacement

To improve durability of the water tank, a Mg-Stick is installed inside the water tank. Generally, the Mg-Stick has a lifespan of two to three years. However, if the quality of water used by the water heater is poor, the Mg-Stick lifespan will be shortened. For Mg-Stick replacement, perform the following steps:

（1）Before removing the Mg-Stick, drain the water tank by following drainage operations.

（2）Open the cap on the mounting mouth for the Mg-Stick in the water tank.

（3）Use a hex key to unscrew the Mg-Stick component, and then steadily removed the magnesium to prevent it from falling into the inner container of the water tank;

（4）Install a new Mg-Stick component into the mounting mouth of the Mg-Stick, and then tighten it using a hex key.

（5）Close the cap, and replenish water by following water replenishment operations.

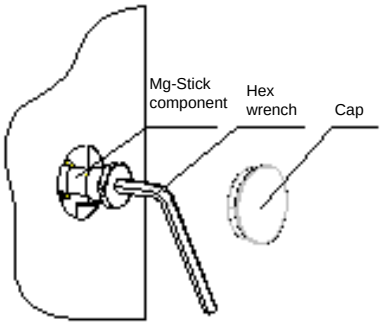


Figure 16-1 Mg-Stick replacement

Caution

The Mg-Stick must be replaced by professional maintenance personnel. Directly contact your local dealer or authorized service center of C&H, and Cooper&Hunter will dispatch professional personnel to provide services.

16.4 Safety Check Valve Maintenance

In the heating process, when the inner container of water tank is in overpressure, a small amount of water may be discharged through the safety check valve, which is a normal phenomenon. However, if a large amount of water is discharged through the safety check valve or even pipe vibration occurs and abnormal noise is caused, contact C&H authorized maintenance centers. The possible causes of this problem are as follows: The safety check valve is damaged; the water replenishment pressure is higher than the maximum working pressure (0.7MPa) of the water tank, which occurs generally when pressure reduction is not performed on the tap water. In normal conditions, the tap water pressure is around 0.3 MPa. If a booster pump is used to replenish water, the water replenishment pressure may exceed 0.7 MPa. In this case, a pressure reduction valve needs to be added to the tap water replenishment pipe to reduce water replenishment pressure.

Open the safety check valve's handle to check whether it is blocked on a regular (about once a month) basis. If it is blocked, contact the authorized maintenance center for check or replacement. Perform sewage disposal by following the guide on a regular (about once a year) basis.

16.5 Maintenance of the Unit

(1) Regularly check whether the air inlet and outlet of the main unit are blocked. If blocked, immediately clean them.

(2) Regularly check whether piping between the main unit and the water tank, piping on the water use side, pipe fittings, and valves are damaged or blocked. Check whether any joint leaks, and whether the filter is blocked.

17 Precautions for Safety Use

(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 C&H after-sales service for help so as to guarantee normal, safe and reliable unit operation.

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

(4) 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.

(5) 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.

(6) The water heater is equipped with safe relief valve for reliable operation, please do not change its location and never block its outlet. The pipe should be directly connected to floor drain.

(7) Never drink the water inside the water tank.

(8) Children bath should be supervised by adults.

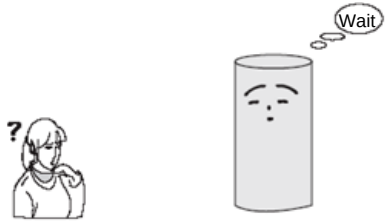
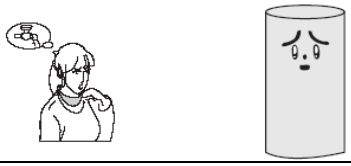
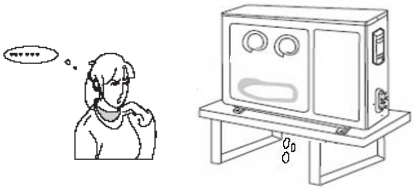
(9) This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.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

18 Troubleshooting

Warning

Do not personally repair the air source water heater. Non-professional maintenance may cause electric shock hazards or a fire. If maintenance is required, please contact C&H authorized service center to dispatch professional personnel. Before contact C&H authorized service center, check the following items, which may save your time and expenses.

Table 18-1

Symptom	Fault Diagnosis
The unit does not run when it is started immediately after shutdown. 	To protect the unit, the microcomputer controls it to run 5 minutes after it is shut down and then immediately started.
The bicker sound can be heard during operating. 	When the unit is running, the "wow" or "hiss" sound can be heard sometimes, which is the sound of flowing refrigerants. It does not indicate a fault.
The main unit discharges condensate water. 	This is a result of normal operating of the unit and does not indicate a fault. You can use the drainage pipe to guide the water to a proper place, as shown in Figure 5-3.
The safety check valve is discharging water.	In the water heating process, when the inner container of the water tank bears overpressure, it may discharge a small amount of water through the safety

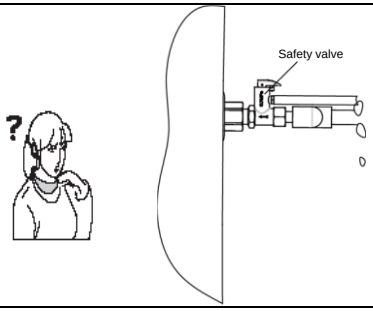
	check valve, which is a normal phenomenon. However, if a large amount of water is discharged through the safety check valve or even pipe vibration occurs and abnormal noise is caused, contactC&H authorized maintenance centers.

Table 18-2

Symptom	Fault Diagnosis
Freeze-proof is displayed on the wired controller.	The unit can automatically enable freeze-proof protection in winter, which is a normal phenomenon.
The sprayer sprays hot water for a short time.	If the sprayer sprays water too fast due to the model, this symptom is a normal phenomenon. You are advised to use a sprayer with a speed of 6 to 7 L/min.
The wired controller alternately displays L6 and the water temperature.	The ambient temperature is too low, it is beyond the running range of the main unit, or the temperature is set too high and exceeds the maximum temperature of the heat pump.
In the water heating process, the unit is slightly frosted.	If the unit runs too long for hot water, it may be frosted, which is a normal phenomenon. To improve heating effects, the unit will automatically defrost.
When defrosting runs, the electric motor of the fan in the unit stops.	The fan does not work during defrosting, which is a normal phenomenon.
If the unit is not used for a long time, turbid fluid may come out from the tap when the unit is started again (or started for the first time).	This is a normal phenomenon. Wait a moment, the turbid fluid will disappear.

Table 18-3

Please contact the C&H appointed service center in case of any of following conditions.

Symptom	Errors
The unit is shut down and E1 is	High pressure protection
The unit is shut down and E4 is displayed on thecontroller.	Discharge protection
The unit is shut down and E5 is displayed on the controller.	Compressor overload protection
The unit is shut down and E6 is displayed on the controller.	Communication error
The unit is shut down and F3 is displayed on the controller.	Outdoor temperature sensor error
The unit is shut down and F4 is displayed on the controller.	Discharge temperature sensor error
The unit is shut down and F6 is displayed on the controller.	Outdoor heat exchanger coil temperature sensor e rror
The unit is shut down and Fd is displayed on the controller.	Suction temperature sensor error
The unit is shut down and FE is displayed on the controller.	Upper Water temperature sensor error
The unit is shut down and FL is displayed on the controller.	Middle Water temperature sensor error
The unit is shut down and L6 is displayed on the controller.	Insufficient unit capability
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 C&H encounters quality problems or other problems, contact your local maintenance centers authorized by C&H.	