



AIR SOURCE HEAT PUMP WATER HEATER SERVICE MANUAL

**T1/R134A/50Hz
(GC201510 - III)**

GREE ELECTRIC APPLIANCES, INC.OF ZHUHAI



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PRODUCT

PRODUCT

1 MODELS LIST

Product type	-	Model	Product code	Heating capacity(W)	Outline diagram
Split type	Water tank	SXD200LCJW/C1-K	ER20000320	2800+1500 (electric heating)	
	Outdoor unit	GRS-S3.0G/NbA-K	ER02000130		

Product type	Model	Product code	Heating capacity(W)	Outline diagram
Integral type	GRS-2.4/D270ANbA-K	ER02100050	2400+1500 (electric heating)	

Notes:

- ① The above table lists specifications of the air source water heater series product for static heat up. The product standard is EN16147-2011, (EU) No 814/2013, EN 12102-2008.
- ② Conditions for testing heating capacity of the unit: outdoor ambient temperature: 20°C DB/15°C WB; Initial/ending water temperature in the water tank: 15°C/55°C.
- ③ For units with a water tank equipped with an electrical heater, that is, the water tank model of which includes “ D ”, both the heat pump and electrical heater are started for heat up under low ambient temperature or rapid mode.
- ④ If the product specification changes with product improvement, refer to the parameter specified on the nameplate.

2 NOMENCLATURE

2.1 Nomenclature of split type unit

G	RS	-	S	3.0	G	/	Nb	A	-	K
1	2		3	4	5		6	7		8

NO.	Description	Options
1	GREE	G
2	Heat Pump Water Heater	RS
3	Heating style	S = Static, C = Circulating
4	Heating Capacity	2.8kW
5	Water Tank Capacity	E=100L,F=150L,G=200L,H=250L
6	Refrigerant	Nb = R134a, Default = R22
7	Design Serial Number	A
8	Power style	220-240V-1Ph ~ 50Hz

2.2 Nomenclature of integral type unit

G	RS	-	2.4	/	D	270	A	Nb	A	-	K
1	2		3		4	5	6	7	8		9

NO.	Description	Options
1	GREE	G
2	Heat Pump Water Heater	RS
3	Heating Capacity	2.4kW
4	Function code	Null for no electric heating function; D—with electric heating function
5	Water Tank Capacity	270L
6	Design code	A—LCJW: floor standing type; outer coil pipe static heating type; B—BCJW: wall-mounted type; outer coil pipe static heating type; C—LCJ: floor standing type; built-in coil pipe static heating type; D—BCJ: wall-mounted type; built-in coil pipe static heating type;
7	Refrigerant	Nb = R134a, Default = R22
8	Design Serial Number	A
9	Power style	220-240V-1Ph ~ 50Hz

3 FUNCTION

No.	Name	Function
1	Compressor	Increases pressure for the refrigerant and provides driving force for circular flow of the refrigerant as a main driving component.
2	Four-way valve	Reverses flow direction of the refrigerant when the system switches between the normal heat up mode and defrosting mode.
3	Water tank	Provides heat exchange channel for refrigerant and water and stores hot water for daily use.
4	Electronic expansion valve	Speeds up high-pressure and high-temperature refrigerant and reduces pressure and adjusts the circulation amount of coolant.

5	Finned tube exchanger	Provides heat exchange channel for refrigerant and air.
6	Fan motor	Enhances heat exchange on the air side of the finned tube exchange and provides a low-temperature heat source continuously.
7	Filter	Filters impurities in refrigerant to protect components with small diameter.

4 PRODUCT PARAMETERS

4.1 Product Parameters of Split type unit

4.1.1 Product Parameters of Outdoor Unit

Model		GRS-S3.0G/NbA-K	
Product code	-	ER02000130	
Rated Heating Capacity ^(*)	W	2800	
Rated Input Power ^(*)	W	700	
COP ^(*)	W/W	4.00	
Load Profile	-	L	
COP _{DHW} ^(**)	W/W	2.90	
Energy Efficiency Class ^(**)	-	A	
Water Heating Energy Efficiency ^(**)	-	110%	
Annual electricity consumption (average climate conditions)	kWh	878	
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	-	I PX4	
Refrigerant	Name		R134a
	Charge	kg	1.20
Outline Dimensions	W x D x H	mm	848x320x540
Package Dimensions	W x D x H	mm	881x363x595
Net Weight		kg	35.5
Sound Power Level ^(***)		dB(A)	61
Operating Range		°C	-7~45°C

Notes:

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

4.1.2 Parameters of the Water Tank

Coil water tank

Model	Product code	Capacity	Power Supply to E-heater	Heating Power of E-heater	Dimensions	Net Weight	Size of Pipe Between the Main Unit and Water Tank Coolant	Size of Pipe at the Water Acquisition Position
	-	L	-	W	mm	kg	mm	mm
SXD200LCJW/C1-K	ER20000320	185	220V-240V~50Hz	1500	545 x 545 x 1919	52	Φ6, Φ9.52	DN15

Notes:

- ① Type selection of water tank shall also be made based on local climatic conditions and opinions from professionals.
- ② For units with a water tank equipped with an electrical heater, that is, the water tank model of which starts with SXD, both the heat pump and electrical heater are started for heat up under low ambient temperature or rapid mode.
- ③ If the specification parameters change with product improvement, refer to the parameter specified on the nameplate.

4.2 Product Parameters of Integral type unit

Model		GRS-2.4/D270ANbA-K	
Product code	-	ER02100050	
Rated Heating Capacity ^(*)	W	2400	
Rated Input Power ^(*)	W	685	
COP ^(*)	W/W	3.50	
Capacity	L	270	
Load Profile	-	XL	
COP _{DHW} ^(**)	W/W	2.58	
Energy Efficiency Class ^(**)	-	A	
Water Heating Energy Efficiency ^(**)	-	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	-	I PX4	
Refrigerant	Name		R134a
	Charge	kg	1.10
Outline Dimensions	W x D x H	mm	660x667x1958
Package Dimensions	W x D x H	mm	813x813x2100
Net Weight		kg	114

Sound Power Level ^(***)	dB(A)	58
Operating Range	°C	-7~45

Notes:

- (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) ^(**) Value obtained with an air temperature of 7°C and a water inlet at 10°C, as per EN16147-2011, (EU) No 814-2013.
- (3) ^(***) Value obtained indoor placement, with 2m long inlet and outlet wind duct, as per EN 12102-2008, (EU) No 814-2013.
- (4) 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.

4.3 Work Temperature Range

	Models	
	GRS-S3.0G/NbA-K	GRS-2.4/D270ANbA-K
Heating	-7~45°C	-7~45°C
Note: The above value range indicates the outdoor ambient temperate range for normal operation of the unit. For details on the configurable range of water temperature, see the nameplate of the water tank.		

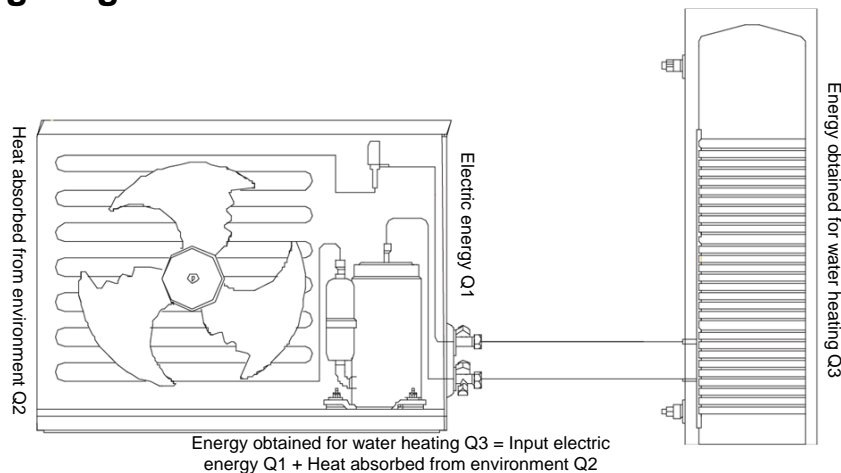
5 Working Principle

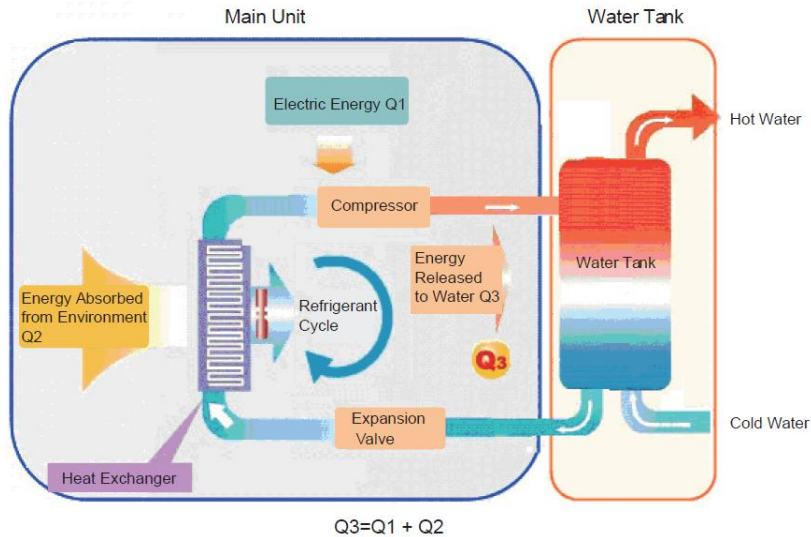
5.1 Brief Introduction to Working Principle

As the refrigerant has different phase-transition temperature under varied pressure, it enables the heat pump to transfer heat of low-temperature heat source to the high-temperature heat source. The air source water heater unit utilizes the heat pump to obtain heat from the ambient low-grade energy (air source) via thermodynamic cycle by consuming partial electrical energy, and then delivers heat to the water tank for heating up water.

5.2 Working Diagram

5.2.1 Working Diagram





The compressor consumes partial electrical energy to compress the refrigerant into high-temperature and high-pressure gas. After entering the condenser (the water tank coil of a water heater in static heat up mode), the gaseous refrigerant transfers its heat to water as its saturation temperature is higher than the water temperature and leaves the condenser after condensing into liquid. The liquid refrigerant enters the throttling device (generally the electronic expansion valve) for speedup and pressure reduction. As partial liquid vaporizes, the liquid refrigerant has two states (gas and liquid) when leaving the throttling device. The low-pressure refrigerant enters the vaporizer (the finned tube exchanger of a water heater in static heat up mode) and is vaporized into liquid after absorbing heat from air as its saturation temperature is lower than the air temperature. The low-pressure gas is inhaled by the compressor for the next cycle.

6 Optional Accessories

The Gree air source water heater unit supports the following accessories:

Item	Model	Remark
Intelligent preheat water return device (transient heat up module)	HS-01	
Self-regulation heating belt	76612816	
Pressure stabilizing valve	07382812	

Note:

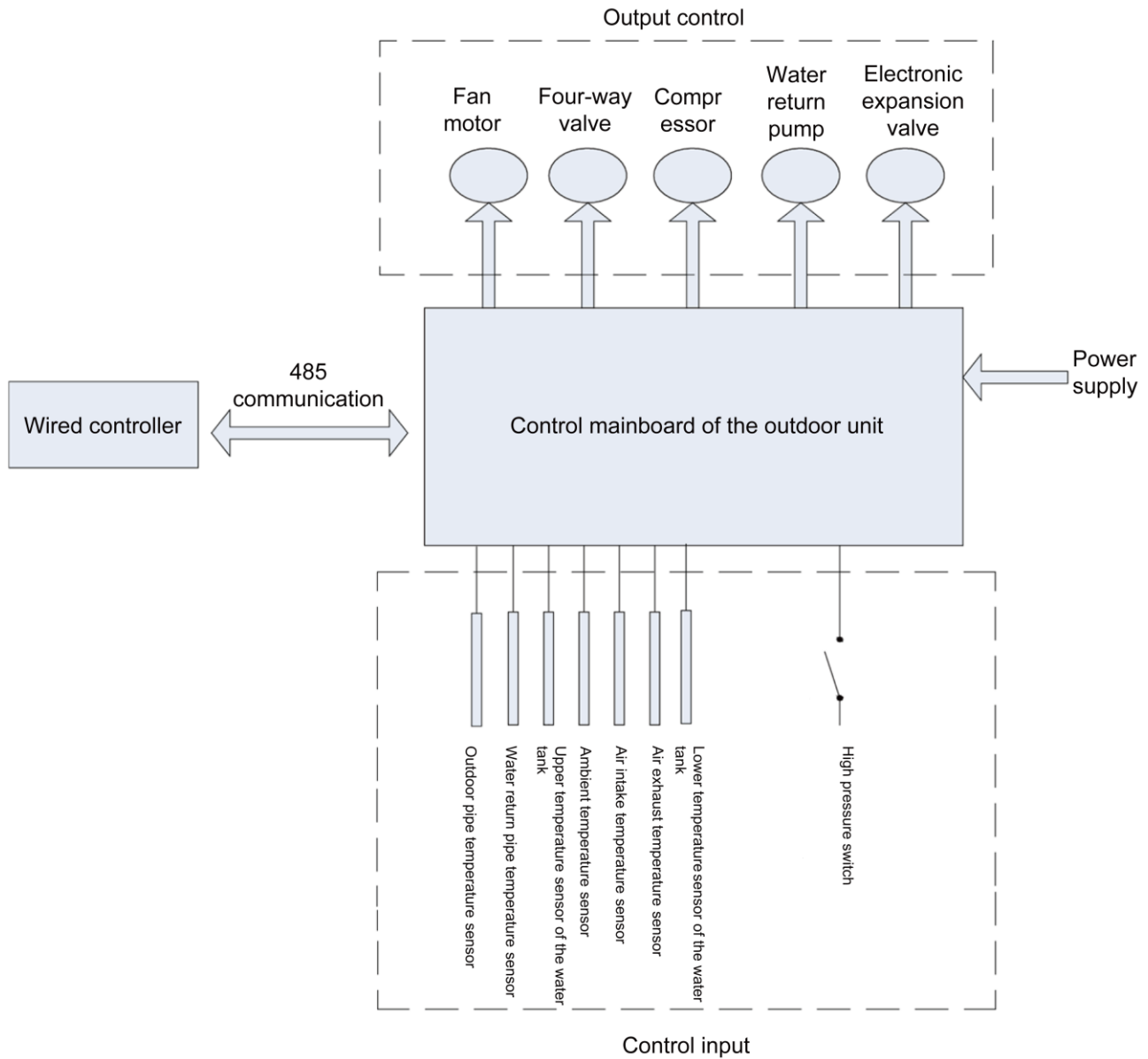
- (1) If any of the preceding accessories is required, contact with the local sales company.
- (2) GRS-2.4/D270ANbA-K unit can not connect Intelligent preheat water return device.

CONTROL

CONTROL

1 Unit Control

1.1 Overall Control Logic



1) High pressure switch

When the detected voltage exceeds the preset value, a fault will be displayed and the unit will stop or not start.

2) Temperature sensor fault detection and handling

Once the temperature sensor for the ambient temperature, air discharge, air inhaling, pipe temperature, or water tank is open-circuited or short-circuited, the corresponding fault code will be displayed and all loads will be cut off. After the fault is rectified, the unit automatically runs again.

1.2 Key Control Logics

1) Control on compressor

After power is connected, start the system by the manual operator and detect the outdoor ambient

temperature sensor. If the outdoor ambient temperature is not lower than -7°C and when no fault is detected and start up conditions of the compressor are met, the system starts by following the hot water sequence.

2) Control on fan motor

When start up conditions of the compressor are met, the system starts by following the hot water sequence. The electronic expansion valve resets and is initialized, and the external fan motor starts. After 10s, the compressor starts. The fan motor will determine whether to still run at high level or to run at low level based on the ambient temperature after it runs at high level. If the system enters overload control, the fan motor will switch to discontinuous start up and shutdown status at low level.

3) Control on defrosting

When the compressor is initially powered on and started, it determines the defrosting condition after running for the preset duration. If the defrosting condition is met, the system defrosts before running in hot water mode (including freeze-proofing operation of compressor). After defrosting is over, the compressor starts for heat up. When the cumulative operation time exceeds or equals to the preset time for defrosting, defrosting will be performed if the relation between the outdoor exchanger pipe temperature sensor T_h and the outdoor ambient temperature sensor T_e meets the defrosting condition.

4) Control on water return pump

The water return pumps runs in automatic or manual control mode as set by users. In automatic control mode, the water return pump is control based on temperature of the return pipe thermo-bulb. In manual control mode, the return pump is stopped after water return is complete.

Notes: GRS-2.4/D270ANbA-K unit have not the function.

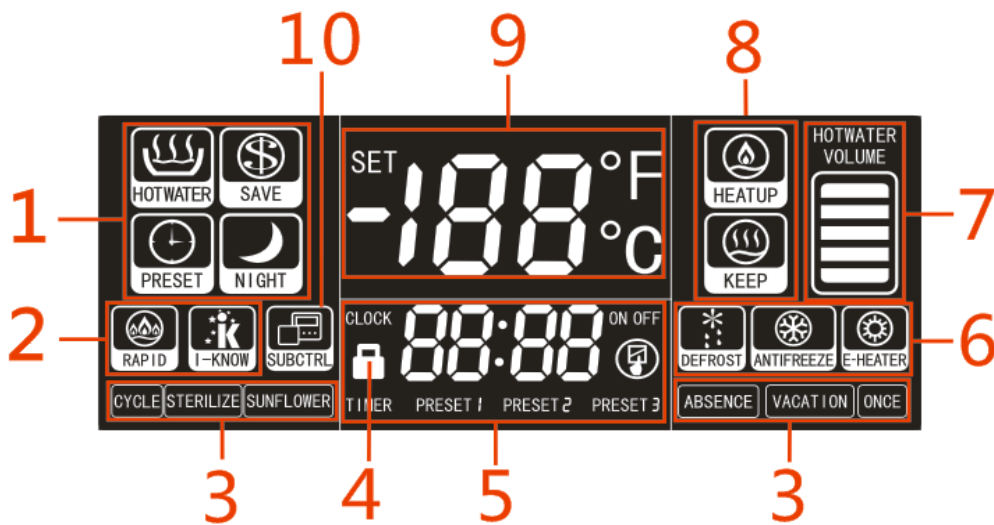
5) Control on freeze-proofing function

In the Off state, if water temperature in the water tank detected by the system based on the ambient temperature is too low, the unit starts the freeze-proofing function immediately.

2 Wired Controller



1	i-know button	2	Timer button	3	Function button	4	Rapid button
5	Mode button	6	Increase button	7	On/Off button	8	Decrease button



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.)
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3 Query Parameters

This function is provided for the debugging personnel to query running status of the unit. After pressing and holding **MODE+▲** button for 5s, the parameter display area blinks. 00 is displayed by default. The ▲ and ▼ buttons can be pressed to switch the query item.

Query codes are described in the following table.

Query Code	Query Parameter
00	00 by default
01	Communication protocol version
02	Temperature of the temperature sensor for water outlet pipe
03	Temperature of the upper temperature sensor of the water tank (detected by the mainboard)
04	Temperature of the outdoor ambient temperature sensor
05	Reserved
06	Temperature of the air intake temperature sensor
08	Temperature of the air exhaust temperature sensor
13	Temperature of the temperature sensor for outdoor pipe
16	Temperature of the water temperature sensor
17	Display of single or dual temperature sensor (01 indicates single temperature sensor and 02 indicates dual temperature sensor)
18	Temperature of the middle temperature sensor of the water tank (part of units have the temperature sensor)
19	Temperature of the upper temperature sensor of the water tank

4 Operation Instructions

4.1 On/Off Setting

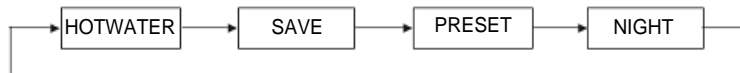
The unit will be started or stopped by pressing the “On/Off ” button.

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.



4.2 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.



4.3 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 5s in any mode under the 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.

4.4 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.

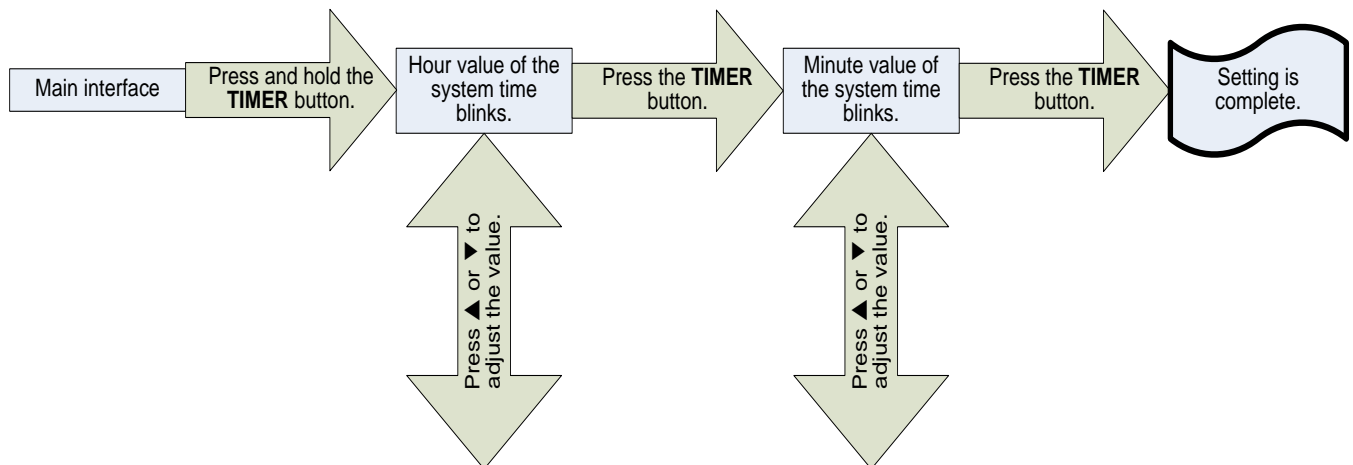
4.5 Time Setting

4.5.1 System Time Setting

In the main interface, press and hold the **TIMER** button for 5s. 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 15s, 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°C or 1 minute.

The setting process is shown in the following figure.

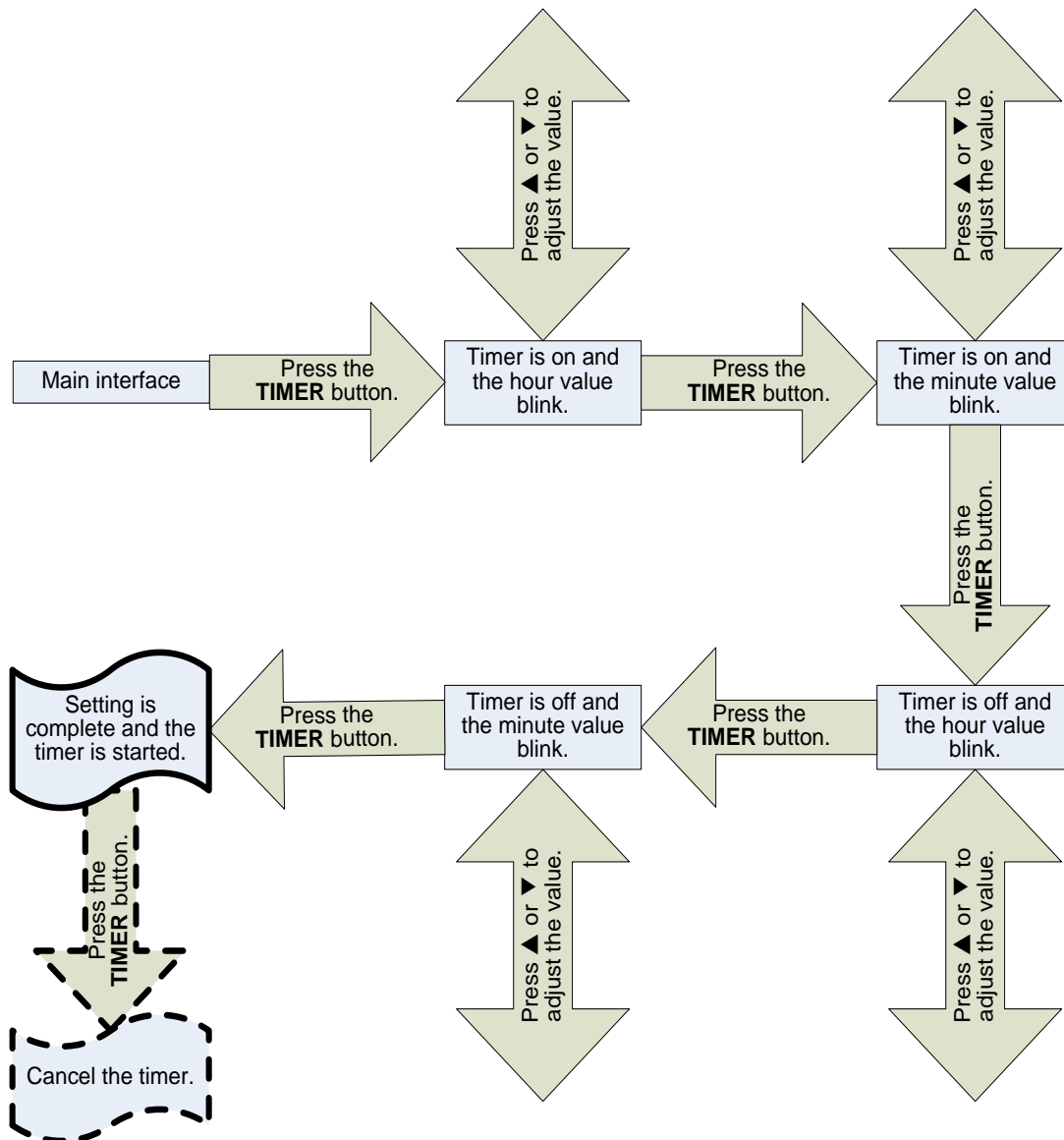


4.5.2 Timer Setting

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 15s, 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.



4.5.3 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.

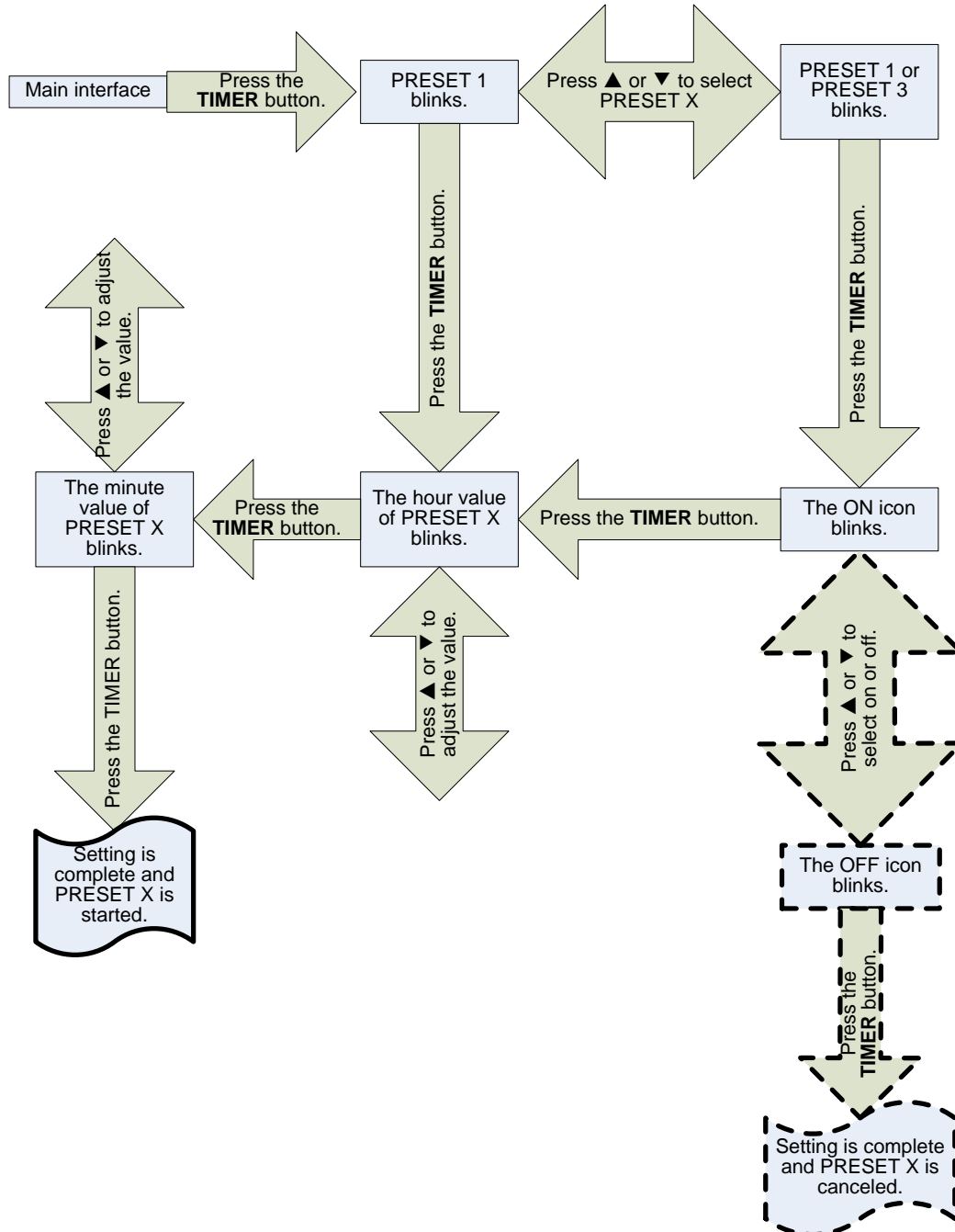
PRESET 2 or PRESET 3 setting: Press the **TIMER** button to select PRESET 2 and then the ON icon blinks. Press **▲ or ▼** to switch the ON and OFF icons. When the ON icon blinks, press the **TIMER** button. Then the PRESET 2 icon is on and the ON icon is off. The hour value blinks. Press **▲ or ▼** to 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 15s, 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.

4.6 Function Setting

4.6.1 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.

4.6.2 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.

4.6.3 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 5s, 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 5s, the interface switches back to the original status.

4.6.4 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 shutdown 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 5s, 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:

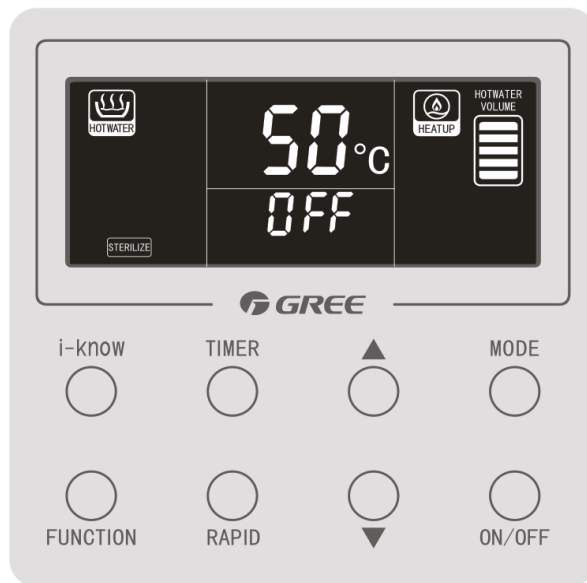
Sterilization is performed circularly by the d value. Once the circular sterilization conditions are met, sterilization is performed regardless of on/off status of the controller and beyond limit of common modes and functions except VACATION. However, users can stop sterilization under process by pressing 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.

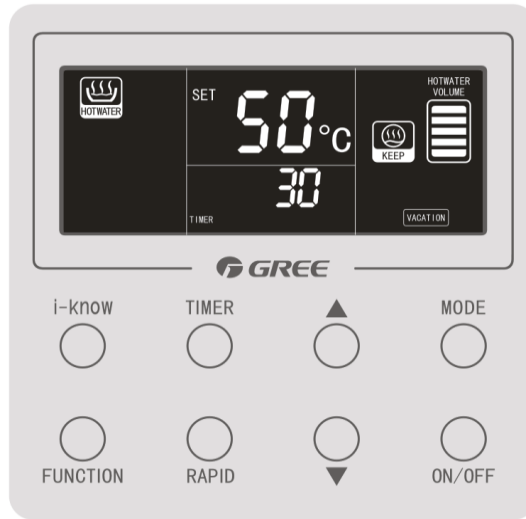


Notes:

- 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.

4.6.5 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 5s, 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.

Notes:

- 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.

4.6.6 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 6.8.3.

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 and hold **▲** or **▼** to keep the CYCLE icon on for 5s and then start the

manual return function. 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 6.8.3.)

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 **▼**.

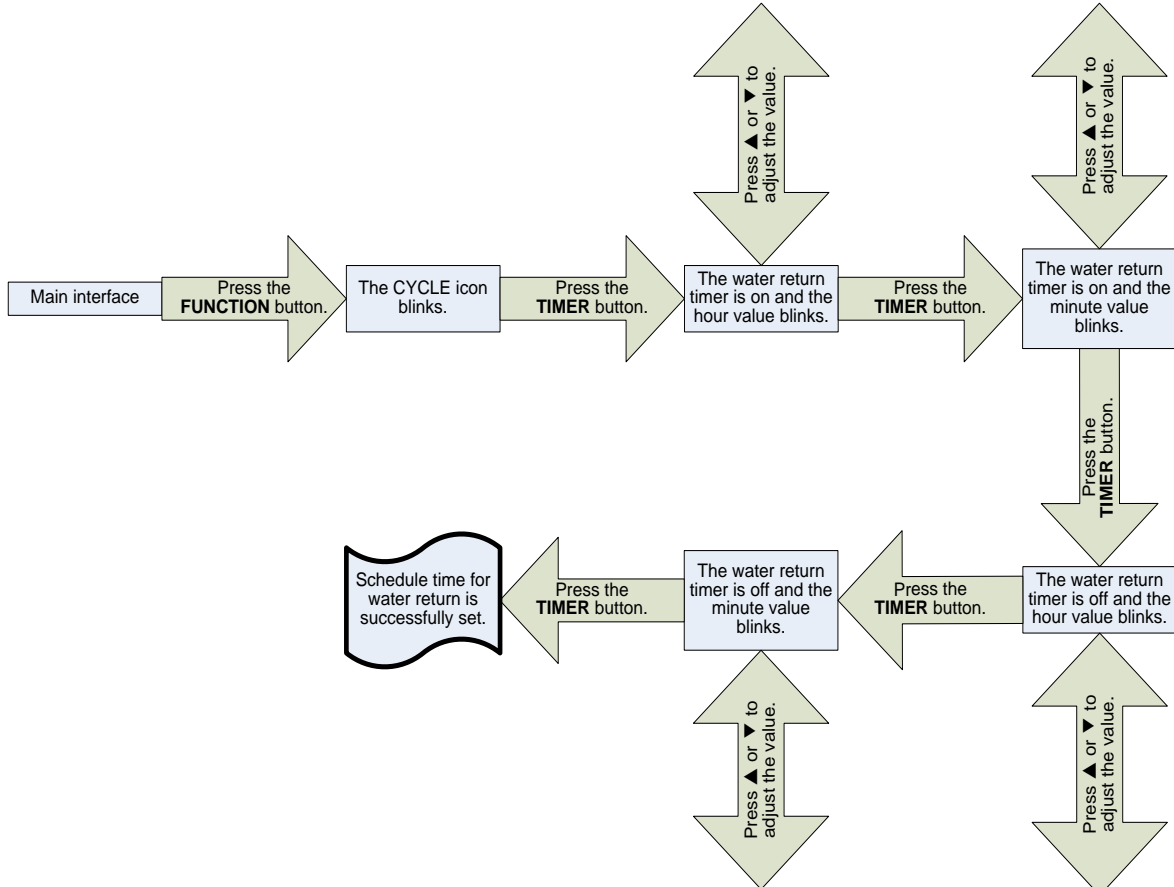
Step 3: After the hour value is set, press the **TIMER** button to switch to the minute value for scheduled start-up. When the minute value blinks, it can be set by pressing **▲** or **▼**.

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 5s, the current interface exits automatically and whether the CYCLE character is displayed is determined based on the scheduled time for water return.



Notes: GRS-2.4/D270ANbA-K unit have no CYCLE function.

4.7 Special Function

4.7.1 Keypad Lock

In normal status of the unit, press and hold **▲+▼** for 5s. 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 5s 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.

4.7.2 Cleaning (available to circular models only)

In the Off state of a normal unit, press and hold **MODE+▼** for 5s. 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 5s 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.

4.7.3 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 5s to enter the query interface. Then the query code 00 is displayed, press and hold **MODE+▲** for 5s 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 15s, it will switch back to the main interface automatically.

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

4.7.4 Temperature unit setting (°C/°F)

In the Off state of the wired controller, press and hold **MODE+▲** on the main interface for 5s to enter the query interface. Then the query code 00 is displayed, press and hold **MODE+▲** for 5s 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 15s, it will switch back to the main interface automatically.

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

4.8 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.

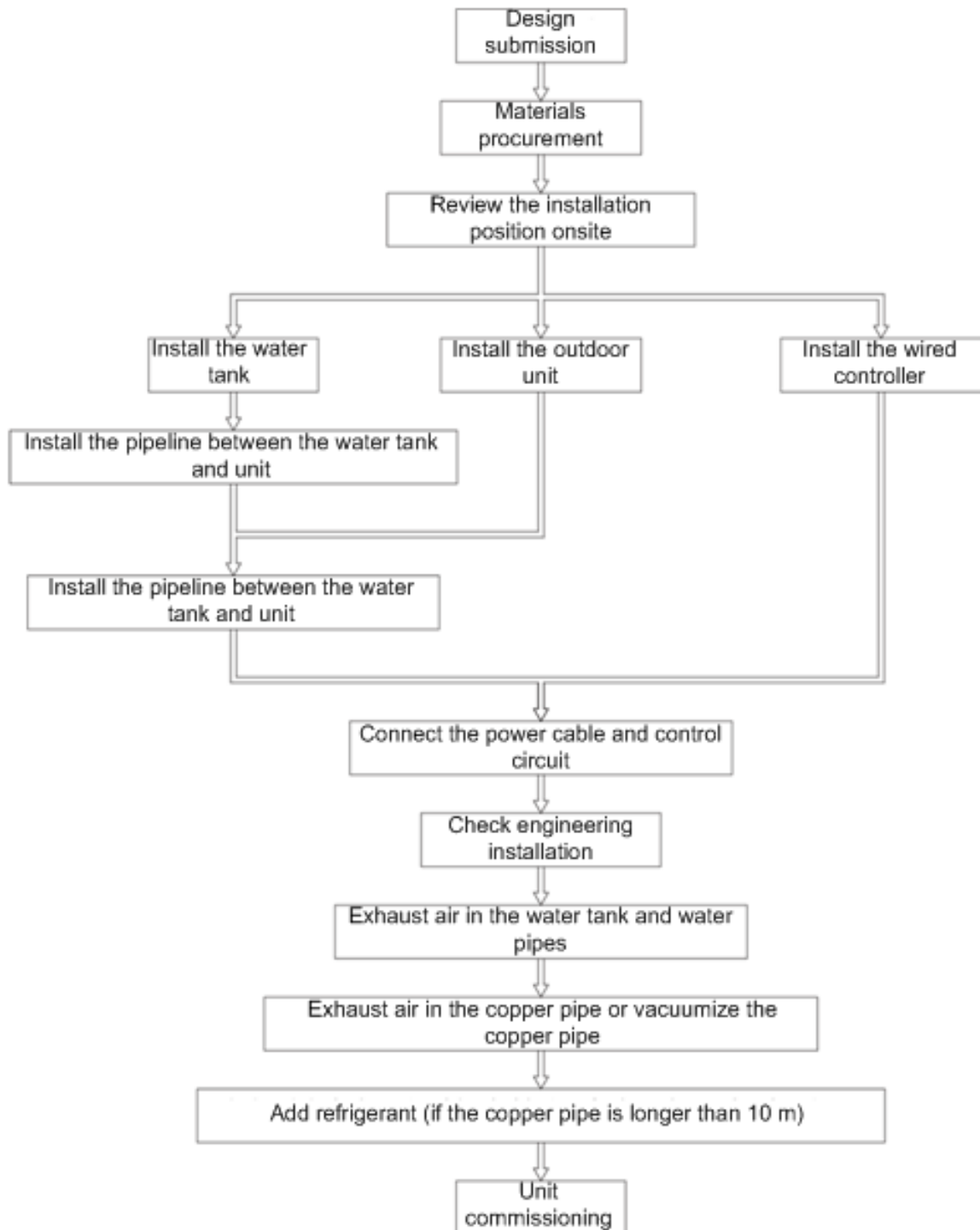


INSTALLATION

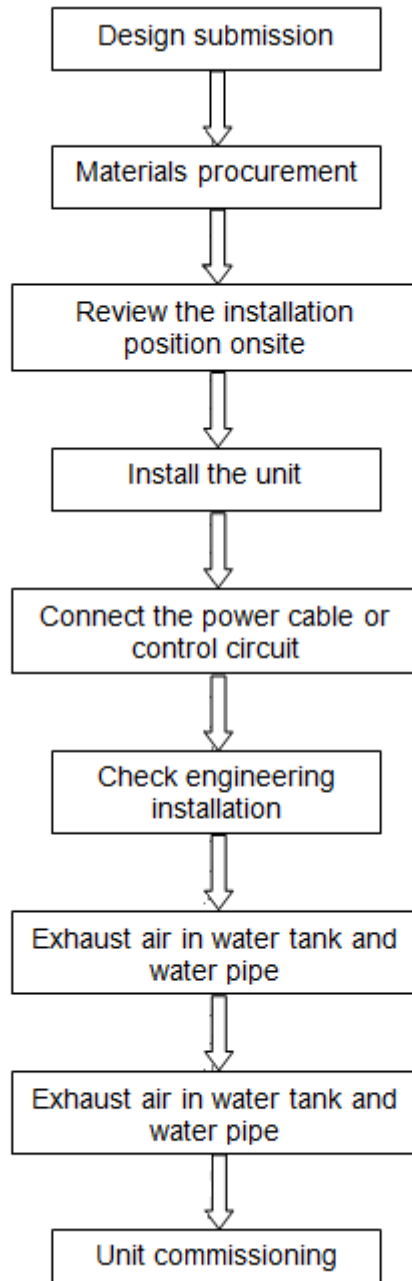
INSTALLATION

1 Engineering Installation Flowchart

1.1 Flowchart for installing a split-type coil unit



1.2 Flowchart for installing a integral-type coil unit



2. Preparations

2.1 Precautions for Engineering Installation

2.1.1 Safety Requirement



Caution!

All installation personnel must receive safety education and be assessed before construction is started. Once a delinquent behavior occurs, the relevant personnel must be liable for it.



Caution!

Personal and property safety must be put first during the entire construction process. Related national regulations on safety must be strictly followed to ensure personal and property safety.

2.1.2 Importance of Engineering Installation

The installation process of a Gree air source water heater involves installation of various parts, such as that of the unit and water tank, water pipe or copper pipe between the unit and water tank, pipes between the water tank and indoor cool/hot water pipes, wired controller, power cable, and control circuit. Each installation phase must be treated with much care to ensure normal operation of the unit. Otherwise, user requirements cannot be met and more seriously, water leakage may be caused and the indoor decoration will be destroyed.

The following table lists problems that are inclined to occur during installation and their adverse effect.

No.	Installation Problem	Adverse Effect
1	Dirt or impurity enters the refrigerant pipe of the coil unit.	The refrigerant pipe is blocked. The air conditioning performance declines and the compressor suffers abrasion. Under a serious case, the unit may fail to work and the compressor may get burned.
2	Vacuum degree of the refrigerant pipe system of the coil unit is insufficient.	The heating effect declines. Protection is frequently started and the unit cannot normally run. Under a serious case, key components such as the compressor may get damaged.
3	Moisture or water enters the refrigerant system of the coil unit.	The compressor may be copperized, which may cause efficiency decrease and abnormal noise. Ice may be generated in the system and the unit fails to work.
4	The safety check valve or TP valve is not connected with a drainage hose or the connection is insecure.	Water leakage occurs and indoor decoration is destroyed.
5	PPR pipes are not properly welded.	The pipe is blocked. Hot water is unavailable as protection is started for the unit. Alternatively, the water flow rate is too low for daily use.
6	No filter is installed for the cool water inlet pipe.	
7	The outdoor unit is installed at a position with poor ventilation.	When the ambient temperature is high, high-voltage protection may be started and the unit stops.
8	The outdoor unit is not securely fixed.	The unit is noisy during operation.
9	The outdoor unit is not connected with a drainage pipe.	Condensate water is discharged at random. Complaints may be generated.
10	The water tank is not securely fixed or is installed on an external wall.	The water tank may topple over or drop down, which may have severe results.

11	The pipe is not provided with thermal insulation or thermal insulation is poor.	The water temperature fails to meet user requirements due to heat loss.
12	City water is unavailable or the water pressure is too low or too high while no remedial measures are taken.	The unit fails to work and complaints are generated due to unavailability of hot water.
13	The communication control cable is not properly protected.	The communication cable is short-circuited or disconnected and the unit fails to start due to communication failure.
14	No water return pipe is installed. *GRS-2.4/D270ANbA-K have no cycle function.	Hot water is available after cool water in the pipe is exhausted. Users may complain as they have to wait a long time.

2.1.3 Collaboration During Installation

The installation process requires collaboration with aspects such as building, structure, electric, water supply and drainage, fire control, and decoration. Layout of the piping shall not affect the automatic spray header for fire extinguishing and should be well designed to go with the electrical device, lighting, and indoor decoration.

2.1.3.1 Collaboration with Civil Engineering

- (1) Holes, casing pipes, and installation positions for drainage standpipe must be reserved. Cable pipes must be laid in advanced.
- (2) Installation positions for the main unit and water tank must be reserved and foundation must be prepared. The installation position for the main unit must meet requirements on weight bearing, ventilation, and maintenance.
- (3) If no holes are reserved, holes can be drilled when required. Hole drilling on the spandrel girder or load bearing wall is prohibited.

2.1.3.2 Collaboration with Decoration Engineering

- (1) Indoor pipes for cool water, hot water, and water return must be laid in advance. Interfaces for cool water, hot water, water return, and water drainage must be reserved.
- (2) Indoor hot water pipes must be provided with thermal insulation.

2.1.3.3 Collaboration with Electrical

- (1) Circuits for the hot water unit must be reserved with proper power type and power use capacity.
- (2) The power cable and air circuit breaker meets requirements of the air conditioning unit as well as national safety regulations.
- (3) The regional power supply should comply with national standards in terms of voltage fluctuation and interference noise. Any incompliance found must be rectified through joint efforts.

2.2 Design Drawing Review

The installation personnel shall carefully read the design scheme and drawing provided by the design personnel. The design intent should be completely understood and construction items should be checked onsite. If any question exists, rational opinions should be put forward in a timely manner.

Items to be checked during drawing review:

No.	Item	Check Result
1	It is recommended that the distance between the coil unit and water tank is within 10 m. If the distance is with 3 m, the connection pipe delivered with the unit can be used. *Integral-type coil unit have no demand.	
2	The unit is provided with a condensate water drainage pipe.	
3	The unit installation position meets space requirements for heat exchange and maintenance.	
4	The unit goes well with the water tank, the volume of which shall meet user requirements. *Integral-type coil unit tank is normal.	
5	The specification, type, and control method of the power cable meet design requirements of the unit.	
6	Preparation, total length, and control method of the control cable meet design requirements of the unit.	



Caution:

The construction personnel shall strictly follow the design drawing. During construction, if any design requirement cannot be met and needs to be changed, the design requirement can be changed upon approval of the design personnel and a written document should be formulated accordingly.

2.3 Installation Material Selection

2.3.1 Precautions

(1) If the brand and specifications of installation materials are specified by the user, user requirements must be met. If not specified, the installation materials purchased shall follow national regulations and meet quality requirements.

(2) The certificate of quality or inspection report must be provided for materials and devices used for installation.

(3) A fire-proof inspection certificate must be provided for products with fire-proof requirement and these products must comply with national regulations and mandatory standards.

(4) When environmental-friendly materials are required by the user, all materials shall meet national environment-protection requirements and relevant certificates must be provided.

2.3.2 Requirements on Installation Material Selection

2.3.2.1 Copper Pipe Selection

(1) Material: Dephosphorization seamlessly drawn copper pipe for air conditioner.

(2) Appearance: Both inner and outer surface of the copper pipe should be free from pinhole, crack, peeling, bubble, inclusion, copper powder, carbon accumulation layer, green rust, dirt, severe oxidation film, and obvious defects such as scratch, pit and spot.

(3) Inspection report: The certificate of quality and quality inspection report must be provided.

(4) The tensile strength shall not be less than 240 kgf/mm².

(5) Specifications:

Outside Diameter of Copper Pipe (mm)	Refrigerant Type	Minimum Wall Thickness (mm)
6.35	R134a	0.5

	R410A	0.8
9.52	R134a	0.71
	R410A	0.8
12.7	R134a	0.8
	R410A	0.8

2.3.2.2 Water Pipe Selection

(1) Selection of PPR water pipe

Generally, PPR pipes are adopted as hot water pipes for their various advantages such as light weight, corrosion resistance, scaling-free, long service life, easy installation, heat preservation and energy-saving, and good heat resistance. PPR pipes are connected by hot melting. Common series and specification are listed in the following table.

Nominal Outside Diameter Dn	Average Outside Diameter		Pipe Series				
			S5	S4	S3.2	S2.5	S2
	Maximum	Minimum	Nominal Wall Thickness en				
20	20.0	20.3	-	2.3	2.8	3.4	4.1
25	25.0	25.3	2.3	2.8	3.5	4.2	5.1

Note: Generally, S4 series pipes are adopted for cool water and S2.5 series pipes are adopted for hot water.

(2) Selection of condensate water pipe

- 1) Rigid PVC pipes are recommended for water drainage as they are easy to purchase and install.
- 2) The certificate of quality and quality inspection report must be provided.
- 3) Specifications and wall thickness:

Rigid PVC pipe (PVC-U pipe): dn 32 mm x 2 mm, dn 40 mm x 2 mm, dn 50 mm x 2 mm ,where dn indicates external diameter.

2.3.2.3 Selection of Thermal Insulation Materials

(1) The quality inspection report and certificate of quality must be provided for thermal insulation materials and products. Technical specifications and performance of these materials and products must comply with related technical standards and design regulations.

(2) Flexible closed foam rubber and plastic materials are recommended for thermal insulation.

(3) Fire-retardant grade of the thermal insulation materials must be B1 (nonflammable) or A (noncombustible).

(4) The heat resisting capacity of the thermal insulation materials shall not be lower than 120°C.

(5) Wall thickness of the copper pipe thermal insulation materials shall not be less than 15 mm.

(6) Wall thickness of the PPR pipe thermal insulation materials shall not be less than 10 mm.

2.3.2.4 Selection of Communication Cable

Twisted pairs or shielded twisted pairs that are already configured for the unit must be adopted as the communication cable and control cable. For standard configuration, length of the communication cable between the unit and wired controller is 8 m. The maximum length is 20 m.

2.3.2.5 Selection of Power Cable

A copper conductor must be adopted as the power cable, which shall comply with related conductor standards and meet the unit's requirement on current-carrying capacity. For details on cable diameter, refer to section 7 of this chapter.

3 Installation of the Split type Unit of Water Heater

3.1 Installation of the Outdoor Unit

3.1.1 Overall Dimensions and Size of Installation Holes

Requirements on outdoor unit installation for the water heater are the same as those for the air conditioner. The outdoor unit can be installed on the external wall, roof, balcony or ground. The air outlet should be set against the wind. Figure 3-1 shows dimensions of the outdoor unit. (unit: mm)

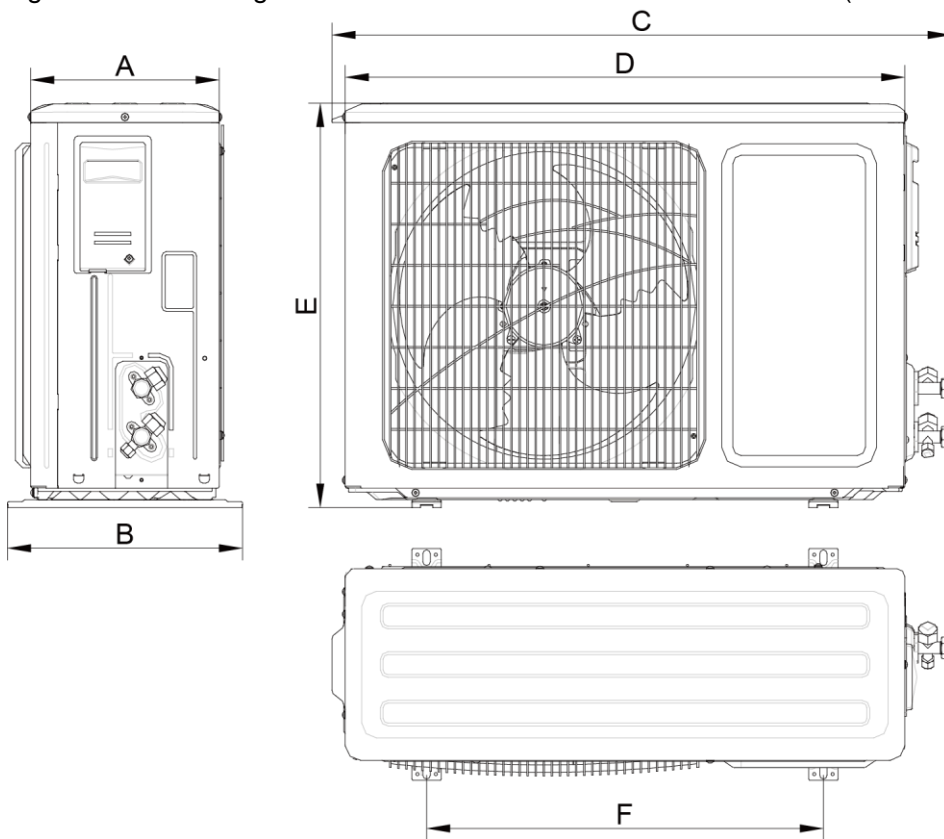


Figure 3-1 Dimensions of the outdoor unit

Product model	A	B	C	D	E	F
GRS-S3.0G/NbA-K	257	320	848	762	540	540

3.1.2 Selection of Installation Position

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.

3.1.3 Requirements on Installation Space

The distance between the outdoor unit and wall or any other obstacle must be proper, as shown in Figure 3-2.

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

(2) 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.

(3) 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, 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.

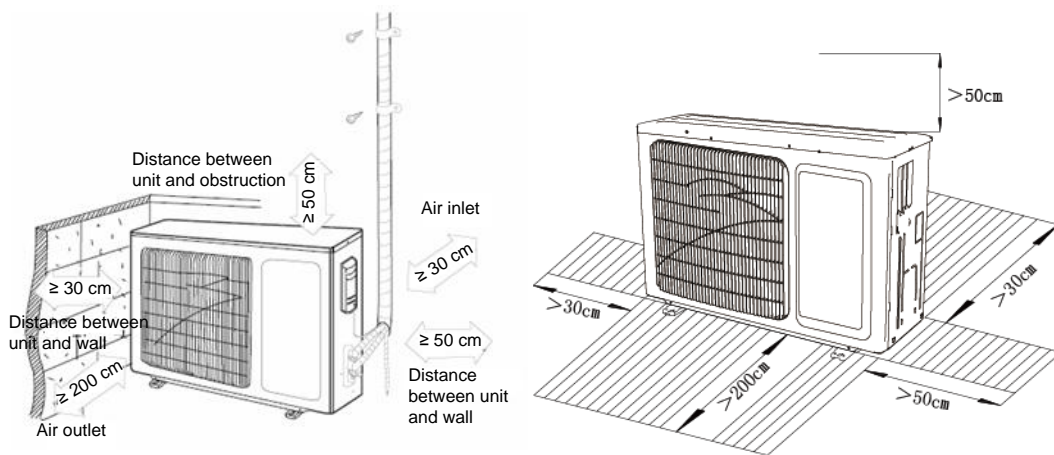


Figure 3-2 Requirement on installation space

3.1.4 Requirements on Foundation Installation

The concrete foundation of the outdoor unit must be strong enough. Ensure that the drainage is smooth and that the ground drainage or floor drainage is not affected. The vertical installation mode must be adopted and the outdoor unit must be fixed using foundation bolt. Requirements on the concrete foundation are as follows:

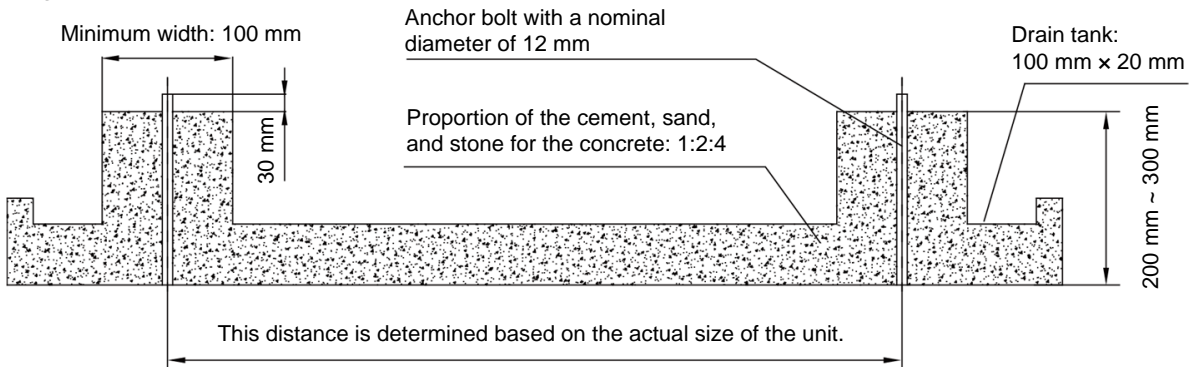
- (1) The concrete foundation must be flat and have enough rigidity and strength to undertake the unit's weight during operation. The height of the foundation is 200 mm to 300 mm, which is determined based on the size of the unit.
- (2) The proportion of the cement, sand, and stone for the concrete is 1:2:4. Place 10 reinforced steel bars ($\phi 10$ mm) with a space of 30 mm.
- (3) Use the mortar to flatten the surface of the foundation.
- (4) When the foundation is built on a concrete floor, crushed stones are not required. But the foundation surface must be roughened.

(5) Clear the oil stains, crushed stones, dirt, and water in the reserved bolt hole of the foundation and install a temporary cover before installing bolts.

(6) Build a drainage ditch around the foundation to discharge the condensate water.

(7) If the outdoor unit is installed on the roof, check the intensity of the building and take waterproof measures.

(8) If a u-steel foundation is adopted, the structure must be designed with sufficient rigidity and strength.



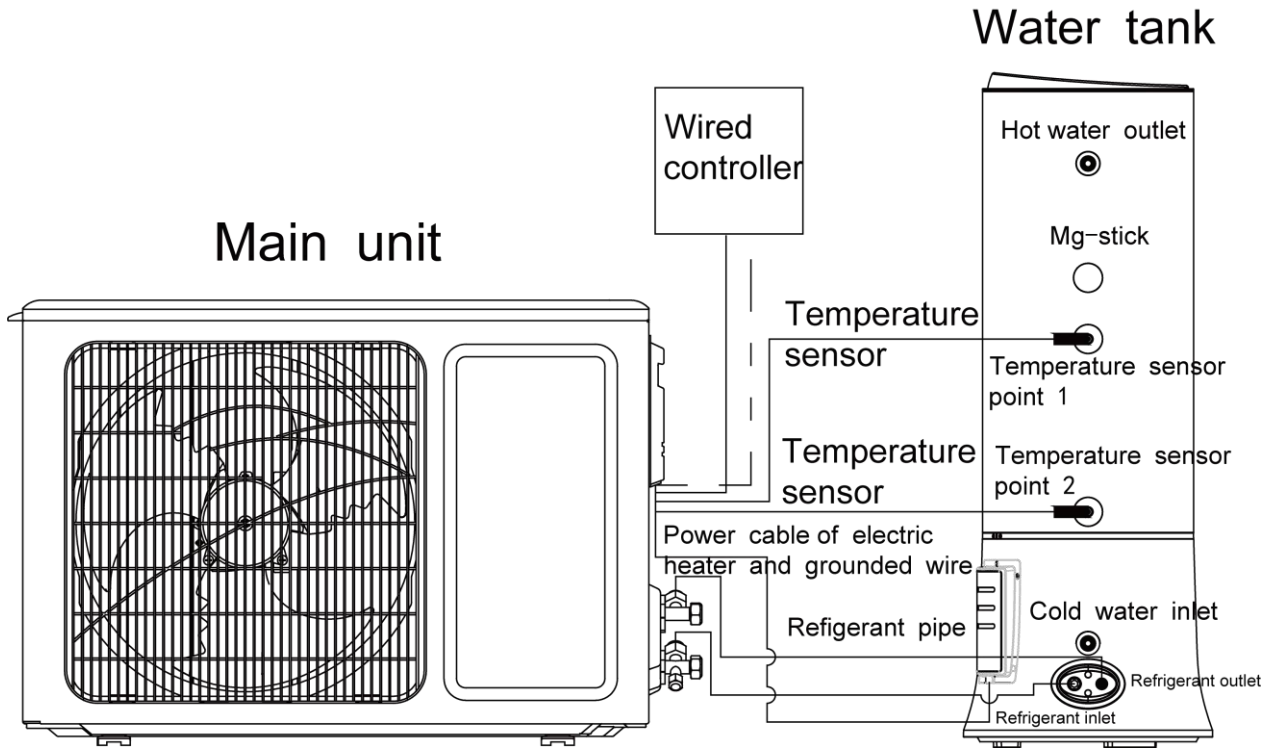
If the wall-mounting mode is adopted, install the outdoor unit of water heat on the load bearing wall. First, drill holes based on the bolt size for support and bracket installation, then install expansion bolts into the holes before installing the supports and brackets. Last, install the outdoor unit onto the supports and brackets and fix it with bolts.

3.1.5 Requirements on Vibration Reduction

The outdoor unit of water heater must be fixed securely. If the outdoor unit vibrates obviously, apply a damping rubber pad between the bottom corner of outdoor unit and the foundation or support board.

3.1.6 Connection of the Outdoor Unit and Water Tank

Connect the outdoor unit to the main unit using the refrigerant pipe configured upon delivery. For details, see Section 5 Refrigerant Pipe Design in this chapter.



3.2 Installation of Water Tank

3.2.1 Overall Dimensions and Size of Installation Holes

(1) Water Tank Model

Model	SXD200LCJW/C1-K
Photo	

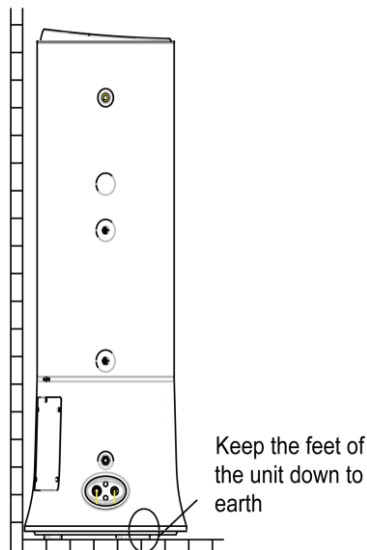
(2) External Dimensions and Installation & Maintenance Space of SXD200LCJW/C1-K

	<table border="1"> <thead> <tr> <th>Parameter</th> <th>SXD200LCJW/C1-K</th> </tr> </thead> <tbody> <tr> <td>Model</td> <td>SXD200LCJW/C1-K</td> </tr> <tr> <td>D</td> <td>462</td> </tr> <tr> <td>H</td> <td>1919</td> </tr> <tr> <td>F</td> <td>1720</td> </tr> <tr> <td>E</td> <td>229</td> </tr> <tr> <td>D1</td> <td>545</td> </tr> <tr> <td>Cool water inlet (internal thread)</td> <td>G1/2</td> </tr> <tr> <td>Hot water outlet (internal thread)</td> <td>G1/2</td> </tr> <tr> <td>Working medium inlet (internal thread)</td> <td>Φ9.52</td> </tr> <tr> <td>Working medium outlet (internal thread)</td> <td>Φ6</td> </tr> </tbody> </table>	Parameter	SXD200LCJW/C1-K	Model	SXD200LCJW/C1-K	D	462	H	1919	F	1720	E	229	D1	545	Cool water inlet (internal thread)	G1/2	Hot water outlet (internal thread)	G1/2	Working medium inlet (internal thread)	Φ9.52	Working medium outlet (internal thread)	Φ6	
	Parameter	SXD200LCJW/C1-K																						
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	H	1919																						
	F	1720																						
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	Hot water outlet (internal thread)	G1/2																						
Working medium inlet (internal thread)	Φ9.52																							
Working medium outlet (internal thread)	Φ6																							

3.2.2 Requirements on Installation Position and Space

(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. The following figure shows the installation diagram.



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.

4 Installation of the Integral type Unit of Water Heater

4.1 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°C , the water heater can only be put indoors and must be installed at the places where the ambient temperature is above 0°C . If the ambient air temperature falls lower than 0°C , the condensate water drainage may be freezing.

(3) If it needs to install and move the air source water heater, please contact with Gree appointed local maintenance center. If the air source water heater is installed by unappointed unit, Gree 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, Gree 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. If using the water in well, ground water or sea water, it will accelerate the consumption of magnesium rod in water tank and shorten the service life of the unit.

(6) The water passed through the iron-exchange water softener will accelerate the consumption of magnesium rod of water tank. Therefore, you are not suggested connecting the water softener to the water inlet of air source water heater.

4.2 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 Gree 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.

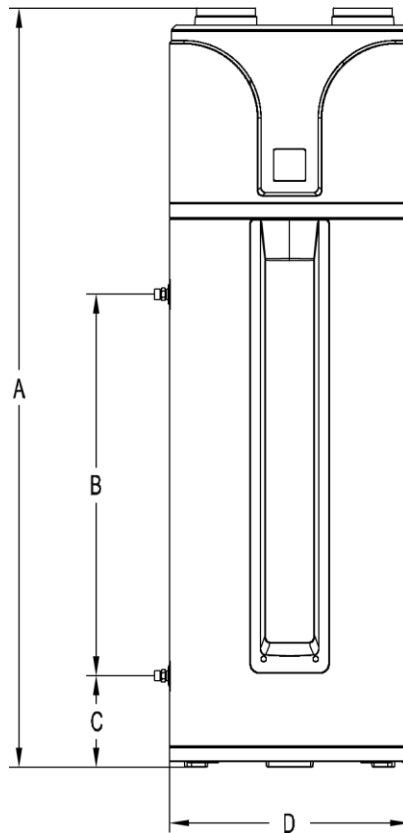
4.3 Selection for installation positions

- (1) The noise and discharge air won't disturb neighbours, animals or plants.
- (2) Make sure the good ventilation for the water heater; air inlet and air outlet of water heater can't be blocked.
- (3) The installation position should bear the weight and vibration for the water heater.
- (4) Select the dry place. The unit can't be exposed at direct sunshine or strong wind.
- (5) 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.

- (6) Select the place where is beyond the children.
- (7) Do not affect the public passage and the city appearance.

4.4 Installation space requirement and installation drawing

4.4.1 Main size



Model	GRS-2.4/D270ANbA-K
A (mm)	1958
B (mm)	984
C (mm)	235.5
D (mm)	620

Figure 4-1 Sketch map for main size

4.4.2 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) If install a rain shed for protecting the water heater, please make sure that it won't affect the heat radiation and absorption for the heat exchanger.

(5) The water heater should be installed at the solid place uprightly. Fix the water heater with ground bolt if necessary.

(6) 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.

(7) 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.

4.5 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

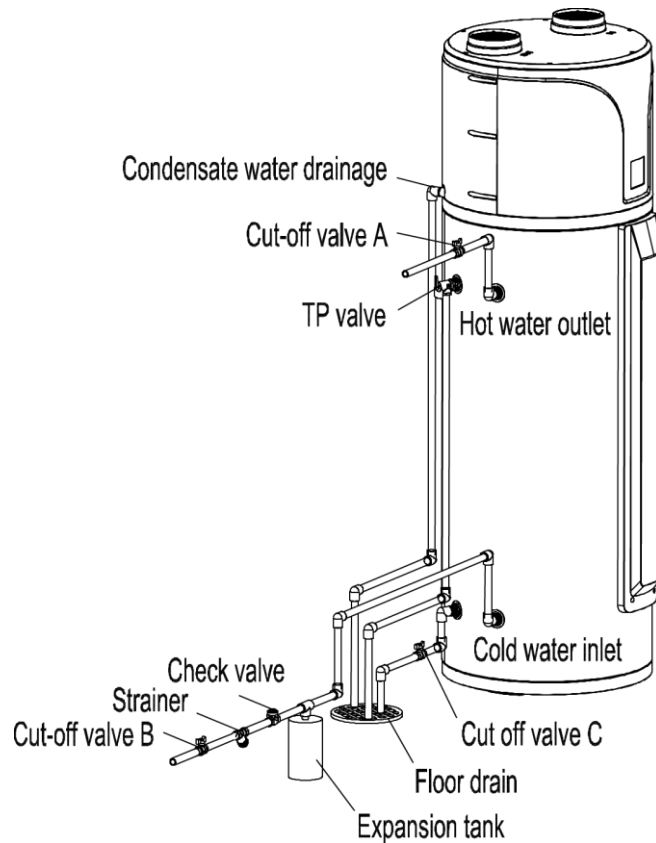
The water inlet pipe must be installed with safe device, strainer and cut-off valve, and the installation sequence must be the same with the sketch map of unit installation. A cut-off valve must be installed on the water outlet pipe.

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; if the water tank is far away from the water using point (hot water pipe is more than 20m) or the hot water using point is lower than the cold water inlet of water tank, three-way valve and cut-off valve must be installed.

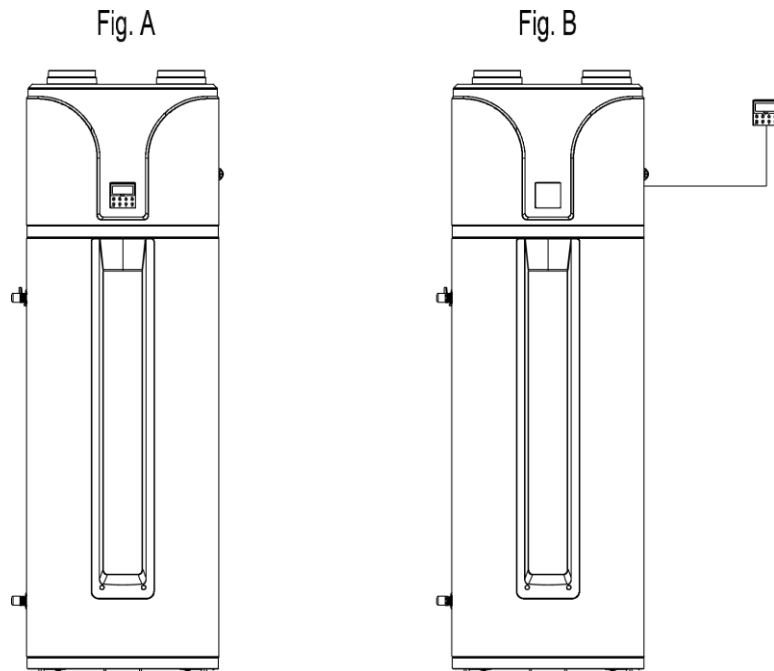
(3) Installation of drainage pipe

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.

4.6 Installation sketch map



4.7 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;

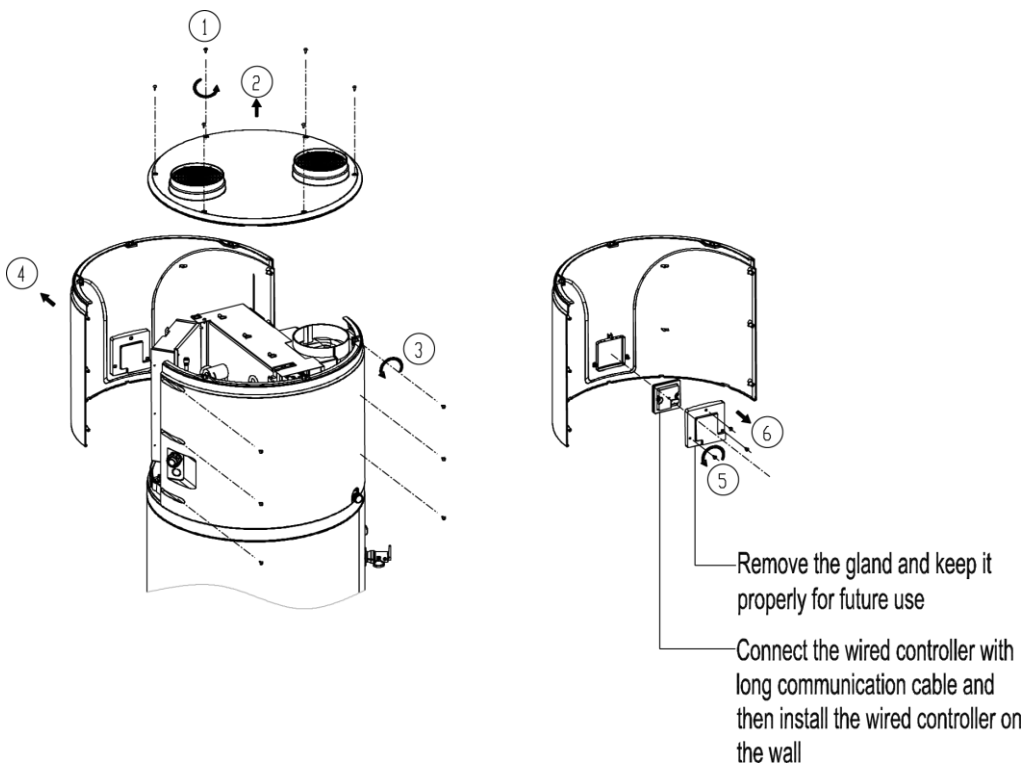
(2) Fig. B is the detached installation way of wired controller. Long communication wire shall be equipped to install the wired controller on the wall. If this kind of installation way is adopted, please contact the after-sales installation personnel to select the communication cable with proper length;

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;



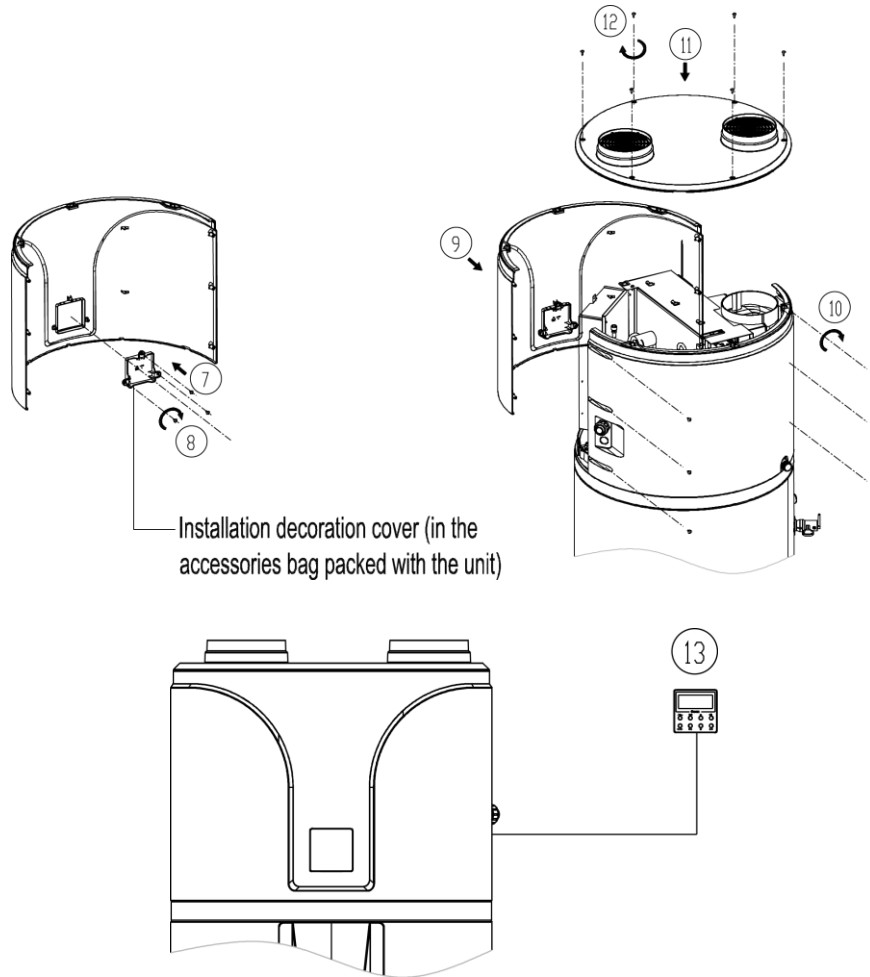
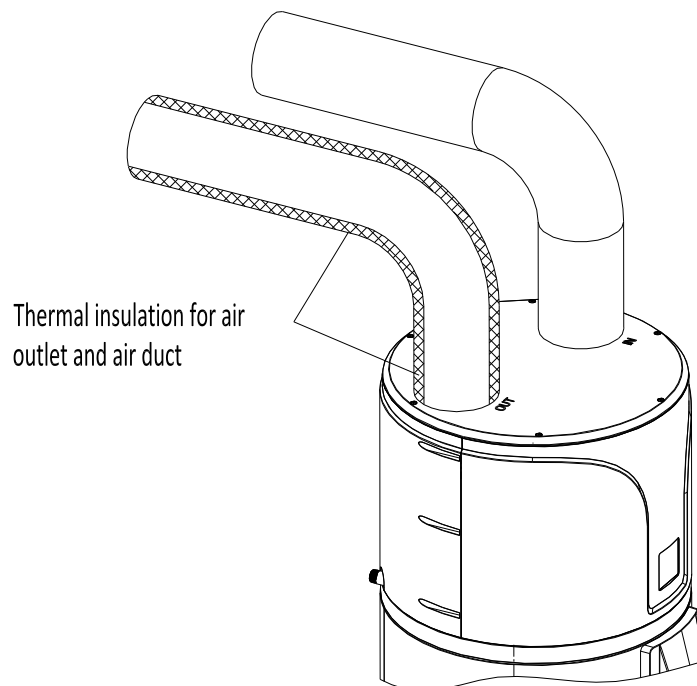


Figure 4-2 Sketch map for Installation Instruction of Wired Controller

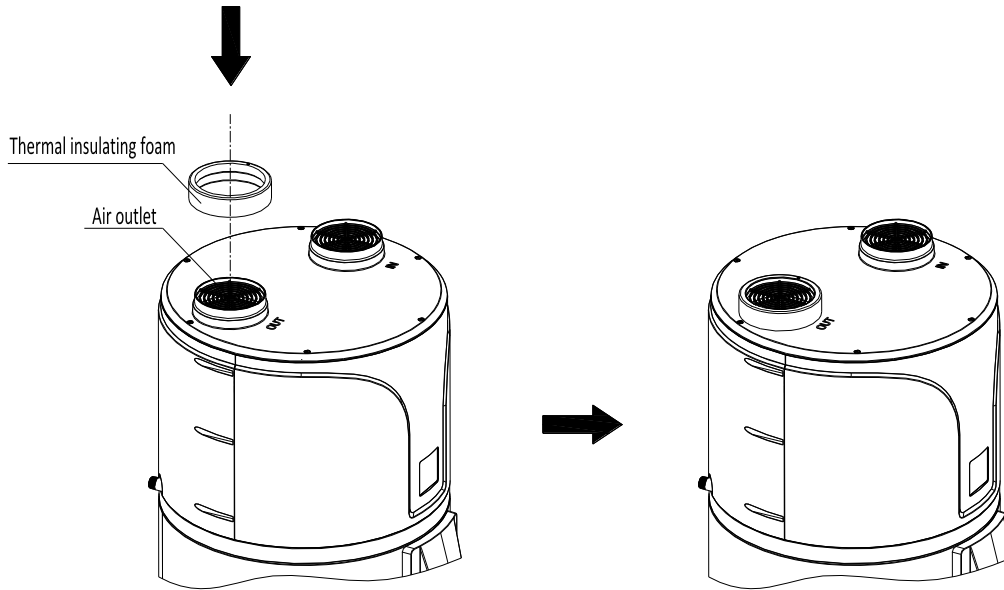
NOTES: Wired controller installation refer to section 8.3

4.8 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 Figure



5 Refrigerant Pipe Design of the Split type Unit

5.1 Precautions on Pipe Design

The refrigerant pipe must meet the following requirements:

Material requirement: Dephosphorization seamlessly drawn copper pipe for air conditioner

Appearance: Both inner and outer surfaces of the copper pipe should be free from pinhole, crack, peeling, bubble, inclusion, copper powder, carbon accumulation layer, green rust, dirt, severe oxidation film, and obvious defects such as scratch, pit and spot.

Inspection report: The certificate of quality and quality inspection report must be provided.

Specification: For standard configuration, one TP2M $\phi 9.52$ (or $\phi 12$) and one TP2M $\phi 6$ are configured for the unit. Length of both pipes is 3 m. If the pipe needs to be extended, this specification needs to be followed.

The Gree air source water heater system poses high requirements on cleanliness and dryness. Therefore, special attention must be paid when connecting the refrigerant pipe to the indoor and outdoor units. If any impurity, moisture, or dust is left in the pipe due to improper operation, many problems may occur to the system and the system may fail to work.

5.2 Pipe Installation Diagram

5.2.1 Installing the Refrigerant Pipe

(1) If the water tank and the main unit need to be connected by punching through a wall, a hole of $\Phi 55$ mm must be drilled in the wall and the hole should be inclined toward the exterior wall, as shown in Figure 5-1. 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 5-2.

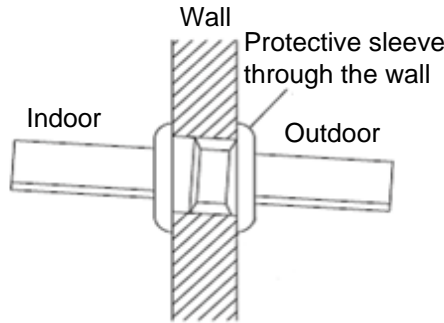


Figure 5-1 Refrigerant connecting pipe through the wall

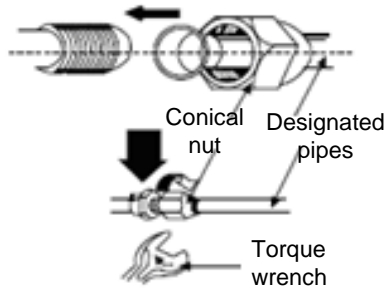


Figure 5-2 Fastening the connecting pipe

5.2.2 Exhausting Air in the Refrigerant Pipe

Table 5-1 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 5-3.
- 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.

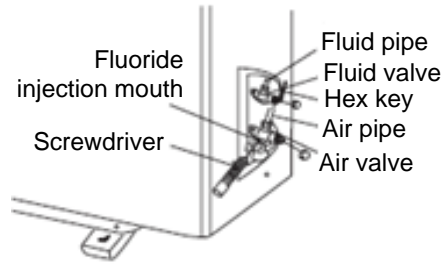


Figure 5-3 Opening the fluid valve and air valve

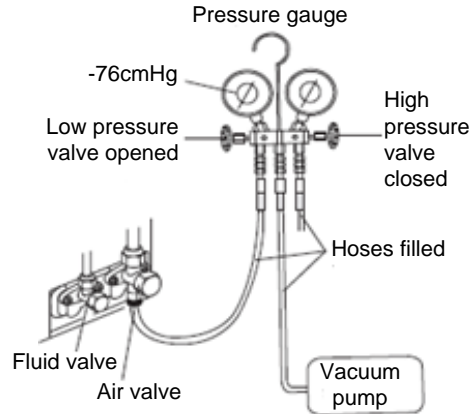


Figure 5-4 Vacuum pump connection diagram

(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 Figure 5-4.
- 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 -1.0×10^5 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 vacuumize 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.

NOTES: Perfusing Refrigerant refer to section 9

6 Pipe Installation and Insulation

6.1 Pipe Installation for the Cooling System of the Split type Unit

6.1.1 Processing to Refrigerant Pipes

A 3-meter refrigerant pipe is configured for the unit for standard configuration. If the required refrigerant pipe is longer than 3 m, it needs to be processed in the steps specified below.

6.1.1.1 Cut-off and Burring



Warning!

Do not use undedicated cutting devices such as a hacksaw.

- 1) Use a special-purpose pipe cutter to cut copper pipes.
- 2) Cut the pipes gently to ensure that the copper pipe does not deform.
- 3) After cutting the pipes, use a slicker to grate bur the pipes with the pipe opening inclining downward so that the copper scales do not fall into the pipe.
- 4) Cover the copper pipe with a sealing cap or adhesive tape to prevent dirt and sundries.
- 5) Allowable deviation: Skewness of the cross section cannot exceed 1% of the copper pipe caliber.

6.1.1.2 Pipe Cleaning

(1) Cleaning with a piece of silk cloth (applying to straight pipes)

- 1) Cleaning with a piece of silk cloth: Wrap a thin steel wire with a piece of clean silk cloth. Crumple the cloth into a lump with diameter larger than the pipe caliber.
 - 2) Apply several drops of chlorylene to the cloth. Push the cloth in from one end of the pipe and pull out from the other end.
 - 3) Every time the cloth is pulled out, remove the dust and sundries with chlorylene.
 - 4) Wash repeatedly until the pipe is clean.
 - (2) Cleaning with nitrogen (applying to coils)
- Blow off all dust and sundries in the pipe with nitrogen.



Warning!

After cleaning, cover the both ends of the pipe with a sealing cap or adhesive tape.

6.1.1.3 Pipe Bending

Precautions:

- a) During bending, there must be no corrugation or deformation inside the pipe.
- b) The welding point of the pipe should not be at the bending part. The distance between the nozzle welding joint and the bending part should be less than 100 mm.

(1) Requirements

The radius of the bending pipe must exceed 3.5D. The ratio of the short diameter after bending to the original diameter must exceed 2/3.

(2) Processing methods:

- 1) Manual bending: applies to thin copper pipes ($\Phi 6.35$ mm to $\Phi 12.7$ mm)
- 2) Mechanical bending: applicable range ($\Phi 6.35$ mm to $\Phi 44.45$ mm)

6.1.1.4 Pipe Expanding

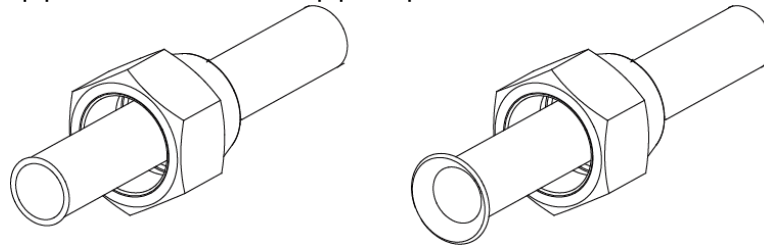
Pipe expanding is used to provide a welding point for pipe connection. Requirements on pipe expanding are as follows:

- 1) Before pipe expanding, apply appropriate amount of lubricant on the surface of the pipe. (The lubricant must meet the refrigerant system's requirements.)
- 2) Pipe expanding length must be in accordance with the insertion depth of the caliber.
- 3) To avoid leakage due to straight lines at the expanding point, turn round the copper pipe and then make corrections.
- 4) Apply appropriate force during pipe expanding to avoid crack.

6.1.1.5 Flaring

Another mode of pipe connection is flare opening connection, which requires pipe flaring before connection.

- (1) Install the flaring nut to the copper pipe.
- (2) Put the copper pipe into the root of the pipe expander.



- 1) Before pipe flaring, apply appropriate amount of lubricant on the surface of the opening to ensure smooth pass of flaring nuts and avoid pipe distortion.
- 2) The concentricity must be ensured after pipe flaring. The sealing face must be intact without any burr, crack, or wrinkle.
- 3) Small burrs at the pipe opening can be cleared using a grater.

6.1.2 Installation of Refrigerant Pipes

6.1.2.1 Installation Sequence

The sequence for installing the refrigerant pipe is as follows:

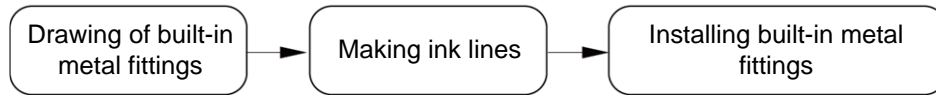
Preparing and installing the support, hanger, and bracket – Piping according to the drawing – Cleaning the pipe – Processing the pipe – Adding an thermal insulation sleeve – Connecting the pipe – Fixing the pipe – Blowing contaminants in the pipe system – Performing an air-tightness test – Performing thermal insulation

6.1.2.2 Construction of Supports, Hangers, and Brackets

- 1) Construction of supports, hangers, and brackets for pipes: These parts must be fixed securely in reasonable type and style without any tilt. The surface is clean without any dirt. The parts embedded into the wall or floor cannot be painted or coated and must be free from grease stains.
- 2) Construction of fixing bolts for devices: Ensure sufficient rigidity for the devices. Take anticorrosive measures for exposed part of built-in fittings. If the foundation must be waterproof, takes waterproof measures.

3) Construction of steel casings: Equip a steel casing for all pipes which are led through the wall or floor. Pipe welding joints cannot be placed inside the sleeve. The steel casing must be parallel with the bottom of the wall or floor but be 20 mm or greater above the bottom. The diameter of the steel casing must be determined based on the thickness of the thermal insulation layer and the inclination degree of the condensate water pipe. Fill the gap between the pipe and the sleeve with flexible and non-flammable materials. The sleeve cannot be used as a support point of the pipe.

4) Operation sequence



If possible, make ink lines on the ground and project them to the top of the building.

5) Installing built-in metal fittings

Select built-in metal fittings in accordance with local regulations.

6) Installing expansion bolts

Use expansion bolts when built-in metal fittings are unavailable due to design change.

7) Installing expansion bolts

- If the foot pedal is 2 m or more from the ground, there must be three points of support.
The foot pedal must be tightened securely with the ladder.
- Do not perform operations on the top of the ladder.

6.1.2.3 Shaping and Fixing of Pipes

When installing refrigerant pipes, ensure that the directions are correct with minimum length and elbows. Alignment and thermal insulation after installation cannot affect the pipe location and elevation. There shall not be flat bending or corrugation on the pipe after piping.

Use angle steel support, bracket, round steel hanger, U-type pipe clip, or flat steel to fix pipes outside the thermal insulation layer. It is better that the thermal insulation materials be not compressed to ensure good thermal insulation.

The style and workmanship of supports, hangers, and brackets must follow the standard T616 HVAC Systems Design Handbook.

The minimum distance between supports, hangers, and brackets is listed in the table below:

Outside Diameter of the Pipe (mm)	$\phi \leq 16$	$40 > \phi \geq 19.05$	$\phi \geq 40$
Distance between Horizontal Pipes (mm)	1000	1500	2000
Distance between Vertical Pipes (mm)	1500	2000	2500

The pipe led through a wall or beam must be fixed by a support, hanger, or bracket on both ends at the position 300 mm away from the hole.

6.1.2.4 Pipe Connection

The refrigerant pipes and indoor units are connected by using the flare opening. Therefore, the quality of flaring connection must be ensured. The flaring depth of the bell mouth cannot be smaller than the caliber. The flaring direction must face towards the direction of medium flow. Use two torque wrenches to fasten the connection.

6.1.3 Air-tightness Test



Precautions:

- (1) The measuring range of the test pressure gauge must be above 4.5 MPa for R410A system and above 3.5 MPa for R134a system.
- (2) Record the value displayed on the pressure gauge, ambient temperature, and test time.
- (3) Pressure correction: The pressure changes by 0.01 MPa when the temperature changes by 1°C.
- (4) The pressure meets the requirement if it does not change.
- (5) If the pressure must be kept for a long time, decrease the pressure to 0.5 MPa or lower. High pressure for a long time may cause leakage at the welding point or safety hazard.
- (6) Before completing the air-tightness test to the refrigerant pipe, do not conduct thermal insulation or wrapping at the points where the refrigerant pipe is connected to the outdoor unit of water heater and water tank.

6.1.3.1 Importance of the Air-tightness Test

Air-tightness of the water heater system mainly refers to the tightness of the refrigerant pipes, which ensures secure and reliable running of the water heater.

Refrigerant leakage may affect functions of the water heater or even damage the compressor and make the system to break down. Therefore, an air-tightness test must be performed.

6.1.3.2 Procedure for Performing the Air-tightness Test

Cut-off valves of the gas and liquid pipes of outdoor unit of the water heater are turned off at delivery.

Before test, apply a small amount of required lubricant on the block nut and pipe terminals and use two wrenches to fix the block nut.

The outdoor unit pipes cannot be connected when the air-tightness test is being performed.

Use dry nitrogen as media for the air-tightness test. Increase the pressure slowly by following the steps below:

Step 1: Increase the pressure to 0.5 MPa. Stop for 5 minutes and then perform air-tightness check. Major leakage may be detected.

Step 2: Increase the pressure to 1.5 MPa. Stop for 5 minutes and then perform air-tightness check. Minor leakage may be detected.

Step 3: Increase the pressure to the test pressure (4.15 MPa for R410A system and 3.15 MPa for R134a system). Keep the test pressure for 1 hour and check whether it decreases. If the pressure does not decrease, it meets the requirement.

6.1.4 Vacuumization and Desiccation

6.1.4.1 Requirements on Vacuum Pump

The vacuum pump for different refrigerant systems cannot be the same.

The ultimate vacuum degree of the vacuum pump should reach -0.1 Mpa.

The air discharge capacity of the vacuum pump must be greater than 4 L/S.

The precision of the vacuum pump must be greater than 0.02 mmHg.

The system vacuum pump must be equipped with a check valve.

6.1.4.2 Procedure and Precautions for Vacuumization and Desiccation

- 1) Connect the perfusion hose with the nozzle for perfusing refrigerant. (The gas valve and liquid valve must be turned off.)
- 2) Connect the perfusion hose with the vacuum pump, as shown in Figure 6-1.
- 3) Totally open the low-pressure valve on the pressure gauge.
- 4) Start the vacuum pump. After vacuumizing for at least 20 minutes, turn off the low-pressure valve and stop the vacuum pump when the pressure gauge indicates $-1.0 \times 10^5 \text{Pa}$ (-76cmHg). Keep it for 2 minutes. If the pressure value does not increase, it means that vacuumization and pressure maintaining succeeds. If the value increases, it means that air gets into the system. Check whether leakage exists and vacuumize again.
- 5) Remove the perfusion hose from the gas valve.
- 6) Totally open the valve pin from the gas valve and liquid valve.
- 7) Screw the fluoride injection mouth nut and tighten the valve caps for the liquid valve and gas valve.
- 8) Tighten the valve cap and use suds or leakage detector to check whether there is gas leakage at the connection point of the outdoor unit and water tank.

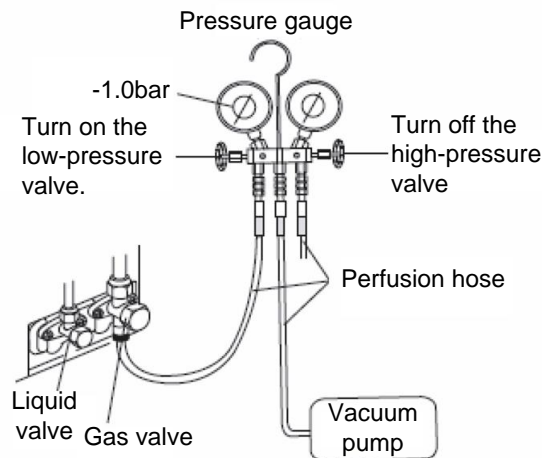


Figure 6-1 Vacuum pump connection

6.2 Installation of Water Pipes

(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 cold water inlet 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 6-2. 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 6-2. 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.

(*) GRS-2.4/D270ANbA-K unit have no safety check value, and must install the TP value.

(4) Installing the outfall pipe

As shown in Figure 6-2, 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.

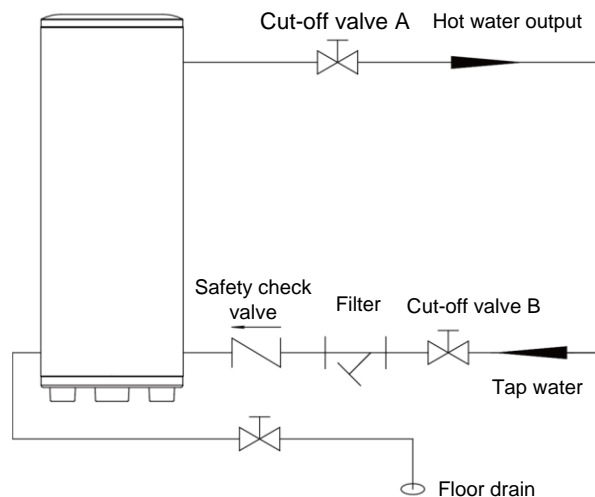


Figure 6-2 Safety check valve and outfall pipe installation

(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. Gree shall not undertake any responsibility for personal injuries, or any loss caused by improper running and use of the air source water heater.

6.3 Thermal Insulation Measures

6.3.1 Thermal Insulation for the Refrigerant Pipes

6.3.1.1 Thermal Insulation Materials

Use closed-cell foam thermal insulation materials with flame retardant grade of B1.

The heat conductivity is not greater than 0.035 w/(m·k) when the average temperature is 0°C.

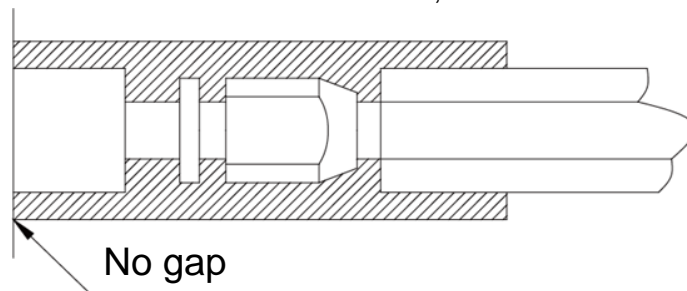
6.3.1.2 Thickness of the Thermal Insulation Layer

Outside Diameter of the Pipe (mm)	≤12.7	≥15.88
Thickness of the Thermal Insulation Layer (mm)	≥15	≥20

Use sunblock, anti-weathering, and non-cracking thermal insulation materials for outdoor pipes.

6.3.1.3 Procedure of Insulation

- a. Select thermal insulation materials based on design requirements.
- b. Wear the thermal insulation sleeve before connecting refrigerant pipes. Users cannot cut the thermal insulation material apart and then wrap up with ties after connecting the pipes by welding.
- c. Specifications of the thermal insulation sleeve must match with that of the refrigerant pipes.
- d. Reserve a distance of about 200 mm near the welding point to protect the thermal insulation sleeve during welding. After performing the air-tightness test, perform thermal insulation to the welding point separately to ensure continuity of the thermal insulation sleeve.
- e. The thermal insulation layer cannot crack during construction. Bond the thermal insulation material joints with special glue and then wrap them with electrical adhesive tape. The width of the adhesive tape must be 50 mm or greater to ensure secure connection.
- f. Use glue to bond the thermal insulation material at the water outlet to the unit to prevent dewing.
- g. Wrap joints of indoor/outdoor units with thermal insulation materials. There must be no gap between the joint and the wall of the indoor/outdoor unit, as shown in the following figure.



6.3.2 Thermal Insulation for Water Pipes

6.3.2.1 Thermal Insulation Materials

Use closed-cell foam thermal insulation materials with flame retardant grade of B1.

The heat conductivity is not greater than 0.035 w/(m·k) when the average temperature is 0°C.

6.3.2.2 Thickness of the Thermal Insulation Layer

Thickness of the thermal insulation layer for the water pipes must be greater than 10 mm.

Bond the thermal insulation material joints with special glue and then wrap them with electrical adhesive tape. The width of the adhesive tape must be 5 cm or greater to ensure secure connection.

7. Electric Installation

7.1 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 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 be 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 by 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 fit 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.

7.2 Installation of Power Cable

7.2.1 Procedure for Installing the Power Cable

(1) Connect the power cable to the connecting terminal of the outdoor unit and fix it securely.

(2) Connect the other end of the power cable to the fixed circuit and fix it securely. During connection, pay attention to the live, neutral, and ground lines.

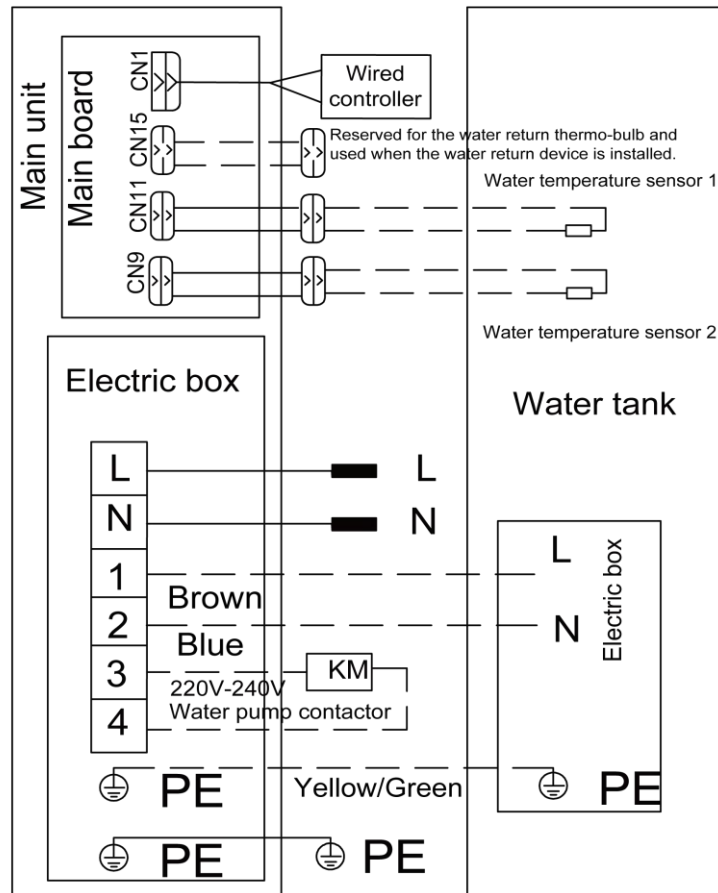
7.2.2 Selection of Power Cable Diameter and Air Circuit Breaker

Table 7-1

Model	Power Supply	Minimum Cross-sectional Area (mm ²)			Capacity of the Air Circuit Breaker
		Live Line	Neutral Line	Ground Line	
GRS-S3.0G/NbA-K	220 V-240 V -50Hz	1.5	1.5	1.5	16
GRS-2.4/D270ANbA-K		1.5	1.5	1.5	16

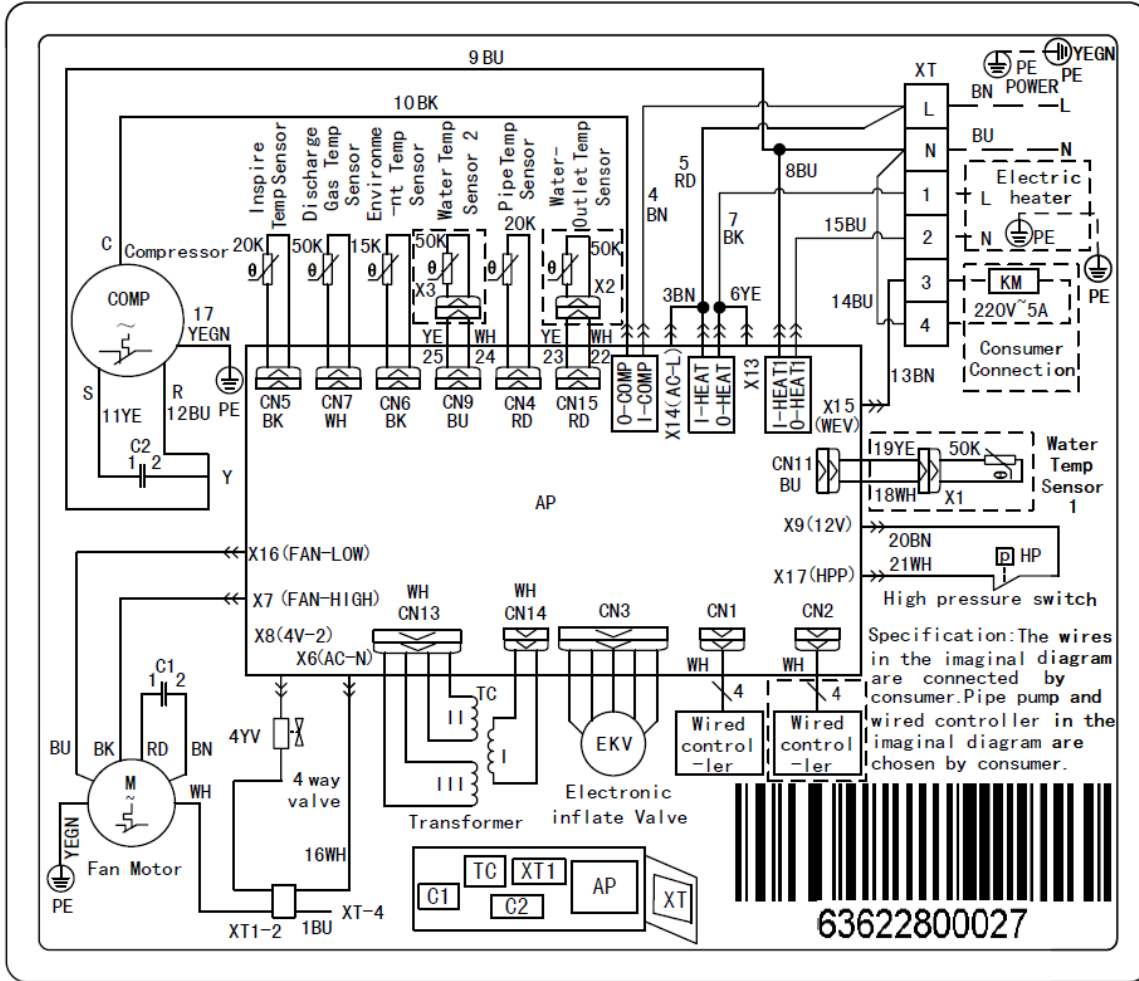
7.2.3 External Connection Diagram of the Unit

The external connection diagram for GRS-S3.0G/NbA-K equipped with SXD200LCJW/C1-K water tank is shown in the following figure.

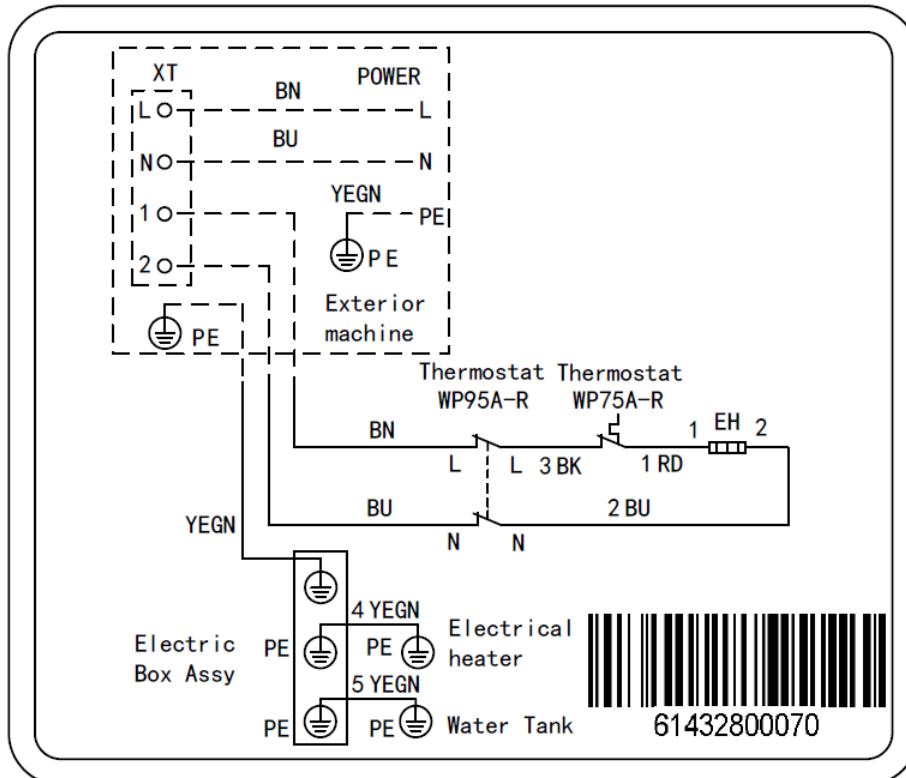


7.3 Circuit Diagram

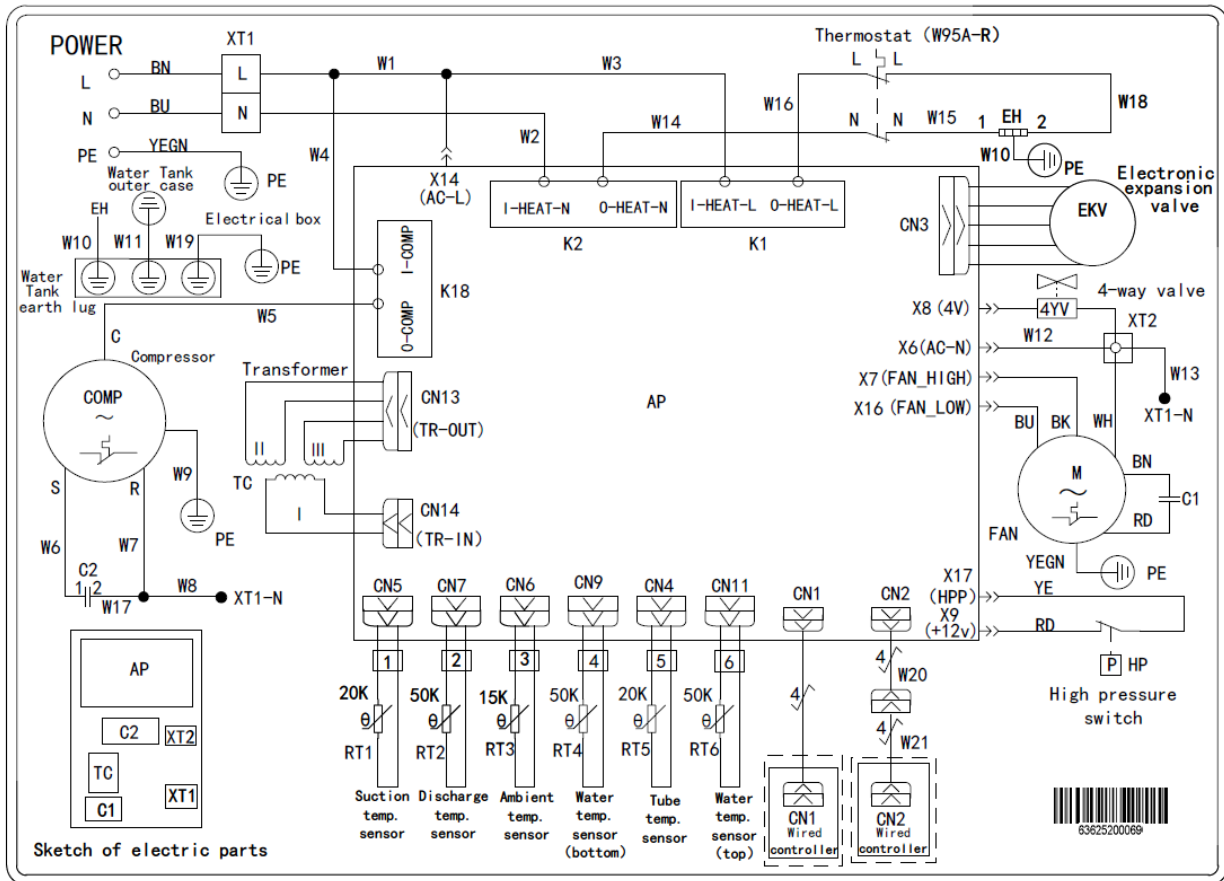
(1) The circuit diagram of GRS-S3.0G/NbA-K unit is shown in the following figure:



(2) The circuit diagram of SXD200LCJW/C1-K water tank is shown in the following figure:



(3) The circuit diagram of GRS-2.4/D270ANbA-K unit is shown in the following figure:



8. Installation of Communication System

8.1 Communication Cable Terminal Connection

Lead out the communication cable from the mainboard of the main unit and insert it into the slot of the wired controller, as shown in the following figure.



8.2 Communication Cable Connection

8.2.1 Communication Cable Connection for Vertical Model

The water tank does not need to communicate with the outdoor unit. Therefore, connect the communication cable led out from the outdoor unit to the wired controller.

8.2.2 Communication Cable Connection for Wall-mounted Model

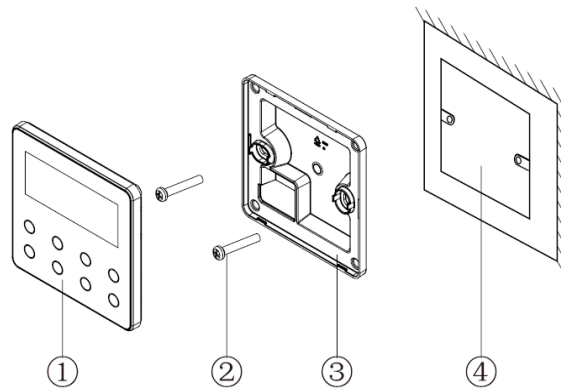
The water tank needs to communicate with the outdoor unit. Therefore, connect the communication cable led out from the water tank to the communication cable interface of the outdoor unit.

8.3 Installation and Disassembly of Wired Controller

8.3.1 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.

8.3.2 Wired Controller Installation



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

Fig. 8-1 Accessories of Wired Controller

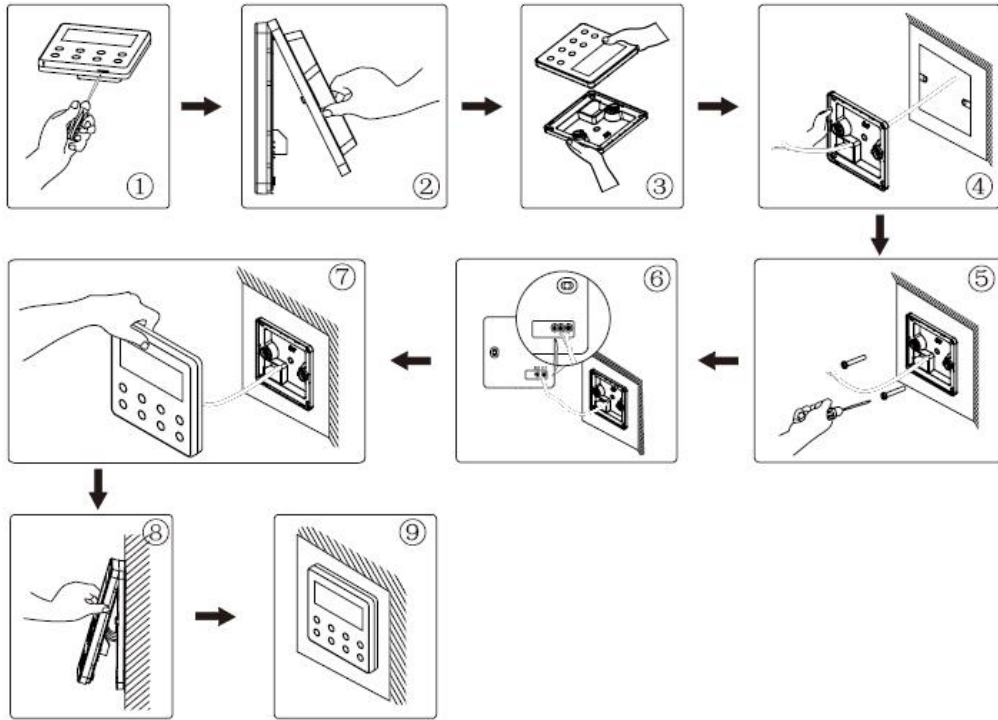


Fig. 8-2 Installation Diagram of Wired Controller

Fig. 8-1 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 M4×25;

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:

(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.

8.3.3 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;

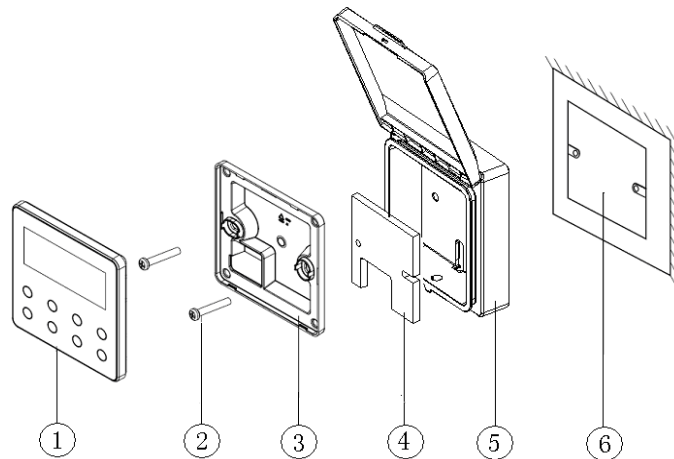
Pull out the communication wire(4-core twisted pair wire) inside the installation box and make this wire go through the wire-crossing hole of rainproof box and wired controller bottom plate;

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. 8-4).



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. 8-3 Rainproof Box Accessories of Wired Controller

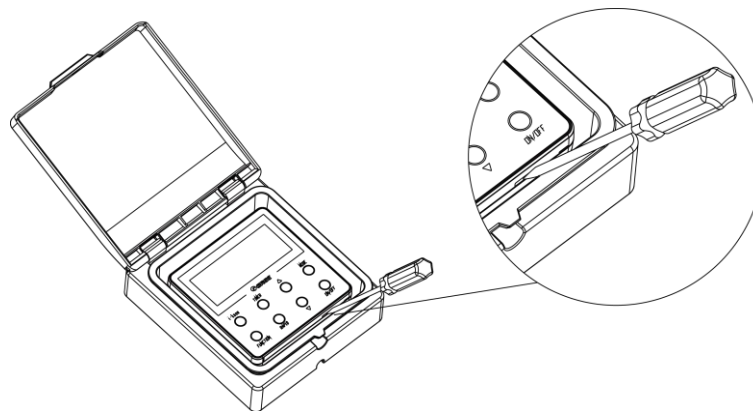


Fig. 8-4 Disassembly Diagram of Rainproof Box of Wired Controller

9. Refrigerant Perfusion

9.1 Precautions on Refrigerant Leakage

The engineering design and installation personnel for the water heater must comply with local laws and regulations on refrigerant leakage. If no safety requirement on refrigerant leakage is posed by local regulations, design and operation of the water heater must meet the requirements specified below. The household air source water heater with static heat up adopts refrigerant R410A and R134a. Although the refrigerant is non-flammable and not toxic, the space must be large enough for possible leakage. The refrigerant concentration must strictly follow the safety requirement; otherwise, suffocate will be caused. The water heater unit consists of the outdoor unit installed outdoor and the water tank which can be installed in the balcony, kitchen, or bathroom. Therefore, special attention must be paid to avoid refrigerant leakage at the water tank side.

The method of calculating the maximum perfusion quantity and the maximum concentration of the refrigerant is subject to the size of space where the water tank is installed. Unit of refrigerant concentration is kg/m³.

Method of calculating the maximum concentration of the refrigerant (the water tank is installed indoor):

1) Calculate the refrigerant perfusion quantity of the water heater.

Total perfusion quantity of the system (kg) = Perfusion quantity of outdoor unit before delivery (kg) + Perfusion quantity added onsite (kg)

2) Calculate the minimum volume of space for installing the water tank (m³).

Volume of space for installing the water tank (m³) = Length x Width x Height

Note: The length, width, and height is the valid length of the indoor space.

3) Calculate the maximum concentration of the refrigerant system.

Total refrigerant quantity of the system ≤ Maximum allowable concentration (kg/m³) x Volume of space for installing the water tank

Note: If there is no local standard on the maximum allowable refrigerant concentration, the maximum allowable concentration is 0.3kg /m³.

4) If the concentration exceeds the maximum allowable value, the refrigerant system must be re-designed into multiple small-volume refrigerant system or consult the local sales company of Gree.

If the water tank is installed outdoor, the refrigerant concentration in the case of refrigerant leakage will not exceed the allowable value. However, if a large amount of refrigerant leaks within a short duration, keep away from the leakage source and unplug the unit. In addition, contact the local sales company of Gree to handle this case onsite.

9.2 Method for Calculating Incremental Refrigerant for Extended Pipe

Length of the pipe configured for the water heater for standard configuration is 3 m. If the pipe meets the installation requirement, there is no need to add refrigerant. If the pipe needs to be extended, add refrigerant according to the following table:

Extended Pipe Length	Quantity of Incremental Refrigerant	
≤ 10 m	/	
10 m-20 m	R134a system	+20 g/m (20 g per 1 m extended)
	R410A system	+22 g/m (22g per 1 m extended)

9.3 Refrigerant Perfusion Method

The refrigerant can be perfused during shutdown or during operation.

9.3.1 Refrigerant Perfusion during Shutdown

Required tools and materials: vacuum pump, electronic scale, refrigerant tank with sufficient refrigerant, and pressure gauge

Step 1: Vacuumizing: Connect the low-pressure gauge pipe to the nozzle for perfusing refrigerant of the gas valve and intermediate gauge pipe to the vacuum pump, and then turn off the high-pressure gauge valve. Power on the vacuum pump to perform vacuumization. After vacuumizing for at least 20 minutes, turn off the low-pressure valve and stop the vacuum pump when the pressure gauge indicates $-1.0 \times 10^5 \text{Pa}$ (-76cmHg).

Step 2: Pressure maintaining: After vacuumization is complete, keep the pressure for 2 minutes. If the pressure value does not increase, it means that vacuumization and pressure maintaining succeeds. If the value increases, it means that air gets into the system. Check whether leakage exists and vacuumize again.

Step 3: Refrigerant tank connecting: After pressure is successfully maintained, disconnect the intermediate gauge pipe from the vacuum pump and connect it to the refrigerant tank.

Step 4: Gauge pipe vacuumizing: Properly loosen the joint between the intermediate gauge pipe and the pressure gauge and slightly turn on the valve of the refrigerant tank. Vacuumize the medium gauge pipe. After that, fasten the joint and turn on the valve of the refrigerant tank completely.

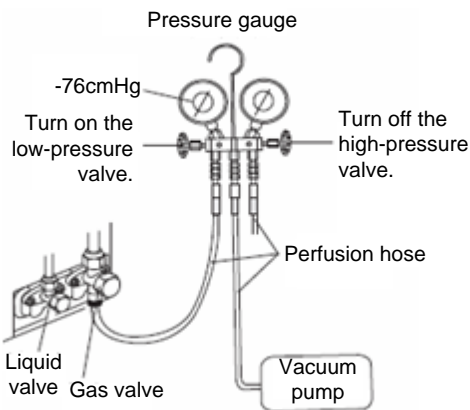


Figure 9-1 Vacuum pump connection

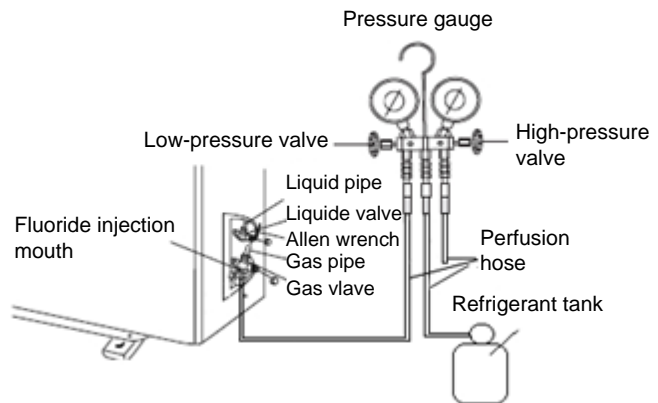


Figure 9-2 Connection for refrigerant perfusion

Step 5: Initial weight recording: If the refrigerant tank is not equipped with a siphon, reverse the refrigerant tank and place it on the electronic scale. Then record the current weight (m_1). If the refrigerant tank is equipped with a siphon, record the current weight (m_1) directly.

Step 6: Perfusion quantity calculating: Calculate weight of the refrigerant tank m_2 (with refrigerant) based on the amount of refrigerant required to be perfused.

Step 7: Refrigerant perfusing: Turn on the valve of the low-pressure gauge and then perfuse refrigerant to the system. Record the change in weight of the refrigerant tank.

Step 8: Perfusion finishing: When the weight displayed on the electronic scales is m2, turn off the valves of the low-pressure gauge and refrigerant tank.

Step 9: End: After perfusion is finished, remove the pressure gauge.

9.3.2 Refrigerant Perfusion during Operating

Refrigerant perfusion during operation often applies to adding of refrigerant. Under special cases, for example, when there is a small amount of refrigerant in the water tank, complete refrigerant perfusion can be performed to the entire system.

Required tools and materials: electronic scale, refrigerant tank with sufficient refrigerant, and pressure gauge

Refrigerant perfusion during operating is allowed to the water heater system under a specific mode.

Step 1: Gauge pipe connecting: Connect the intermediate hose of the pressure gauge to the refrigerant tank. Connect the blue hose of the low-pressure gauge to the perfusion nozzle of the air valve without tightening it. Turn on the valve of the refrigerant tank and then turn on the valve beside the low-pressure gauge. After vacuumizing for 5 s, tighten the hose connector to the perfusion nozzle.

Step 2: Mode setting: In the HOTWATER mode, press and hold **MODE+▲** for 5s to enter the query interface. When **00** is displayed at the water temperature position, press and hold **MODE+▲** for 5s again to change **00** to **P0**. Press **▲** or **▼** to select **P3** and press **MODE** to enter the setting interface. Press **▲** or **▼** again to change **00** to **01**. Then press **MODE** to enter the defrosting mode.

Step 3: Refrigerant perfusing: Repeat step 4 to step 7 in section 9.3.1.

Step 4: End: After perfusion is finished, remove the pressure gauge.

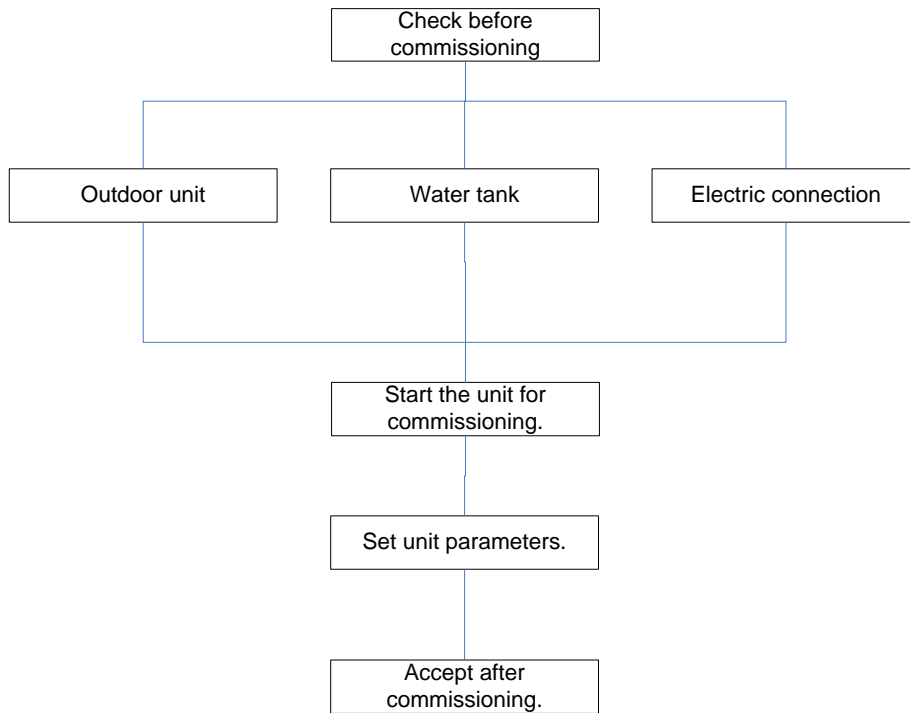
10. Check for Acceptance After Installation

No.	Check Item	Check Result
1	The distance between the coil unit and water tank is smaller than 10 m.	
2	The outdoor unit is installed at a position with good ventilation.	
3	Vibration-damping facilities are provided for the foundation of the outdoor.	
4	A condensate water drainage pipe is installed for the outdoor unit.	
5	The water tank is securely and stably installed.	
6	The safety device is connected with a drainage hose to the floor drain or any other position as specified.	
7	Pressure of the inlet water is between 0.15 MPa and 0.7 MPa.	
8	A filter is equipped for the cool water inlet pipe.	
9	No water leakage or block occurs to the cool water and hot water pipes.	
10	No refrigerant leakage occurs to the refrigerant pipe.	
11	Copper pipes are properly laid and insulated.	
12	Specifications and model of the power cable meet the unit's requirement.	
13	Preparation and total length of the control cable meet the unit's requirement.	

COMMISSIONING and TRIAL RUN

COMMISSIONING and TRIAL RUN

1 Commissioning Flowchart



2 Precautions on Safety

Before commissioning, ensure that the power supply model, possible usage range (pipe distance, indoor and outdoor high and low voltage difference, and power supply voltage), and installation space meet user requirements.

After verifying that no exception exists upon commissioning, introduce the operation and maintenance method to the customer according to the user manual. In addition, deliver the precautions and user manual to the customer for careful storage.

3 Preparations

3.1 Tool Preparation for Commissioning

Hex key
Adjustable wrench
Phillips screwdriver
Straight screwdriver
Vacuum pump
Electronic scale
High-pressure and low-pressure gauges for the related refrigerant system

3.2 Document Preparation for Commissioning

Running Parameters for Commissioning of Household Air Source Water Heaters

Project name:		Unit model:	
Commissioning performed by:		Water tank model:	
Rated capacity of the outdoor unit (kW)		Capacity of the water tank	Date
Maximum drop between the outdoor unit and water tank (m)		Length of system pipe	
Commissioning status: <input type="checkbox"/> Heat up			
Status Parameter	Unit	Before Startup	60 minutes
Status parameters of the outdoor unit	Outdoor ambient temperature	°C	
	Power supply voltage	V	
	Air intake temperature	°C	
	Air exhaust temperature	°C	
Parameters of the water tank	Temperature of the temperature sensor for water outlet pipe	°C	
	Temperature of the water temperature sensor	°C	
Summary			

Checklist for Commissioning of Household Air Source Water Heaters		
No.	Check Item	Pass
Outdoor unit	The heat exchange space for unit installation meets the related requirement.	
	A drainage ditch or outlet is available near the installation position to facilitate water drainage.	
	The drop between the outdoor unit and water tank meets the unit's design requirement.	
	1. The foundation or support is solid and secure to ensure stable operation of the unit.	
	2. The unit must be installed in a horizontal manner without any tilt.	
	Total pipe length meets the requirement.	
	Cable diameter of the outdoor unit meet the unit's design requirement.	
Water tank	The circuit breaker and leakage circuit breaker meet the unit's design requirement.	
	1. The position for installing the water tank must have sufficient load-bearing capacity.	
	2. The drain outlet for water tank is near the drainage ditch or drainage hole.	
	3. The safety check valve and drainage pipe are installed securely.	
	4. The safety check valve and drainage pipe are placed in the drainage pipe for drainage.	
	Insulation pipes such as PPR pipes are adopted as the inlet/outlet pipe for cool water and hot water. The length (L) of each section of insulation pipes is larger than or equal to $70 \times R^2$ (R indicates the internal radius of pipe).	
Wired controller	Water leaks in the hot water tap.	
	1. The communication cable of the wired controller is 50 mm or more away from the strong electricity cable.	

	2. The wired controller is not installed in a place with high temperature and high humidity, such as the kitchen and bathroom.	
	It is recommended that the wired controller is installed indoor. If it is installed outdoor, an opaque rain-proof box must be provided to protect it against sunlight and rain.	

3.3 Check before Commissioning

3.3.1 Selection of Installation Position

3.3.1.1 Installation Position of the Main Unit

- 1) The main unit is installed in a spacious room with good ventilation. The air inlet and outlet are not blocked.
- 2) A drainage ditch or outlet is available near the installation position to facilitate water drainage.
- 3) The foundation or support is solid and secure to ensure stable operation of the unit.
- 4) The unit must be installed in a horizontal manner without any tilt.

3.3.1.2 Installation Position of the Water Tank

- 1) The position for installing the water tank must have sufficient load-bearing capacity.
- 2) The drain outlet for water tank is near the drainage ditch or drainage hole.

3.3.1.3 Installation Position of the Wired Controller

- 1) The wired controller is not installed in a place with high temperature and high humidity, such as the kitchen and bathroom.
- 2) It is recommended that the wired controller is installed indoor. If it is installed outdoor, an opaque rain-proof box must be provided to protect it against sunlight and rain.
- 3) The communication cable of the wired controller is 50 mm or more away from the strong electricity cable.

3.3.2 Matching of Power Supply and Circuit Breaker

Model	Power Supply	Minimum Cross-sectional Area (mm ²)			Capacity of the Air Circuit Breaker
		Live Line	Neutral Line	Ground Line	
GRS-S3.0G/NbA-K	220 V-240 V -50Hz	1.5	1.5	1.5	16
GRS-2.4/D270ANbA-K		1.5	1.5	1.5	16

Note:

- ① The power cable of the unit must be a copper-core cable. The work temperature must meet the related requirement.
- ② If the power cable is more than 15 m. Its cross-sectional area must be expanded accordingly to avoid overload.
- ③ As a category-I appliance, the unit must be reliably grounded.
- ④ The power cable specification refers to the specification adopted when the BV single-core cables (2-4 pieces) are led through a plastic pipe and the work temperature is 40°C. The circuit breaker is D-type and it is used under temperature of 40°C.
- ⑤ 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.

4 Commissioning and Trial Run

4.1 Precautions for Commissioning

Before commissioning, ensure that the power supply model, possible usage range (pipe distance, indoor and outdoor high and low voltage difference, and power supply voltage), and installation space meet user requirements.

After verifying that no exception exists upon commissioning, introduce the operation and maintenance method to the customer according to the user manual. In addition, deliver the precautions and user manual to the customer for careful storage.

4.2 Brief Introduction to Commissioning

As engineering design, installation, and system control require high precision, commissioning must be performed after installation. The unit can be delivered if no exception is detected during commissioning.

4.3 Engineering Commissioning

4.3.1 Air Exhaust for Initial Run

1) After the water tank is fully injected with water, exhaust air in the pipe. (In initial installation, this operation shall be implemented by the installation and commissioning personnel. During normal operation, users also need to exhaust air in the pipe before water makeup startup after water in the water tank is discharged. Operations must be in accordance with the manual or label on the water tank.)

Inject water fully and check leakage. Turn on the water inlet/outlet cut-off valve of the water tank and the hot water tap or shower head on the user's side. If water flows out continuously at the tap or shower head, the water tank is full of water. Then turn off the tap or shower head. Check whether leakage exist in the water pipeline, especially at joints. When no leakage is found, power on the unit.

2) Unit power-on: After the unit is powered up, the wired controller buzzes for once. Check whether an error code is displayed on the wired controller. It is normal if no error code is displayed. As the wired controller has the memory function for blackout, it may be in the off or standby mode when it is powered on for the first time. Note: The unit must be powered on by strictly following the air exhaust steps.

3) Unit running: After air is exhausted, check the water pipeline system. Ensure that the tap or shower head on the user's side is turned off and other cut-off valves are turned on before starting the unit. When the wired controller displays the heat up icon, check whether the unit runs properly. Judgment criteria include that the fan runs properly and the unit runs stably without obvious shake and noise. After the unit runs properly for at least 30 minutes and no exception is found, it can be delivered to the user.



Attention:

All operations should be performed in accordance with the corresponding product manual.

4.3.2 Precautions for Operation in Winter

- 1) Before starting the unit which has not been used for a long period or in quite low temperature in winter, energize the unit for at least 8 hours.
- 2) Do not disconnect the power supply when the outdoor temperature is quite low in winter; otherwise, the automatic antifreeze protection will fail to work.
- 3) If the unit will not be used for a long period, power off the unit and drain the water in the water tank and pipe through the drain valve.

Drain the water by following the steps below:

Turn off the water inlet cut-off valve of the water tank. Turn on the water outlet cut-off valve and the hot water tap or shower head on the user's side. Last, turn on the cut-off valve at the drain outlet.

If the unit needs to be used after water drainage, fill the water tank fully with water before starting the unit. For details, see the description on air exhaust for the water pipeline during unit commissioning.

4.4 Commissioning Completed

Running Parameters for Commissioning of Household Air Source Water Heaters

Project name:		Unit model:	
Commissioning performed by:		Water tank model:	
Rated capacity of the outdoor unit (kW)		Capacity of the water tank	Date
Maximum drop between the outdoor unit and water tank (m)		Length of system pipe	
Commissioning status: <input type="checkbox"/> Heat up			
Status Parameter	Unit	Before Startup	30 minutes
Status parameters of the outdoor unit	Outdoor ambient temperature	°C	
	Power supply voltage	V	
	Air intake temperature	°C	
Parameters of the water tank	Air exhaust temperature	°C	
	Temperature of the temperature sensor for water outlet pipe	°C	
	Temperature of the water temperature sensor	°C	
Summary			

4.5 Reference Value for Judging Running Parameters of the Unit (Commissioning Inspection)

After the ON/OFF button is pressed for a while, the wired controller displays the heat up icon. The fan and compressor run properly and the unit runs stably without obvious shake and noise. During heat up, the water temperature displayed on the wired controller increase gradually. After the unit runs properly for at least 30 minutes, it can be delivered to the user.

5 Check Before Acceptance

Checklist for Commissioning of Household Air Source Water Heaters		
No.	Check Item	Pass
Outdoor unit	The heat exchange space for unit installation meets the related requirement.	
	A drainage ditch or outlet is available near the installation position to facilitate water drainage.	
	The drop between the outdoor unit and water tank meets the unit's design requirement.	
	1. The foundation or support is solid and secure to ensure stable operation of the unit.	
	2. The unit must be installed in a horizontal manner without any tilt.	
	Total pipe length meets the related requirement.	
	The copper pipe thickness meets the unit's design requirement.	
	Cable diameter of the outdoor unit meets the unit's design requirement.	
	The circuit breaker and leakage circuit breaker meet the unit's design requirement.	
Water tank	Foundation of the outdoor unit is solid. Vibration reduction and water drainage meets the related requirement.	
	1. The position for installing the water tank must have sufficient load-bearing capacity.	
	2. The drain outlet for water tank is near the drainage ditch or drainage hole.	
	3. The safety check valve and drainage pipe are installed securely.	
	4. The safety check valve and drainage pipe are placed in the drainage pipe for water drainage.	
	Insulation pipes such as PPR pipes are adopted as the inlet/outlet pipe for cool water and hot water. Length (L) of each section of insulation pipes is larger than or equal to $70 \times R^2$ (R indicates the internal radius of pipe).	
Wired controller	Water leakage occurs to the hot water tap.	
	1. The communication cable of the wired controller is 50 mm or more away from the strong electricity cable.	
	2. The wired controller is not installed in a place with high temperature and high humidity, such as the kitchen and bathroom. It is recommended that the wired controller is installed indoor. If it is installed outdoor, an opaque rain-proof box must be provided to protect it against sunlight and rain.	

Running Parameters for Commissioning of Household Air Source Water Heaters

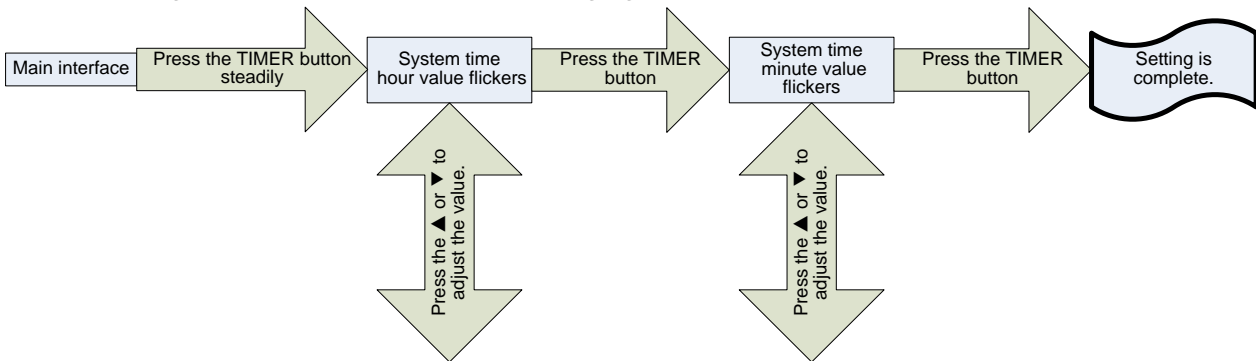
Project name:		Unit model:	
Commissioning performed by:		Water tank model:	
Rated capacity of the outdoor unit (kW)		Capacity of the water tank	Date
Maximum drop between the outdoor unit and water tank (m)		Length of system pipe	
Commissioning status: <input type="checkbox"/> Heat up			
Status Parameter	Unit	Before Startup	60 minutes
Status parameters of the outdoor unit	Outdoor ambient temperature	°C	
	Power supply voltage	V	
	Air intake temperature	°C	
	Air exhaust temperature	°C	
Parameters of the water tank	Temperature of the temperature sensor for water outlet pipe	°C	
	Temperature of the water temperature sensor	°C	
Summary			

6 Unit Function Setting

On the main interface, press the TIMER button for 5s. The system time setting interface is displayed. The time icon is on and the hour value flickers. Press ▲ or ▼ to adjust the hour value and press the TIMER button to confirm setting. Then the minute value flicks. 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. During the setting process, if no button is pressed within 15s, the main interface will be displayed and setting will not be saved.

The system time ranges from 00:00 to 23:59. Upon each press of the ▲ or ▼ button, the time increases or decreases by 1 hour or 1 minute. When the button is pressed steadily, the time increases or decrease continuously by 1 hour or 1 minute.

The setting process is shown in the following figure.



NOTES: The other functions setting refer to wired controller instructions of the unit.

MAINTENANCE

MAINTENANCE

1 Fault Code

Symptom	Fault Description
The water heater stops and the wired controller displays E1.	System high pressure protection.
The water heater stops and the wired controller displays E3	Refrigerant-lacking protection
The water heater stops and the wired controller displays E4.	Air exhaust protection.
The water heater stops and the wired controller displays E6.	Communication failure.
The water heater stops and the wired controller displays EH.	Auxiliary electricity heating protection.
The water heater stops and the wired controller displays F3.	Outdoor ambient temperature sensor fault.
The water heater stops and the wired controller displays F4.	Air exhaust temperature sensor fault.
The water heater stops and the wired controller displays F6.	Pipe temperature sensor fault (for outdoor heat exchanger).
The water heater stops and the wired controller displays Fd.	Air intake temperature sensor fault.
The water heater stops and the wired controller displays FE.	Upper temperature sensor fault of the water tank.
The water heater stops and the wired controller displays FL.	Lower temperature sensor fault of the water tank.
The water heater stops and the wired controller displays L6.	Unit capacity insufficient.

2 Troubleshooting

2.1 E1 High Pressure Protection

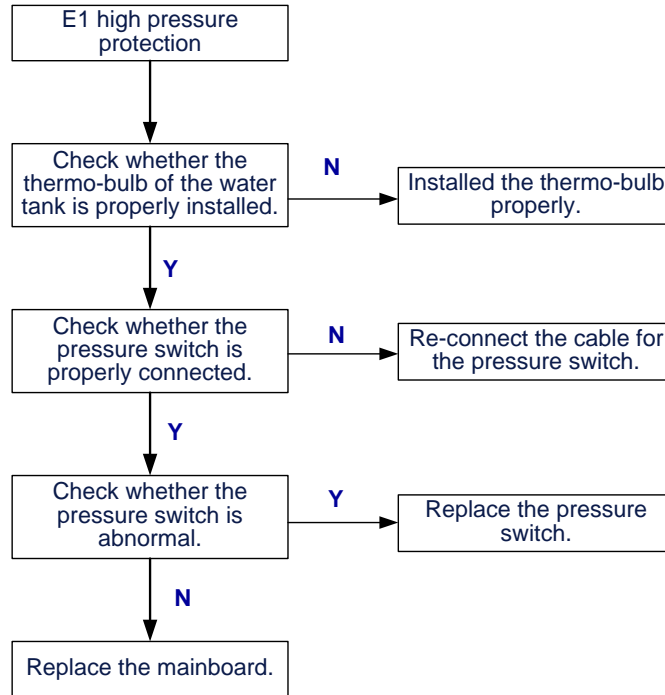
Fault code: 

Applicable model: HOTWATER; SAVE; PRESET; NIGHT

Fault judgment condition and method: E1 is displayed on the wired controller. The troubleshooting method is shown in the flowchart below.

Possible cause: 1) Poor connection of the water tank temperature sensor; 2) Loose pressure switch cable; 3) Pressure switch fault; 4) Mainboard fault

Troubleshooting:



2.2 E3 Refrigerant-lacking Protection

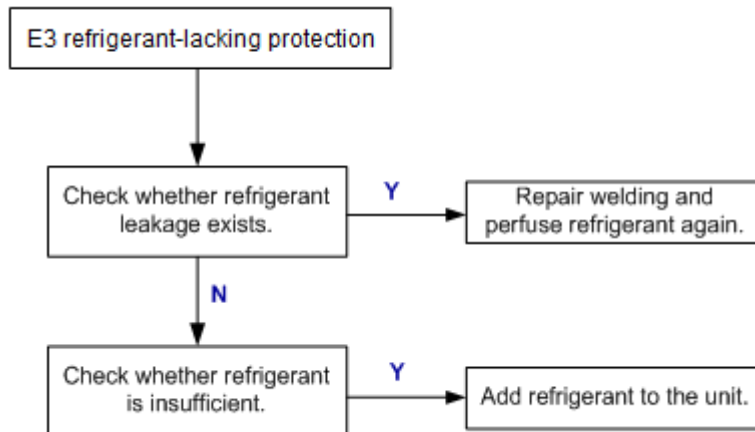
Fault code: 

Applicable model: HOTWATER; SAVE; PRESET; NIGHT

Fault judgment condition and method: E3 is displayed on the wired controller. The troubleshooting method is shown in the flowchart below.

Possible cause: (1) Refrigerant leakage of the unit; (3) Insufficient refrigerant of the unit

Troubleshooting:



2.3 E4 Air Exhaust Protection

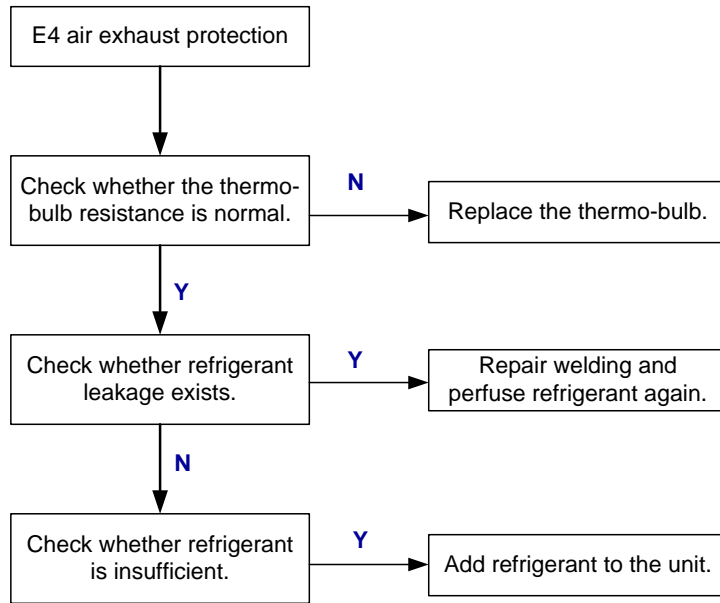
Fault code: 

Applicable model: HOTWATER; SAVE; PRESET; NIGHT

Fault judgment condition and method: E4 is displayed on the wired controller. The troubleshooting method is shown in the flowchart below.

Possible cause: (1) Air exhaust temperature sensor fault ; (2) Refrigerant leakage of the unit; (3) Insufficient refrigerant of the unit

Troubleshooting:



2.4 E6 Communication Fault

Fault code: 

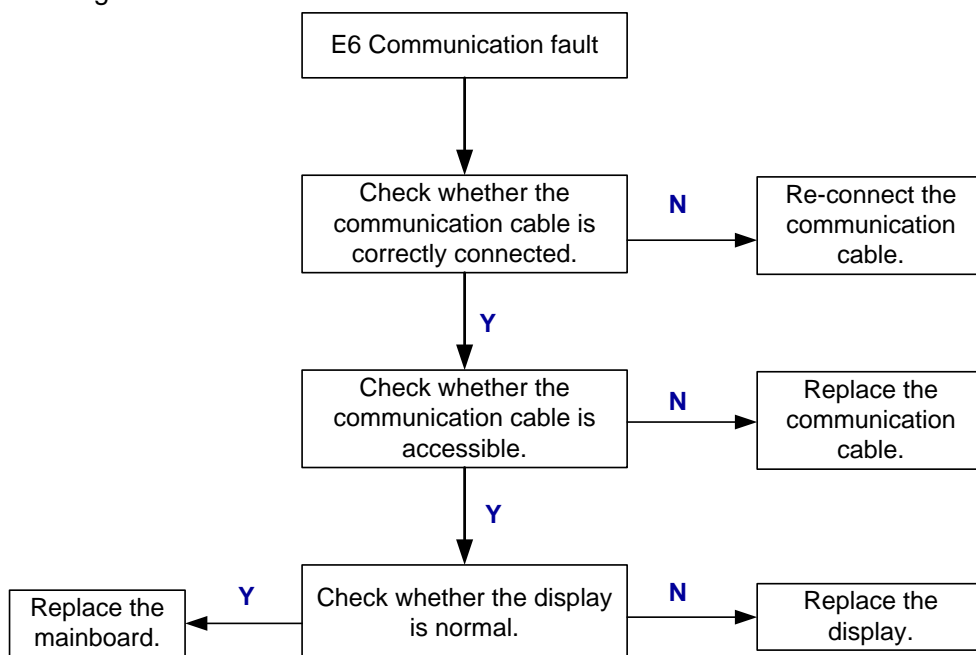
Applicable model: all models

Fault judgment condition and method: E6 is displayed on the wired controller. The troubleshooting method is shown in the flowchart below.

Possible cause:

(1) Exception or incorrect connection of the communication cable; (2) Display fault; (3) Mainboard fault

Troubleshooting:



2.5 F3, F4, F6, Fd, FE, FL Temperature sensor Fault

Fault error: F3, F4, F6, Fd, FE, or FL (one or more of these codes may be displayed), for example,



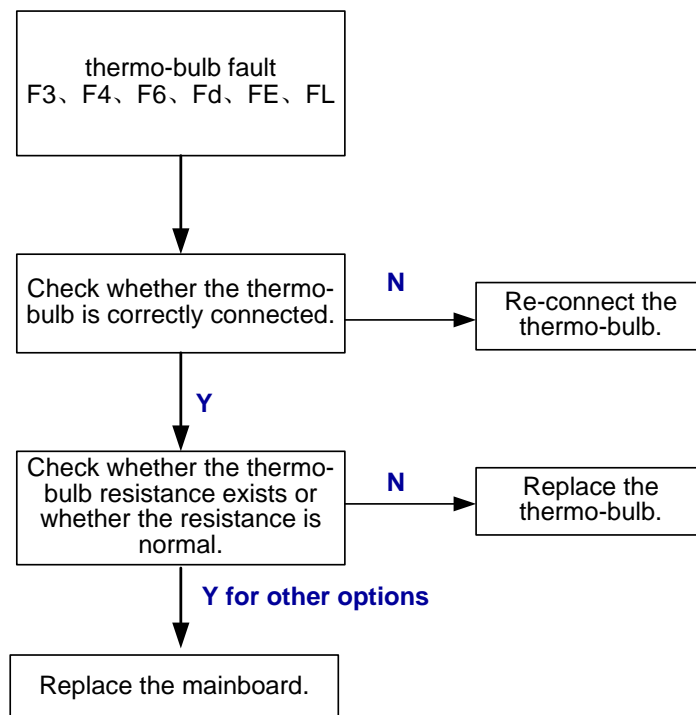
Applicable model: all models

Fault judgment condition and method: F3, F4, F6, Fd, FE, or FL is displayed on the wired controller (F3: Outdoor ambient temperature sensor fault; F4: Air exhaust temperature sensor fault; F6: Pipe temperature sensor fault (for outdoor heat exchanger); Fd: Air intake temperature sensor fault; FE: Upper temperature sensor fault of the water tank; FL: Lower temperature sensor fault of the water tank). The troubleshooting method is shown in the flowchart below.

Possible cause:

(1) Incorrect connection of temperature sensor; (2) Temperature sensor fault; (3) Mainboard fault

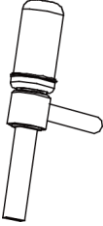
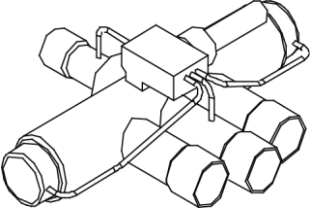
Troubleshooting:



3 Repair of Key Components

3.1 Introduction to Key Components

	<p>Compressor</p>	<p>Driven by the electric energy, the compressor compresses refrigerant to high-temperature and high-pressure gas and enables the gas to flow circularly in the refrigerant. Volume of the low-pressure refrigerant decreases via compression. After the pressure and temperature increases gradually, it becomes high-pressure and high-temperature refrigerant, which is the driving force of the entire system.</p>
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	<p>Electronic expansion valve</p>	<p>The electronic expansion valve performs throttling and pressure reduction to high-pressure liquid refrigerant to ensure the pressure difference between the condenser and evaporator. In addition, it adjusts the flow rate of refrigerant entering the evaporator based on heat load change of the evaporator so as to ensure stable operation of the refrigeration equipment.</p>
	<p>Four-way valve</p>	<p>The four-way valve changes flow direction of refrigerant during defrosting of the circular water heater. In the defrosting mode, the compressed refrigerant enters the evaporator for heat exchange and defrosting after its flow direction is changed by the four-way valve. Then it flows into the tube heat changer through the expansion valve. After that, it is sucked by the compressor to enter the next cycle.</p>

3.2 Disassembly of Key Components

3.2.1 Disassembly of Key Components of the Outdoor Unit

(1) Disassembly of Compressor

Disassembly of Compressor	
Procedure	Description
<p>1. Remove the power cable of the compressor.</p>	<ul style="list-style-type: none"> • Unscrew the power cable using a screwdriver.
	<ul style="list-style-type: none"> • Remove the power cable.
	<p>Note: When removing the power cable, make marks for cable color and the corresponding terminal to avoid incorrect connection when the cable is connected again.</p>
<p>2. Unscrew the compressor.</p>	<ul style="list-style-type: none"> • Unscrew the compressor using a screwdriver. Remove the pad first if the compressor is equipped with a pad.
<p>3. Remove the air intake and air exhaust pipes.</p>	<ul style="list-style-type: none"> • Heat up the air intake and air exhaust pipes with the fired heater before removing them.
	<ul style="list-style-type: none"> • Nitrogen must be charged for protection during welding. Nitrogen pressure: $0.5 \pm 0.1 \text{ kgf/cm}^2$ (relative pressure) <p>Note: Surrounding materials must be protected against being burnt by high temperature during heat up.</p>
<p>4. Remove the compressor.</p>	<ul style="list-style-type: none"> • Remove the fixed bolts at bottom corners of the compressor using the spanner.
	<ul style="list-style-type: none"> • Remove the compressor from the supporting structure.
	<p>Note: The compressor must be handled horizontally or vertically without inversion.</p>
<p>5. Place the repaired or new compressor on the supporting structure.</p>	<ul style="list-style-type: none"> • Place the repaired or new compressor on the supporting structure in the same direction as that before removal.
	<ul style="list-style-type: none"> • Screw on the fixed bolts at bottom corners of the compressor using the spanner.
	<p>Note: The compressor must be handled horizontally or vertically without inversion.</p>
<p>6. Install fixed bolts for the compressor.</p>	<ul style="list-style-type: none"> • Screw on the fixed bolts at bottom corners of the compressor using the spanner.
<p>7. Connect the air intake and air exhaust pipes.</p>	<ul style="list-style-type: none"> • Connect the air intake and air exhaust pipes to the system by welding after heating them with the fired heater.
	<ul style="list-style-type: none"> • Nitrogen must be charged for protection during welding. Nitrogen pressure: $0.5 \pm 0.1 \text{ kgf/cm}^2$ (relative pressure)

	Note: Surrounding materials must be protected against being burnt by high temperature during heat up.
8. Install the power cable of the compressor.	<ul style="list-style-type: none"> ● Install the power cable to the fixed bolt in the sequence as that for disassembly. ● Screw on the fixed bolts of the power cable using a screwdriver.
9. Vacuumize and keep pressure for the system to ensure tightness.	
10. Re-perfuse refrigerant.	<ul style="list-style-type: none"> ● Connect the perfusion nozzle (arrowed) on the air return pipe of the compressor to the refrigerant. ● Perfuse refrigerant to the system. <p>Note: Refrigerant must be perfused based on the unit standard as the refrigerant volume has great effect on cooling performance of the unit.</p>
Note: Before disassembling the compressor, ensure that there is no refrigerant in the pipeline system and power is cut off.	

(2) Disassembly of Four-Way Valve

Disassembly of Four-Way Valve	
Procedure	Description
1. Disconnect the four-way valve by welding.	<ul style="list-style-type: none"> ● Record direction of the four-way valve before disconnecting it as the direction for two systems of a dual-system unit may differ. ● Remove the coil and mark the direction.
	<ul style="list-style-type: none"> ● Wrap the four-way valve with a wet cloth to protect the sliding block in the valve against being burnt during welding and prevent water from entering the pipe.
	<ul style="list-style-type: none"> ● Nitrogen must be charged for protection during welding. Nitrogen pressure: $0.5 \pm 0.1 \text{ kgf/cm}^2$ (relative pressure)
2. Remove the four-way valve.	<ul style="list-style-type: none"> ● Remove the four-way valve with care to avoid touching other parts, components, or pipes.
3. Place the four-way valve to the original position.	<ul style="list-style-type: none"> ● Place the four-way valve to the original position with care to avoid touching other parts, components, or pipes.
4. Connect the four-way valve to by welding.	<ul style="list-style-type: none"> ● Model of the new four-way valve must be the same as the original one.
	<ul style="list-style-type: none"> ● Pipe connection must be the same as the original connection.
	<ul style="list-style-type: none"> ● Nitrogen must be charged for protection during welding. Nitrogen pressure: $0.5 \pm 0.1 \text{ kgf/cm}^2$ (relative pressure)
Note: Before replacing the four-way valve, cut off power supply for the unit and recycle refrigerant properly.	

(3) Disassembly of Electronic Expansion Valve

Disassembly of Electronic Expansion Valve	
Procedure	Description
1. Remove the coil of the electronic expansion valve.	<ul style="list-style-type: none"> ● Generally, the concave on the valve meshes with the convex on the coil. Before removing the electronic expansion valve, turn the coil clockwise or counterclockwise for a small angle until that the convex is between two adjacent concaves. Disconnect the convex from the concave and then remove the coil upwards.
2. Disconnect the electronic expansion valve by welding.	<ul style="list-style-type: none"> ● Avoid burning other pipes during welding.
	<ul style="list-style-type: none"> ● Remove the electronic expansion valve with care to avoid touching other parts, components, or pipes
	<ul style="list-style-type: none"> ● Nitrogen must be charged for protection during welding. Nitrogen pressure: $0.5 \pm 0.1 \text{ kgf/cm}^2$ (relative pressure)
3. Connect the electronic expansion valve by welding	<ul style="list-style-type: none"> ● Model of the new electronic expansion valve must be the same as the original one.
	<ul style="list-style-type: none"> ● Wrap the expansion valve with a wet cloth to protect the sliding block in the valve against being burnt during welding and prevent water from

	entering the pipe.
	<ul style="list-style-type: none"> • Nitrogen must be charged for protection during welding. Nitrogen pressure: 0.5 ± 0.1 kgf/cm² (relative pressure) • Install the coil after the connection pipe is welded. Ensure that the convex on the coil meshes with the concave on the valve.
4. After replacing the electronic expansion valve, power off the unit and power it on again.	<ul style="list-style-type: none"> • If the coil plug of the electronic expansion valve is re-connected after being disconnected from the mainboard, the unit must be powered on again after being powering off.
Note: Before replacing the electronic expansion valve, cut off power supply for the unit and recycle refrigerant properly.	

3.2.2 Disassembly of Key Components of the Water Tank

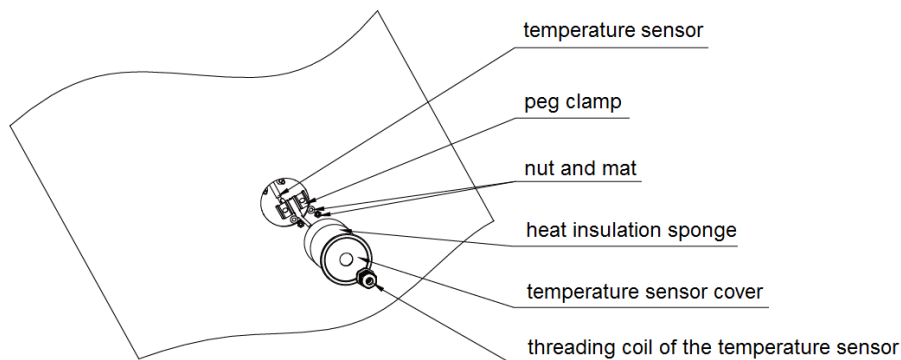
(1) Procedure for replacing the water tank temperature sensor

GRS-S3.0G/NbA-K and SXD200LCJW/C1-K Unit:

- 1) Screw off threading coil of the temperature sensor.
- 2) Remove the temperature sensor cover.
- 3) Take out the temperature sensor.
- 4) Install a new temperature sensor and assemble related parts in sequence. After the temperature sensor cable is properly placed, start the unit for trial run.

GRS-2.4/D270ANbA-K Unit:

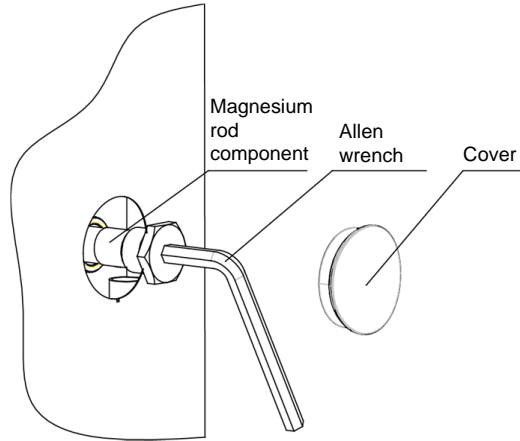
- 1) Screw off threading coil of the temperature sensor.
- 2) Remove the temperature sensor cover.
- 3) Take out the heat insulation sponge of the temperature sensor.
- 4) Remove the nut and mat on the peg clamp of the temperature sensor.
- 5) Take out the temperature sensor and the peg clamp.
- 6) Take out the temperature sensor in PCB, then replacing the same temperature sensor .
- 7) Install all parts of the temperature sensor in order, then tidy up the temperature sensor line.



(2) Procedure for replacing the Mg-stick

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. The procedure for replacing the Mg-stick is as follows:

- 1) Discharge all water in the water tank.
- 2) Open the upper cover and insulation sponge above the Mg-stick.
- 3) Unscrew the Mg-stick using an hex key and take it out carefully to prevent Mg-stick slags from dropping into the water tank.
- 4) Install the new Mg-stick and screw it with an hex key.
- 5) Place the upper cover to the original position and fill the water tank with water.

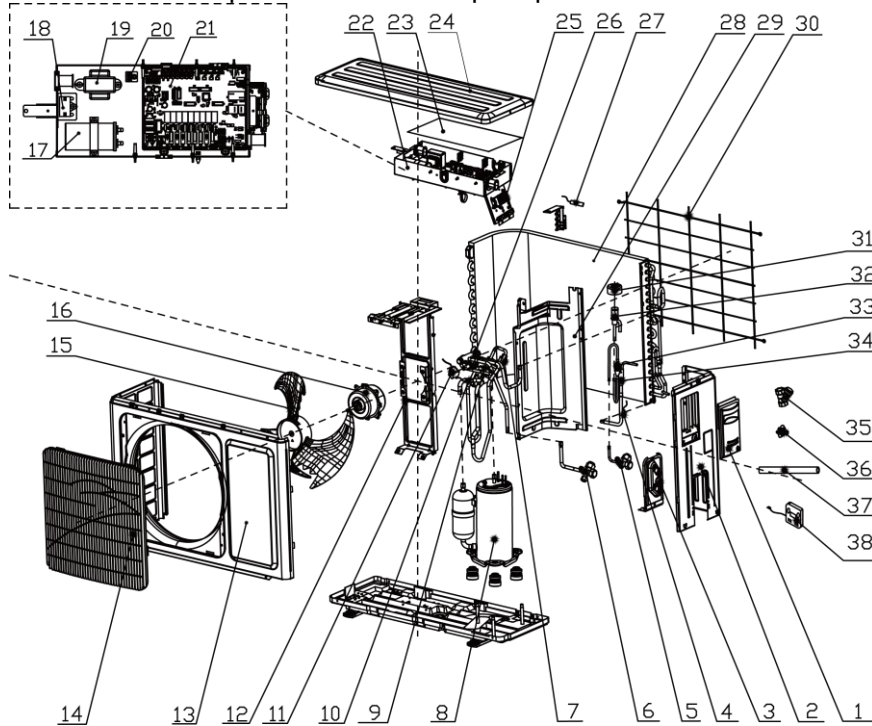


Replacing the Mg-stick

4 Exploded View and Parts List

4.1 Exploded View and Parts List of the Main Unit

◆ Model: GRS-S3.0G/NbA-K Exploded Views and spare parts list:



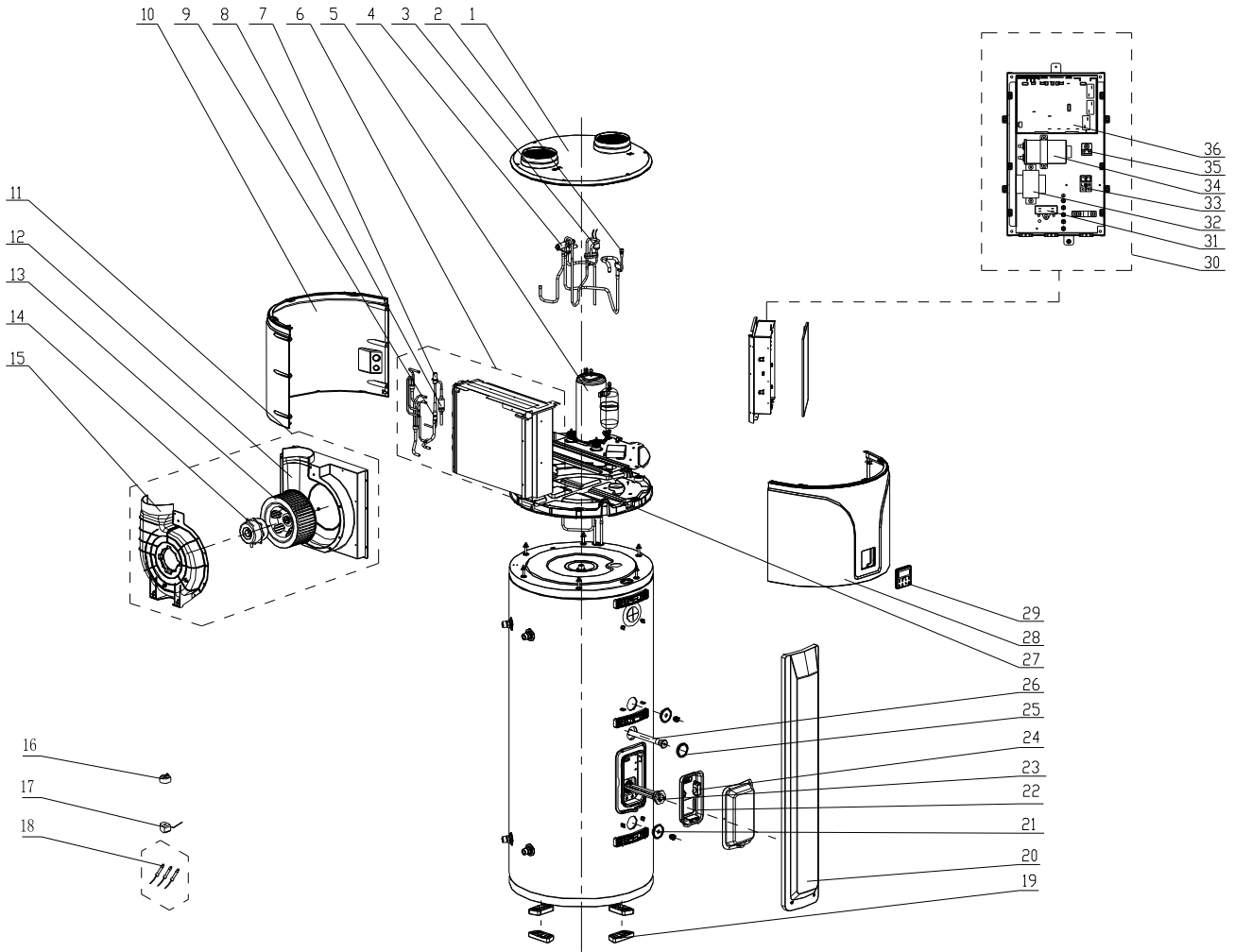
NO.	Name of Part	GRS-S3.0G/NbA-K	
		Product Code	ER0200130
		Part Code	Quantity
1	Big Handle	2623343106	1
2	Right Side Plate	01303172P	1
3	Valve Support	01713424	1
4	Temperature Sensor	39000192G	1
5	Valve	07100143	1
6	Valve	07100125	1
7	Pressure Switch	46028008	1
8	Compressor and Fittings	00202818	1
9	Temperature Sensor	3900001601G	1
10	Temperature Sensor	390002073G	1

AIR SOURCE HEAT PUMP WATER HEATER SERVICE MANUAL

11	Magnet Coil	4300040047	1
12	Motor Support	01703102	1
13	Front Panel	0153303204P	1
14	Front Grill	22413049	1
15	Axial Flow Fan	10333004	1
16	Fan Motor	150130674	1
17	Capacitor	3300008101	1
18	Capacitor	3301074710	1
19	Transformer	43118000001	1
20	Terminal Board	42011147	1
21	Main Board	30222000036	1
22	Electric Box Assembly	01392800146	1
23	Electric Box Cover	1413048	1
24	Top Cover Plate	01253443	1
25	Terminal Board	420112551	1
26	4-way Valve	430004022	1
27	Temperature Sensor	3900012123	1
28	Condenser Assembly	01122800077	1
29	Clapboard	01245244	1
30	Rear Grill	01473057	1
31	Electronic Expansion Valve Coil	4300034401	1
32	Electronic Expansion Valve	43042800063	1
33	Filter	07414100006	1
34	Filter	0721160101	1
35	Filter	07412802	1
36	Drainage Connector	06123401	1
38	Drain Pipe	05230022	1

Above data is subject to change without notice, please reference the SP in global service website.

◆ Model: GRS-2.4/D270ANbA-K Exploded Views and spare parts list:



NO.	Name of Part	GRS-2.4/D270ANbA-K	
		Product Code	ER02100050
		Part Code	Quantity
1	Top Cover	26909400058	1
2	Nozzle for Adding Freon	06120011	1
3	Pressure Protect Switch	46020015101	1
4	Four-Way Valve	430004022	1
5	Compressor and Fittings	00202818	1
6	Condenser Assembly	01122800085	1
7	Electronic Expand Valve	43042800063	1
8	Strainer	0721160101	1
9	Strainer	0721160101	1
10	Cabinet (Back)	26909400060	1
11	Air Routeway Assembly	01262800165	1
12	Cover of Propeller Housing (Front)	26909400063	1
13	Centrifugal Fan	10452800002	1
14	Fan Motor	15702800002	1
15	Cover of Propeller Housing (Back)	26909400062	1
16	Electric Expand Value Fitting	43048011	1
17	Magnet Coil	4300040044	1
18	Sensor Subassembly	39008000131G	1

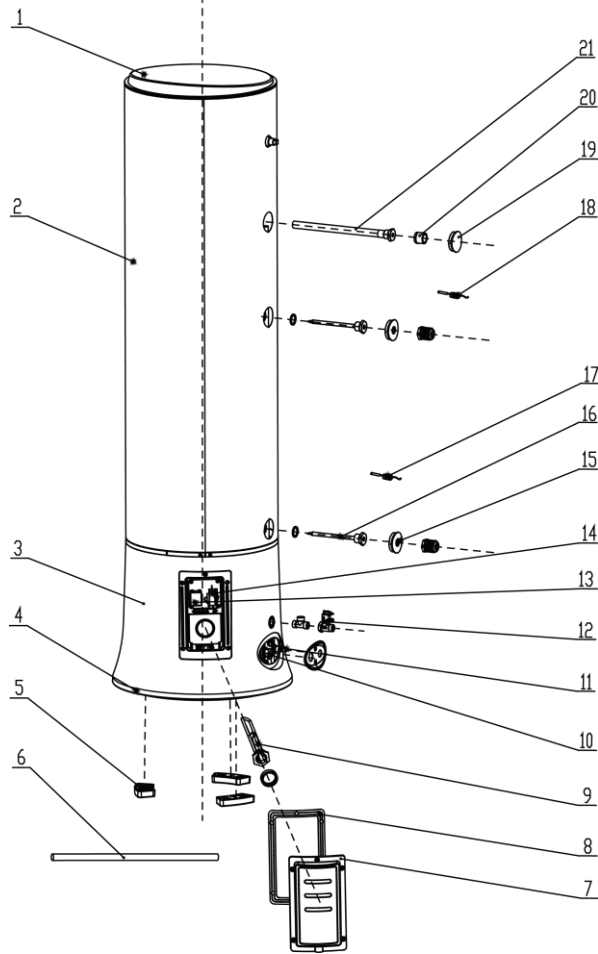
AIR SOURCE HEAT PUMP WATER HEATER SERVICE MANUAL

19	Water tank bottom feet	26902848	3
20	Front Panel	26909400059	1
21	Gasket	70412804	2
22	Electric Box Assembly (Tank)	01392800141	1
23	Electric heater	32110000009	1
24	Thermostat	45048003	1
25	Gasket	7041280401	1
26	Magnesium rod Subassembly	0406280000202	1
27	Water Tray	26909400057	1
28	Cabinet (Front)	26909400061	1
29	Display Board	30296000028	1
30	Electric Box Assembly	01392800167	1
31	Capacitor CBB61S	3301074704	1
32	Transformer	43118000001	1
33	Terminal Board	4201115404	1
34	Capacitor CBB65	3300008101	1
35	Terminal Board	42011147	1
36	Main Board	30222000026	1

Above data is subject to change without notice, please reference the SP in global service website.

4.2 Exploded View and Parts List of the Water Tank

◆ Model: SXD200LCJW/C1-K Exploded Views and spare parts list:



NO.	Name of Part	SXD200LCJW/C1-K	
		Product Code	ER20000320
		Part Code	Quantity
1	Top cover 2	26902852	1
2	Mid Part of Housing Subassembly	01512800014	1
3	Base Frame	2690285303	1
4	Bottom Cover	01262926P	1
5	Water Tank Base	26902848	3
6	Drainage Hose	05332800002	1.5
7	Electric Box Cover	26902849	1
8	Vibration absorber	76812824	1
9	Electric heater	32110000009	1
10	Pipe Connector	06652830	1
11	Pipe Connector	06652828	1
12	Relief Valve	0738280101	1
13	Thermostat	45048002	1
14	Thermostat	45048003	1
15	Gasket	26902855	2
16	Temp Sensor Pipe Subassembly	04162802	2
17	Temperature Sensor	3900028314G	1
18	Temperature Sensor	3900028315G	1
19	Gasket	2690285501	1

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20	Joint	06652807	3
21	Magnesium rod Subassembly	04062800002	1

Above data is subject to change without notice, please reference the SP in global service website.

UNIT MAINTENANCE

UNIT MAINTENANCE

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.

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.

3. 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 Gree 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.

4. 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.

Attachment: Mapping Table of the Temperature Sensor Resistance and Temperature

The following tables lists the mapping relationship between resistance of different temperature sensors and temperature. The resistance for different temperature can be queried during maintenance.

Note: Due to variance in measuring method and temperature sensing, the sensor resistance may deviate at $\pm 5^{\circ}\text{C}$.

Mapping between the temperature and resistance of 15 k Ω (outdoor ambient temperature sensor)

Temperature ($^{\circ}\text{C}$)	Resistance (k Ω)	Temperature ($^{\circ}\text{C}$)	Resistance (k Ω)
-20	144	71	2.523
-19	138.1	72	2.439
-18	128.6	73	2.358
-17	121.6	74	2.28
-16	115	75	2.205
-15	108.7	76	2.133
-14	102.9	77	2.064
-13	97.4	78	1.997
-12	92.22	79	1.933
-11	87.35	80	1.871
-10	82.75	81	1.811
-9	78.43	82	1.754
-8	74.35	83	1.699
-7	70.5	84	1.645
-6	66.88	85	1.594
-5	63.46	86	1.544
-4	60.23	87	1.497
-3	57.18	88	1.451
-2	54.31	89	1.408
-1	51.59	90	1.363
0	49.02	91	1.322
1	46.8	92	1.282
2	44.31	93	1.244
3	42.14	94	1.207
4	40.09	95	1.171
5	38.15	96	1.136
6	36.32	97	1.103
7	34.58	98	1.071
8	32.94	99	1.039

9	31.38	100	1.009
10	29.9	101	0.98
11	28.51	102	0.952
12	27.18	103	0.925
13	25.92	104	0.898
14	24.73	105	0.873
15	23.6	106	0.848
16	22.53	107	0.825
17	21.51	108	0.802
18	20.54	109	0.779
19	19.63	110	0.758
20	18.75	111	0.737
21	17.93	112	0.717
22	17.14	113	0.697
23	16.39	114	0.678
24	15.68	115	0.66
25	15	116	0.642
26	14.36	117	0.625
27	13.74	118	0.608
28	13.16	119	0.592
29	12.6	120	0.577
30	12.07	121	0.561
31	11.57	122	0.547
32	11.09	123	0.532
33	10.63	124	0.519
34	10.2	125	0.505
35	9.779	126	0.492
36	9.382	127	0.48
37	9.003	128	0.467
38	8.642	129	0.456
39	5.997	130	0.444
41	7.653	131	0.433
42	7.352	132	0.422
43	7.065	133	0.412
44	6.791	134	0.401
45	6.529	135	0.391
46	6.278	136	0.382
47	6.038	137	0.372
48	5.809	138	0.363
49	5.589	139	0.355
50	5.379	140	0.346

51	5.179	141	0.338
52	4.986	142	0.33
53	4.802	143	0.322
54	4.625	144	0.314
55	4.456	145	0.307
56	4.294	146	0.299
57	4.139	147	0.292
58	3.99	148	0.286
59	3.848	149	0.279
60	3.711	150	0.273
61	3.579	151	0.266
62	3.454	152	0.261
63	3.333	153	0.254
64	3.217	154	0.248
65	3.105	155	0.243
66	2.998	156	0.237
67	2.898	157	0.232
68	2.797	158	0.227
69	2.702	159	0.222
70	2.611	160	0.217

Mapping between the temperature and resistance of 20 kΩ (pipe temperature sensor and air intake temperature sensor)

Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)
-30	361.8	66	3.998
-29	339.8	67	3.861
-28	319.2	68	3.729
-27	300	69	3.603
-26	282.2	70	3.481
-25	265.5	71	3.364
-24	249.9	72	3.252
-23	235.3	73	3.144
-22	221.6	74	3.04
-21	208.9	75	2.94
-20	196.9	76	2.844
-19	181.4	77	2.752
-18	171.4	78	2.663
-17	162.1	79	2.577
-16	153.3	80	2.495
-15	145	81	2.415
-14	137.2	82	2.339

-13	129.9	83	2.265
-12	123	84	2.194
-11	116.5	85	2.125
-10	110.3	86	2.059
-9	104.6	87	1.996
-8	99.13	88	1.934
-7	94	89	1.875
-6	89.17	90	1.818
-5	84.61	91	1.763
-4	80.31	92	1.71
-3	76.24	93	1.658
-2	72.41	94	1.609
-1	68.79	95	1.561
0	65.37	96	1.515
1	62.13	97	1.47
2	59.08	98	1.427
3	56.19	99	1.386
4	53.46	100	1.346
5	50.87	101	1.307
6	48.42	102	1.269
7	46.11	103	1.233
8	43.92	104	1.198
9	41.84	105	1.164
10	39.87	106	1.131
11	38.01	107	1.099
12	36.24	108	1.069
13	34.57	109	1.039
14	32.98	110	1.01
15	31.47	111	0.9825
16	30.04	112	0.9556
17	28.68	113	0.9295
18	27.39	114	0.9043
19	26.17	115	0.8799
20	25.01	116	0.8562
21	23.9	117	0.8333
22	22.85	118	0.8111
23	21.85	119	0.7895
24	20.9	120	0.7687
25	20	121	0.7485
26	19.14	122	0.7289
27	18.32	123	0.7099

28	17.55	124	0.6915
29	16.8	125	0.6736
30	16.1	126	0.6563
31	15.43	127	0.6395
32	14.79	128	0.6232
33	14.18	129	0.6074
34	13.59	130	0.5921
35	13.04	131	0.5772
36	12.51	132	0.5627
37	12	133	0.5487
38	11.52	134	0.5351
39	11.06	135	0.5219
40	10.62	136	0.509
41	10.2	137	0.4966
42	9.803	138	0.4845
43	9.42	139	0.4727
44	9.054	140	0.4613
45	8.705	141	0.4502
46	8.37	142	0.4394
47	8.051	143	0.4289
48	7.745	144	0.4187
49	7.453	145	0.4088
50	7.173	146	0.3992
51	6.905	147	0.3899
52	6.648	148	0.3808
53	6.403	149	0.3719
54	6.167	150	0.3633
55	5.942	151	0.3549
56	5.726	152	0.3468
57	5.519	153	0.3389
58	5.32	154	0.3312
59	5.13	155	0.3237
60	4.948	156	0.3164
61	4.773	157	0.3093
62	4.605	158	0.3024
63	4.443	159	0.2956
64	4.289	160	0.2891
65	4.14		

Mapping between the temperature and resistance of 50 kΩ (upper and lower temperature sensors in the water tank and air exhaust temperature sensor)

Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)
-30	911.56	61	11.736
-29	853.66	62	11.322
-28	799.98	63	10.925
-27	750.18	64	10.544
-26	703.92	65	10.178
-25	660.93	66	9.8269
-24	620.94	67	9.4896
-23	583.72	68	9.1655
-22	549.04	69	8.9542
-21	516.71	70	8.5551
-20	486.55	71	5.9676
-19	458.4	72	7.9913
-18	432.1	73	7.7257
-17	407.51	74	7.4702
-16	384.51	75	7.2245
-15	362.99	76	6.9882
-14	342.83	77	6.7608
-13	323.94	78	6.542
-12	306.23	79	6.3315
-11	289.61	80	6.1288
-10	274.02	81	5.9336
-9	259.37	82	5.7457
-8	245.61	83	5.5647
-7	232.67	84	5.3903
-6	220.5	85	5.2223
-5	209.05	86	5.0605
-4	195.97	87	4.9044
-3	188.12	88	4.7541
-2	178.65	89	4.6091
-1	169.68	90	4.4693
0	161.02	91	4.3345
1	153	92	4.2044
2	145.42	93	4.0789
3	135.96	94	3.9579
4	131.5	95	3.841
5	126.17	96	3.7283
6	119.08	97	3.6194
7	113.37	98	3.5143
8	107.96	99	3.4128
9	102.85	100	3.3147

10	98.006	101	3.22
11	93.42	102	3.1285
12	89.075	103	3.0401
13	84.956	104	2.9547
14	81.052	105	2.8721
15	77.349	106	2.7922
16	73.896	107	2.715
17	70.503	108	2.6404
18	67.338	109	2.5682
19	64.333	110	2.4983
20	61.478	111	2.4308
21	58.766	112	2.3654
22	56.189	113	2.3021
23	53.738	114	2.2409
24	51.408	115	2.1816
25	49.191	116	2.1242
26	47.082	117	2.0686
27	45.074	118	2.0148
28	43.163	119	1.9626
29	41.313	120	1.9123
30	39.61	121	1.8652
31	37.958	122	1.8158
32	36.384	123	1.7698
33	34.883	124	1.7253
34	33.453	125	1.6821
35	32.088	126	1.6402
36	30.787	127	1.5996
37	29.544	128	1.5602
38	28.359	129	1.522
39	27.227	130	1.485
40	26.147	131	1.449
41	25.114	132	1.4141
42	24.128	133	1.3803
43	23.186	134	1.3474
44	22.286	135	1.3155
45	21.425	136	1.2846
46	20.601	137	1.2545
47	19.814	138	1.2233
48	19.061	139	1.1969
49	18.34	140	1.1694
50	17.651	141	1.1476

51	16.99	142	1.1166
52	16.358	143	1.0913
53	15.753	144	1.0667
54	15.173	145	1.0429
55	14.618	146	1.0197
56	14.085	147	0.9971
57	13.575	148	0.9752
58	13.086	149	0.9538
59	12.617	150	0.9331
60	12.368		

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