



Service Manual

AIR SOURCE HEAT PUMP WATER HEATER

Capacity: 1.5~2.4kW

Rated Frequency: 50Hz

Operation Range : -7°C~45°C

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PRODUCT

PRODUCT

1 MODELS LIST

Product type	Model	Product Code	Heating capacity (W)	Outline diagram
Integral type	GRS-2.4/D270ANbA-K	ER02100050	2400+1500 (electric heating)	
	GRS-1.5/D150ANbA-K GRS-1.5/D200ANbA-K	ER02100070 ER02100080	1500+1500 (electric heating)	
	GRS-1.5/TD150ANbA-K GRS-1.5/TD200ANbA-K	ER02100100 ER02100090	1500+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 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

GRS	-	1.5				/	T	D	200	A			Nb	A		-	K
1		2	3	4	5		6	7	8	9	10	11	12	13	14		15

No.	Description	Options
1	Product code	GRS—heat pump water heater
2	Heating capacity code	Nominal heating capacity (Unit: kW)
3	Compressor system	Null for single compressor; S—two compressors
4	Functions 1	P— inverter; Pd—DC inverter; M—modular for fixed speed; PM—AC inverter modular; PdM—DC inverter modular; Null for fixed speed
5	Functions 2	Null for general; Re—Low temp heat pump
6	Material of water tank	Null for stainless steel; T—Porcelain enamel
7	Function code	Null for no electric heating function; D—with electric heating function
8	Water tank capacity	Capacity of water tank; Unit: (L)
9	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;
10	Water tank shape	Null for rotundity; F—squareness
11	Inner tank number	Null for one inner tank; 2—two inner tank
12	Refrigerant	Null for R22; R407c—N; R410A—Na; R134a—Nb; R417A—Ne
13	Design Serial number	A, B, C...or A1, A2..., B1, B2...
14	Cycle function	H—cycle function; Null for no cycle function
15	Power supply code	M—380-415V 3PH~50Hz; K—220V-240V 1PH~50Hz; D—220V-240V 1PH~60Hz; ...

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

Model			GRS-2.4/D270ANbA-K
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	2.61
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	660×667×1958
Package Dimensions	W x D x H	mm	813×813×2100
Net Weight		kg	114
Sound Power Level ^(***)		dB(A)	60
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.
- ⑤ Under RAPID function, electric heater helps to heating water.
- ⑥ Please always see the nameplate for the exact data as this table is subject to change.

Model		GRS-1.5/D150ANbA-K	GRS-1.5/D200ANbA-K
Rated Heating Capacity ^(*)	W	1500	1500
Rated Input Power ^(*)	W	429	429
COP ^(*)	W/W	3.50	3.50
Capacity	L	150	190
Load Profile	-	L	L
COP _{DHW} ^(**)	W/W	2.47	2.47
Energy Efficiency Class ^(**)	-	A	A
Water Heating Energy Efficiency ^(**)	-	103.9%	103.9%
Annual electricity consumption (average climate conditions)	kWh	985	985
Maximum Input Power	W	650+1500W (Electric Heater)	
Outlet Water Temperature	°C	Default: 55°C, 35°C~70°C	
Power Supply	-	220V-240V ~50Hz	
Insulation Level	-	I	I
Protection of Ingression	-	I PX4	I PX4
Refrigerant	Name		R134a
	Charge	kg	0.8
Outline Dimensions	W×D×H	mm	591×591×1685
Package Dimensions	W×D×H	mm	703×703×1765
Gross/Net Weight	kg	88.0/73.5	95.5/79.0
Sound Power Level ^(***)	dB(A)	61	61
Operating Range	°C	0~45	0~45

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, as per EN 12102-2008, (EU) No 814-2013.
- ④ Under Rapid function, electric heater helps to heating water.
- ⑤ Please always see the nameplate for the exact data as this table is subject to change.

Model			GRS-1.5/TD150ANbA-K	GRS-1.5/TD200ANbA-K
Rated Heating Capacity ^(*)	W		1500	1500
Rated Input Power ^(*)	W		429	429
COP ^(*)	W/W		3.50	3.50
Capacity	L		150	190
Load Profile	-		L	L
COP _{DHW} ^(**)	W/W		2.47	2.24
Energy Efficiency Class ^(**)	-		A	A
Water Heating Energy Efficiency ^(**)	-		104%	95%
Annual electricity consumption (average climate conditions)	kWh		985	1075
Maximum Input Power	W		650+1500W (Electric Heater)	
Outlet Water Temperature	°C		Default: 55°C, 35°C~70°C	
Power Supply	-		220V-240V ~ 50Hz	
Insulation Level	-		I	I
Protection of Ingression	-		I PX4	I PX4
Refrigerant	Name		R134a	R134a
	Charge	kg	0.8	0.8
Outline Dimensions	WxDxH	mm	621×561×1760	621×561×2030
Package Dimensions	WxDxH	mm	731×717×1845	731×717×2110
Gross/Net Weight	kg		112.0/92.0	122.5/102.5
Sound Power Level ^(***)	dB(A)		62	62
Operating Range	°C		0~45	0~45

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, as per EN 12102-2008, (EU) No 814-2013.
- ④ Under Rapid function, electric heater helps to heating water.
- ⑤ Please always see the nameplate for the exact data as this table is subject to change.

4.2 Work Temperature Range

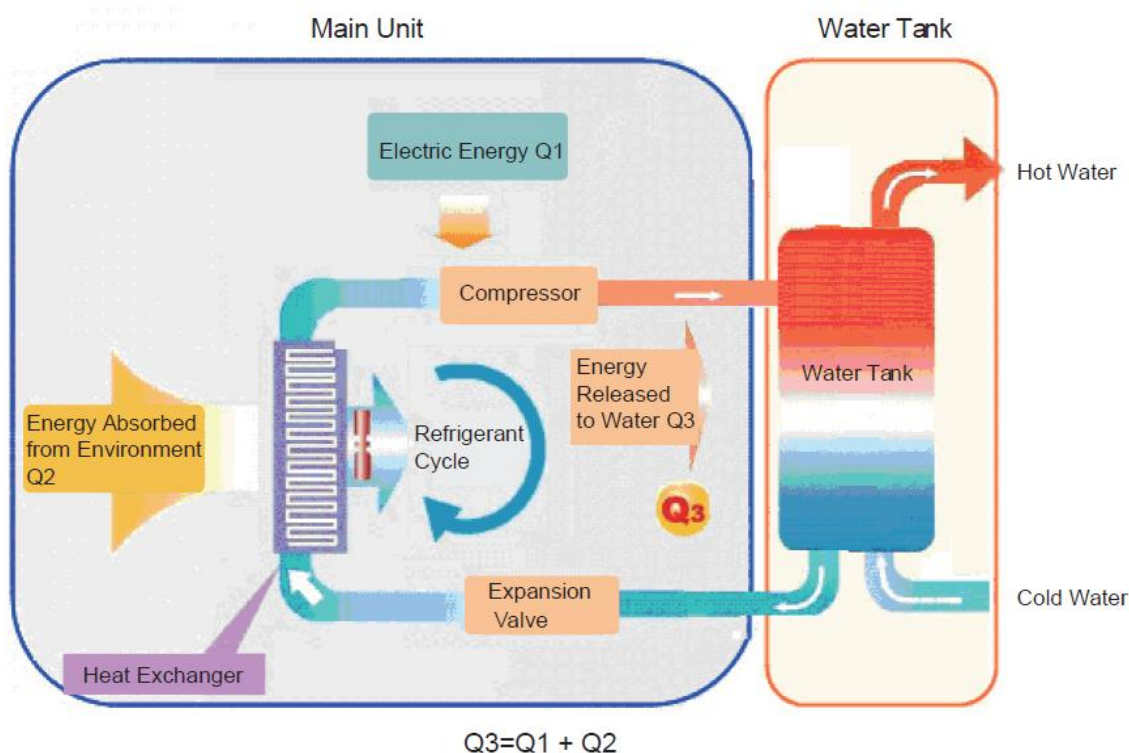
	Models		
	GRS-2.4/D270ANbA-K	GRS-1.5/D150ANbA-K GRS-1.5/D200ANbA-K	GRS-1.5/TD150ANbA-K GRS-1.5/TD200ANbA-K
Heating	-7~45°C	0~45°C	0~45°C
Note: The above value range indicates the outdoor ambient temperate range for normal operation of the unit. For details on the configurable range of water temperature, 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



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

Note:

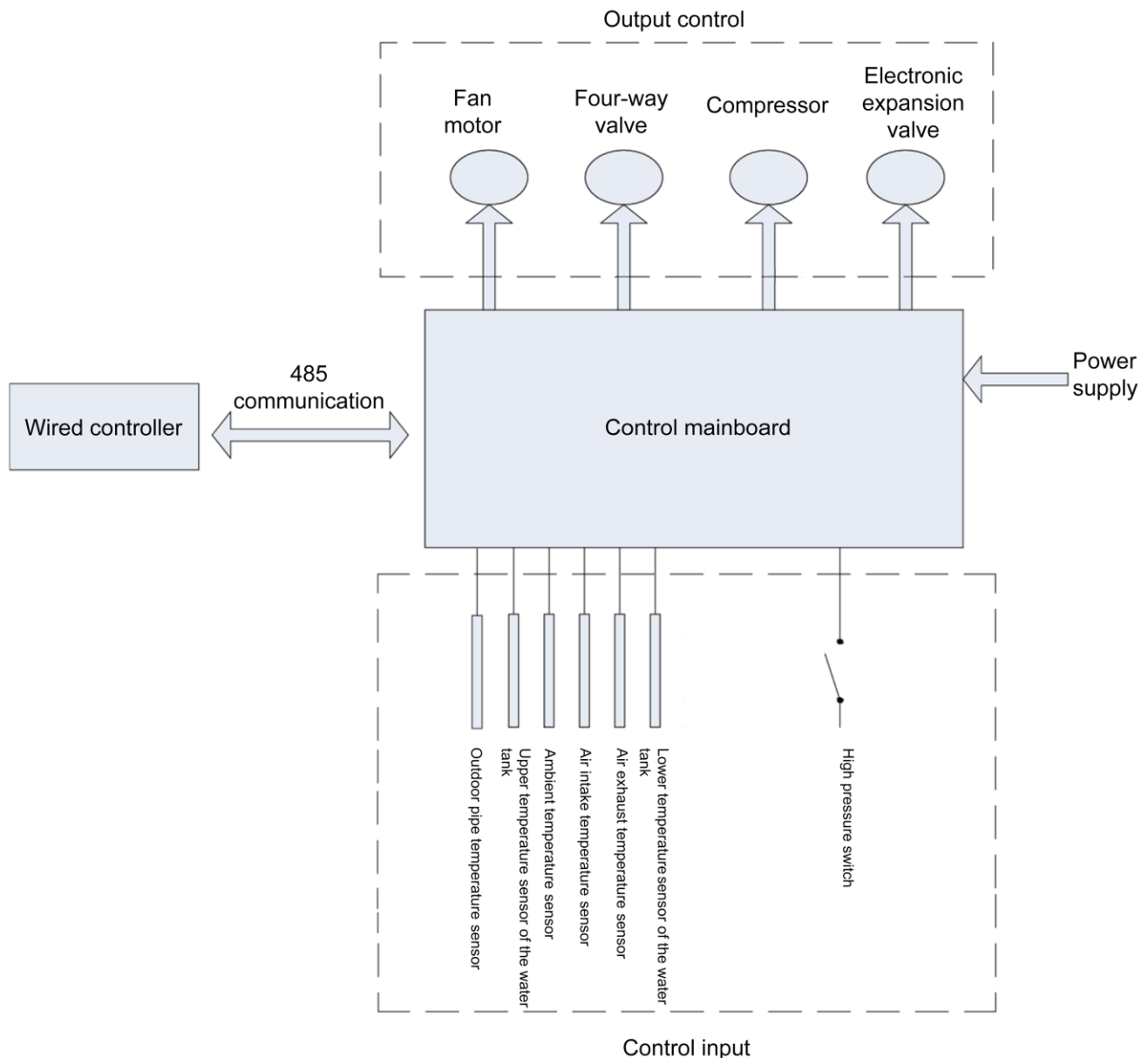
If any of the preceding accessories is required, contact with the local sales company.

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 (0°C of GRS-1.5/D150ANbA-K、GRS-1.5/D200ANbA-K、GRS-1.5/TD150ANbA-K、GRS-1.5/TD200ANbA-K) 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 freeze-proofing function

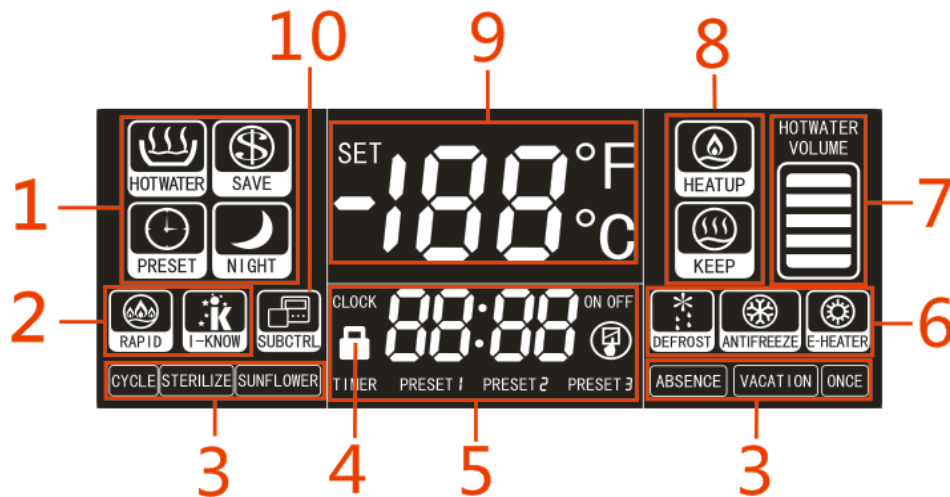
In the Off state, if water temperature in the water tank detected by the system based on the ambient temperature is too low, the unit starts the freeze-proofing function immediately.

2 Wired Controller

(1) Controller for GRS-2.4/D270ANbA-K:



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

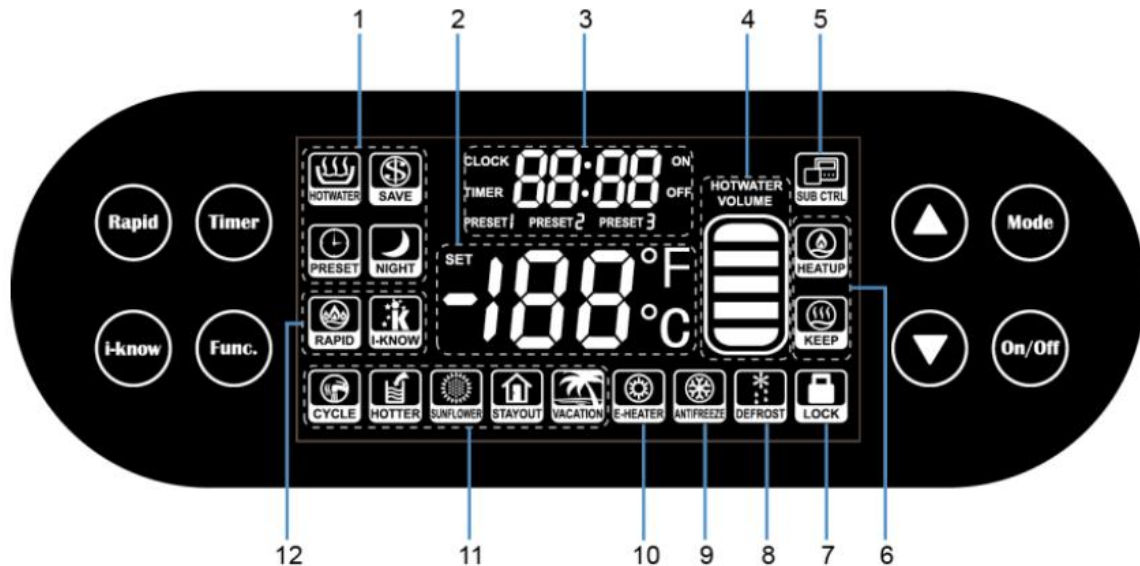


1	Display of Common Operation Modes: HOTWATER, SAVE, PRESET and NIGHT mode.	6	Display of defrost, antifreeze running, and e-heater running (or display of the Special E-HEATER Mode).
2	Display of RAPID and i-know function.	7	Display of hot water volume (this function is unavailable to models with single 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.)

(2) Controller for GRS-1.5/D150ANbA-K, GRS-1.5/D200ANbA-K, GRS-1.5/TD150ANbA-K, GRS-1.5/TD200ANbA-K:



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



1	Display of Common Operation Modes: HOTWATER, SAVE, PRESET and NIGHT mode.	7	Display of Keypad Lock function.
2	Display of actual water temperature, temperature setpoint, error codes, and running parameters.	8	Display of defrost running
3	Display of system time, preset time, timer setting and running parameters.	9	Display of antifreeze running
4	Display of hot water volume (this function is unavailable to models with single temperature sensor).	10	Display of e-heater running
5	Display of the sub-controller. (This function is reserved.)	11	Display of CYCLE, HOTTER, SUNFLOWER, STAYOUT and VACATION function (the HOTTER function may not work for models without an electrical heater).
6	Display of operating/standby.	12	Display of RAPID and i-know function.

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
03	Temperature of the upper temperature sensor of the water tank (detected by the mainboard)
04	Temperature of the outdoor ambient temperature sensor
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 lower temperature sensor of the water tank (detected by the mainboard)
17	Display of single or dual temperature sensor (01 indicates single temperature sensor and 02 indicates dual temperature sensor)

4 Operation Instructions

4.1 On/Off Setting

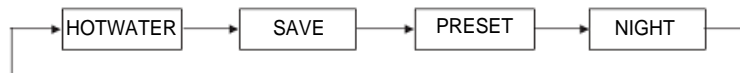
The unit will be started or stopped by pressing the “On/Off ” button.

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 70°C.

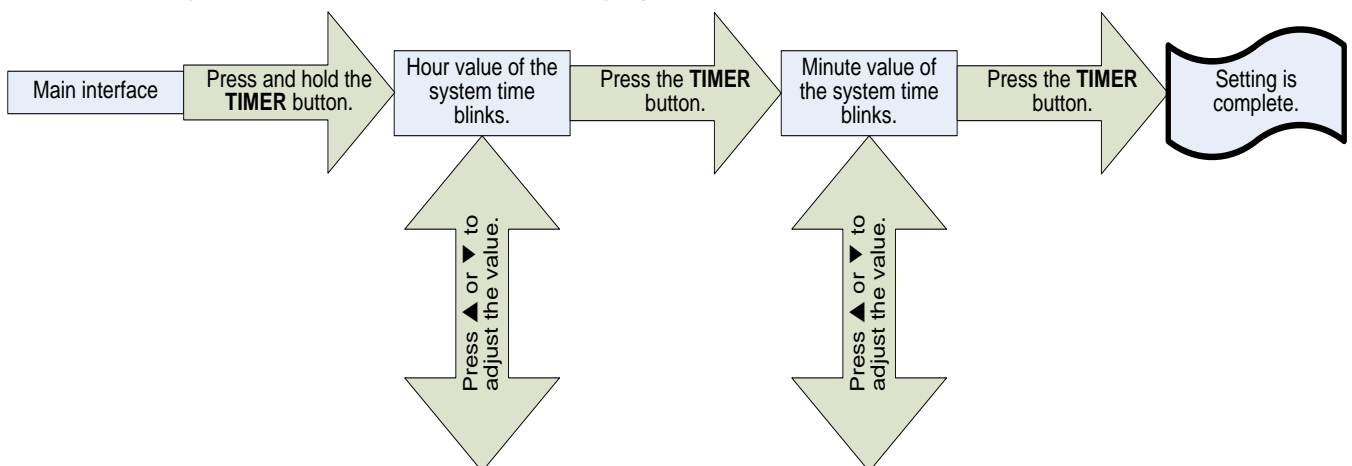
4.5 Time Setting

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 hour or 1 minute.

The setting process is shown in the following figure.

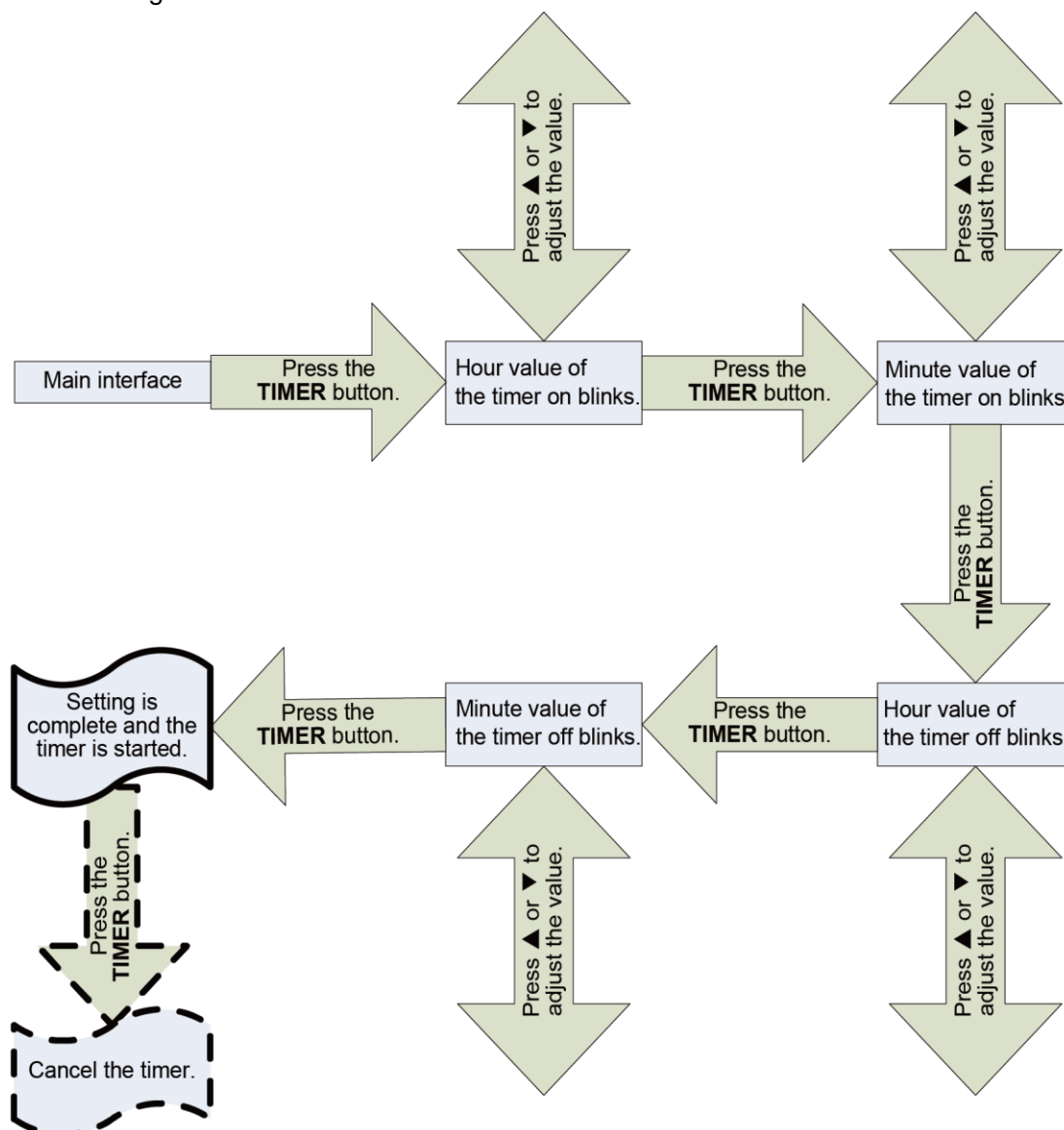


4.5.2 Timer Setting

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.

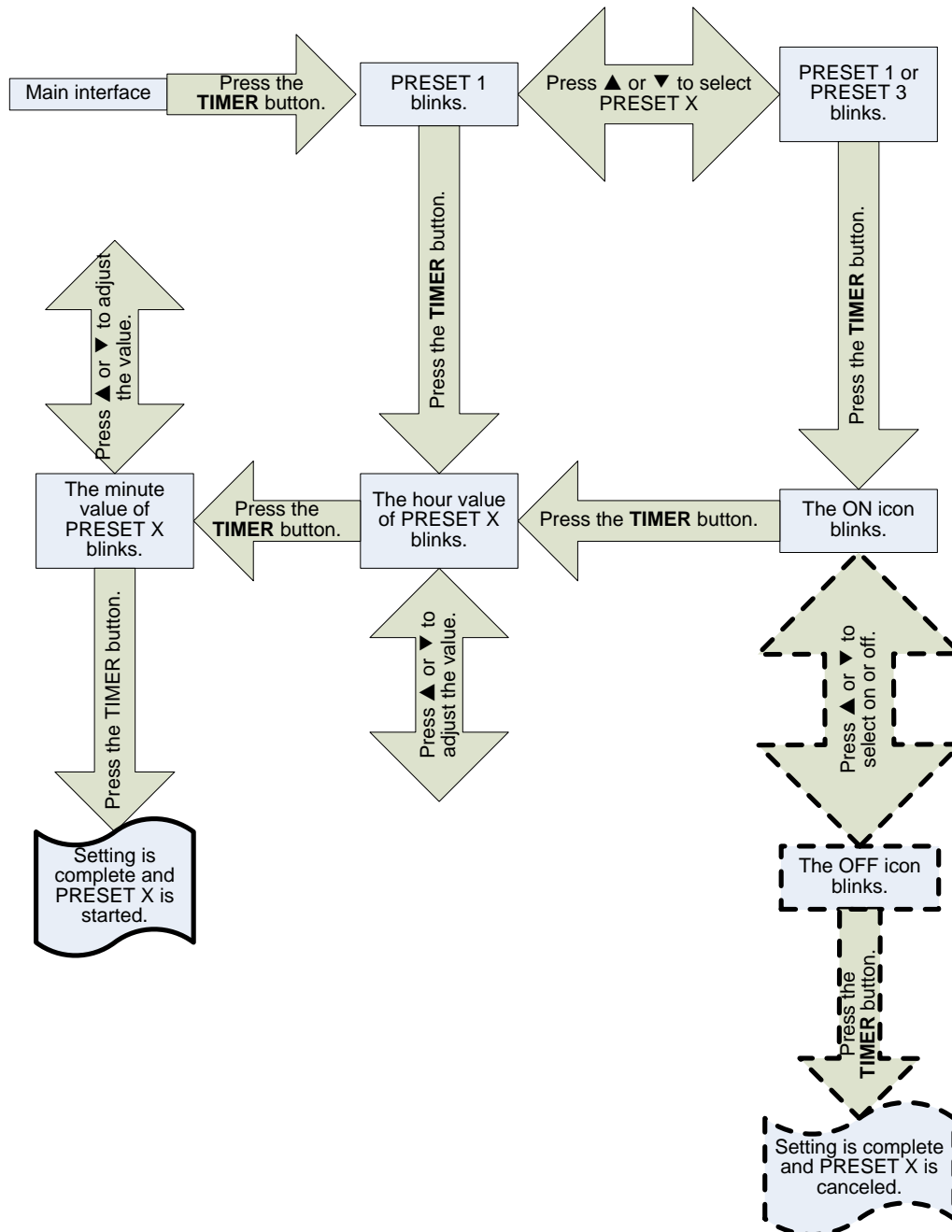
PRESET 2 or PRESET 3 setting: Press the **TIMER** button to select PRESET 2 and then the ON icon blinks. Press **▲ or ▼** to switch the ON and OFF icons. When the ON icon blinks, press the **TIMER** button. Then the PRESET 2 icon is on and the ON icon is off. The hour value blinks. Press **▲ or ▼** to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

In the on state, press the **FUNCTION** button to enter the interface for selecting among the 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.

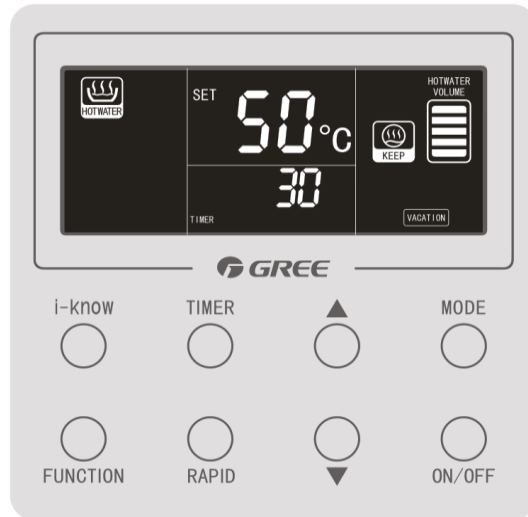


Notes:

- 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.

4.7 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 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.

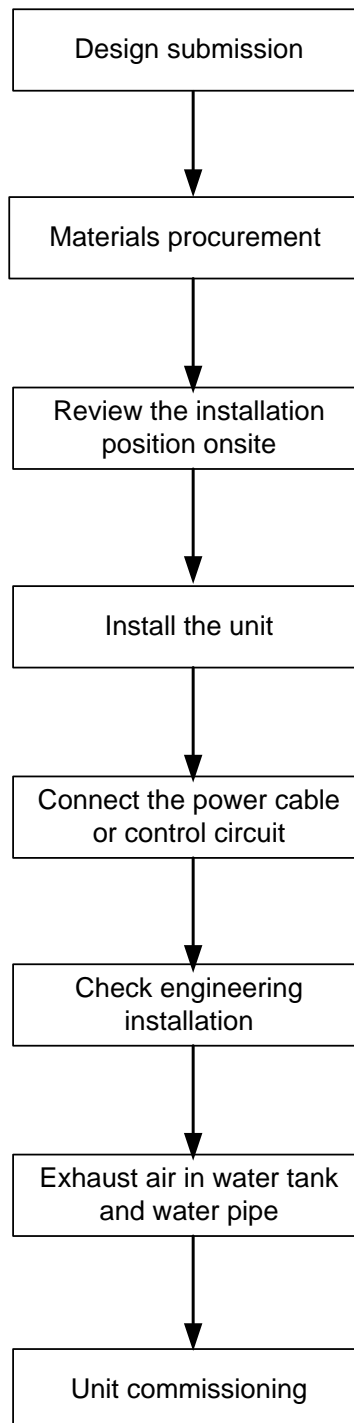


NOTES: Controller ZF5201 refer to the operational method ibidem.

INSTALLATION

INSTALLATION

1 Engineering Installation Flowchart



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.

No.	Installation Problem	Adverse Effect
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.

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 unit must be reserved and foundation must be prepared. The installation position for the 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 and hot water must be laid in advance. Interfaces for cool water, hot water, 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	The unit is provided with a condensate water drainage pipe.	
2	The unit installation position meets space requirements for heat exchange and maintenance.	
3	The specification, type, and control method of the power cable meet design requirements of the unit.	
4	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 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.

2.3.2.2 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.

2.3.2.3 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 5 of this chapter.

3 Installation of the Unit of Water Heater

3.1 Important hint

(1) The air source water heater must be installed by professional person according to national wiring regulation and this instruction manual.

(2) Although the heat pump can operate when the ambient temperature is above -7°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.

3.2 Basic requirement for the installation position

If the product is installed at below places, it may cause malfunction for the air source water heater. If it's unavoidable, please contact local 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.

3.3 Selection for installation positions

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

3.4 Installation space requirement and installation drawing

3.4.1 Main size

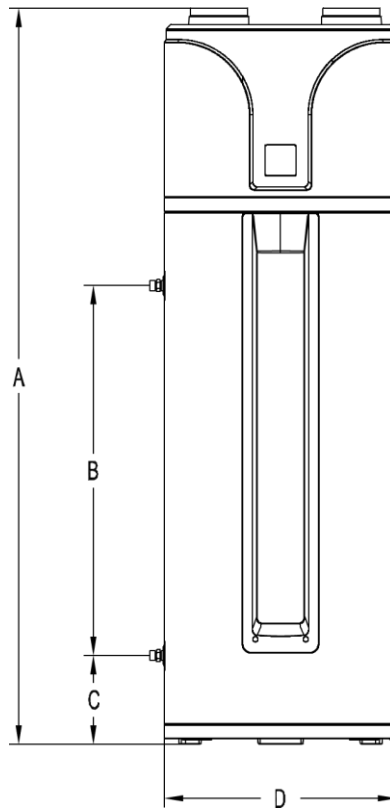


Figure 3-1 Sketch map for main size of GRS-2.4/D270ANbA-K

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

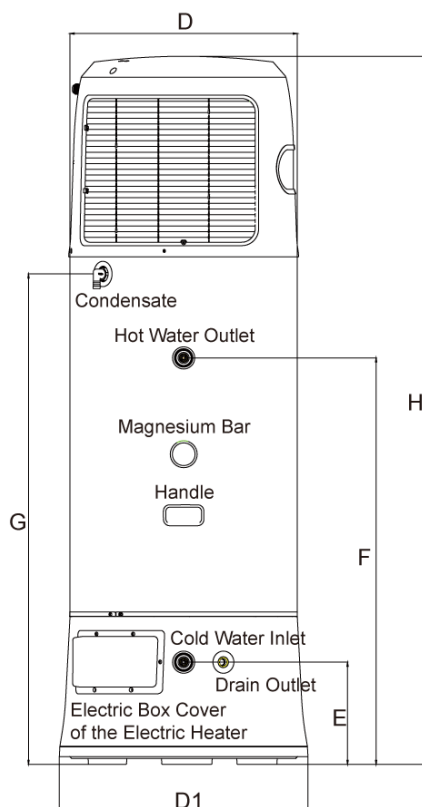


Figure 3-2 Sketch map for main size of GRS-1.5/D150ANbA-K, GRS-1.5/D200ANbA-K

Model Parameter	GRS-1.5/D150ANbA-K	GRS-1.5/D200ANbA-K
D(mm)	Φ540	Φ540
D1(mm)	Φ591	Φ591
H(mm)	1685	1935
G(mm)	1167	1417
E(mm)	243	243
F(mm)	967	1217

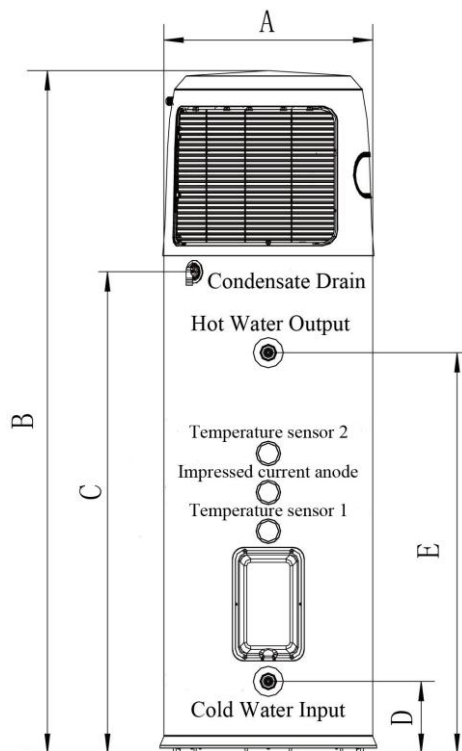


Figure 3-3 Sketch map for main size of GRS-1.5/TD150ANbA-K, GRS-1.5/TD200ANbA-K

Model Parameter	GRS-1.5/TD150ANbA-K	GRS-1.5/TD200ANbA-K
A(mm)	Φ540	Φ540
B(mm)	1760	2030
C(mm)	1206	1476
D(mm)	186	186
E(mm)	1032	1302

3.4.2 Installation requirement

- (1) Do not point the air outlet of water heater at the upwind direction.
- (2) The water heater should be installed at the places where the ambient temperature is above 0℃; 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.

3.5 Water pipe connection

(1) Pipeline preparation

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

(2) Installation of water inlet pipe and water outlet pipe of water tank

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

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

The safety vale (“→” indicates the direction to the water tank) supplied with the unit shall be connected to the inlet of the water tank via a stub of PPR as Fig 4-5 is shown. The other end of the safety valve is connected with running water pipe. To ensure usage safety, sequence in Fig 6-1 shall be strictly obeyed.

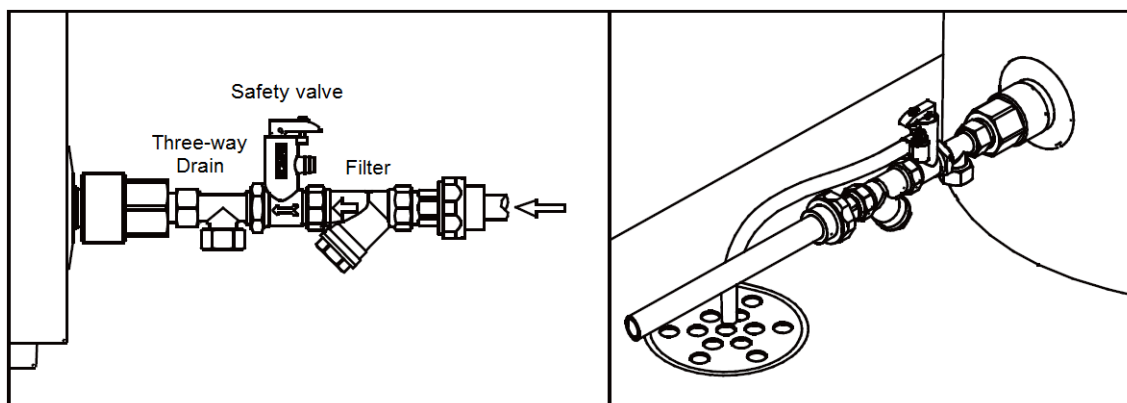
Cut off valve or check valve (one-way valve) shall not be installed between safety valve and the water tank, otherwise, safety valve shall not work normally, water tank error might occur.

During heating operation process, safety valve dripping water is a normal phenomenon of pressure relief. Under standby status, if the safety valve keeps dripping water, please check if water pressure is too high (not over 0.7MPa). If water pressure is higher than 0.7MPa, install stabilizing valve correctly according to “(6) Stabilizing valve installation” ; if water pressure is below 0.7MPa, please check and replace safety valve.

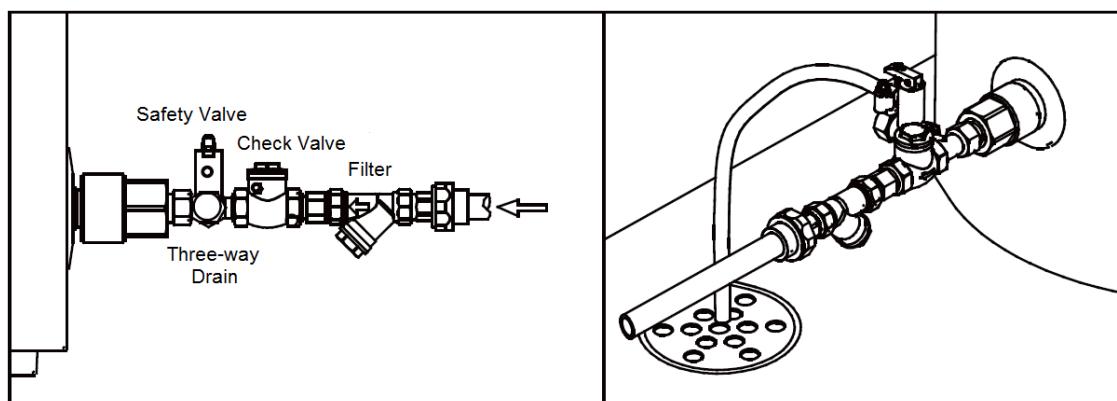
Safety valve must install diversion tube and be reliably fixed to prevent falling off; lead the drainage hose to floor drain downward naturally and properly without bending or any twine. After that, the surplus hose must be cut to avoid water in drainage hose getting frozen due to blocking of drainage or low temperature.

To avoid any inconveniences or property losses due to water leakage or safety valve discharging

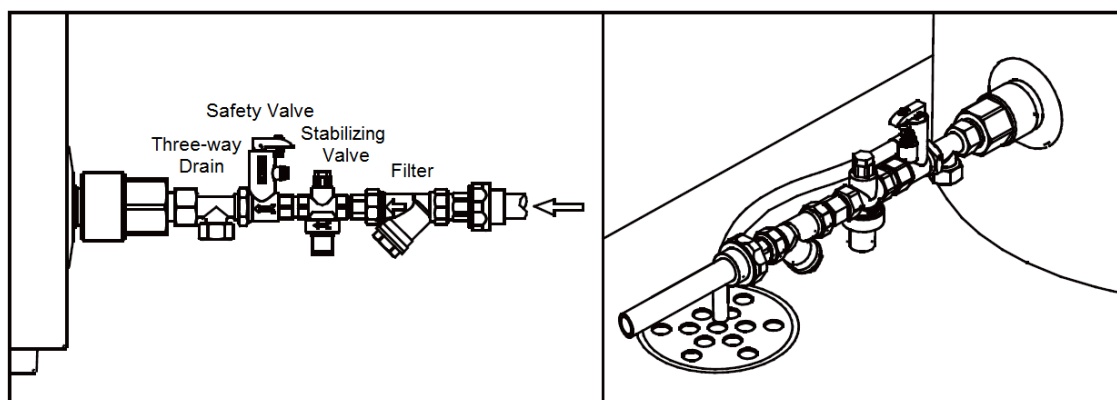
water which is resulted from improper connection of water pipe, water tank and safety valve shall not be installed inside the room or balcony which is without discharge floor drain.



(a) Installation method 1



(b) Installation method 2



(c) Installation method 3

Figure 3-4 Safety valve installation diagram of water inlet pipe in water tank

Material code	Name	Specification	pressure	Quantity
07382801	Safety valve	G1/2	0.7Mpa	1

(5) Installation of Antifreezing tracing belt

If the water tank shall inevitably be installed in places with temperature below 0°C, to avoid the pipeline getting frozen due to bad insulation of water system pipeline, antifreezing tracing belt for pipeline shall be installed in water inlet pipe of water tank, our pipeline antifreezing tracing belt and its accessories

is recommended, detailed list is as follows:

Material code	Name	Quantity
76612816	Selflimiting temperature tracing belt	1
01802894	frame	1
8600800101	aluminum-foil paper	1
64132820	Pipeline antifreezing tracing belt installation statement sheet	1

(6) Installation of Stabilizing valve

Before connecting water pipe, measure water supply pressure of running water first, if water pressure is over 0.7MPa, add stabilizing valve in waterway, otherwise, pressure relief on safety valve might occur when the unit is not heated. Stabilizing valve ("→" direction shall accord with the water tank direction) shall be installed between safety valve and filter.



Notices !

① To ensure water safety, the PPR pipe length at the water inlet and outlet is determined as per the formula: $L \geq 70 \times R^2$, wherein L indicate the pipe length, and R indicates the inner diameter of the pipe (unit: cm). The pipe should be insulated properly. No metal pipe is allowed.

② To ensure safety and reliability, special accessory equipped with this unit must be adopted (PPR water pipe joint, safety valve and filter etc.). Don't use the accessory of any third party and replace the accessory by yourself, any losses thereof for normal operation and usage of heat pump water heater result from personal injury and improper installation, Gree shall not be liable.

3.6 Installation sketch map

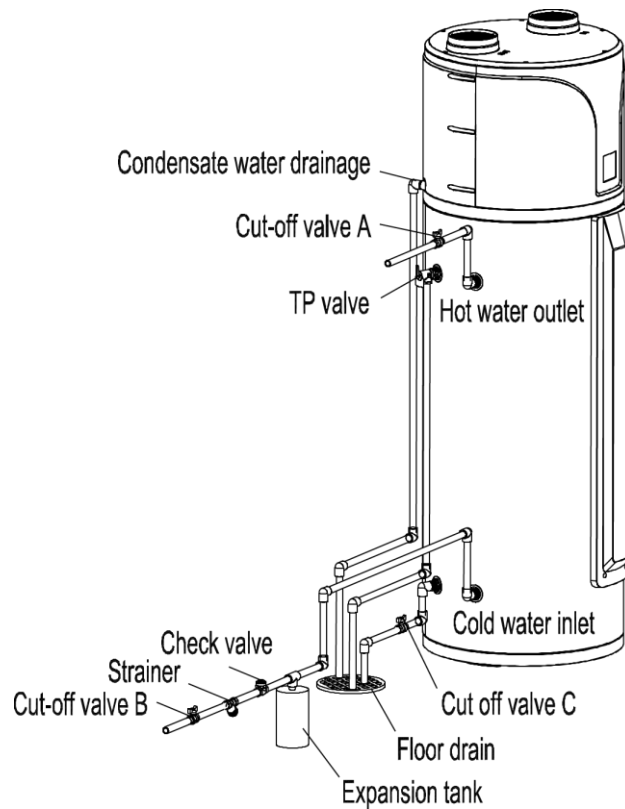


Figure 3-5 Installation sketch map of GRS-2.4/D270ANbA-K

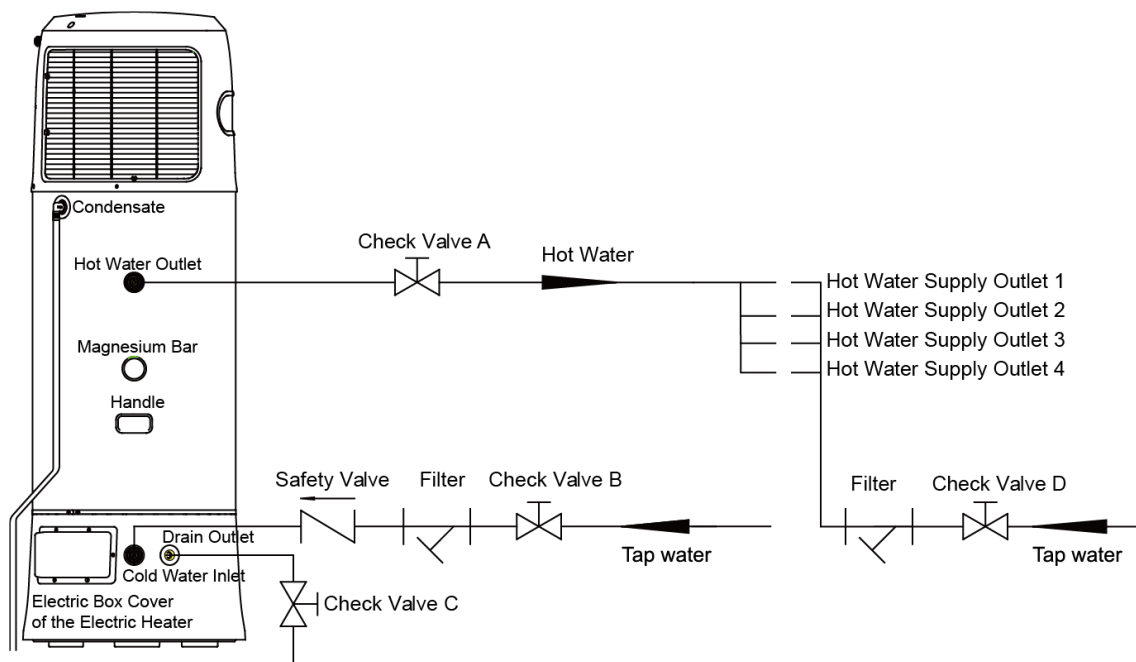


Figure 3-6 Installation sketch map of GRS-1.5/D150ANbA-K; GRS-1.5/D200ANbA-K

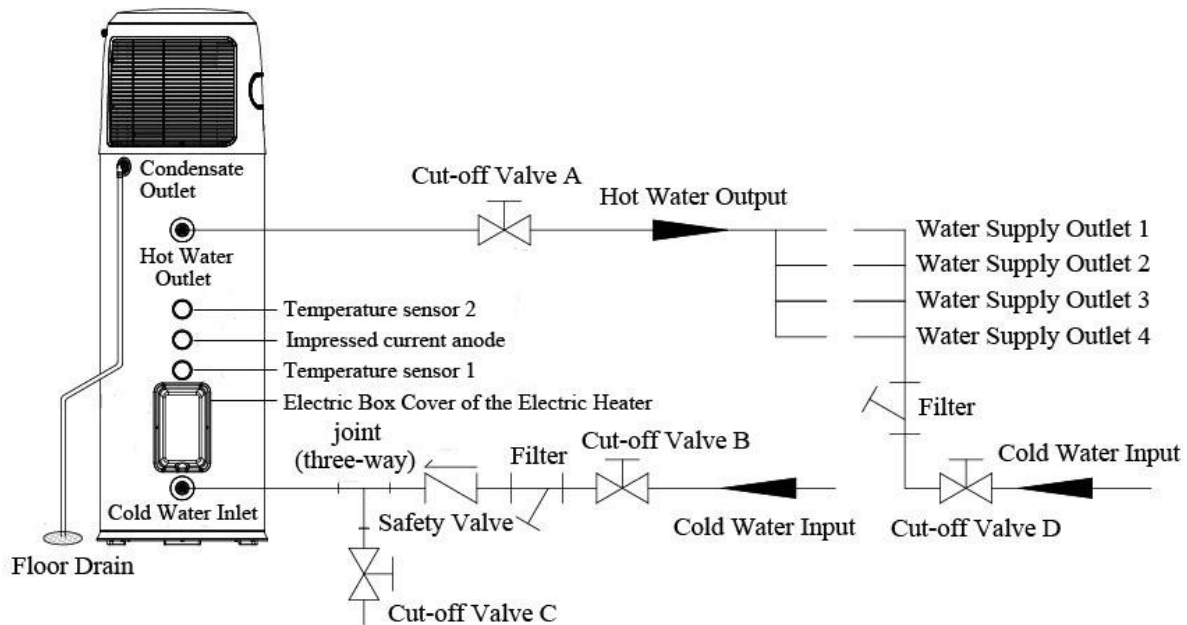
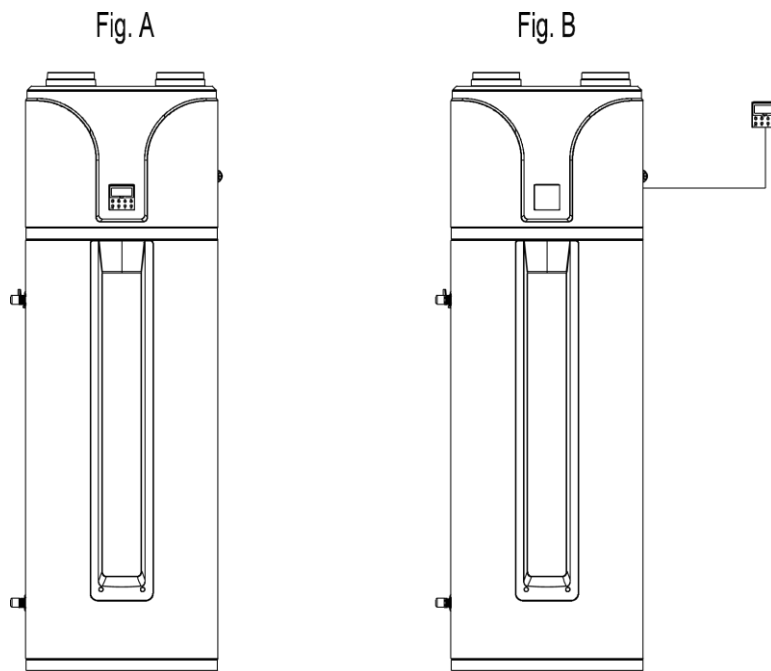


Figure 3-7 Installation sketch map of GRS-1.5/TD150ANbA-K; GRS-1.5/TD200ANbA-K

3.7 Installation Instruction of Wired Controller (*GRS-2.4/D270ANbA-K)



(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;

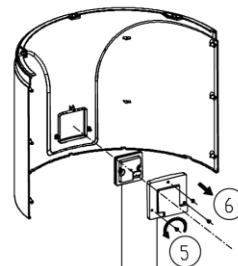
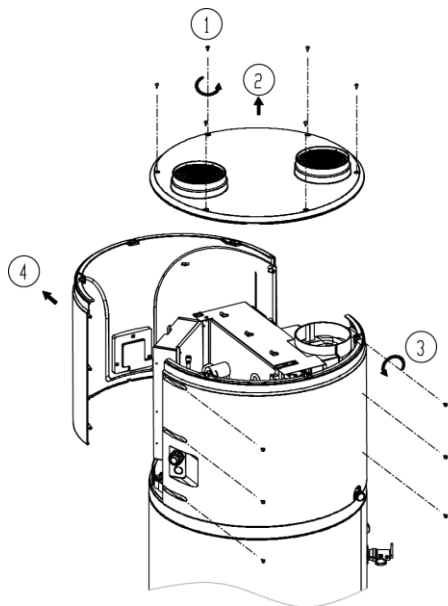
Instructions for installing the wired controller on the wall:

- 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;



Remove the gland and keep it properly for future use

Connect the wired controller with long communication cable and then install the wired controller on the wall

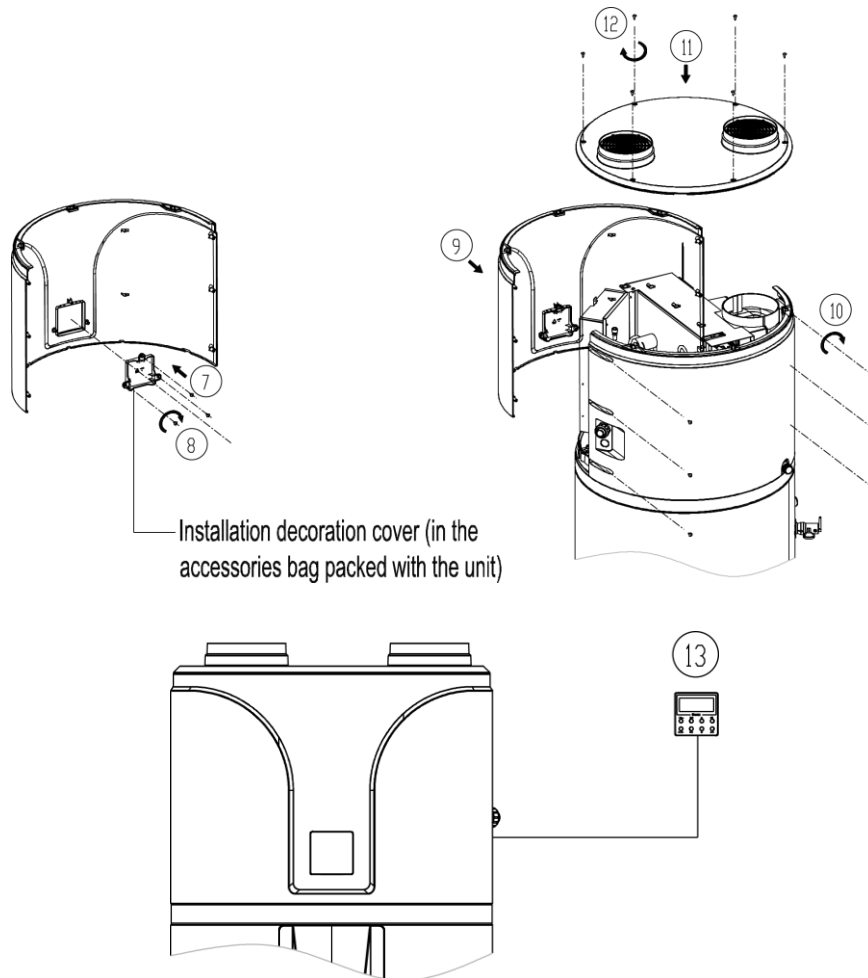
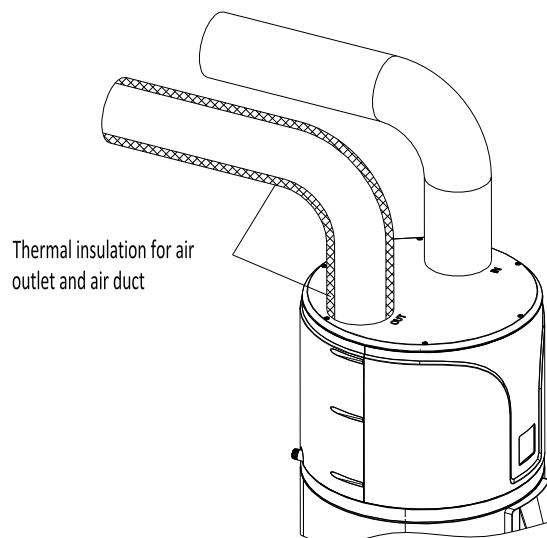


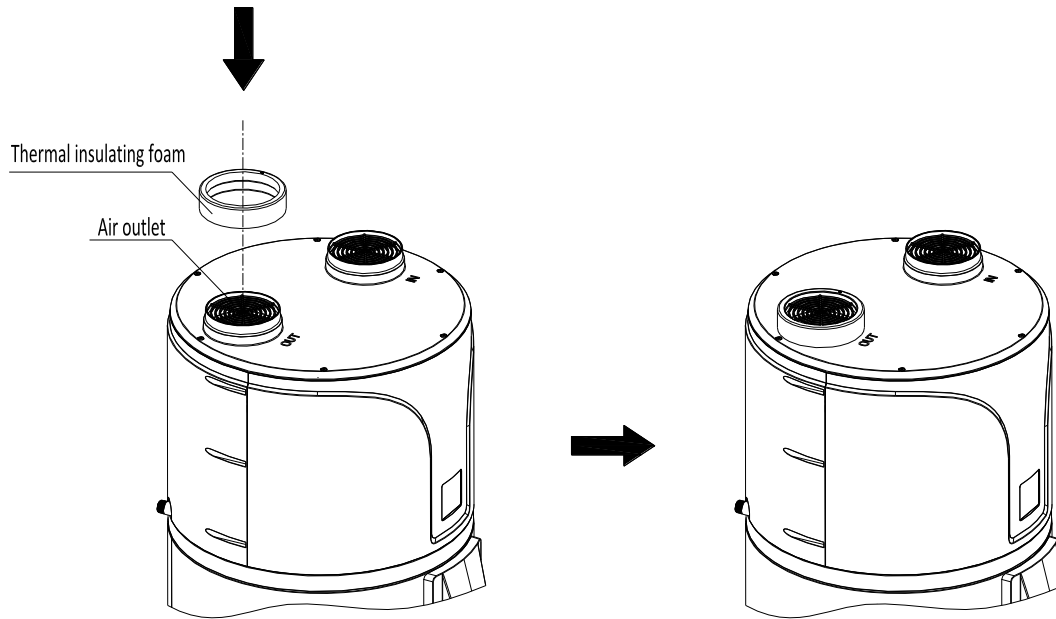
Figure 3-8 Sketch map for Installation Instruction of Wired Controller

3.8 Thermal insulation for air outlet to prevent condensate water (*GRS-2.4/D270ANbA-K)

(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



4 Pipe Insulation

4.1 Thermal Insulation Measures for Water Pipes

4.1.1 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.

4.1.2 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.

5 Electric Installation

5.1 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 greater than the stipulated value. The diameter of the cables should be large enough. For

details, refer to Table 5-1. If the length of the power cable is greater than 15 meters, choose a power cable with a larger cross-sectional area to prevent problems caused overloading. Do not pull the power cable during the installation.

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

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

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

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

5.2 Installation of Power Cable

5.2.1 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 fixed it securely. During connection, pay attention to the live, neutral, and ground lines.

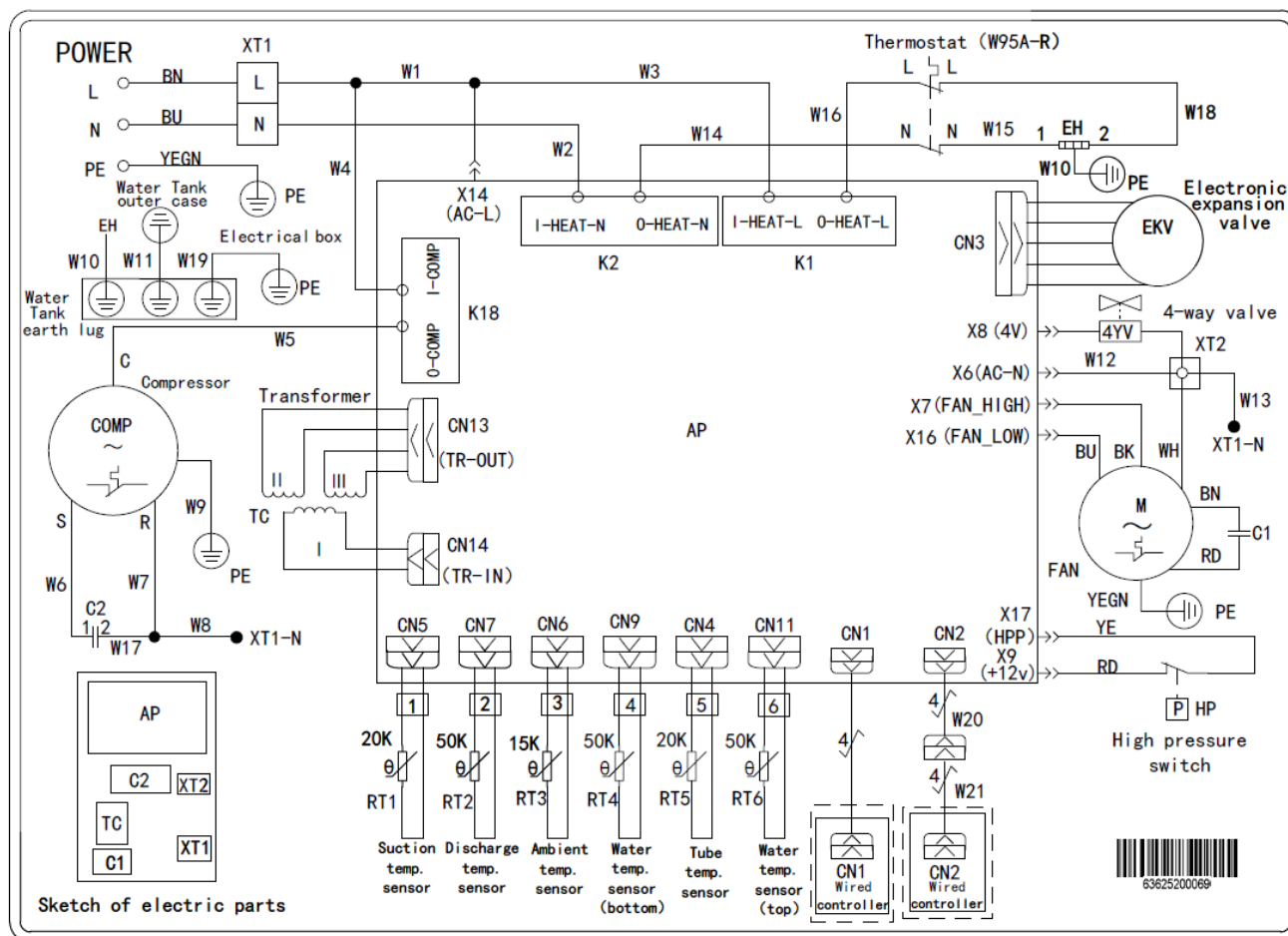
5.2.2 Selection of Power Cable Diameter and Air Circuit Breaker

Table 5-1

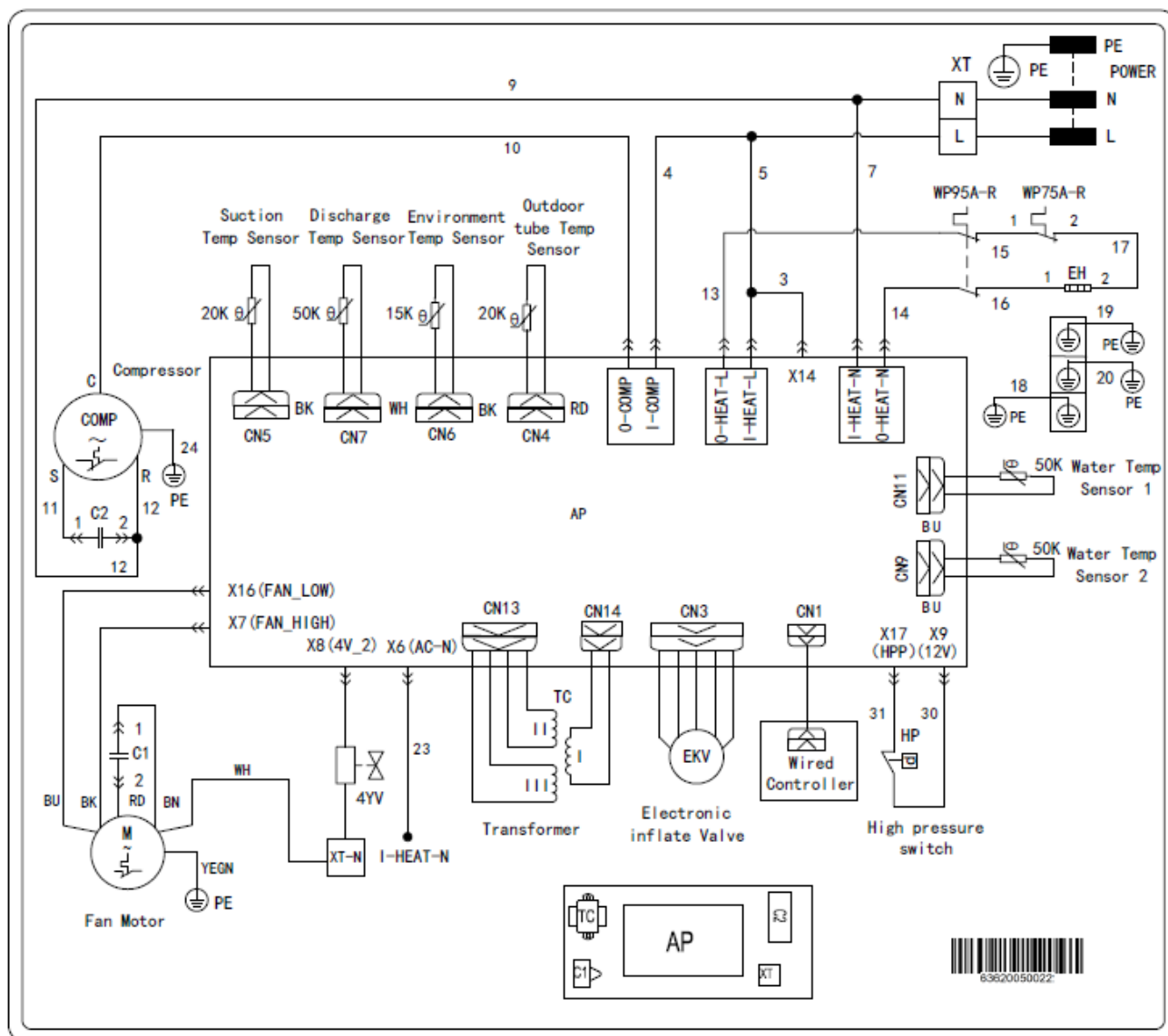
Model	Power Supply	Minimum Cross-sectional Area (mm ²)			Capacity of the Air Circuit Breaker
		Live Line	Neutral Line	Ground Line	
GRS-2.4/D270ANbA-K	220-240V~ 50Hz	1.5	1.5	1.5	16
GRS-1.5/D150ANbA-K		1.5	1.5	1.5	16
GRS-1.5/D200ANbA-K		1.5	1.5	1.5	16
GRS-1.5/TD150ANbA-K		1.5	1.5	1.5	16
GRS-1.5/TD200ANbA-K		1.5	1.5	1.5	16

5.3 Circuit Diagram

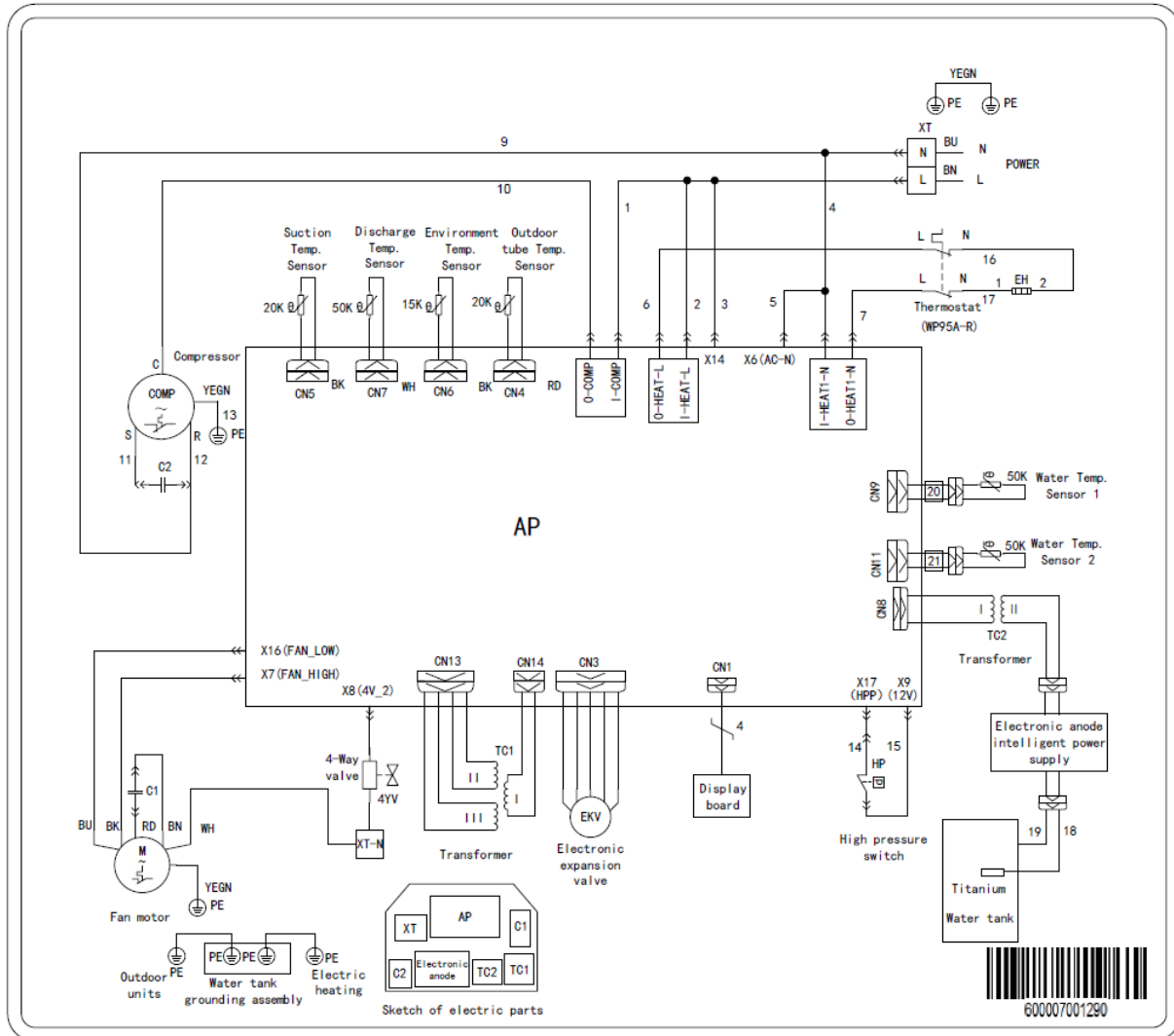
(1) The circuit diagram of GRS-2.4/D270ANbA-K unit is shown in the following figure:



(2) The circuit diagram of GRS-1.5/D150ANbA-K; GRS-1.5/D200ANbA-K unit is shown in the following figure:



(3) The circuit diagram of GRS-1.5/TD150ANbA-K; GRS-1.5/TD200ANbA-K unit is shown in the following figure:



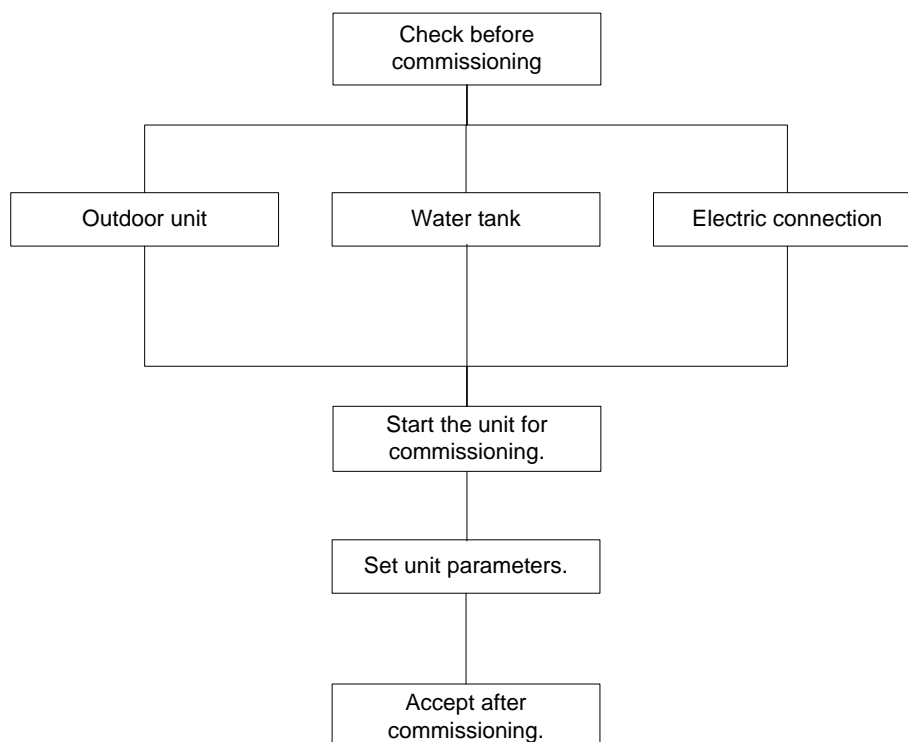
6 Check for Acceptance After Installation

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
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.	
	The foundation or support is solid and secure to ensure stable operation of the unit.	
	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.	
	The circuit breaker and leakage circuit breaker meet the unit's design requirement.	
	The position for installing the water tank must have sufficient load-bearing capacity.	
	The drain outlet for water tank is near the drainage ditch or drainage hole.	
	The safety check valve and drainage pipe are installed securely.	
	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).	
Water leaks in the hot water tap.		
Wired controller	The communication cable of the wired controller is 50 mm or more away from the strong electricity cable.	
	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 Unit

- (1) The 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.
- (5) The position for installing the water tank must have sufficient load-bearing capacity.
- (6) 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-2.4/D270ANbA-K	220-240V ~ 50Hz	1.5	1.5	1.5	16
GRS-1.5/D150ANbA-K		1.5	1.5	1.5	16
GRS-1.5/D200ANbA-K		1.5	1.5	1.5	16
GRS-1.5/TD150ANbA-K		1.5	1.5	1.5	16
GRS-1.5/TD200ANbA-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			
	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					

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.	
	Foundation of the outdoor unit is solid. Vibration reduction and water drainage meets the related requirement.	
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. 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).	
	Water leakage occurs to the hot water tap.	
Wired controller	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

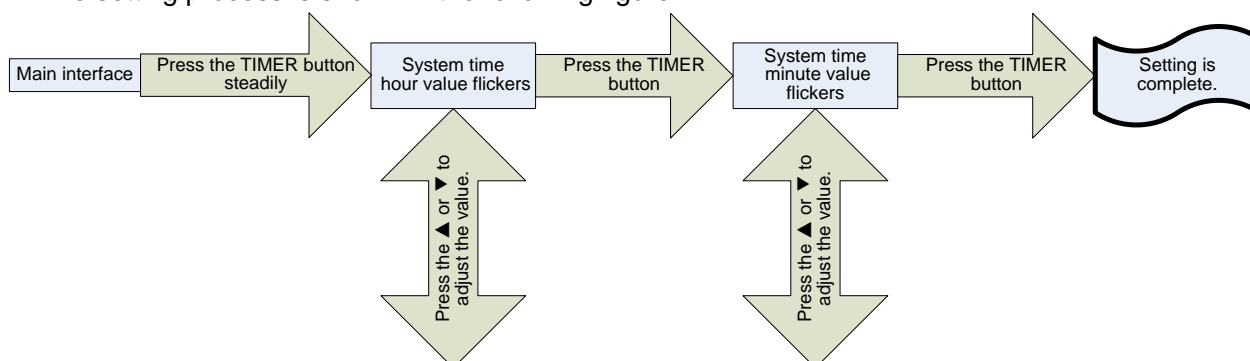
Project name:				Unit model:	
Commissioning performed by:				Water tank model:	
Rated capacity of the outdoor unit (kW)		Capacity of the water tank		Date	
Maximum drop between the outdoor unit and water tank (m)		Length of system pipe			
Commissioning status: <input type="checkbox"/> Heat up					
Status 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 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

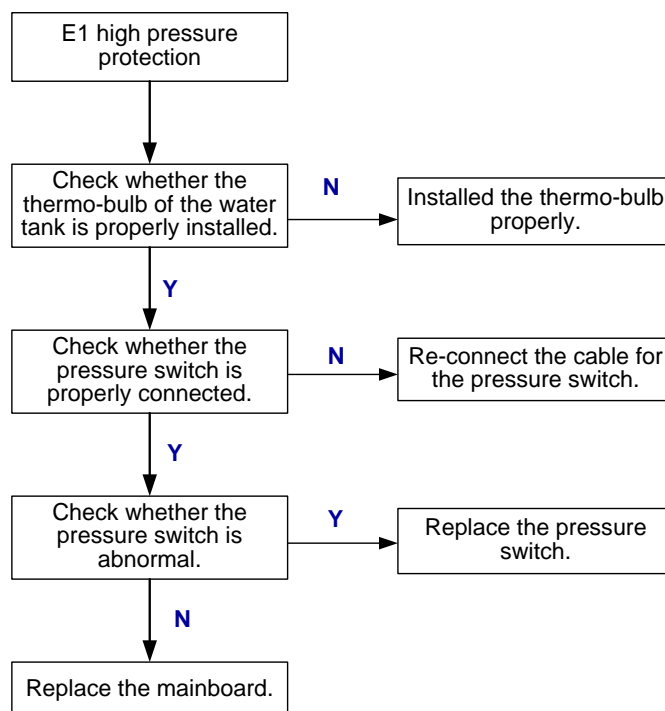
Fault code: 

Applicable mode: 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 E4 Air Exhaust Protection

Fault code:

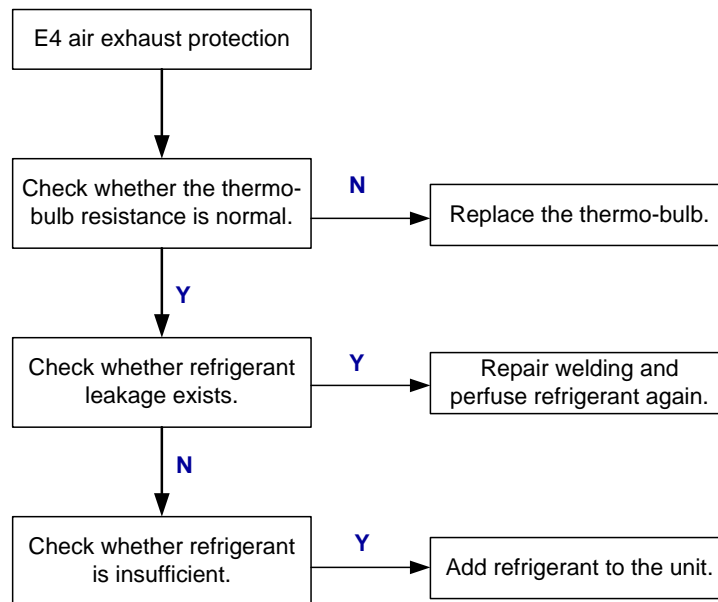


Applicable mode: HOTWATER; SAVE; PRESET; NIGHT

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:



2.3 E6 Communication Fault

Fault code:



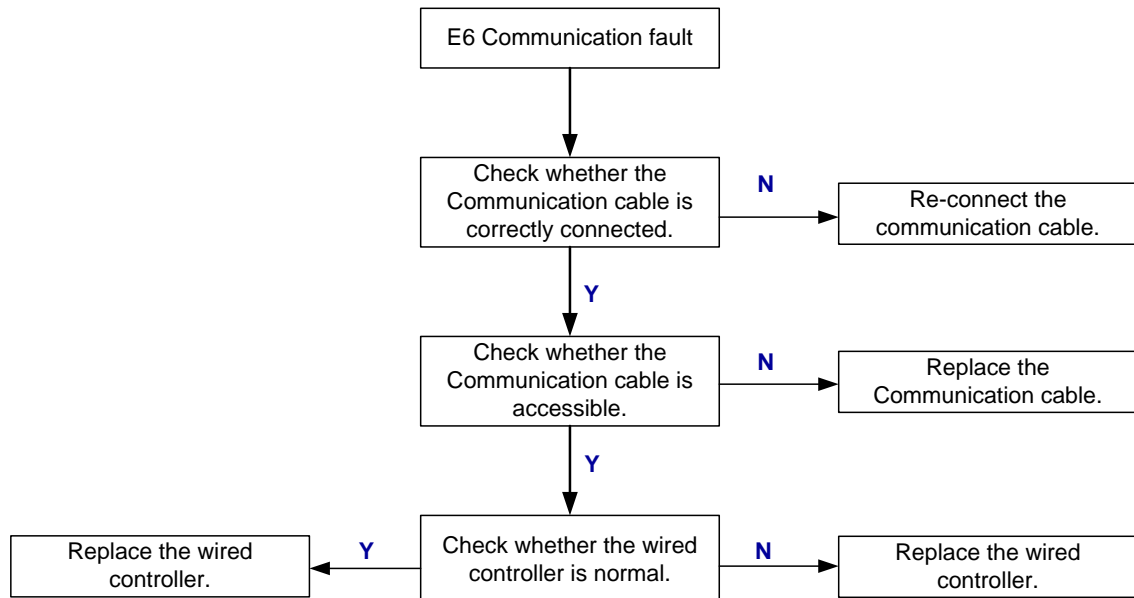
Applicable mode: all modes

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:



2.4 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,



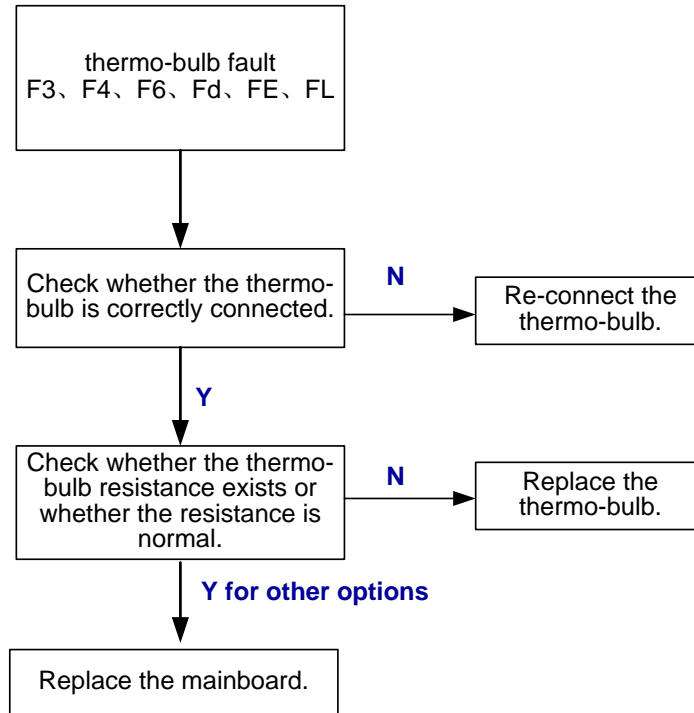
Applicable mode: all modes

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:

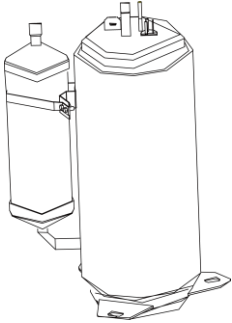
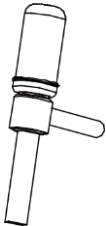
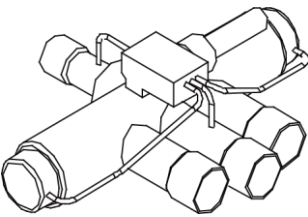
(1) Incorrect connection of temperature sensor; (2) Temperature sensor fault; (3) Mainboard fault

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.</p> <p>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>
	<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.</p> <p>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
1. Remove the power cable of the compressor.	<ul style="list-style-type: none"> • Unscrew the power cable using a screwdriver.
	<ul style="list-style-type: none"> • Remove the power cable.
	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.
2. Unscrew the compressor.	<ul style="list-style-type: none"> • Unscrew the compressor using a screwdriver. Remove the pad first if the compressor is equipped with a pad.
3. Remove the air intake and air exhaust pipes.	<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)
	Note: Surrounding materials must be protected against being burnt by high temperature during heat up.
4. Remove the compressor.	<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.
	Note: The compressor must be handled horizontally or vertically without inversion.
5. Place the repaired or new compressor on the supporting structure.	<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.
	Note: The compressor must be handled horizontally or vertically without inversion.
6. Install fixed bolts for the compressor.	<ul style="list-style-type: none"> • Screw on the fixed bolts at bottom corners of the compressor using the spanner.
7. Connect the air intake and air exhaust pipes.	<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.
	<ul style="list-style-type: none"> • Screw on the fixed bolts of the power cable using a screwdriver.
9. Vacuumize and keep pressure for the system to ensure tightness.	<ul style="list-style-type: none"> • Connect the pump to vacuumize the system, then keep pressure for the system to ensure leak or not.
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.
	<ul style="list-style-type: none"> • Perfuse refrigerant to the system.
	Note: Refrigerant must be perfused based on the unit standard as the refrigerant volume has great effect on cooling performance of the unit.
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

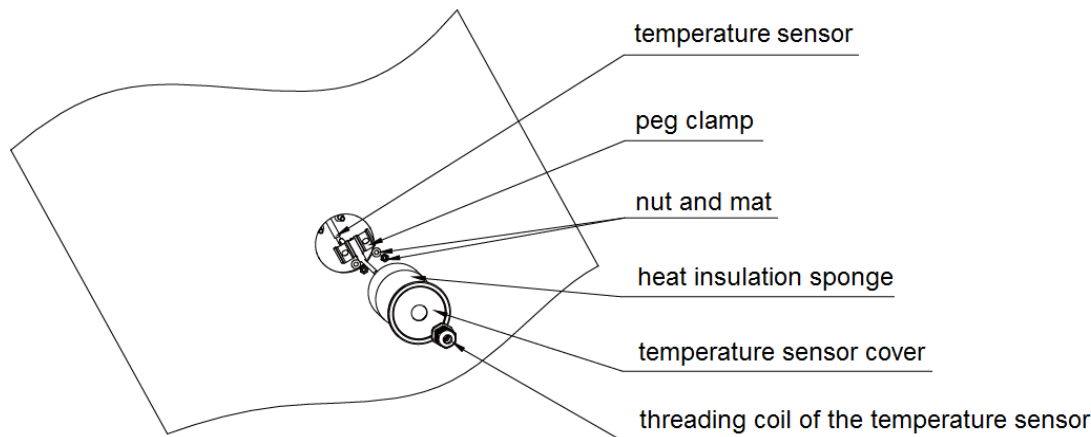
Disassembly of Four-Way Valve	
Procedure	Description
1. Disconnect the four-way valve by welding.	<ul style="list-style-type: none"> Record direction of the four-way valve before disconnecting it as the direction for two systems of a dual-system unit may differ.
	<ul style="list-style-type: none"> Remove 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: $0.5 \pm 0.1 \text{ kgf/cm}^2$ (relative pressure)
	<ul style="list-style-type: none"> 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

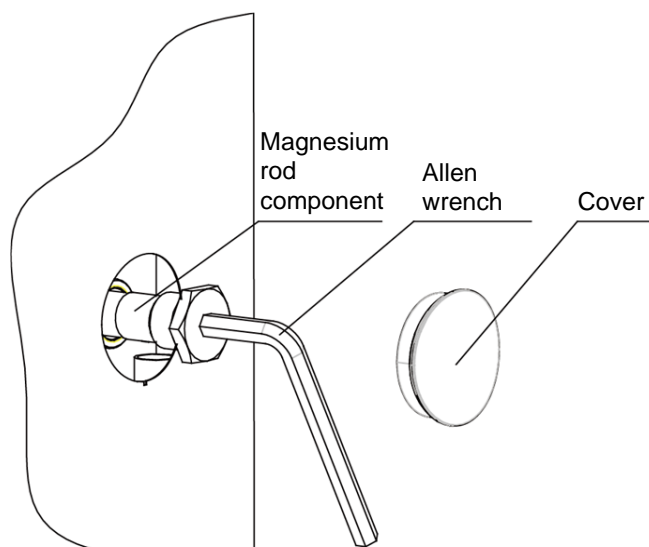
- (1) Procedure for replacing the water tank temperature sensor
 - 1) Screw off threading coil of the temperature sensor.
 - 2) Remove the temperature sensor cover.
 - 3) Take out the heat insulation sponge of the temperature sensor.
 - 4) Remove the nut and mat on the peg clamp of the temperature sensor.
 - 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:

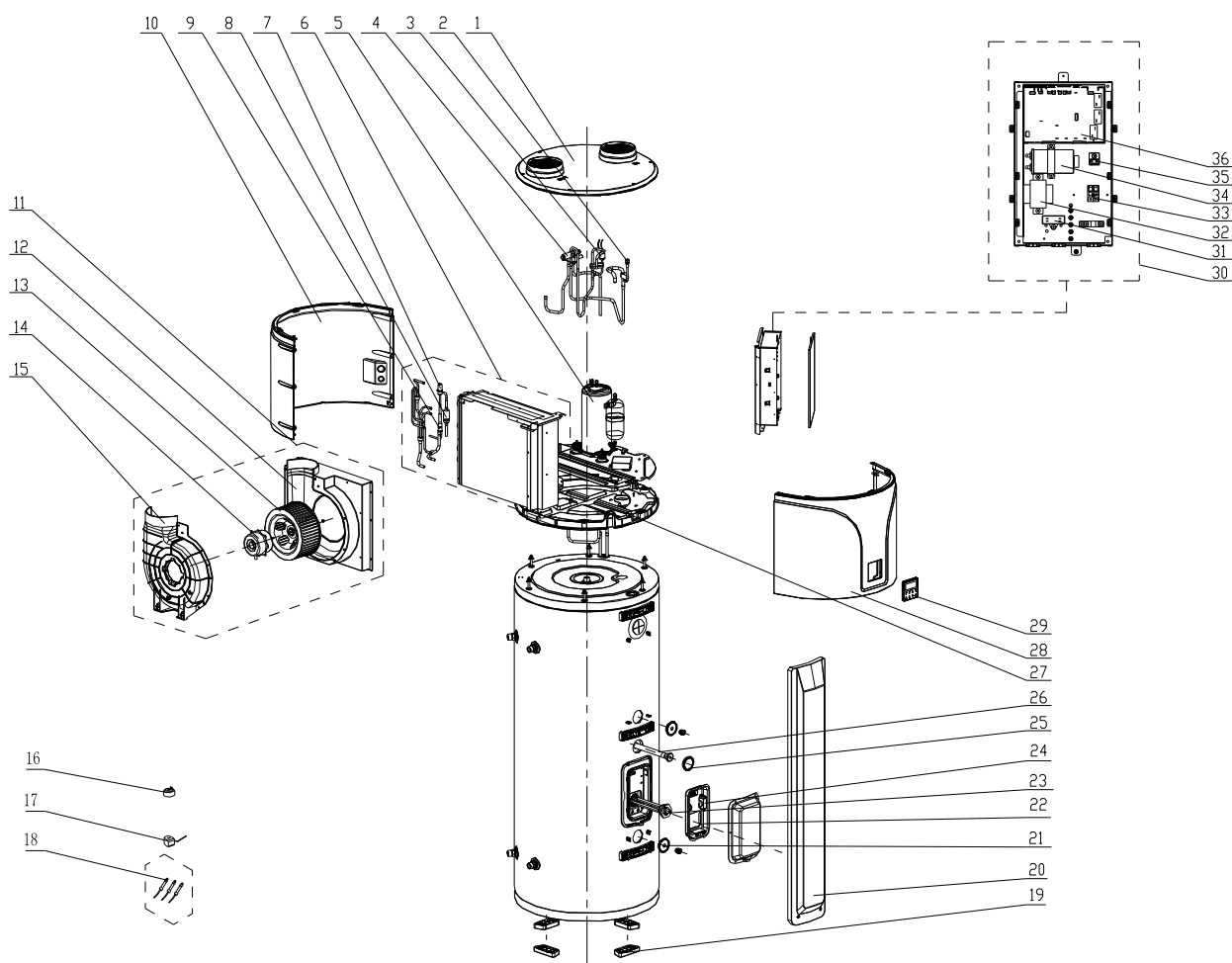
- 1) Discharge all water in the water tank.
- 2) Open the upper cover and insulation sponge above the Mg-stick.
- 3) Unscrew the Mg-stick using an Allen key and take it out carefully to prevent Mg-stick slags from dropping into the water tank.
- 4) Install the new Mg-stick and screw it with an Allen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

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

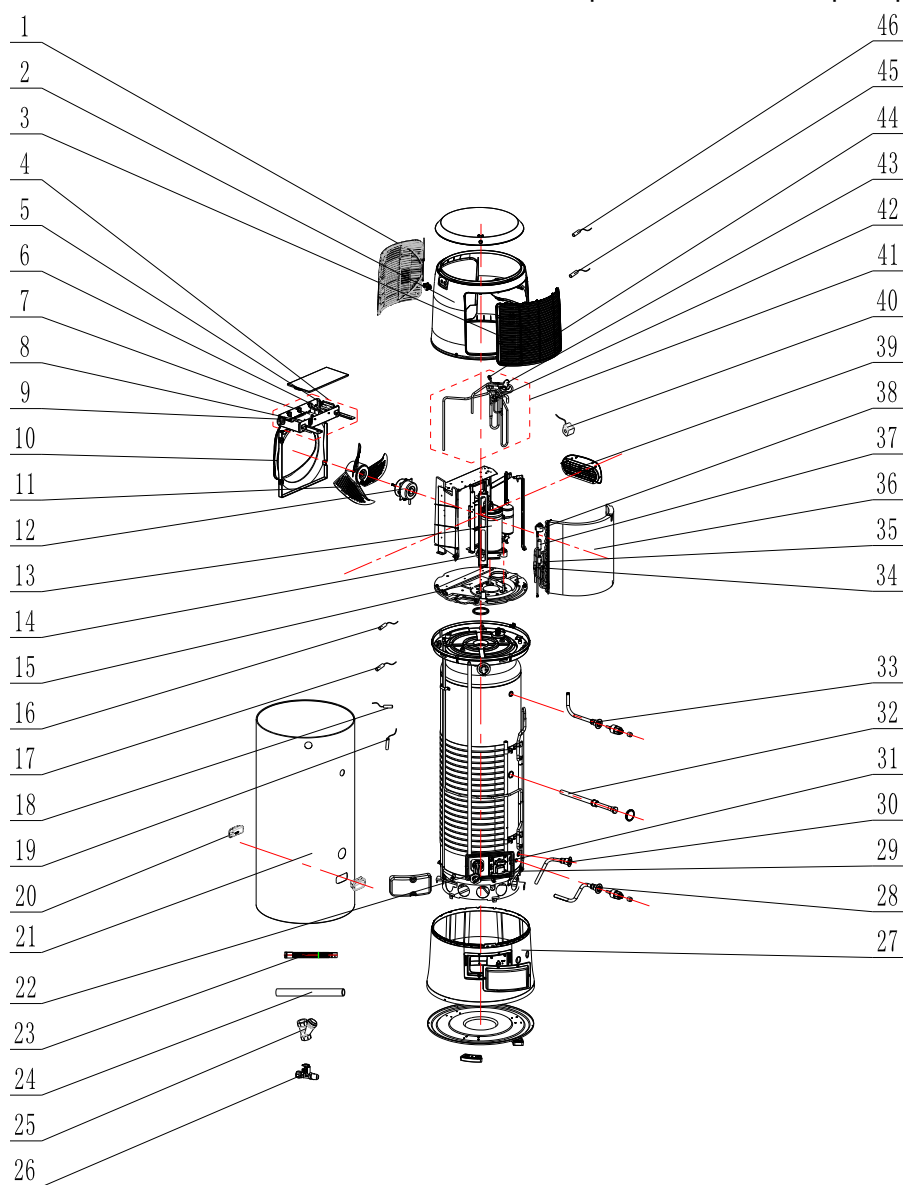


NO.	Name of Part	GRS-2.4/D270ANbA-K	
		Product Code	ER02100050
		Part Code	Quantity
1	Top Cover	26909400058	1
2	Nozzle for Adding Freon	06120011	1
3	Pressure Protect Switch	46020015101	1
4	Four-Way Valve	430004022	1
5	Compressor and Fittings	00202818	1
6	Condenser Assembly	01122800085	1
7	Electronic 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

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.

◆ Model: GRS-1.5/D150ANbA-K、GRS-1.5/D200ANbA-K Exploded Views and spare parts list:

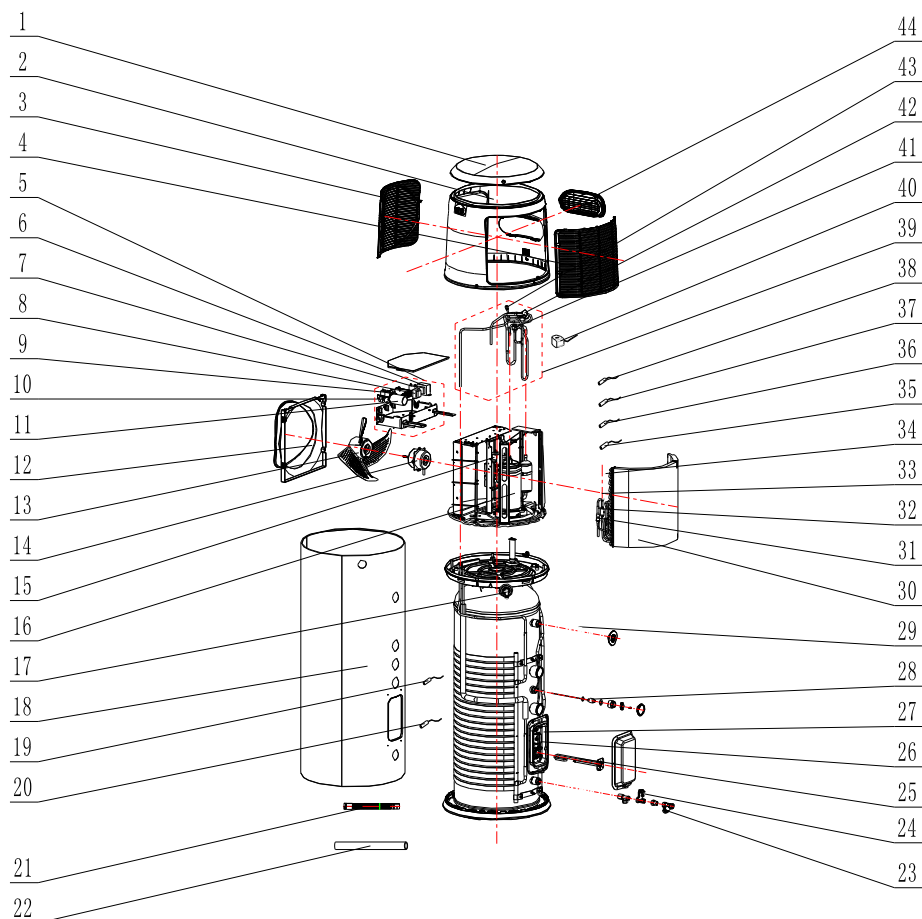


NO.	Name of Part	GRS-1.5/D150ANbA-K ⁽¹⁾ GRS-1.5/D200ANbA-K ⁽²⁾		
		Product Code	ER02100070 ⁽¹⁾	ER02100080 ⁽²⁾
		Part Code ⁽¹⁾	Part Code ⁽²⁾	Quantity
1	Front Grill	26902800031	26902800031	1
2	Cabinet	26902800025S	26902800025S	1
3	Front Grill	26902800030	26902800030	1
4	Electric Box Assy	01392800064	01392800064	1
5	Transformer	43118000001	43118000001	1
6	Capacitor CBB61	33010020	33010020	1
7	Main Board	30222000026	30222000026	1
8	Capacitor CBB65	33000081	33000081	1
9	Terminal Board	42011103	42011103	1
10	Air deflector ring	26902800024	26902800024	1
11	Axial Flow Fan	10333002	10333002	1
12	Fan Motor	15702800001	15702800001	1
13	Compressor and Fittings	00202800010	00202800010	1
14	Compressor Gasket	76711004	76711004	4

NO.	Name of Part	GRS-1.5/D150ANbA-K ⁽¹⁾ GRS-1.5/D200ANbA-K ⁽²⁾		
		Product Code	ER02100070 ⁽¹⁾	ER02100080 ⁽²⁾
		Part Code ⁽¹⁾	Part Code ⁽²⁾	Quantity
15	Chassis Sub-Assy	01192800008P	01192800008P	1
16	Temperature Sensor	390000598	390000598	1
17	Temperature Sensor	3900020615G	3900020615G	1
18	Temperature Sensor	390002073G	390002073G	1
19	Temperature Sensor	390000451	390000451	1
20	Handle	26902800018	26902800018	2
21	Middle Part of Outer Casing	01512800033	0151280003301	1
22	Electric heater	3211280001	3211280001	1
23	Drain Pipe	05230022	05230022	1
24	Drainage Pipe(Rubber)	05332800002	05332800002	1
25	Strainer	07412802	07412802	1
26	Relief Valve	0738280101	0738280101	1
27	Base Frame	26902800015	26902800015	1
28	Enter Water Pipe Sub-Assy	04362872	04362872	1
29	Thermostat	45048002	45048002	1
30	Blow-off pipe Sub-Assy	04362921	04362921	1
31	Thermostat	45048003	45048003	1
32	Magnesium bar Sub-Assy	0406280000201	0406280000201	1
33	Discharge pipe Sub-Assy	04362873	04362873	1
34	Strainer	07213032	07213032	1
35	Strainer	0721160101	0721160101	1
36	Condenser Assy	01122800020	01122800020	1
37	Electronic Expansion Valve	43042800008	43042800008	1
38	Electric Expand Valve Fitting	4304413205	4304413205	1
39	Display Board	30295000006	30295000006	1
40	Magnet Coil	4300040022	4300040022	1
41	4-Way Valve Assy	04042800040	04042800040	1
42	Pressure Protect Switch	46028008	46028008	1
43	4-Way Valve	430004022	430004022	1
44	Nozzle for Adding Freon	06120011	06120011	1
45	Temperature Sensor	3900028306G	3900028309G	1
46	Temperature Sensor	3900028307G	3900028308G	1

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

◆ Model: GRS-1.5/TD150ANbA-K、GRS-1.5/TD200ANbA-K Exploded Views and spare parts list:



NO.	Name of Part	GRS-1.5/TD150ANbA-K ⁽¹⁾ GRS-1.5/TD200ANbA-K ⁽²⁾		
		Product Code	ER02100100 ⁽¹⁾	ER02100090 ⁽²⁾
		Part Code ⁽¹⁾	Part Code ⁽²⁾	Quantity
1	Top cover	26902800026	26902800026	1
2	Cabinet	26902800025S01	26902800025S01	1
3	Front Grill	26902800030	26902800030	1
4	Front Grill	26902800031	26902800031	1
5	Electric Box Assy	017007000178	017007000178	1
6	Transformer	43118000001	43118000001	1
7	Transformer	4311800000401	4311800000401	1
8	Capacitor CBB65	33000081	33000081	1
9	Main Board	30222000026	30222000026	1
10	Terminal Board	42011106	42011106	1
11	Capacitor CBB61	301074701	301074701	1
12	Air deflector ring	26902800024	26902800024	1
13	Axial Flow Fan	10333002	10333002	1
14	Fan Motor	15702800001	15702800001	1
15	Compressor Gasket	76711004	76711004	1
16	Compressor and Fittings	00202800010	00202800010	4
17	Drainage Joint	26902800023	26902800023	1
18	Shell middle Sub-Assy	01501000000102	01501000000103	1
19	Temperature Sensor	3900028318G	3900028318G	1
20	Temperature Sensor	3900028317G	3900028317G	1

NO.	Name of Part	GRS-1.5/TD150ANbA-K ⁽¹⁾ GRS-1.5/TD200ANbA-K ⁽²⁾		
		Product Code	ER02100100 ⁽¹⁾	ER02100090 ⁽²⁾
		Part Code ⁽¹⁾	Part Code ⁽²⁾	Quantity
21	Drain Pipe	05230022	05230022	1
22	Drainage Pipe(Rubber)	05332800002	05332800002	1
23	Strainer	07412802	07412802	1
24	Relief Valve	07382801	07382801	1
25	Electric heater	32112800004	32112800004	1
26	Thermostat	45048003	45048003	1
27	Electric Box Assy	100002001090	100002001090	1
28	Electric Anode	04062800008	04062800008	1
29	Water inlet Pipe Sub-Assy 2	04362929	04362929	1
30	Condenser Assy	01122800020	01122800020	1
31	Strainer	07213032	07213032	1
32	Strainer	0721160101	0721160101	1
33	Electronic Expansion Valve	43042800008	43042800008	1
34	Electric Expand Valve Fitting	4304413205	4304413205	1
35	Temperature Sensor	390000598	390000598	1
36	Discharge sensor	3900020615G	3900020615G	1
37	Tube Sensor	390002073G	390002073G	1
38	Temperature Sensor	390000451	390000451	1
39	4-Way Valve Assy	030152000350	030152000350	1
40	Magnet Coil	4300040022	4300040022	1
41	Pressure Protect Switch	46028008	46028008	1
42	4-Way Valve	430004022	430004022	1
43	Nozzle for Adding Freon	06120011	06120011	1
44	Display Board	30295000006	30295000006	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 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

Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)
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

Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)
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

Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)
-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

Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)
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 k Ω (upper and lower temperature sensors in the water tank and air exhaust temperature sensor)

Temperature (°C)	Resistance (k Ω)	Temperature (°C)	Resistance (k Ω)
-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

Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)
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

Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)
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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