Service Manual

Ver. 01 | 30-07-2025

EN



MULTI VARIABLE DHW
INDOOR UNITS

MV-200WT

sinclair
AIR CONDITIONING

„ORIGINAL INSTRUCTIONS“

IMPORTANT NOTE:

Read this manual carefully before installing or operating your new air conditioning unit.
Make sure to save this manual for future reference.

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1. Summary

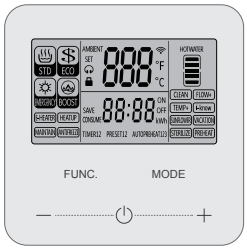
Appearance:

MV-200WT



Wired Controller:

SWC-06WT



Model list:

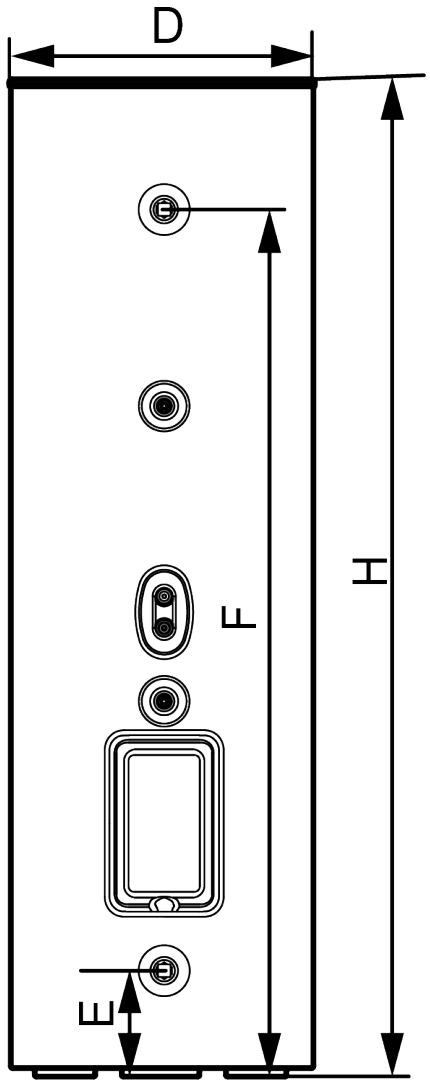
No.	Model	Product Code	Outdoor Unit Model	Outdoor Unit Product Code	Wired Controller
1	MV-200WT	ER20000342	MV-E36BIDHW	CB228W20400	SWC-06WT
			MV-E42BIDHW	CB228W20500	

2. Specifications

Model	-	MV-200WT
Product Code	-	ER20000342
Rated Voltage	V~	220-240
Rated Frequency	Hz	50
Phases	-	1
Input Power for Electric Heater	W	1500
Hot Water Heating Capacity	kW	4.2
Water Tank Volume	L	185
Rated Water Supply	L/h	90
Heating Water COP	W/W	4.56
Water Temperature Range	°C	35~55
Heating Water Operation Ambient Temperature Range	°C	-22~43
SCOPDHW(Average/Warmer/Colder)	-	2.74/3.43/2.00
Qelec(Average/Warmer/Colder)	kWh	4.25/3.4/5.83
ηWh(Average/Warmer/Colder)	%	115/145/83
Heating Water Sound Pressure Level	dB(A)	56
Heating Water Sound Power Level	dB(A)	63
Heating Water Rated Power Input	kW	2.5
Heating Water Power Input	kW	0.92
Heating Water Rated Current	A	11
Heating Water Current Input	A	4.0
Dimension(WXHXD)	mm	462X2000X462
Dimension of Carton Box (LXWXH)	mm	2105X580X550
Dimension of Package (LXWXH)	mm	2108X583X565
Net Weight	kg	72.5
Gross Weight	kg	83
Connection Pipe Max. Height Distance (indoor and indoor)	m	25
Connection Pipe Max. Height Distance (indoor and outdoor and indoor up)	m	25
Connection Pipe Max. Height Distance (indoor and outdoor and outdoor up)	m	25
Max. equivalent connection pipe length (outdoor to last indoor)	m	25
Connection Pipe Water In/Out Pipe Diameter	inch	0.59
Screw Thread connection	inch	0.5
Connecting Pipes Length (to Water Tank)	inch	0
Water Temperature Sensor Cable Length	m	5
Water Temperature Sensor Quantity	-	2
Heat Exchanger Type (Water Side)	-	Microchannel heat exchanger
Heat Exchanger Quantity (Water Side)	-	1
Heat Exchanger Water Flow	L/min	/
Heat Exchanger Max. Pressure	bar	/
Heat Exchanger Pressure Drop	kPa	/
Optional Software and Controller	-	SWC-06WT

The above data is subject to change without notice; please refer to the nameplate of the unit.

3. Outline Dimension Diagram

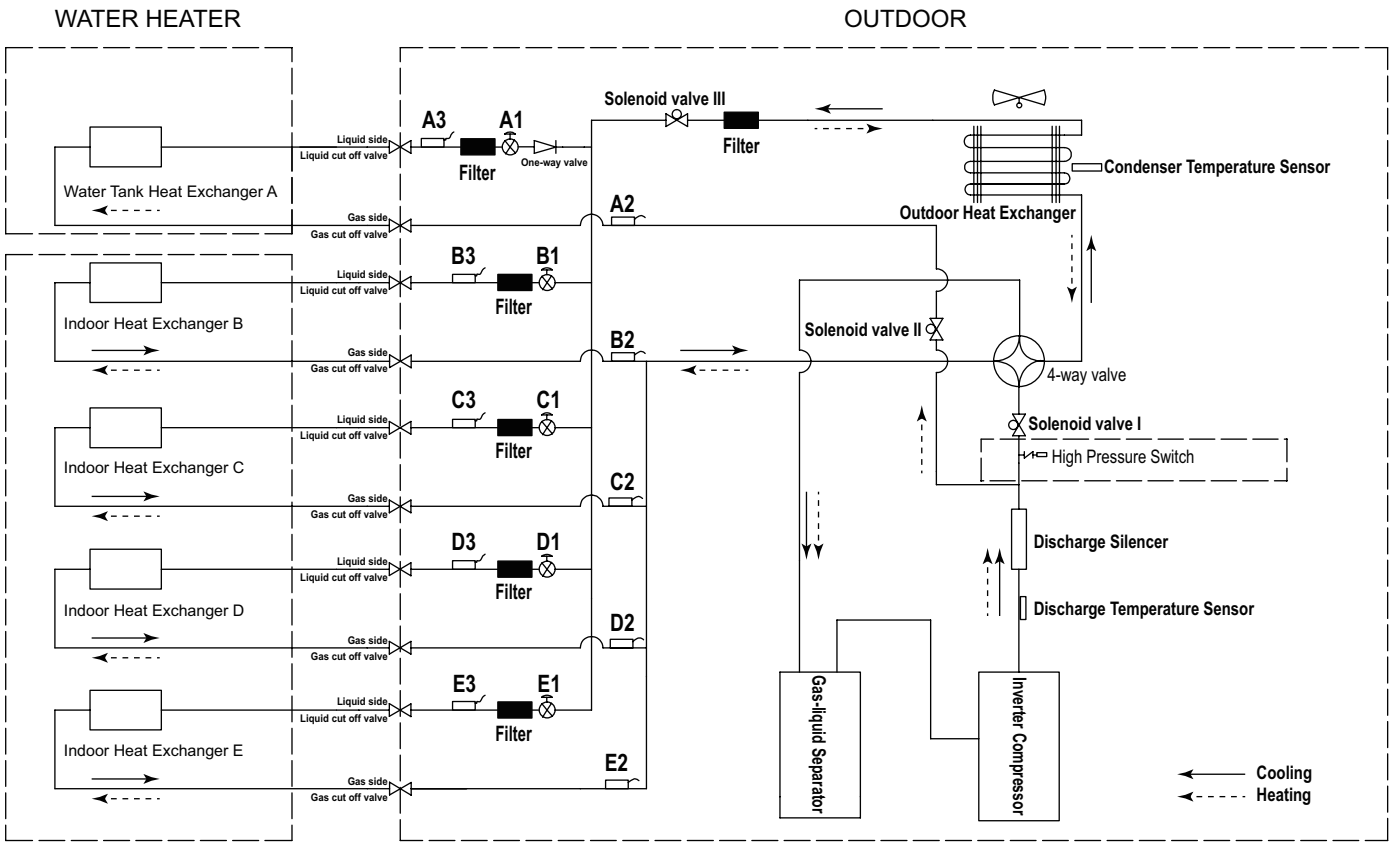


Unit: mm

Model	D	E	F	H
MV-200WT	462	166	1797	2000

4. Refrigerant System Diagram

(Note: Take five units for example.)



AIR CONDITIONING INDOOR PART

A1:A-unit Electronic Expansion Valve
B1:B-unit Electronic Expansion Valve
C1:C-unit Electronic Expansion Valve
D1:D-unit Electronic Expansion Valve
E1:E-unit Electronic Expansion Valve

A2:A-unit Gas Pipe Temperature Sensor
B2:B-unit Gas Pipe Temperature Sensor
C2:C-unit Gas Pipe Temperature Sensor
D2:D-unit Gas Pipe Temperature Sensor
E2:E-unit Gas Pipe Temperature Sensor

A3:A-unit Liquid Pipe Temperature Sensor
B3:B-unit Liquid Pipe Temperature Sensor
C3:C-unit Liquid Pipe Temperature Sensor
D3:D-unit Liquid Pipe Temperature Sensor
E3:E-unit Liquid Pipe Temperature Sensor

5. Electrical Part

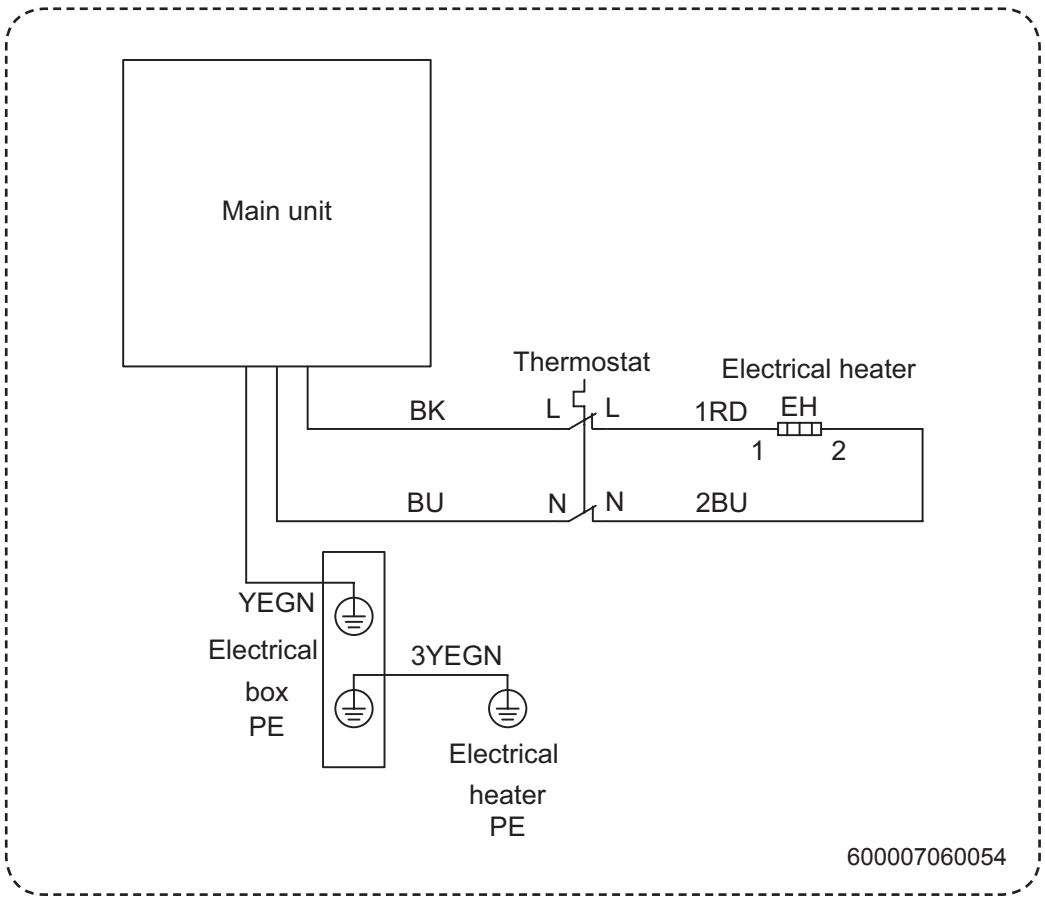
● Instruction

Symbol	Symbol Color	Symbol	Symbol Color	Symbol	Name
WH	White	GN	Green	CAP	Jumper cap
YE	Yellow	BN	Brown	COMP	Compressor
RD	Red	BU	Blue	⏚	Grounding wire
YEGN	Yellow/Green	BK	Black	/	/
VT	Violet	OG	Orange	/	/

Note: Jumper cap is used to determine fan speed and the swing angle of horizontal lover for this model.

● Circuit Diagram

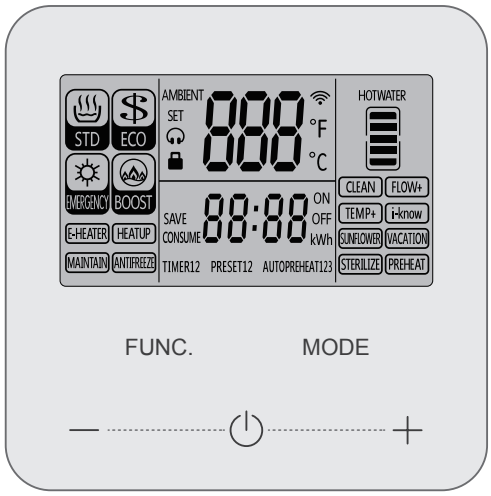
MV-200WT



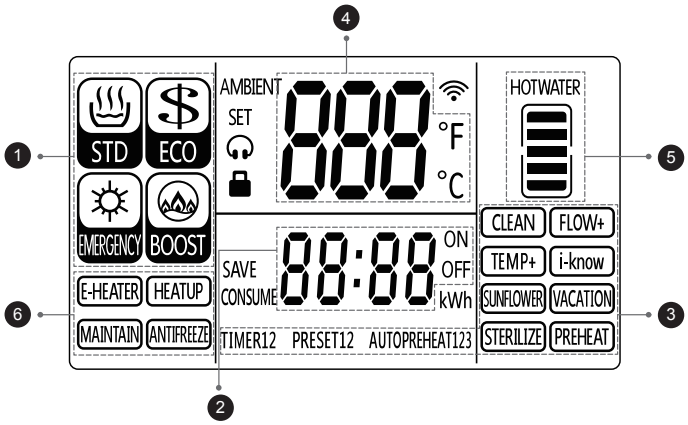
These wiring diagrams are subject to change without notice; please refer to the one supplied with the unit.

6. Introduction of Wired Controller

Appearance of Wired Controller



LCD and Description of Wired Controller



1. Mode display
2. System time, timer time, preset time, autopreheat time, disinfection/vacation time display
3. Function display
4. Actual water temperature, set water temperature error code display
5. Hot water display (some models do not have this function)
6. Status display

Introduction of Operation Mode

Mode name	Mode introduction
Standard	It automatically coordinates the operation of the heat pump or the electric heating of the models with E-heater to produce hot water. This mode has a moderate heating time and energy consumption.
Energy-saving	Maximize water heating with energy saving.
Fast	Suitable for the models with auxiliary electric heater or some inverter models, shortening heating time for fast hot water production.
Electric heating	Suitable for the models with auxiliary electric heater. It will automatically enter the electric heating mode when heat pump error occurs and produce hot water with electric heater for emergency within 48h.

NOTE:

Some of the above modes can only be set for specific models, and please refer to the actual products.

Function Description

Function name	Function introduction
TIMER	Set the timer on and timer off time, and the water heater will run in the timing period. After setting, it will be executed every day.
PRESET	Set the preset time. The water heater produces hot water in advance according to the preset time, and automatically turns to standby status two hours after the preset time. After setting, it will be executed every day. Except the preset time, the water will be heated to medium temperature in maximum, to reduce the unit energy consumption.
i-know	It realizes automatic control of the unit according to the water demand by learning the user's water consumption habits. This function is only effective when the user has a regular daily water consumption habit. In the non-customary water consumption time, the water will be heated to medium temperature in maximum, to reduce the unit energy consumption.
TEMP+	Control the water heater to heat the water temperature to a higher temperature, providing more hot water. The temperature of some units can be set. When the temperature is set to the upper limit, hold the “+” button for 3s or press the “+” button three times within 1s to enter.
PREHEAT	Suitable for the unit that Gree instant heating module (water return device) is purchased additionally and installed. The wired controller only provides the function setting operation. The preheat function can use the hot water in the tank to cycle and preheat the water pipe.
SUNFLOWER	The higher the temperature, the easier it is for the water heater to absorb heat from the environment, and the more energy saving it is to heat hot water. When the sunflower function is enabled, the water heater will heat the water during the time period of the day with higher temperature. For the rest of the day, it will heat water to the medium temperature in maximum. Compared with heating at lower ambient temperature, it is more energy saving. It is recommended to enable this function if you only use one tank of hot water a day. After setting, it will be executed every day.
VACATION	Set the vacation date and the hot water will be prepared one day before you return. The water heater is on standby during the vacation. This function is automatically cancelled after the end of the vacation.
STERILIZE	Suitable for models with auxiliary electric heating. Heat water to 70°C or the highest temperature that can be set according to specific control, to achieve high temperature disinfection.
CLEAN	Suitable for waterway emptying and cleaning operation of circulating water heater.

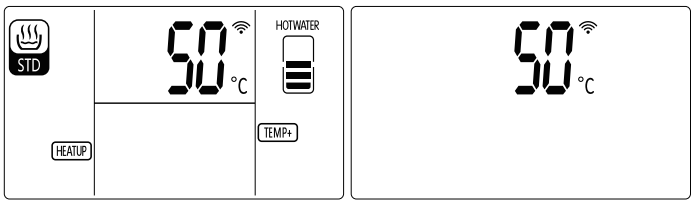
NOTE:

- The medium temperature of the water is generally 40°C, depending on the unit.
- Some of the above functions are mainly for designated models, please subject to actual products.

Operation Instructions

1. Unit On/Off

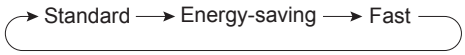
Press the "⏻" button to turn on the unit and start water heating function. Press the "⏻" button again to turn off the unit and stop water heating function. The mode icon is not displayed when the unit is off. The display of the clock and separation line depends on whether the related function of timer is enabled. The unit on and off interfaces are shown as follows:



Unit On Interface　　Unit Off Interface

2. Mode Setting

On the unit on interface, every time you press the "Mode" button, the hot water mode will switch between standard, energy-saving and fast, and the switching sequence is shown as follows:



Mode Settings

- Electric heating mode:

On unit on status, the unit will automatically start the electric heating mode when malfunction occurs, and the electric heating mode will automatically shut down after 48 hours of operation. If you need to continue operation, please turn it on. The electric heating mode will increase the power consumption of the unit, which is only to ensure the emergency water demand and not recommended for long-term use. If the electric heating mode is operating, it means that the unit is in malfunction, please contact the company's designated customer service for repair.

3. Temperature Settings

Pressing "+" or "-" button under unit on status, the set temperature will increase or decrease by 1 degree (Celsius or Fahrenheit); when hold on pressing "+" or "-" button, the set temperature will increase or decrease by 1 degree (Celsius or Fahrenheit) continuously. The set temperature range varies from mode to mode. For the specific water temperature setting range of each model, please refer to the actual unit.

4. Function Settings

The functions are divided into basic functions and advanced functions. Advanced functions can only be enabled after carefully reading the "Function Introduction" section to understand the function features and application scenes. Otherwise, hot water may be insufficient for using.

NOTE:

After the unit is powered off, please recalibrate the system time and function.

- Basic function settings:

1. On the unit on interface, press the "Function" button to enter the function selection interface, and press the "Function" button to select the system time, timer, autopreheat, temp+, quiet, preheat and sterilize functions. When the corresponding function icon is blinking, press the "+" and "-" button to enable or disable this function.

2. On the unit off interface, press the "Function" button to enter the function selection interface, and press the "Function" button to select the system time, timer, autopreheat, preheat and cleaning functions. When the corresponding function icon is blinking, press the "+" and "-" button to enable or disable this function.

- Advanced functions:

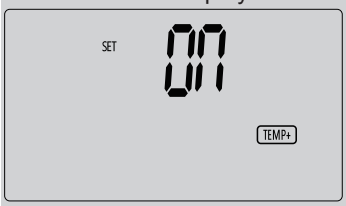
On the unit on interface, hold the "Function" button for 5s to enter the function selection interface. In addition, you can also select the second group of timer, two groups of preset, three additional groups of autopreheat, sunflower, i-know, vacation function, power consumption display and other functions. When the corresponding icon is blinking, press the "+" and "-" button to enable or disable this function.

NOTE:

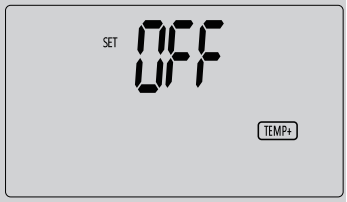
- On the advanced functions interface, you can set two groups of timer function (timer 1, timer 2) or two groups of preset functions (preset 1, preset 2), and three groups of autopreheat function (autopreheat 1, autopreheat 2, autopreheat 3). Timer 1 and autopreheat 1 correspond to timer and autopreheat functions in basic function settings. Its serial number is displayed only when the advanced function or the second group of functions is enabled;
- Advanced functions that have been enabled can be set on the basic functions interface. Advanced functions that are not enabled must be set on the advanced functions interface;
- Autopreheat and preheat functions are available for the unit that Gree instant heating module (water return device) is purchased additionally and installed;
- The functions of "Vacation", "Timer", "Preset", "Temp+", "Sterilize", "Sunflower" and "i-know" are mutually exclusive. When any function is enabled, the other functions are automatically cancelled;
- After the cleaning function is enabled, the unit cannot be turned on except for the cleaning operation is finished or the cleaning function is manually turned off. When the cleaning function is enabled, the time area displays the time when the cleaning function is enabled.
- When the unit has the temp+ function and the set temperature

reaches the upper limit of the mode, the temp+ mode can be enabled by holding the "+" button for 3s or pressing the "+" button three times within 1s. In this case, the set temperature can be further increased. If the set temperature is lower than the upper limit of the mode when the temp+ function is enabled, the temp+ function will be automatically exited.

- Some of the above functions are only available by specific models and please refer to the actual products.
- When a function is selected, the status of the function is displayed in the temperature area, and the "Settings" icon is displayed. "ON" is displayed when the function is enabled, and "OFF" is displayed when the function is disabled:



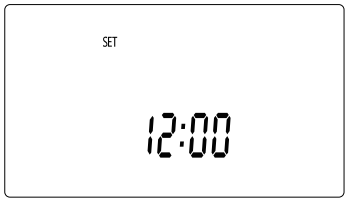
Temp+ Function Enabled



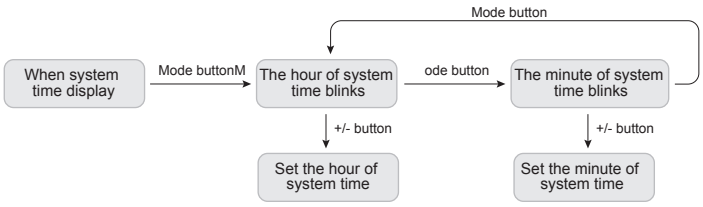
Temp+ Function Disabled

4-1 Setting System Time

1. Press the "Mode" button, and the time hour blinks. Press the "+" or "-" button to adjust the hour.
2. Press the "Mode" button again, and the time minute blinks. Press the "+" or "-" button to adjust the minute.
3. During the setting process, pressing the "⏻" button or no button operation for 20s, it will automatically return to the main interface and the system time setting will be completed.



System Time Display



System Time Setting Steps

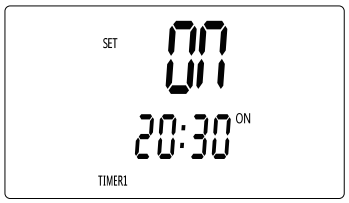
4-2 Setting Timer On/Off Time

- **Clock Timer**

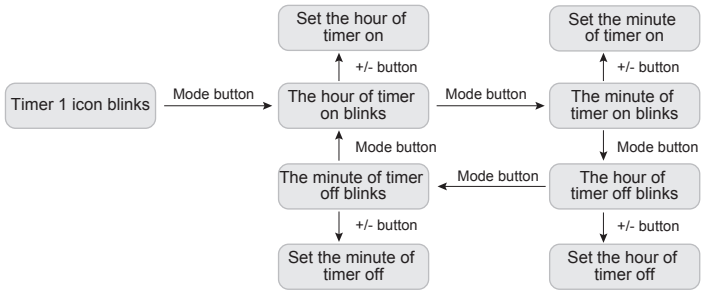
When Timer 1/Timer 2 icon blinks:

1. Press the "Mode" button, and the "Hour of Timer On Time" and "On" icon blink. Press the "+" or "-" button to adjust the hour of timer on time;
2. Press the "Mode" button again, and the "Minute of Timer On Time" and "On" icon blink. Press the "+" or "-" button to adjust the minute of timer on time;
3. Press the "Mode" button again, and the "Hour of Timer Off Time" and "Off" icon blink. Press the "+" or "-" button to adjust the hour of timer off time;
4. Press the "Mode" button again, the "Minute of Timer Off Time" and "Off" icon blink. Press the "+" or "-" button to adjust the minute of timer off time;
5. During the setting process, pressing the "⏻" button or no button operation for 20s, it will automatically return to the main interface and the timer time setting will be completed.

The setting method of timer 1 is taken as an example as follows:



Timer 1 Time display



Timer 1 Setting Steps

NOTE:

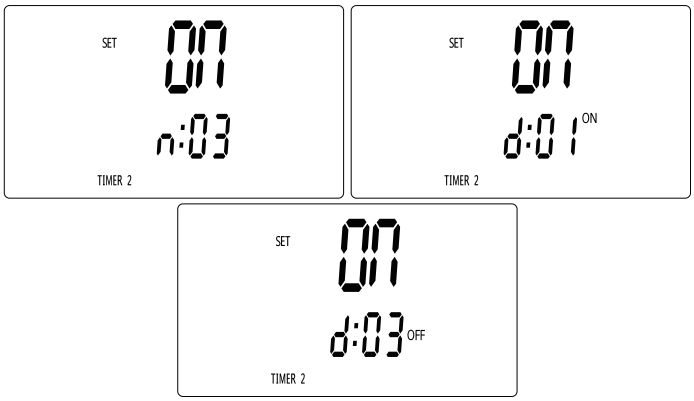
The timer on time cannot be the same as the timer off time; otherwise the timer function will not be performed.

- **Weekly Timer**

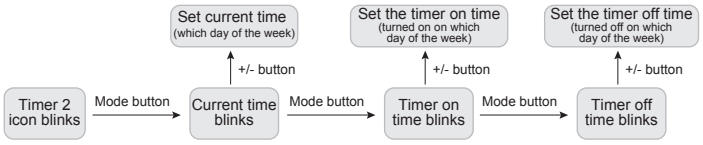
When Timer 2 icon blinks:

1. Press the "Mode" button, and "n: XX" blinks, which indicates the day of the current week. Press "+" or "-" button to adjust the calibration time;
2. Press the "Mode" button again, and "d: XX" and "On" icon blink, indicating the unit will be turned on on which day of the week. Press "+" or "-" button to adjust the timer on time;
3. Press the "Mode" button again, and "d: XX" and "Off" icon blink. Press "+" or "-" button to adjust the timer off time;
4. During the setting process, pressing the "⏻" button or no button operation for 20s, it will automatically return to the main interface and the timer time setting will be completed.

The examples of setting current time, unit on time and unit off time of weekly timer are as shown as below:



Weekly Timer Time Display Diagram



Weekly Timer Time Setting Steps

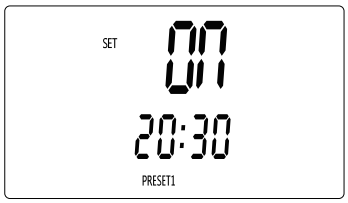
NOTE:

Some models do not support the weekly timer setting. In this case, timing 2 is the clock timer and the setting method is the same as that of timer 1.

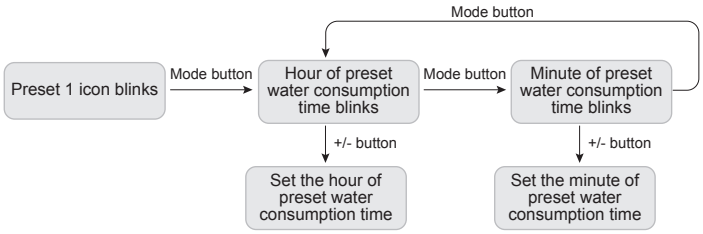
4-3 Setting of Preset Water Consumption Time

When the Preset 1/ Preset 2 icon blinks:

1. Press the "Mode" button, and the "Hour of Preset Water Consumption Time" icon blinks. Press the "+" or "-" button to adjust the hour of preset water consumption time;
2. Press the "Mode" button again, and the "Minute of Preset Water Consumption Time" icon blinks, press the "+" or "-" button to adjust the minute of preset water consumption time;
3. During the setting process, pressing the "⏻" button or no button operation for 20s, it will automatically return to the main interface and the preset water consumption time setting will be completed. The setting method of Preset 1 is taken as an example:



Preset 1 Time Display

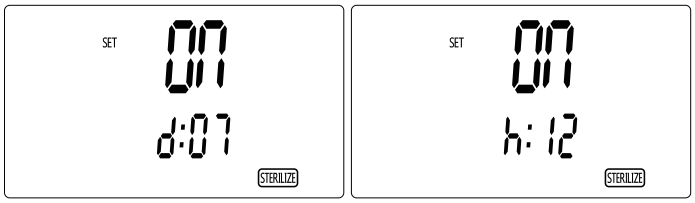


Preset 1 Time Setting Steps

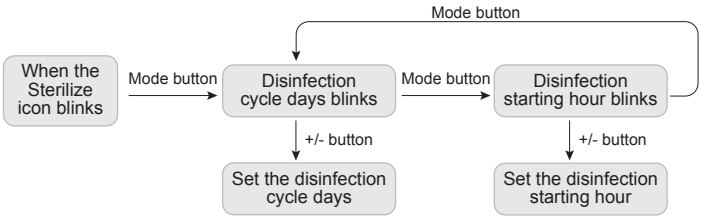
4-4 Setting of Disinfection Time

When the Sterilize icon blinks:

1. Press the "Mode" button, and the "Disinfection Cycle" blinks. Press the "+" or "-" button to adjust the disinfection cycle;
2. Press the "Mode" button again, and the "Disinfection Starting Hour" blinks. Press the "+" or "-" button to adjust the disinfection starting hour;
3. During the setting process, pressing the "⏻" button or no button operation for 20s, it will automatically return to the main interface and the disinfection time setting will be completed.



Disinfection Cycle Display Disinfection Starting Hour Display

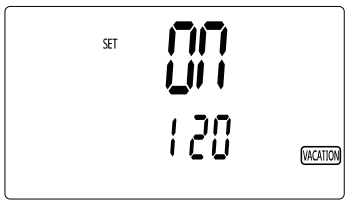


Disinfection Time Setting Steps

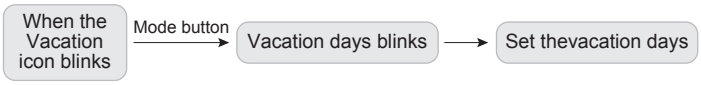
4-5 Setting of Vacation Time

When the Vacation icon blinks:

1. Press the "Mode" button, and the "Vacation Days" blinks. Press the "+" or "-" button to adjust the vacation days;
2. During the setting process, pressing the "⏻" button or no button operation for 20s, it will automatically return to the main interface and the vacation time setting will be completed.



Vacation Time Setting



Vacation Time Setting Steps

5. Setting of Lock Function

When there is no malfunction, press the "+" and "-" buttons simultaneously for 5s to enable the lock function, and the LCD displays "🔒" . Press the "+" and "-" buttons simultaneously for 5s again to exit the lock function.

Under lock status, there is no response when pressing other

buttons, and lock function will be memorized when power failure occurs.

6. WiFi Function

Tips: "Gree+" App supports iOS/Android smartphones. With product upgrades and improvements, the contents of the App may change. Please refer to the actual display and operation of the App. Connect the "Gree+" device to WiFi: Please open the "Gree+" App, and click the "+" in the upper right corner of the "Home" page to select your home appliance product and model. Check whether the WiFi indicator is blinking, and connect to the network according to the prompts on the App:

1. When the device has never been connected to the network, each time the device is re-connected to the power supply, the WiFi indicator will blink, waiting for network connection.
2. When the name and password of the router are changed, the device WiFi can be reset and then reconnected to the network.
3. When reconnecting the network, the device needs to reset the WiFi before network connection. Device WiFi reset: On the main interface, hold the "Function" and "+" buttons simultaneously for 5s, and the wired controller will give out 3 sound and display "YES" for 5s, which means the WiFi is reset successfully. If there is communication malfunction between the WiFi module and the wired controller occurs, "JF" will be displayed for 5s and the reset will be invalid.

NOTE:

The WiFi band used by this product is 2.4GHz, which supports IEEE 802.11b/g/n, and does not support 5GHz band.

7. Restoring Factory Settings

If the factory default settings are changed by misoperation, resulting in the unit function cannot be fully played. In this case, you can try to solve it by restoring the factory settings of the wired controller. Method: Hold the "⏻" for 5s to restore factory settings.

7. Notes for Installation and Maintenance

Safety Precautions: Important!

Please read the safety precautions carefully before installation and maintenance.

The following contents are very important for installation and maintenance.

Please follow the instructions below.

• The installation or maintenance must accord with the instructions.

• Comply with all national electrical codes and local electrical codes.

• Pay attention to the warnings and cautions in this manual.

• All installation and maintenance shall be performed by distributor or qualified person.

• All electric work must be performed by a licensed technician according to local regulations and the instructions given in this manual.

• Be caution during installation and maintenance. Prohibit incorrect operation to prevent electric shock, casualty and other accidents.

⚠ WARNINGS

Electrical Safety Precautions:

1. Cut off the power supply of the unit before checking and maintenance.

2. The unit must apply specialized circuit and prohibit share the same circuit with other appliances.

3. The unit should be installed in suitable location and ensure the power plug is touchable.

4. Make sure each wiring terminal is connected firmly during installation and maintenance.

5. Have the unit adequately grounded. The grounding wire can't be used for other purposes.

6. Must apply protective accessories such as protective boards, cable-cross loop and wire clip.

7. The live wire, neutral wire and grounding wire of power supply must be corresponding to the live wire, neutral wire and grounding wire of the the unit.

8. The power cord and power connection wires can't be pressed by hard objects.

9. If power cord or connection wire is broken, it must be replaced by a qualified person.

10. If the power cord or connection wire is not long enough, please get the specialized power cord or connection wire from the manufacture or distributor. Prohibit prolong the wire by yourself.

11. For the unit without plug, an air switch must be installed in the circuit. The air switch should be all-pole parting and the contact parting distance should be more than 3mm.

12. Make sure all wires and pipes are connected properly and the valves are opened before energizing.

13. Check if there is electric leakage on the unit body. If yes, please eliminate the electric leakage.

14. Replace the fuse with a new one of the same specification if it is burnt down; Don't replace it with a cooper wire or conducting wire.

15. If the unit is to be installed in a humid place, the circuit breaker must be installed.

Installation Safety Precautions:

1. Select the installation location according to the requirement of this manual. (See the requirements in installation part)

2. Handle unit transportation with care; the unit should not be carried by only one person if it is more than 20kg.

3. When installing the indoor unit and outdoor unit, a sufficient fixing bolt must be installed; make sure the installation support is firm.

4. Ware safety belt if the height of working is above 2m.

5. Use equipped components or appointed components during installation.

6. Make sure no foreign objects are left in the unit after finishing installation.

Refrigerant Safety Precautions:

1. When refrigerant leaks or requires discharge during installation, maintenance, or disassembly, it should be handled by certified professionals or otherwise in compliance with local laws and regulations.

2. Avoid contact between refrigerant and fire as it generates poisonous gas; Prohibit prolong the connection pipe by welding.

3. Apply specified refrigerant only. Never have it mixed with any other refrigerant. Never have air remain in the refrigerant line as it may lead to rupture or other hazards.

4. Make sure no refrigerant gas is leaking out when installation is completed.

5. If there is refrigerant leakage, please take sufficient measure to minimize the density of refrigerant.

6. Never touch the refrigerant piping or compressor without wearing glove to avoid scald or frostbite.

Improper installation may lead to fire hazard, explosion, electric shock or injury.

Safety Precautions for Installing and Relocating the Unit:

To ensure safety, please be mindful of the following precautions.

⚠WARNINGS

1. When installing or relocating the unit, be sure to keep the refrigerant circuit free from air or substances other than the specified refrigerant.

Any presence of air or other foreign substance in the refrigerant circuit will cause system pressure rise or compressor rupture, resulting in injury.

2. When installing or moving this unit, do not charge the refrigerant which is not comply with that on the nameplate or unqualified refrigerant.

Otherwise, it may cause abnormal operation, wrong action, mechanical malfunction or even series safety accident.

3. When refrigerant needs to be recovered during relocating or repairing the unit, the following steps need to be followed for refrigerant recovery.

Step 1: Completely close two valves of road A;

Step 2: Connect the fluorine injection nozzle at the gas valve of Road A and the fluorine injection nozzle at any gas valve of BCDE with a rubber hose similar to the following figure, and tighten it. Note that the middle switch before connecting this rubber hose is closed;

Step 3: Open the switch in the middle of the rubber tube;

Step 4: All air conditioner is running in cooling mode.;

Step 5: Completely close the valve at high pressure side (liquid valve) of road BCDE. After about 2 minutes, completely close the valve at low pressure side (gas valve) of road BCDE, immediately stop the unit and disconnect the power supply. Please note that the time for refrigerant recovery should not exceed 4 minutes;

Step 6: Turn off the switch in the middle of the above rubber tube and remove it

If refrigerant recovery takes too much time, air may be sucked in and cause pressure rise or compressor rupture, resulting in injury.

4. During refrigerant recovery, make sure that liquid valve and gas valve are fully closed and power is disconnected before detaching the connection pipe.

If compressor starts running when stop valve is open and connection pipe is not yet connected, air will be sucked in and cause pressure rise or compressor rupture, resulting in injury.

5. When installing the unit, make sure that connection pipe is securely connected before the compressor starts running.

If compressor starts running when stop valve is open and connection pipe is not yet connected, air will be sucked in and cause pressure rise or compressor rupture, resulting in injury.

6. Prohibit installing the unit at the place where there may be leaked corrosive gas or flammable gas.

If there leaked gas around the unit, it may cause explosion and other accidents.

7. Do not use extension cords for electrical connections. If the electric wire is not long enough, please contact a local service center authorized and ask for a proper electric wire.

Poor connections may lead to electric shock or fire.

8. Use the specified types of wires for electrical connections between the indoor and outdoor units. Firmly clamp the wires so that their terminals receive no external stresses.

Electric wires with insufficient capacity, wrong wire connections and insecure wire terminals may cause electric shock or fire.



Installation of rubber hose



Rubber tube joint



Refrigerant recycling device

Safety Precautions for Refrigerant

• To realize the function of the air conditioner unit, a special refrigerant circulates in the system. The used refrigerant is the fluoride R32, which is specially cleaned. The refrigerant is flammable and inodorous. Furthermore, it can leads to explosion under certain conditions. But the flammability of the refrigerant is very low. It can be ignited only by fire.

• Compared to common refrigerants, R32 is a nonpolluting refrigerant with no harm to the ozonosphere. The influence upon the greenhouse effect is also lower. R32 has got very good thermodynamic features which lead to a really high energy efficiency. The units therefore need a less filling.

WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacture. Should repair be necessary, contact your nearest authorized Service Centre. Any repairs carried out by unqualified personnel may be dangerous. The appliance shall be stored in a room without continuously operating ignition sources. (For example: open flames, an operating gas appliance or an operating electric heater.) Do not pierce or burn. Appliance shall be installed, operated and stored in a room with a floor area larger than Xm^2. (Please refer to table "a" in section of "Safety operation of flammable refrigerant" for space X.) Appliance filled with flammable gas R32. For repairs, strictly follow manufacturer's instructions only. Be aware that refrigerants may not contain an odour. Read specialist's manual.



This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience an d knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

Hereby, Our company, declares that this Air Conditioner is in compliance with the essential requirement and other relevant provisions of RE Directive 2014/53/EU. A copy of the full DoC is attached. Wireless frequency range: 2412MHz - 2472MHz Maximum Transmit Power: 18dBm



R32: 675

This marking indicates that this product should not be disposed with other house hold wastes. To prevent possible harm to the environment or human health from uncontrolled waste throughout the EU. To prevent possible harm to the environment or human health.

From uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

If it needs to install, move or maintain the unit, please contact dealer or local service center to conduct it at first. The unit must be installed, moved or maintained by appointed unit. Otherwise, it may cause serious damage or personal injury or death.

Safety Operation of Flammable Refrigerant

1. Qualification requirement for installation and maintenance man

• All the work men who are engaging in the refrigeration system should bear the valid certification awarded by the authoritative organization and the qualification for dealing with the refrigeration system recognized by this industry. If it needs other technician to maintain and repair the appliance, they should be supervised by the person who bears the qualification for using the flammable refrigerant.

• It can only be repaired by the method suggested by the equipments manufacturer.

2. Installation notes

• The air conditioner must be installed in a room that is larger than the minimum room area. The minimum room area is shown on the nameplate or following table a.

• It is not allowed to drill hole or burn the connection pipe.

• Leak test is a must after installation.

table a - Minimum room area (m^2)

Charge amount (kg)	Floor location	Window mounted	Wall mounted	Ceiling mounted
≤1.2	/	/	/	/
1.3	14.5	5.2	1.6	2.6
1.4	16.8	6.1	1.9	2.8
1.5	19.3	7	2.1	3
1.6	22	7.9	2.4	3.2
1.7	24.8	8.9	2.8	3.4
1.8	27.8	10	3.1	3.6
1.9	31	11.2	3.4	3.8
2.0	34.3	12.4	3.8	4
2.1	37.8	13.6	4.2	4.2
2.2	41.5	15	4.6	4.4
2.3	45.4	16.3	5	4.6
2.4	49.4	17.8	5.5	4.8
2.5	53.6	19.3	6	5
2.6	58.1	20.9	6.5	5.2
2.7	62.6	22.6	7	5.4
2.8	67.4	24.3	7.5	5.6
2.9	72.3	26	8.1	5.8
3.0	77.3	27.9	8.6	6
3.1	82.6	29.8	9.2	6.2
3.2	88	31.7	9.8	6.6
3.3	93.6	33.7	10.4	7
3.4	99.3	35.8	11.1	7.4
3.5	105.2	37.9	11.7	7.9
3.6	111.3	40.1	12.4	8.3
3.7	117.6	42.4	13.1	8.8
3.8	124	44.7	13.8	9.3
3.9	130.7	47.1	14.6	9.8
4.0	137.4	49.5	15.3	10.3

3. Maintenance notes

• Check whether the maintenance area or the room area meet the requirement of the nameplate.

— It's only allowed to be operated in the rooms that meet the requirement of the nameplate.

• Check whether the maintenance area is well-ventilated.

— The continuous ventilation status should be kept during the operation process.

• Check whether there is fire source or potential fire source in the maintenance area.

— The naked flame is prohibited in the maintenance area; and the "no smoking" warning board should be hanged.

• Check whether the appliance mark is in good condition.

— Replace the vague or damaged warning mark.

4. Welding

• If you should cut or weld the refrigerant system pipes in the process of maintaining, please follow the steps as below:

a. Shut down the unit and cut power supply

b. Eliminate the refrigerant

c. Vacuuming

d. Clean it with N_2 gas

e. Cutting or welding

f. Carry back to the service spot for welding

• Make sure that there isnt any naked flame near the outlet of the vacuum pump and its well-ventilated.

• The refrigerant should be recycled into the specialized storage tank.

5. Filling the refrigerant

• Use the refrigerant filling appliances specialized for R32. Make sure that different kinds of refrigerant wont contaminate with each other.

• The refrigerant tank should be kept upright at the time of filling refrigerant.

• Stick the label on the system after filling is finished (or havent finished).

• Don't overfilling.

• After filling is finished, please do the leakage detection before test running; another time of leak detection should be done when its removed.

6. Safety instructions for transportation and storage

• Please use the flammable gas detector to check before unload and open the container.

• No fire source and smoking.

• According to the local rules and laws.

Specialist's Manual

• The following checks shall be applied to installations using flammable refrigerants:

— the charge size is in accordance with the room size within which the refrigerant containing parts are installed;

— the ventilation machinery and outlets are operating adequately and are not obstructed;

— if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;

— marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be

corrected;

— refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

• Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

• Initial safety checks shall include:

— that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;

— that no live electrical components and wiring are exposed while charging, recovering or purging the system;

— that there is continuity of earth bonding.

• Checks to the area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, DD.4.3 to DD.4.7 shall be completed prior to conducting work on the system.

• Work procedure

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

• General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

• Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

• Presence of fire extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

• No ignition sources

No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space.

Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

• Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

• Checks to the refrigerating equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using flammable refrigerants:

— the actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed;

— the ventilation machinery and outlets are operating adequately and are not obstructed;

— if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;

— marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;

— refrigerating pipe or components are installed in a

position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

• Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

— that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;

— that no live electrical components and wiring are exposed while charging, recovering or purging the system;

— that there is continuity of earth bonding.

• Repairs to sealed components

During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

— Ensure that the apparatus is mounted securely.

— Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

NOTE: The use of silicon sealant can inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

• Repair to intrinsically safe components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

• Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

• Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

• Leak detection methods

The following leak detection methods are deemed acceptable for all refrigerant systems.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need recalibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

If a leak is suspected, all naked flames shall be removed/ extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. For appliances containing flammable

refrigerants, oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

● Removal and evacuation

When breaking into the refrigerant circuit to make repairs — or for any other purpose — conventional procedures shall be used. However, for flammable refrigerants it is important that best practice is followed since flammability is a consideration. The following procedure shall be adhered to:

- remove refrigerant;
- purge the circuit with inert gas;
- evacuate;
- purge with inert gas;
- open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders. For appliances containing flammable refrigerants, the system shall be "flushed" with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place.

Ensure that the outlet for the vacuum pump is not close to any ignition sources and that ventilation is available.

● Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigerating system.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

● Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure, ensure that:

— mechanical handling equipment is available, if required, for handling refrigerant cylinders;

— all personal protective equipment is available and being used correctly;

— the recovery process is supervised at all times by a competent person;

— recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f) Make sure that cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate in accordance with manufacturer's instructions.

h) Do not overfill cylinders. (No more than 80% volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.

j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation

valves on the equipment are closed off.

k) Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

• Labelling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

• Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

• General

That the installation of pipe-work shall be kept to a minimum.

That compliance with national gas regulations shall be observed.

That mechanical connections made in accordance with 22.118 shall be accessible for maintenance purposes.

Main Tools for Installation and Maintenance



Level meter



Measuring tape



Screw driver



Impact drill



Drill head



Electric drill



Electroprobe



Universal meter



Torque wrench



Open-end wrench



Inner hexagon spanner



Electronic leakage detector



Vacuum pump



Pressure meter



Pipe pliers



Pipe pliers



Pipe cutter



Pipe expander



Pipe bender



Soldering appliance



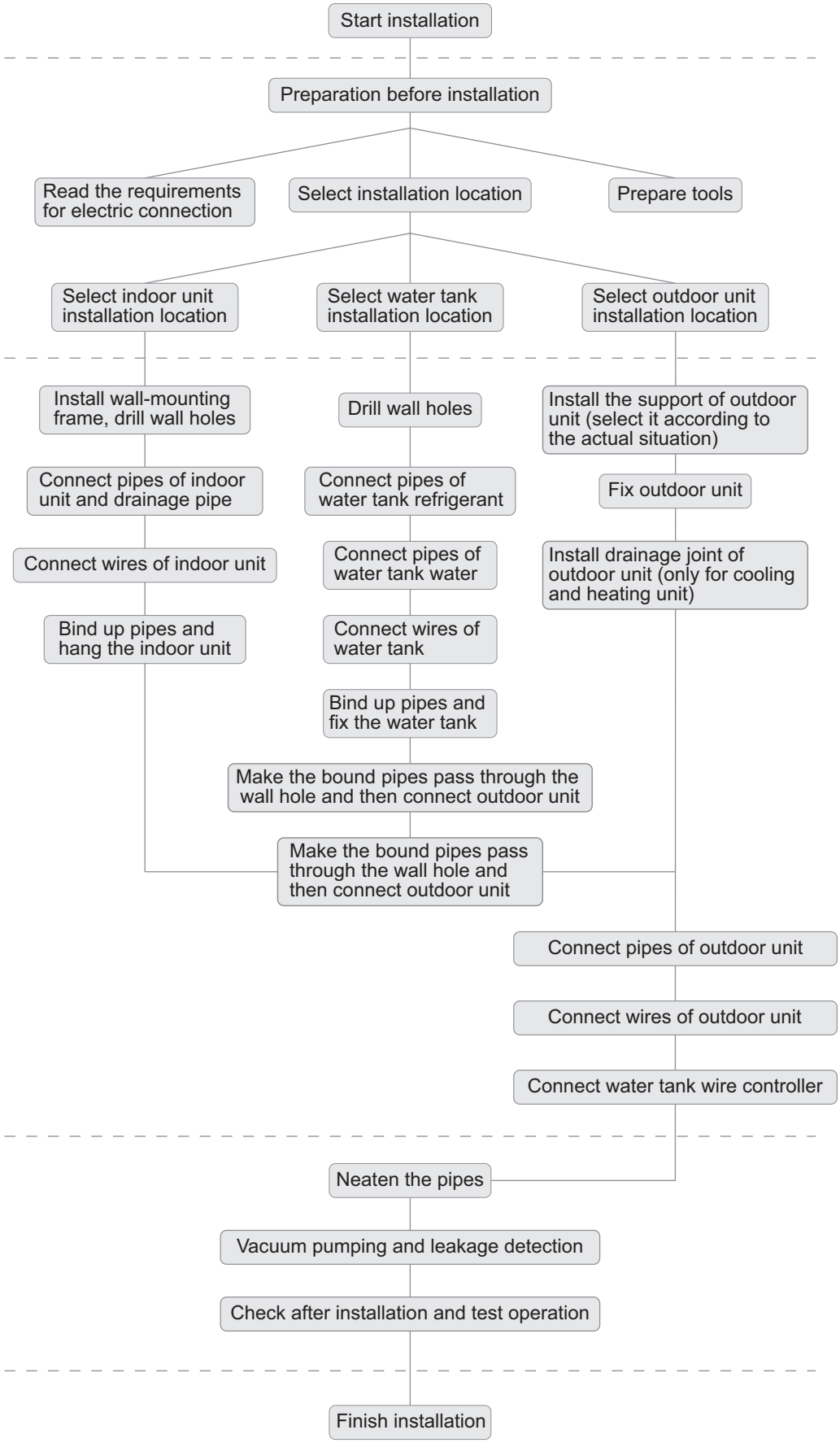
Refrigerant container



Electronic scale

8. Installation

Installation Procedures



Note: this flow is only for reference; please find the more detailed installation steps in this section.

8.1 Preparations

Precautions for Engineering Installation

(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) 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 cord, 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 valve is not connected with a drainage hose or the connection is insecure.	Water leakage occurs and indoor decoration is destroyed.
5	PPR pipes are not properly welded.	The pipe is blocked. Hot water is unavailable as protection is started for the unit. Alternatively, the water flow rate is too low for daily use.
6	No filter is installed for the cool water inlet pipe.	
7	The outdoor unit is installed at a position with poor ventilation.	When the ambient temperature is high, high-voltage protection may be started and the unit stops.
8	The outdoor unit is not securely fixed.	The unit is noisy during operation.
9	The outdoor unit is not connected with a drainage pipe.	Condensate water is discharged at random. Complaints may be generated.
10	The water tank is not securely fixed or is installed on an external wall.	The water tank may topple over or drop down, which may have severe results.
11	The pipe is not provided with thermal insulation or thermal insulation is poor.	The water temperature fails to meet user requirements due to heat loss.
12	City water is unavailable or the water pressure is too low or too high while no remedial measures are taken.	The unit fails to work and complaints are generated due to unavailability of hot water.
13	The communication control cable is not properly protected.	The communication cable is short-circuited or disconnected and the unit fails to start due to communication failure.

(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.

1. Collaboration with Civil Engineering

a) Holes, casing pipes, and installation positions for drainage standpipe must be reserved. Cable pipes must be laid in advanced.

b) Installation positions for the outdoor unit and water tank must be reserved and foundation must be prepared. The installation position for the outdoor unit must meet requirements on weight bearing, ventilation, and maintenance.

c) If no holes are reserved, holes can be drilled when required. Hole drilling on the spandrel girder or load bearing wall is prohibited.

2. Collaboration with Decoration Engineering

a) Indoor pipes for cool water, hot water, and water return must be laid in advance. Interfaces for cool water, hot water, water return, and water drainage must be reserved.

b) Indoor hot water pipes must be provided with thermal insulation.

3. Collaboration with Electrical

a) Circuits for the hot water unit must be reserved with proper power type and power use capacity.

b) The power cord and air circuit breaker meets requirements of the air conditioning unit as well as national safety regulations.

c) 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.

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.

No.	Installation Problem	Adverse Effect
1	It is recommended that the distance between the coil unit and water tank is within 10 meters. If the distance is with 3 meters, the connection pipe delivered with the unit can be used.	
2	The unit is provided with a condensate water drainage pipe.	
3	The unit installation position meets space requirements for heat exchange and maintenance.	
4	The unit goes well with the water tank, the volume of which shall meet user re-quirements.	
5	The specification, type, and control method of the power cord meet design requirements of the unit.	
6	Preparation, total length, and control method of the control cable meet design requirements of the unit.	

CAUTION!

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

Installation Material Selection

(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) Requirements on Installation Material Selection

1. Copper Pipe Selection

a) Material: Dephophorization seamlessly drawn copper pipe for air conditioner.

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

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

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

e) Specifications:

Outside Diameter of Copper Pipe (mm)	Refrigerant Type	Minimum Wall Thickness (mm)
6.35	R32	0.8
9.52	R32	0.8

2. Water Pipe Selection

a) 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				
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.

b) Selection of condensate water pipe

I Rigid PVC pipes are recommended for water drainage as they are easy to purchase and install.

II The certificate of quality and quality inspection report must be provided.

III Specifications and wall thickness:

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

3. Selection of Thermal Insulation Materials

a) 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.

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

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

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

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

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

4. Selection of Communication Cable

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

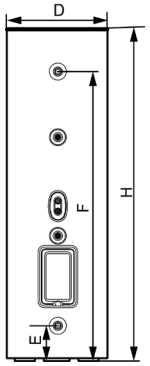
5. Selection of Power Cord

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

8.2 Installation of Water Tank

Overall Dimensions and Size of Installation Holes

External Dimensions and Installation & Maintenance Space of MV-200WT



Parameter	Product Code
	ER20000342
D	462
H	2000
F	1797
E	166
Cool water inlet (internal thread)	G1/2
Hot water outlet (internal thread)	G1/2
Working medium inlet (internal thread)	Φ9.52
Working medium outlet (internal thread)	Φ6

Requirements on Installation Position and Space

(1) The water tank suggest be installed indoors. When be installed outdoors, it need a shed or mantle to prevent rain. In addition, the water tank and safety valve shall not be installed inside the room or balcony which is without discharge floor drain.

(2) Try to install it in an environment where the temperature is higher than 0°C. The hot water outlet should not be too far away from the locations for use. Lay out the pipes in a centralized manner, and take thermal insulation measures on hot water piping to reduce heat loss.

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

NOTE:

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

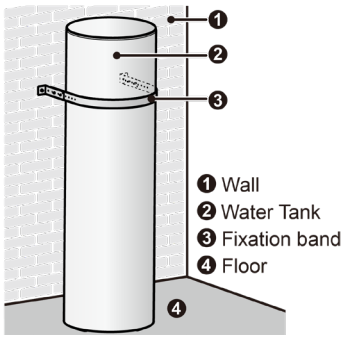


Figure 2-1 Fixing Installation schematic diagram of water tank

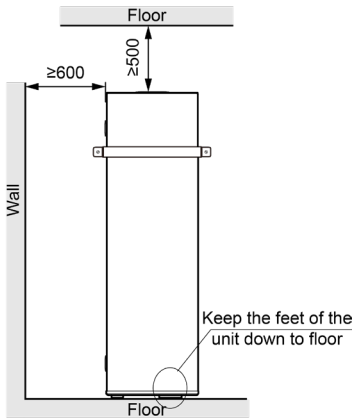


Figure 2-2 Space requirements for Installation of water tank (Unit: mm)

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

8.3 Refrigerant Pipe Design

Precautions on Pipe Design

The refrigerant pipe must meet the following requirements:

Material requirement: Dephophorization seamlessly drawn copper pipe for air conditioner

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

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

Specification: For standard configuration, one TP2M Φ9.52 (or Φ12) and one TP2M Φ6 are configured for the unit. Length of both pipes is 3 m. If the pipe needs to be extended, this specification needs to be followed.

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

Pipe Installation Diagram

(1) Installing the Refrigerant Pipe

1. If the water tank and the outdoor unit need to be connected by punching through a wall, a hole of Φ 55 mm must be drilled in the wall and the hole should be inclined toward the exterior wall, as shown in Figure 3-1. Protective sleeves need to be put on both sides of the hole.
2. Bind up the connecting pipes, power cord, water temperature sensing package, and communication lines (if necessary) of the wired controller with thermal insulation bands, and then lead them through the hole.
3. Remove the refrigerant pipe joint from the water tank and the sealing nuts from the small and large valves of the outdoor unit, and add refrigerant oil on the joint and valve cones.
4. Remove the sealing caps of the connecting pipe. Align the center of the bell mouth with the pipe joint and valve cone, and screw up the conical nut with your hand and then with a wrench, as shown in Figure 3-2.

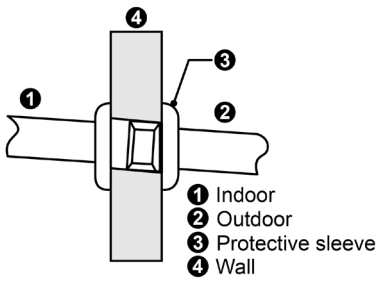


Figure 3-1 Refrigerant connecting pipe through the wall

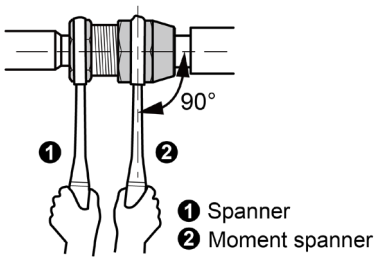


Figure 3-2 Fastening the connecting pipe

(2) Exhausting Air in the Refrigerant Pipe

Table 3-1 Exhaust methods

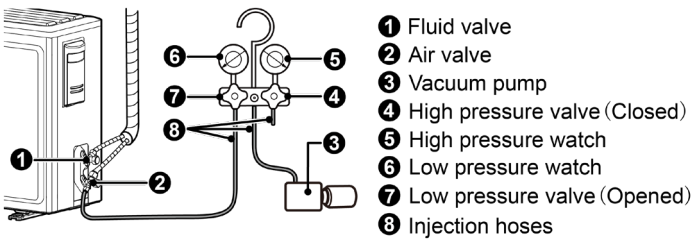
Length of Connection Pipe	Refrigerant Charge Volume
Not greater than 10 m	/
10 to 20 m	+20g/m

NOTE:

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

Exhausting Air in the Refrigerant Pipe must use vacuum pump.

1. Connect the filling hose to the fluoride injection mouth of the air valve. Ensure that the valve cores of the air valve and fluid valve are tightly closed.
2. Connect the joint of the filling hose to the vacuum pump.
3. Fully open the low pressure valve of the pressure gauge.
4. Start the vacuum pump to vacuumize the air for 20 minutes or more, and ensure that the pressure gauge pointer points to -1.0 bar. Close the low pressure valve, and stop the vacuum pump. Wait 2 minutes. If the number indicated by the pressure gauge pointer does not rise, the vacuumization and piping are successful. If the number indicated by the pressure gauge pointer rises, it indicates that air is entering the system. In this case, check the piping for leaks, and vaccumize the air again.
5. Remove the filling pose from the air valve.
6. Fully open valve cores of the gas valve and fluid valve.
7. Tighten the valve caps of the air valve and fluid valve, and the fluoride injection mouth nut.
8. Tighten the valve caps, and then use a leak detector or soapy water to check whether the pipes for connecting the outdoor unit and the water tank leak.



8.4 Pipes Installation and Insulation

Pipes Installation for the Cooling System

(1) Processing to Refrigerant Pipes

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

1. Cut-off and Burring

WARMING!

Do not use undedicated cutting devices such as a hacksaw.

a) Use a special-purpose pipe cutter to cut copper pipes.

b) Cut the pipes gently to ensure that the copper pipe does not deform.

c) After cutting the pipes, use a slicker to grater bur the pipes with the pipe opening inclining downward so that the copper scales do not fall into the pipe.

d) Cover the copper pipe with a sealing cap or adhesive tape to prevent dirt and sundries.

e) Allowable deviation: Skewness of the cross section cannot exceed 1% of the copper pipe caliber.

2. Pipe Cleaning

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

I Cleaning with a piece of silk cloth: Wrap a thin steel wire with a piece of clean silk cloth. Crumple the cloth into a lump with diameter larger than the pipe caliber.

II Apply several drops of chlorylene to the cloth. Push the cloth in from one end of the pipe and pull out from the other end.

III Every time the cloth is pulled out, remove the dust and sundries with chlorylene.

IV Wash repeatedly until the pipe is clean.

b) Cleaning with nitrogen (applying to coils)

Blow off all dust and sundries in the pipe with nitrogen.

WARMING!

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

3. Pipe Bending

PRECAUTIONS:

1. During bending, there must be no corrugation or deformation inside the pipe.

2. The welding point of the pipe should not be at the bending part. The distance between the nozzle welding joint and the bending part should be less than 100 mm.

a) Requirements

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

b) Processing methods

I Manual bending: applies to thin copper pipes (Φ6.35 mm to Φ12.7 mm)

II Mechanical bending: applicable range (Φ6.35 mm to Φ44.45mm)

4. Pipe Expanding

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

a) Before pipe expanding, apply appropriate amount of lubricant on the surface of the pipe. (The lubricant must meet the refrigerant system's requirements.)

b) Pipe expanding length must be in accordance with the insertion depth of the caliber.

c) To avoid leakage due to straight lines at the expanding point, turn round the copper pipe and then make corrections.

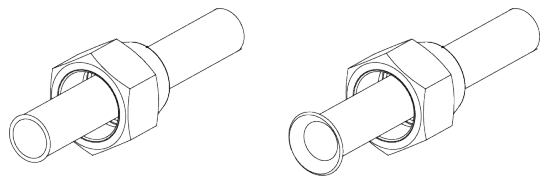
d) Apply appropriate force during pipe expanding to avoid crack.

5. Flaring

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

a) Install the flaring nut to the copper pipe.

b) Put the copper pipe into the root of the pipe expander.



I Before pipe flaring, apply appropriate amount of lubricant on the surface of the opening to ensure smooth pass of flaring nuts and avoid pipe distortion.

II The concentricity must be ensured after pipe flaring. The sealing face must be intact without any burr, crack, or wrinkle.

III Small burrs at the pipe opening can be cleared using a grater.

(2) Installation of Refrigerant Pipes

1. Installation Sequence

The sequence for installing the refrigerant pipe is as follows:

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

2. Construction of Supports, Hangers, and Brackets

a) Construction of supports, hangers, and brackets for pipes:

These parts must be fixed securely in reasonable type and style without any tilt. The surface is clean without any dirt. The parts embedded into the wall or floor cannot be painted or coated and must be free from grease stains.

b) Construction of fixing bolts for devices: Ensure sufficient rigidity for the devices. Take anticorrosive measures for exposed part of built-in fittings. If the foundation must be waterproof, takes waterproof measures.

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

d) Operation sequence



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

e) Installing built-in metal fittings

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

f) Installing expansion bolts

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

g) Installing expansion bolts

- If the foot pedal is 2 m or more from the ground, there must be three points of support.

  The foot pedal must be tightened securely with the ladder.

- Do not perform operations on the top of the ladder.

3. Shaping and Fixing of Pipes

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

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

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

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

Outside Diameter of the Pipe (mm)	Φ≤16	40>Φ≥19.05	Φ≥40
Distance between Horizontal Pipes (mm)	1000	1500	2000
Distance between Vertical Pipes (mm)	1500	2000	2500

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

4. Pipe Connection

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

(3) Air-tightness Test

PRECAUTIONS:

1. The measuring range of the test pressure gauge must beabove 4.5 MPa for R32 system.
2. Record the value displayed on the pressure gauge, ambient temperature, and test time.
3. Pressure correction: The pressure changes by 0.01 MPa when the temperature changes by 1°C.
4. The pressure meets the requirement if it does not change.
5. If the pressure must be kept for a long time, decrease the pressure to 0.5 MPa or lower. High pressure for a long time may cause leakage at the welding point or safety hazard.
6. Before completing the air-tightness test to the refrigerant pipe, do not conduct thermal insulation or wrapping at the points where the refrigerant pipe is connected to the outdoor unit of water heater and water tank.

1. Importance of the Air-tightness Test

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

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

2. Procedure for Performing the Air-tightness Test

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

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

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

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

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

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

Step 3: Increase the pressure to the test pressure (4.15 MPa for R32 system). Keep the test pressure for 1 hour and check whether it decreases. If the pressure does not decrease, it meets the requirement.

(4) Vacuumization and Desiccation

1. Requirements on Vacuum Pump

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

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

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

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

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

2. Procedure and Precautions for Vacuumization and Desiccation

a) Connect the perfusion hose with the nozzle for perfusing refrigerant. (The gas valve and liquid valve must be turned off.)

b) Connect the perfusion hose with the vacuum pump, as shown in Figure 4-1.

c) Totally open the low-pressure valve on the pressure gauge.

d) Start the vacuum pump. After vacuumizing for at least 20 minutes, turn off the low-pressure valve and stop the vacuum pump when the pressure gauge indicates -1.0bar. Keep it for 2 minutes. If the pressure value does not increase, it means that vacuumization and pressure maintaining succeeds. If the value increases, it means that air gets into the system. Check whether leakage exists and vacuumize again.

e) Remove the perfusion hose from the gas valve.

f) Totally open the valve pin from the gas valve and liquid valve.

g) Screw the fluoride injection mouth nut and tighten the valve caps for the liquid valve and gas valve.

h) Tighten the valve cap and use suds or leakage detector to check whether there is gas leakage at the connection point of the outdoor unit and water tank.

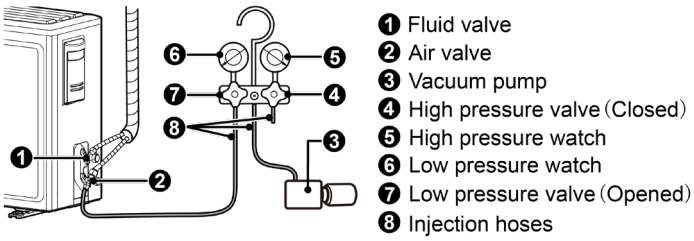


Figure 4-1 Vacuum pump connection

Installation of Water Pipes

(1) Preparing of water pipes

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

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

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

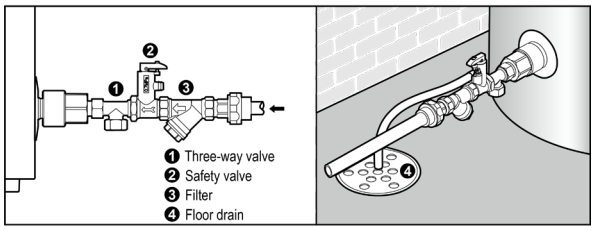
In order to facilitate water tank emptying or cleaning, you are advised to add a tee joint and a cut-off valve at the water outlet of the water tank. They must be installed if the water tank is far away (the hot water pipe is longer than 20 m) from the location for water use or all locations for water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

(3) Installing the safety valve

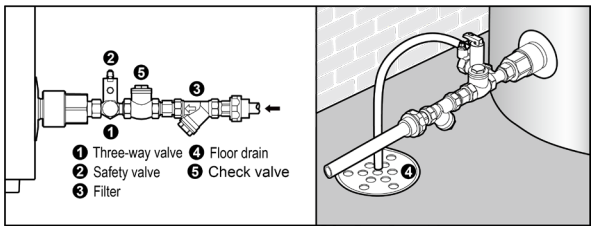
Use a PPR pip to connect the safety valve delivered with the unit to the water inlet of the water tank (note: the direction indicated by "→" should point to the water tank). The other end of the safety valve is connected to the tap water for water replenishment. To ensure safe use, please strictly follow the installation order shown in Figure 4-2. 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

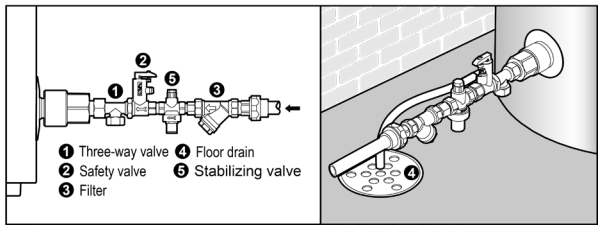
shall not be installed inside the room or balcony which is without discharge floor drain.



Installation method 1(inlet cold water pressure is between 0.1MPa and 0.5MPa)



Installation method 2(inlet cold water pressure is less than 0.1MPa)



Installation method 3(inlet cold water pressure is greater than 0.5MPa)

Figure 4-2 Safety valve installation diagram of cold water inlet pipe

(4) Installing the drainage pipe

As shown in Figure of Installation diagram, remove the plug of the three-way valve. Then, use a drainage pipe to connect the three-way valve to the floor drain, and ensure that the drainage pipe and the joint of the floor drain are lower than the bottom of the water tank. Otherwise, the water cannot be drained. In addition, the cut-off valve must be installed in the position at which the user can conveniently operate it.

(5) Installing 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	Self-limiting temperature tracing belt	1
01802894	Frame	1
8600800101	Aluminum-foil paper	1
64132820	Pipeline antifreezing tracing belt installation statement sheet	1

CAUTION!

1. To ensure water safety, the PPR pipe length at the water inlet and outlet is determined as per the formula: L≥70×R2, 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.

Thermal Insulation Measures

(1) Thermal Insulation for the Refrigerant Pipes

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.

2. Thickness of the Thermal Insulation Layer

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

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

3. Procedure of Insulation

a) Select thermal insulation materials based on design requirements.

b) Wear the thermal insulation sleeve before connecting refrigerant pipes. Users cannot cut the thermal insulation material apart and then wrap up with ties after connecting the pipes by welding.

c) Specifications of the thermal insulation sleeve must match with that of the refrigerant pipes.

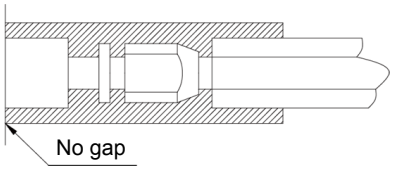
d) Reserve a distance of about 200 mm near the welding point to protect the thermal insulation sleeve during welding. After performing the air-tightness test, perform thermal insulation to the welding point separately to ensure continuity of the thermal insulation sleeve.

e) The thermal insulation layer cannot crack during construction. Bond the thermal insulation material joints with special glue and then wrap them with electrical adhesive tape. The width of the adhesive tape must be 50 mm or greater to ensure secure connection.

f) Use glue to bond the thermal insulation material at the water

outlet to the unit to prevent dewing.

g) Wrap joints of indoor/outdoor units with thermal insulation materials. There must be no gap between the joint and the wall of the indoor/outdoor unit, as shown in the following figure.



(2) Thermal Insulation for Water Pipes

1. Thermal Insulation Materials

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

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

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.

8.5 Electric Installation

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 cords, 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 6-1. If the length of the power cord is greater than 15 meters, choose a cord with a larger cross-sectional area to prevent problems caused overloading. Do not pull the power cord 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 cords 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.

Installation of Power Cord

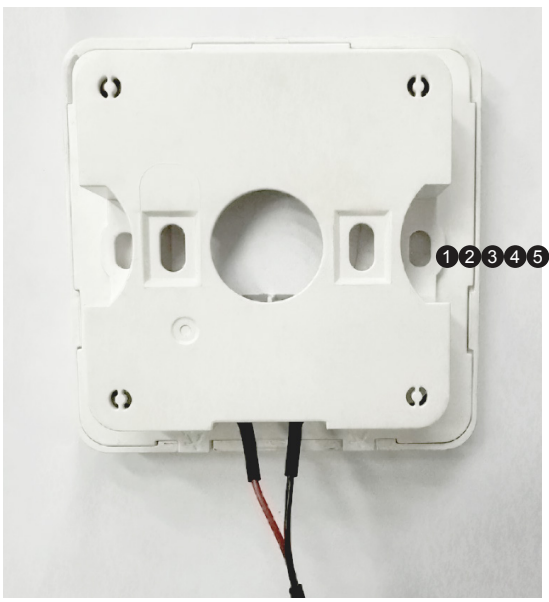
(1) Procedure for Installing the Power Cord

1. Connect the power cord to the connecting terminal of the outdoor unit and fix it securely.
2. Connect the other end of the power cord to the fixed circuit and fixed it securely. During connection, pay attention to the live, neutral, and ground lines.

8.6 Installation of Communication System

Communication Cable Terminal Connection

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



Communication Cable Terminal Connection

(1) Communication Cable Connection for Vertical Model

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

(2) Communication Cable Connection for Wall-mounted Model

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

Installation of Wired Controller

(1) Dimension and Parts of Wired Controller

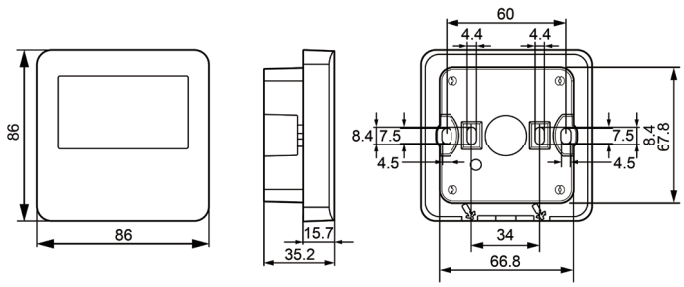


Figure 6-1 Dimension of Wired Controller (Unit: mm)

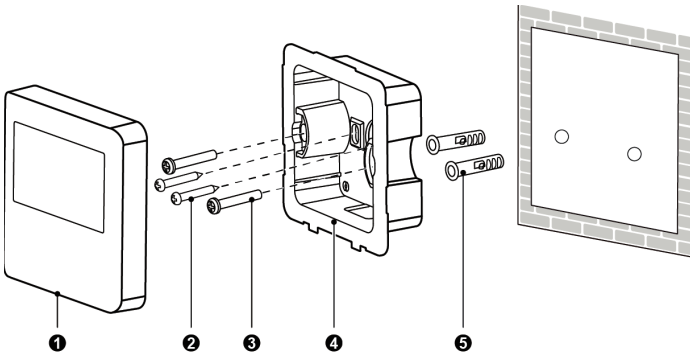


Figure 6-2 Parts of Wired Controller

No.	Name	Quantity	Note
❶	Wired controller	1	-
❷	Tapping screw	2	Used in exposed installation
❸	Screw M4×25	2	Used in concealed installation
❹	Mounting box of wired controller	1	-
❺	Plastic expansion tube	2	Used in exposed installation

(2) Requirements for Installation Position of Wired Controller

1. Prohibit installing the wired controller at the place where is damp or the wired controller might be splashed by water.
2. Prohibit installing the wired controller at the place where is closed to high-temperature objects or with direct sunshine.
3. Before installation, please cut off the power supply of the strong wire buried in the wall installation hole, and the power must be disconnected during the whole installation process.
4. In order to avoid abnormal operation of the unit due to electromagnetic interference and other reasons, please pay attention to the following matters during wiring:
   a) Ensure that the communication wire access interface is correct; otherwise, the communication error may be caused.
   b) When the wiring of the unit is laid externally, the communication wire of the wired controller should be separated from the power cord and the indoor and outdoor connection wire. The minimum distance of horizontal wiring should be greater than 20cm, otherwise it may lead to abnormal communication of the unit.
   c) If the unit is installed in a place that may be easily affected by electromagnetic interference, the signal wire of the wired controller must use shielding twisted pair wire.
5. The wire controller can only be installed indoors, and the operating temperature range is 0°C~50°C.
6. The wiring terminal of the wired controller does not distinguish polarity, but it cannot be connected to strong current.

(3) Installation of Wired Controller

First choose the appropriate signal wire for the wired controller: two-core signal wire (wire diameter≥0.75mm, length<30m). The wired controller can adopt concealed installation or exposed installation. Concealed installation means that the protruding part of the back cover of the wired controller is installed in the pre-embedded box #86 in the wall; exposed installation means that the wired controller is installed on the wall surface as a whole.

The installation process of the wired controller is as follows: Please refer to the “Wired Controller Installation Diagram” and the brief description is as follows:

1. Pull out the two-core twisted pair wire from the wall or from the box #86, and then let it go through the hole at the back of the mounting box of wired controller.
2. Installing the mounting shell of the wired controller:
   a) Concealed installation: If the box #86 is embedded, please use screw M4x25 to secure the mounting box of the wired controller to the box #86 reserved in the wall.
   b) Exposed installation: If the box #86 is not embedded, drill two holes in the wall, and install the plastic expansion tube in the wall, and then use the self-tapping screws to fix the mounting box of the wired controller on the wall surface.
3. Connect the two-core twisted pair wires to the two terminals on the back of the wired controller, and then tighten the screws.
4. Fasten the panel of the wired controller with the mounting box of the wired controller together, and the installation is completed.

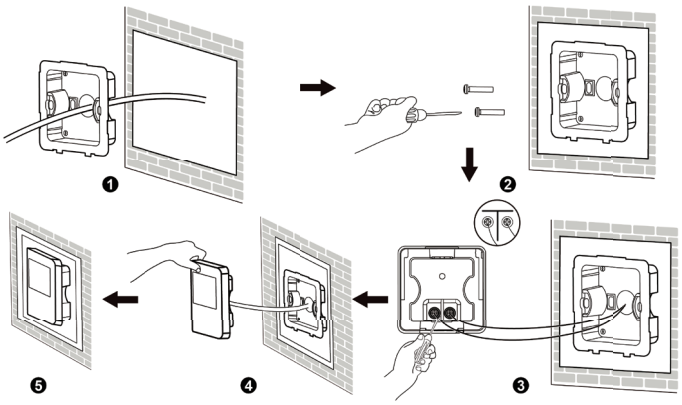


Figure 6-3 Wired Controller Installation Diagram

(4) Removal of Wired Controller

The removal of the wired controller is as shown in the figure below:

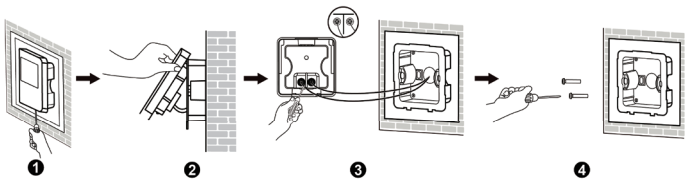


Figure 6-4 Wired Controller Removal Diagram

9. Maintenance

9.1 Error Code List

Display method of indoor unit (Error code)	Malfunction name	AC status	Possible causes
b5	Liquid valve temperature sensor is ON / short-circuited		1. Temperature sensor is not well connected or damaged; 2. The wire of temperature sensor is damaged, causing short circuit to copper pipe or outer casing; 3. Main board of outdoor unit is damaged.
b7	Gas valve temperature sensor is ON / short-circuited		1. Temperature sensor is not well connected or damaged; 2. The wire of temperature sensor is damaged, causing short circuit to copper pipe or outer casing; 3. Main board of outdoor unit is damaged.
E1	High pressure protection of system	Cool/Dry: all loads stops operation except indoor fan; Heat: all loads stops operation.	1. Heat exchange of outdoor unit is too dirty, or it blocked the air inlet/outlet; 2. Is power voltage normal; (three-phase unit) 3. Ambient temperature is too high; 4. Wiring of high pressure switch is loose or high pressure switch is damaged; 5. The internal system is blocked; (dirt blockage, ice blockage, oil blockage, angle valve is not completely opened) 6. Main board of outdoor unit is damaged; 7. Refrigerant is too much.
E4	High discharge temperature protection of compressor	Cool/Dry: compressor and outdoor fan stops operation, while indoor fan operates; Heat: all loads stops operation.	See “Overload protection of compressor, high discharge temperature protection of compressor” Fixed speed unit: 1. System abnormality; (e.g.: blockage) 2. Rotate speed of outdoor motor is abnormal; (cooling) 3. Outdoor air inlet is abnormal; (cooling) 4. System is normal, but the resistance of compressor exhausting temperature sensor is abnormal or poorly connected.
E5	AC overcurrent protection	Cool/Dry: compressor and outdoor fan stops operation, while indoor fan operates; Heat: all loads stops operation.	1. Power voltage is unstable; 2. Power voltage is too low; 3. System load is too high, which leads to high current; 4. Heat exchange of indoor unit is too dirty, or it blocked the air inlet/outlet; 5. Fan motor operation is abnormal; the fan speed is too low or not functioning; 6. Compressor is blocked; 7. The internal system is blocked; (dirt blockage, ice blockage, oil blockage, angle valve is not completely opened) 8. Main board of outdoor unit is damaged. See “AC overcurrent protection”

Display method of indoor unit (Error code)	Malfunction name	AC status	Possible causes
E6	Communication malfunction between indoor unit and outdoor unit	Cool: compressor stops operation, while indoor fan operates; Heat: all loads stops operation.	See "Communication malfunction"
E8	High temperature prevention protection	Cool: compressor stops operation while indoor fan operates; Heat: all loads stops operation.	See “High temperature prevention protection; high power; system isabnormal”
EE	Malfunction of EEPROM	Cool/Dry: compressor stops operation, while indoor fan operates; Heat: all loads stops operation.	Main board of outdoor unit is damaged.
F3	Outdoor ambient temperature is open/short-circuited	Cool/Dry: compressor and outdoor fan stop operation, while indoor fan operates; Heat: all loads stops operation.	1. Temperature sensor is not connected well or damaged; 2. Temperature sensor wire of outdoor unit is damaged; short circuit between the temperature sensor and copper pipe or outer case 3. Main board of outdoor unit is damaged;
F4	Outdoor condenser temperature sensor is open/ short-circuited	Cool/Dry: compressor and outdoor fan stop operation, while indoor fan operates; Heat: after operating for 3mins, all loads stops operation.	1. Temperature sensor is not connected well or damaged; 2. Temperature sensor wire of outdoor unit is damaged; short circuit between the temperature sensor and copper pipe or outer case; 3. Main board of outdoor unit is damaged.
F5	Outdoor air discharge temperature is open/short-circuited	Complete unit stops operation; motor of sliding door is cut off power.	1. The exhaust temperature sensor is not connected well or damaged. 2. Temperature sensor wire of outdoor unit is damaged; short circuit between the temperature sensor and copper pipe or outer case 3. Main board of outdoor unit is damaged;
FE	Malfunction of water tank upper sensor		Water tank temperature sensor hasn't been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor.
FL	Malfunction of water tank lower sensor		Water tank temperature sensor hasn't been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor.

Display method of indoor unit (Error code)	Malfunction name	AC status	Possible causes
H3	Overload protection of compressor	Cool/Dry: compressor stops operation, while indoor fan operates. Heat: all loads stops operation.	1. Overload wire of compressor is loose; 2. The overload protector is damaged. Under normal circumstances, the resistance between both ends of terminal is less than 1ohm. 3. See “Overload protection of compressor , High discharge temperature protection of compressor”
H5	IPM protection	Cool/Dry: compressor stops operation, while indoor fan operates. Heat: all loads stops operation.	See “IPM protection, over-phase current of compressor”
H7	Desynchronizing of compressor	Cool/Dry: compressor stops operation, while indoor fan operates; Heat: all loads stops operation.	See “Desynchronization diagnosis for compressor”
HC	PFC protection	Cool/Dry: compressor stops operation, while indoor fan operates; Heat: all loads stops operation.	1. The power grid quality is bad; AC input voltage fluctuates sharply; 2. Power plug of air conditioner or wiring board or reactor is not connected reliably; 3. Indoor and outdoor heat exchanger is too dirty, or air inlet/ outlet is blocked; 4. Main board of outdoor unit is damaged.
L3	Malfunction of outdoor fan/ malfunction of DC motor	Cool/Dry: all loads stops operation except indoor fan. Heat: all loads stops operation.	1. Outdoor condenser, air inlet and air outlet are blocked by filth or dirt; 2. Fan is blocked or loosened; 3. Motor or connection wire of motor is damaged; 4. Main board of outdoor unit is damaged; (As for dual-outdoor fan, L3 indicates fan 1; LA indicates fan 2)
L6	Insufficient unit capacity		1. Any malfunction that causes the compressor to stop? 2. Does the water heater reach the temperature point and stop the heat pump? 3. Does the electrical heating of wire controller set to 0? 4. Does the wire controller set up energy efficiency mode?
Lc	Start-up failed	Cool/Dry: compressor stops, while indoor fan operates; Heat: all loads stops operation.	See “Malfunction diagnosis for failure startup”

Display method of indoor unit (Error code)	Malfunction name	AC status	Possible causes
P5	Over-phase current protection of compressor	Cool/Dry: compressor stops operation, while indoor fan operates; Heat: all loads stops operation.	See “Overload protection of compressor , High discharge temperature protection of compressor”
PH	DC bus voltage is too high	Cool/Dry: compressor stops operation, while indoor fan operates; Heat: all loads stops operation.	1. Measure the voltage between position L and position N on the wiring board (XT). If it’s higher than 265 VAC, please turn on the unit until the power voltage is decreased to the normal range; 2. If the AC input is normal, please replace the outdoor control board.
PL	DC bus voltage is too low	Cool/Dry: compressor stops operation, while indoor fan operates; Heat: all loads stops operation.	1. Measure the voltage between position L and position N on the wiring board (XT). If it’s lower than 150 VAC, please turn on the unit until the power voltage is increased to the normal range; 2. If the AC input is normal, please replace the outdoor control board.
PU	Charging malfunction of capacitor	Cool/Dry: compressor stops operation, while indoor fan operates; Heat: all loads stops operation.	See “Charging malfunction of capacitor”
U1	Malfunction of phase current detection circuit for compressor	Cool: compressor and outdoor fan stops operation, while indoor fan operates; Heat: compressor, outdoor fan and indoor fan stops operation.	The control board is damaged

9.2 Procedure of Troubleshooting

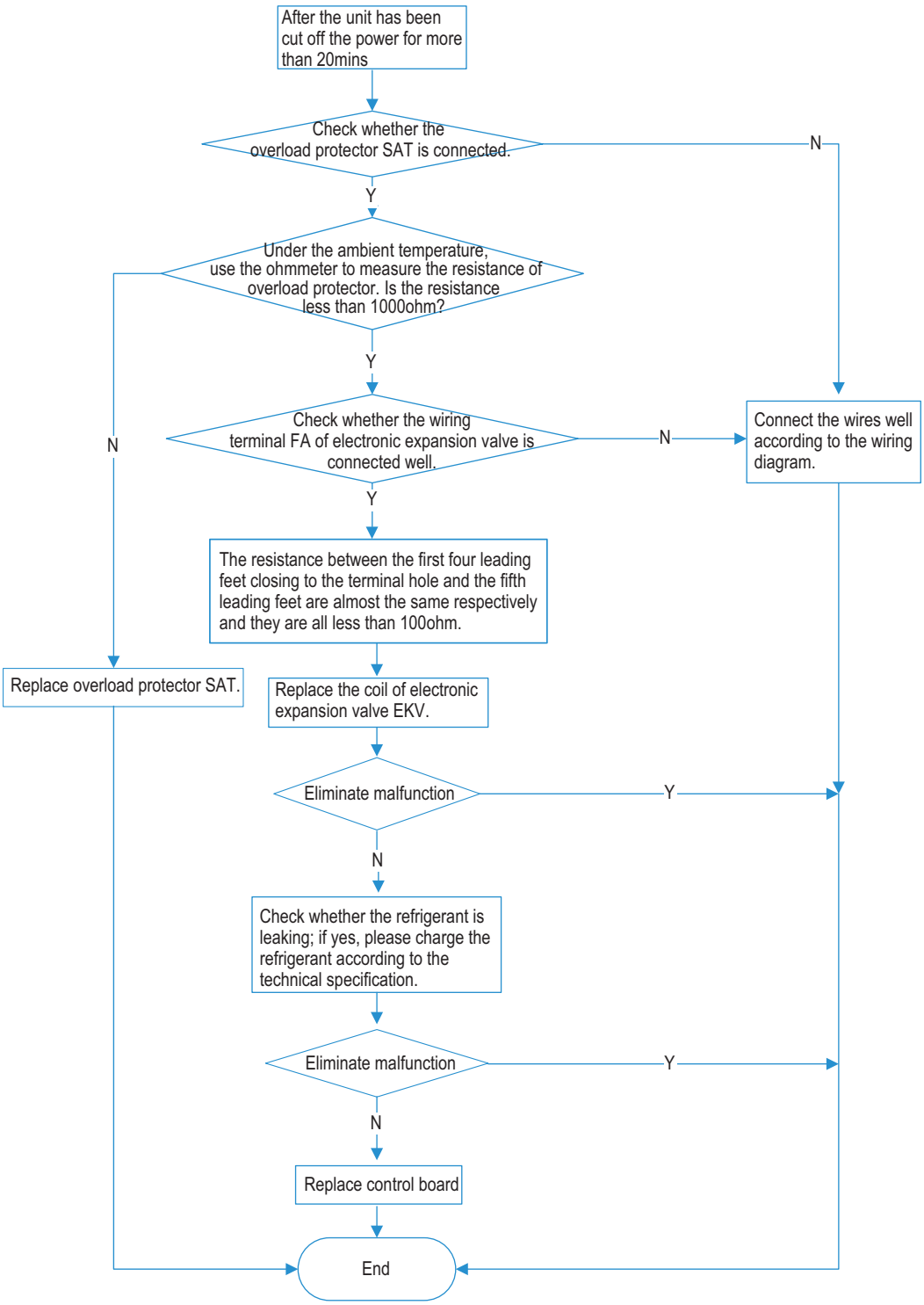
1. Overload protection of compressor H3, high discharge temperature protection of compressor E4

Main check points:

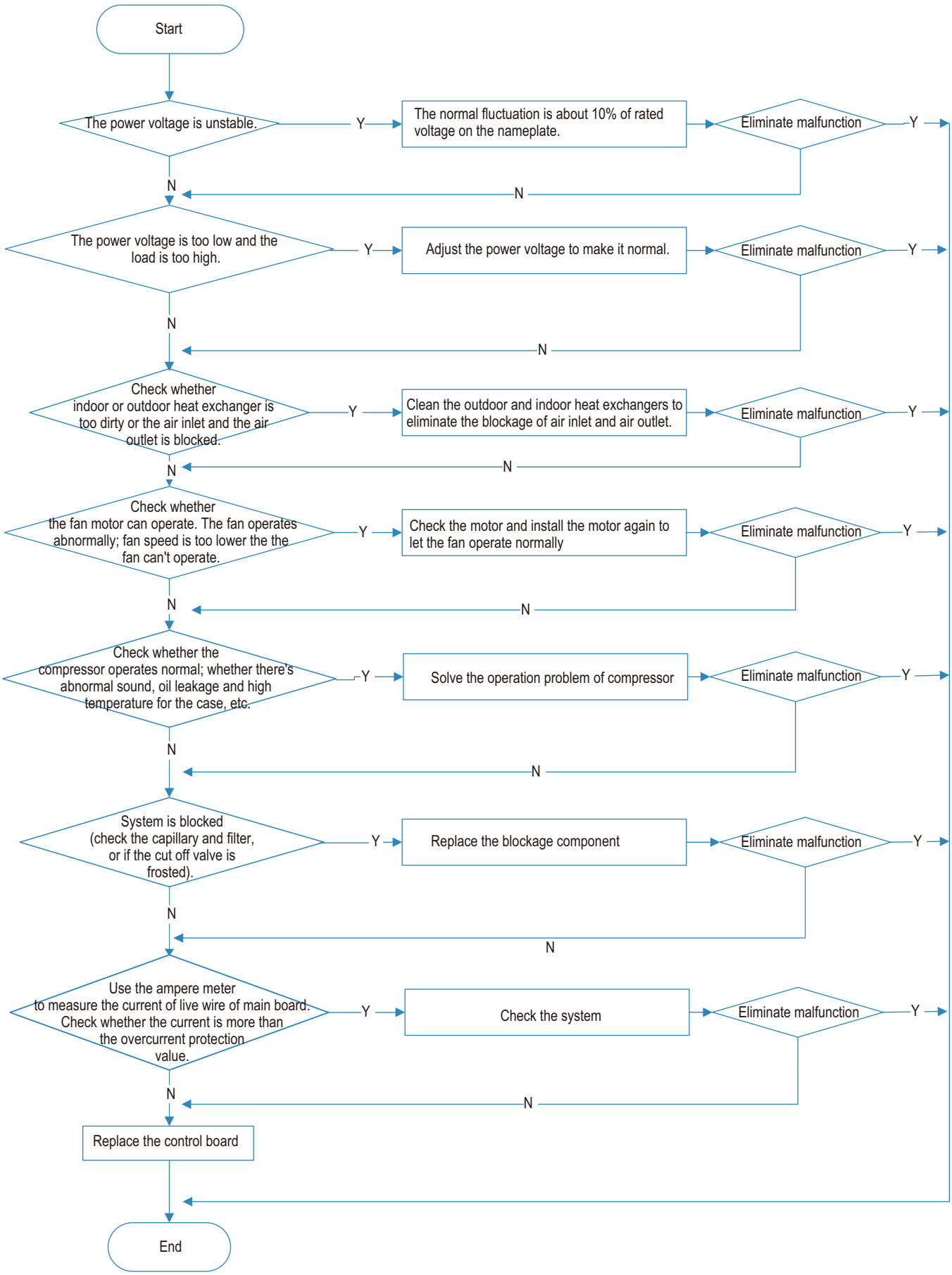
(1) electronic expansion valve (2) expansion valve terminal

(3) charging amount of refrigerant (4) overload protector

NOTE: The control board as below means the control board of outdoor unit.



2. AC overcurrent protection E5



3. Communication malfunction E6

3.1 Communication error of indoor and outdoor unit

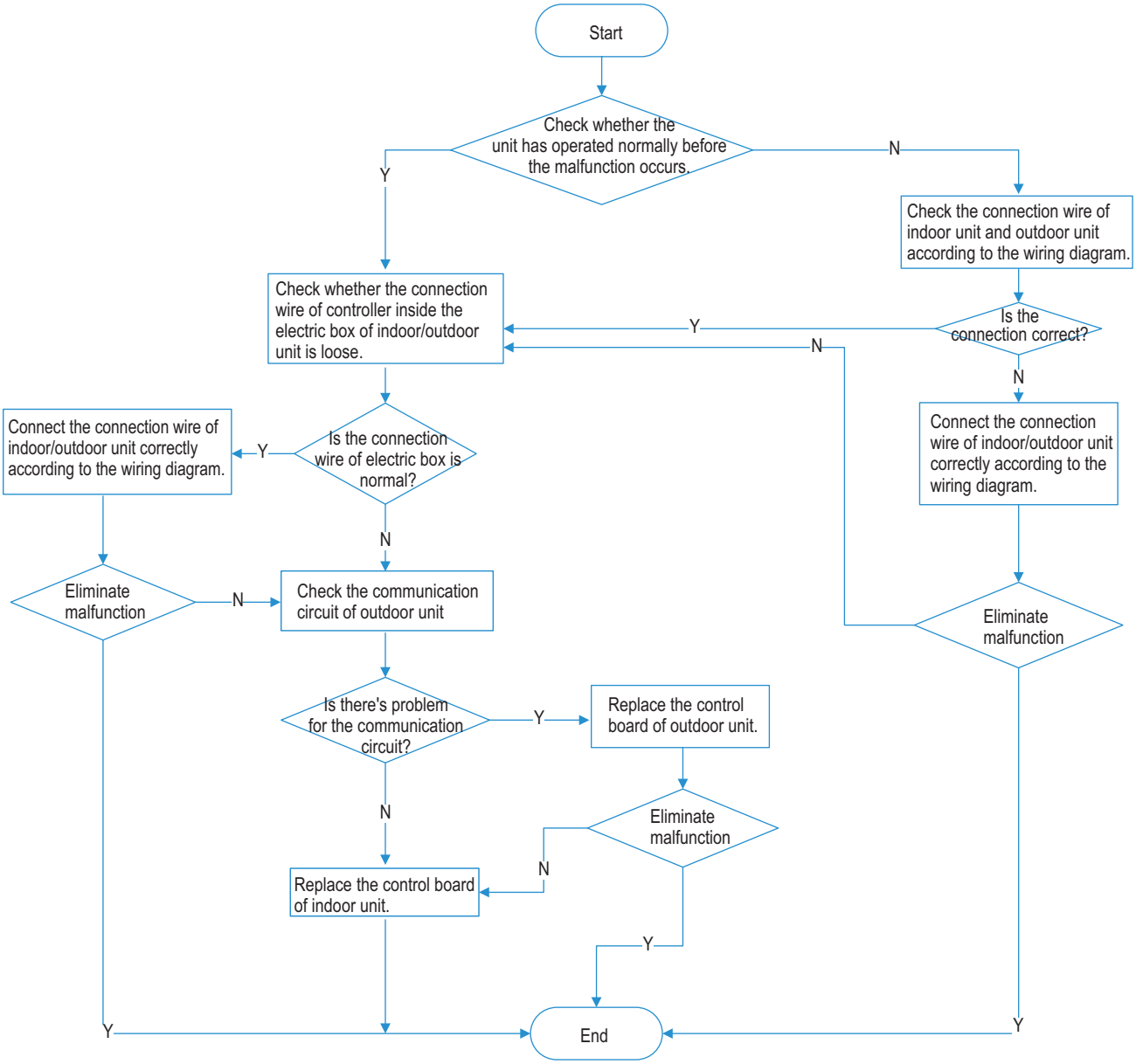
Main check points:

(1) Connection wire between indoor unit and outdoor unit

(2) Wiring inside the unit

(3) Communication circuit of control board of indoor unit

(4) Communication circuit of control board of outdoor unit



Note: Method for checking the communication circuit of inverter split type and floor standing unit: cut off the communication wires of indoor/outdoor unit, and then measure the voltage between COM and N of the control board of outdoor unit (DC notch, about 56V)

3.2 Communication error between wired controller and indoor unit

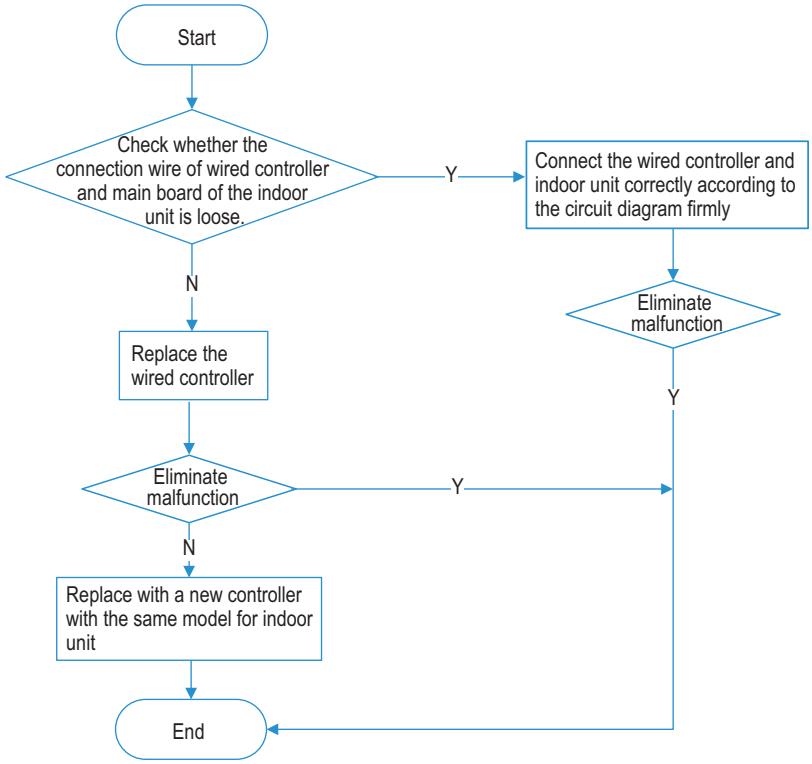
Main check points:

(1) Connection wire of wired controller

(2) Wiring terminal

(3) Wired controller

(4) Main board of indoor unit



4. High temperature prevention protection E8

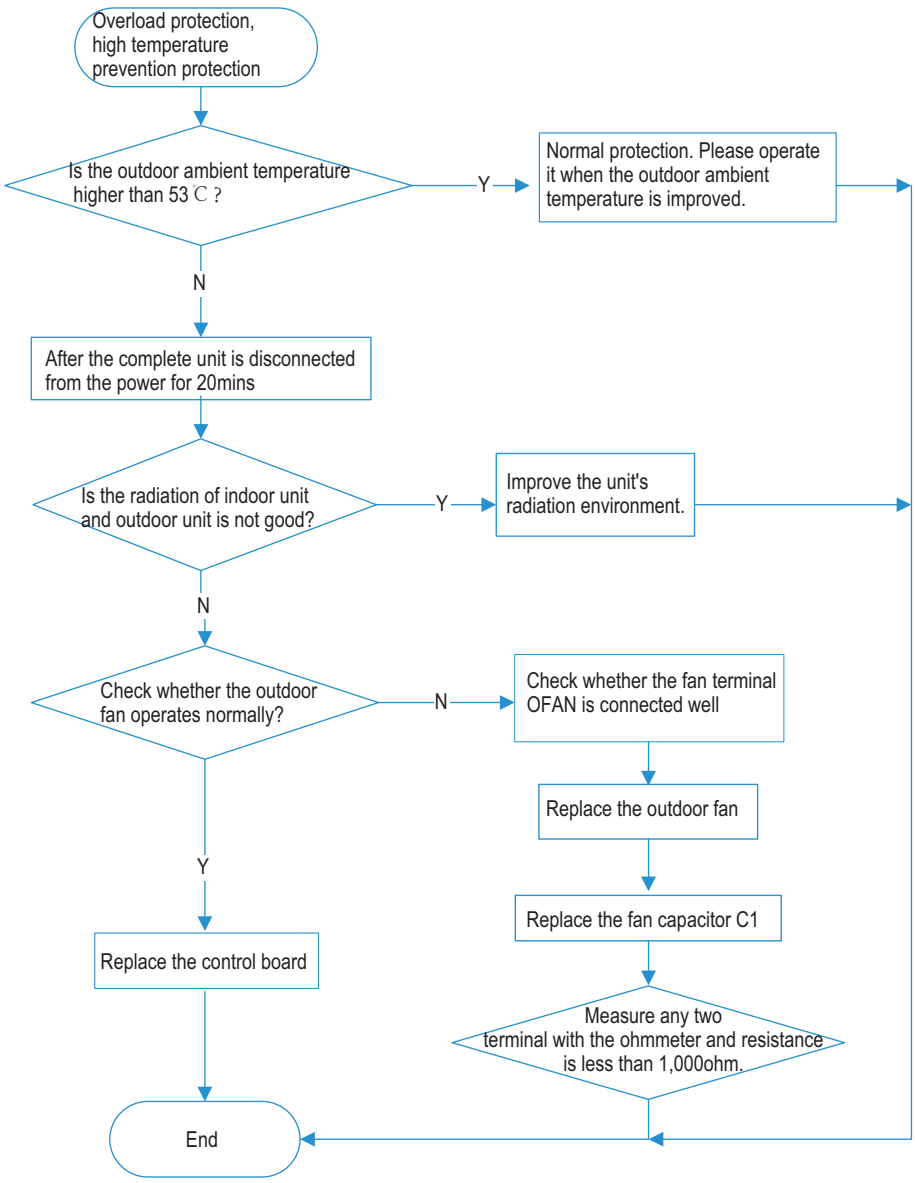
Main check points:

(1) outdoor temperature

(2) fan

(3) air inlet and air outlet of indoor/outdoor unit

NOTE: The control board as below means the control board of outdoor unit.



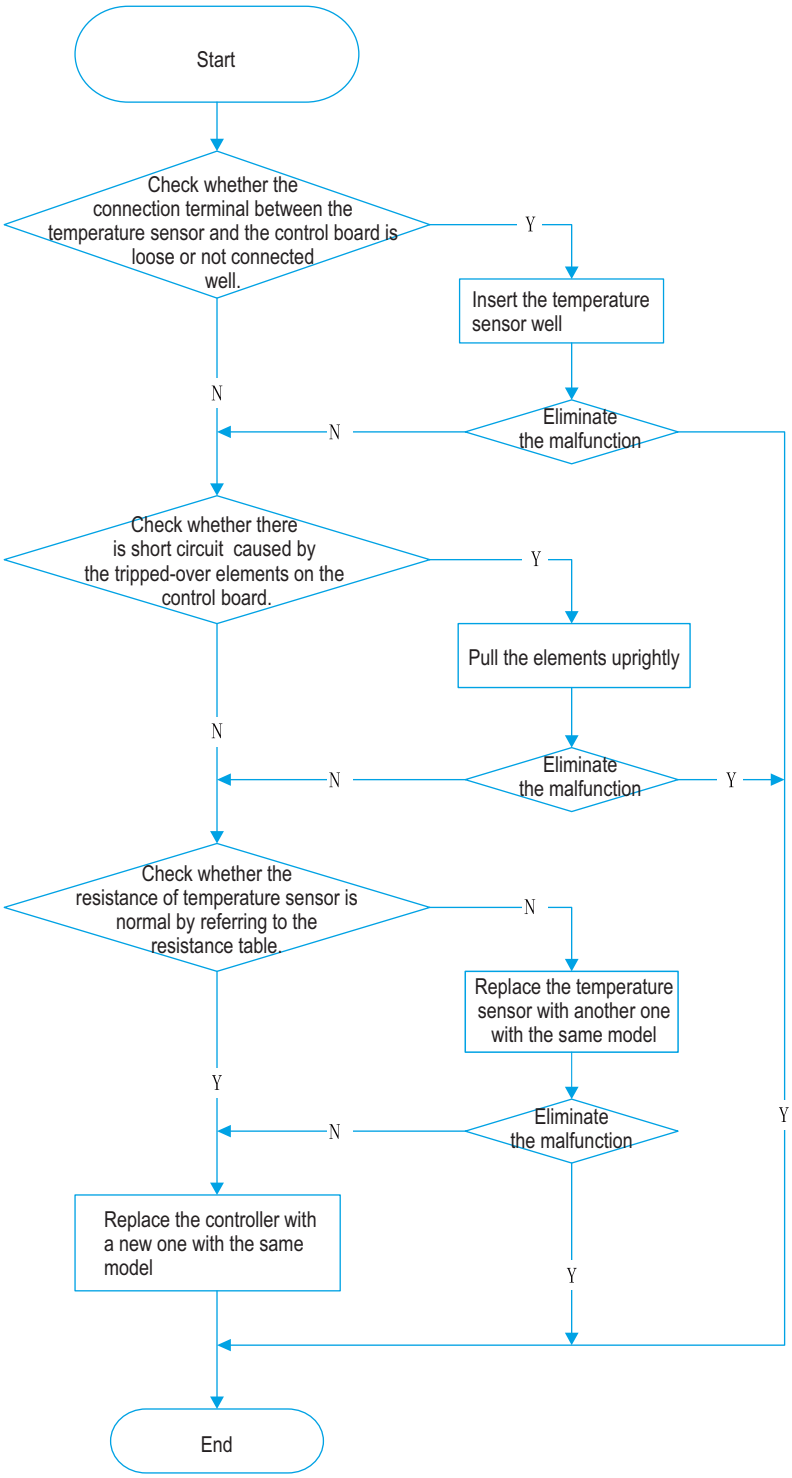
5. Troubleshooting for temperature sensor F3, F4, F5

Main check points:

(1) connection terminal

(2) temperature sensor

(3) main board



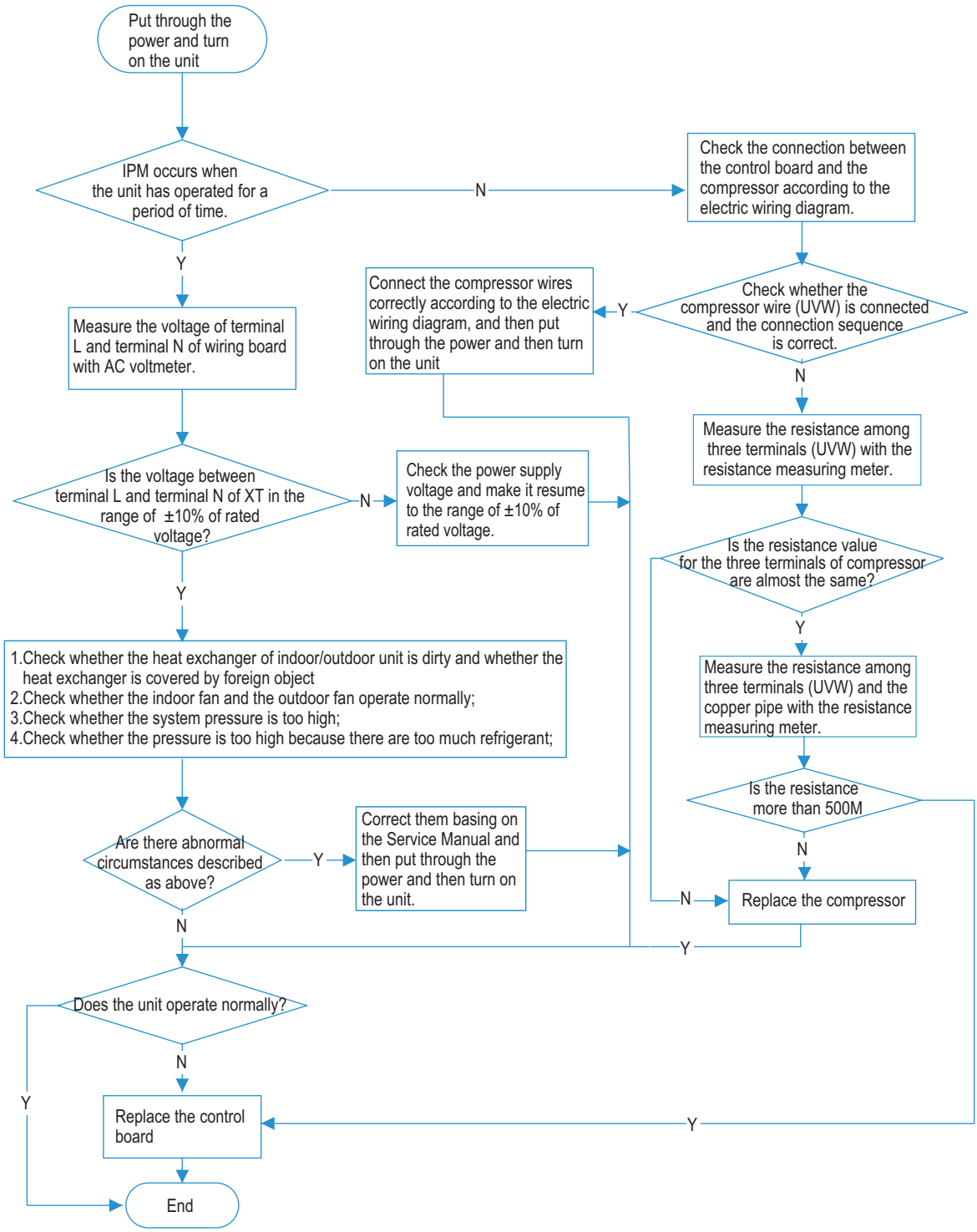
6. IPM protection H5, over-phase current of compressor P5

Main check points:

(1) compressor COMP terminal (2) power supply voltage (3) compressor

(4) charging amount of refrigerant (5) air inlet and air outlet of indoor/outdoor unit

NOTE: The control board as below means the control board of outdoor unit.



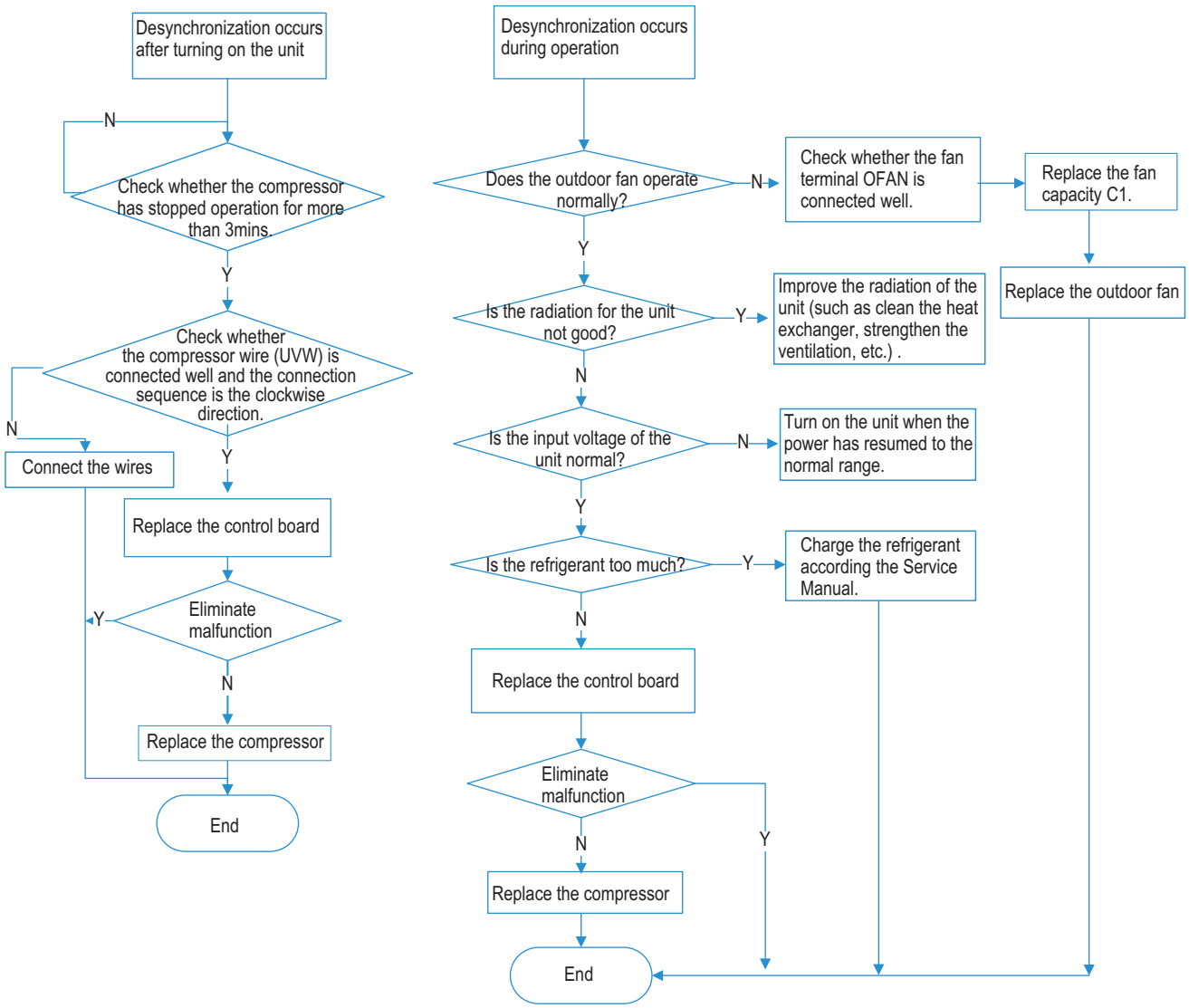
7. Desynchronization diagnosis for compressor H7

Main check point:

(1) system pressure

(2) power supply voltage

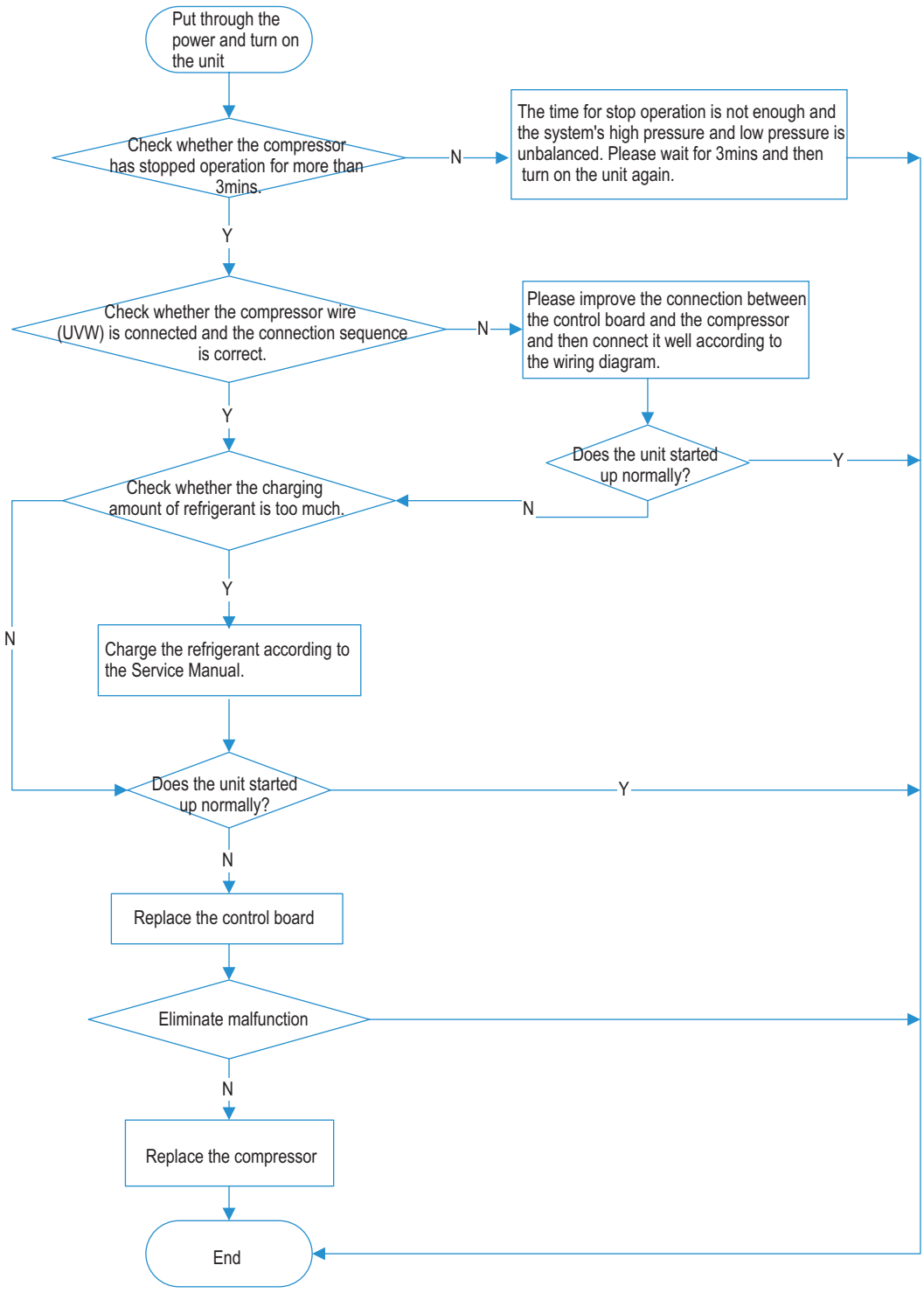
NOTE: The control board as below means the control board of outdoor unit.



8. Malfunction diagnosis for failure startup Lc

Main check points:
(1) compressor wire
(2) compressor
(3) charging amount of refrigerant

NOTE: The control board as below means the control board of outdoor unit.



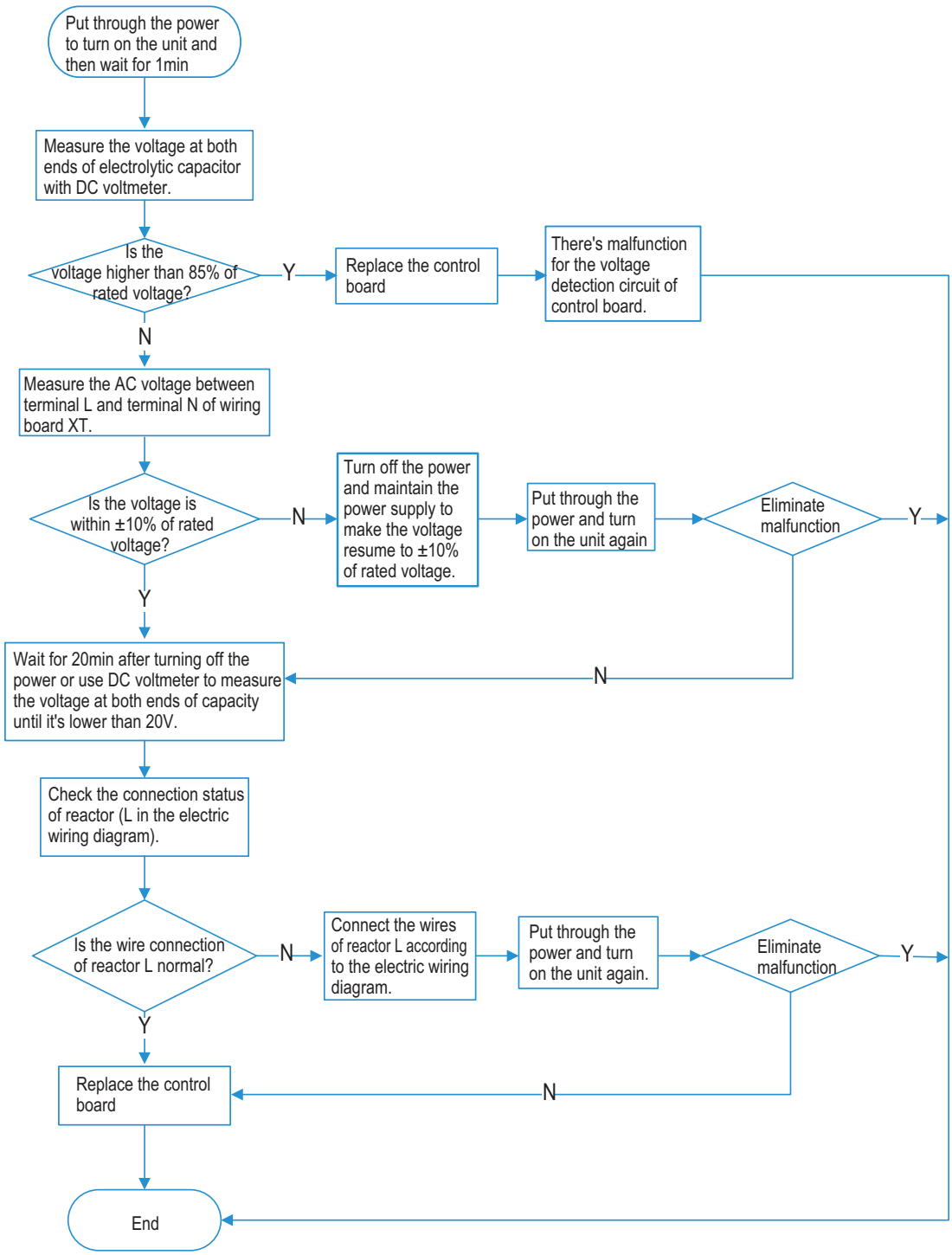
9. Charging malfunction of capacitor PU

Main check points:

(1) wiring board XT

(2) reactor

NOTE: The control board as below means the control board of outdoor unit.



9.3 Repair of Key Components

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 temperature sensor.
4) Install a new temperature sensor and assemble related parts in sequence. After the temperature sensor cord is properly placed, start the unit for trial run.

(2) Procedure for replacing the magnesium stick

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

1) Before removing the magnesium stick, drain the water tank by following drainage operations.
2) Open the cap on the mounting mouth for the magnesium stick in the water tank.
3) Use a hex key to unscrew the magnesium stick component, and then steadily removed the magnesium stick to prevent it from falling into the inner container of the water tank.
4) Install a new magnesium stick component into the mounting mouth of the magnesium stick, and then tighten it using a hex key.
5) Close the cap, and replenish water by following water replenishment operations.

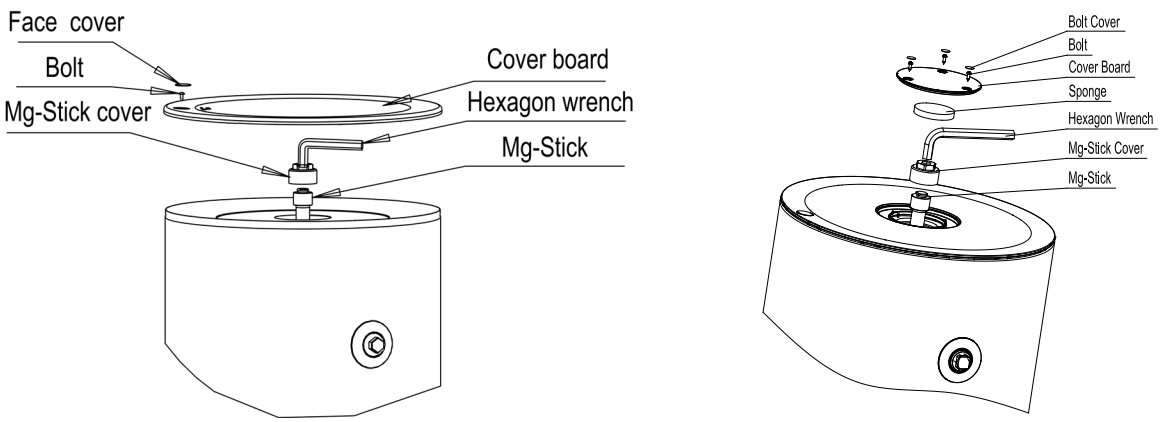
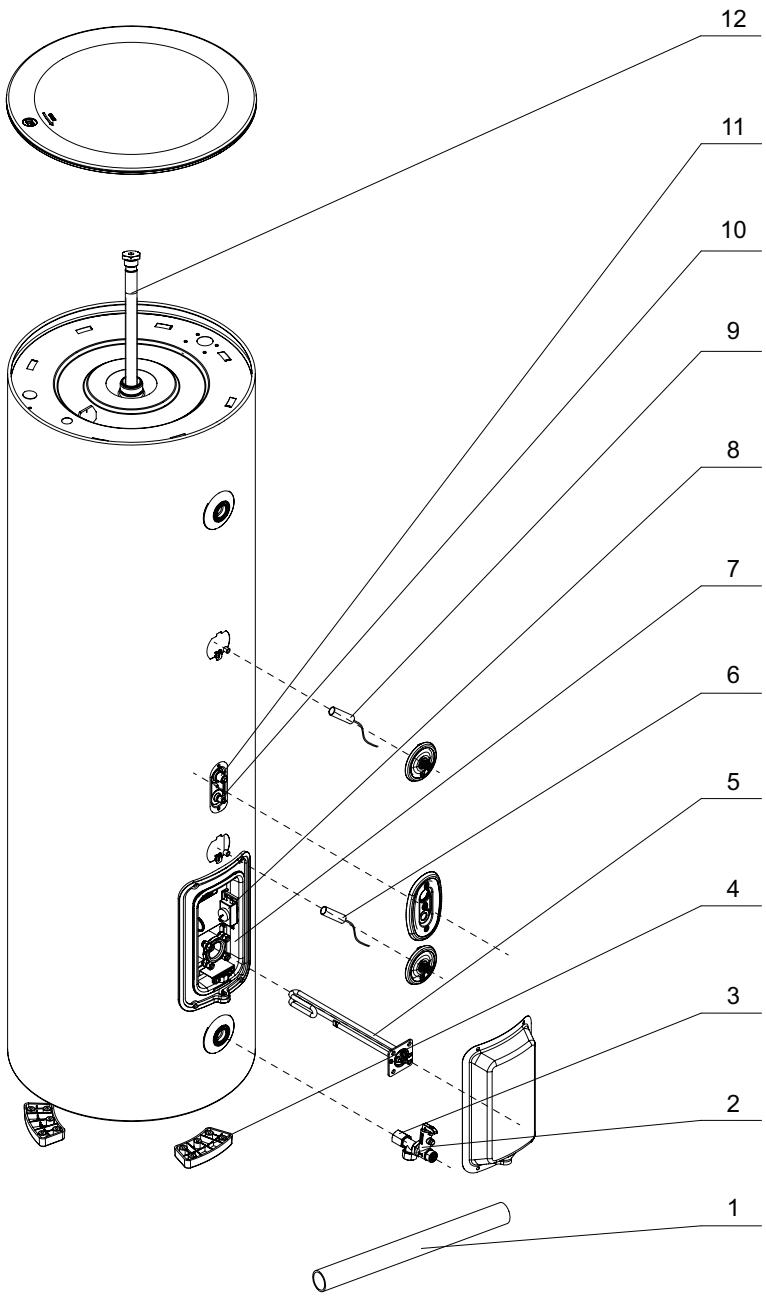


Figure 9-1 Magnesium stick replacement

10. Exploded View and Parts List

MV-200WT



The component picture is only for reference; please refer to the actual product.

NO.	Description
1	Drainage Pipe(Rubber)
2	Relief Valve
3	Water Pipe Connector
4	Water Tank Bottom Feet
5	Electric Heater
6	Temperature Sensor

NO.	Description
7	Electric Box Assy
8	Thermostat
9	Temperature Sensor
10	Pipe Connector
11	Pipe Connector
12	Magnesium Bar Sub-Assy

Some models may not contain some parts, please refer to the actual product.

Appendix: Unit Maintenance

Appendix 1: Water Input and Drainage of Water Tank

(1) Operation process for water input on the water tank

1. Cut off the power supply and open the cut-off valve at the water inlet of the tap faucet.
2. Open the cut-off valve at the hot water drain outlet and valve in user water use site.
3. Close the valve in user water use site when water is flowing out from user water use site.
4. Complete water input operation and reenergize the unit.

(2) Operation process for drainage on the water tank

1. Cut off the power supply and close the cut-off valve at the water outlet of the tap faucet.
2. Open the cut-off valve at the hot water drain outlet and valve in user water use site.
3. Open the cut-off valve on the joint (3-way) pipe.
4. Close the drainage cut-off valve after draining water on the water tank to complete drainage operation.

Appendix 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 at the hot water drain outlet and valve in user water use site.
4. Open the cut-off valve in joint (3-way) connector, and wait for drainage of water inside water tank.
5. Close the cut-off valve in joint (3-way) connector, open the cut-off valve at the water inlet of the water tank, close the cut-off valve at the water inlet when water flows from user water use site, then reopen the cut-off valve in joint (3-way) connector, repeat the drainage operation, close the cut-off valve in joint (3-way) connector when water discharged is clean.
6. Conduct water input for the water tank according to water input operation.
7. Water tank cleaning completed and energize it.

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.

Appendix 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 valve, which is a normal phenomenon. However, if a large amount of water is discharged through the safety 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 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 0.3MPa. If a booster pump is used to replenish water, the water replenishment pressure may exceed 0.5MPa. In this case, a stabilizing valve needs to be added to the tap water replenishment pipe to reduce water replenishment pressure.

Open the safety 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.

Appendix 4: Maintenance of the Unit

1. Regularly check whether the air inlet and outlet of the outdoor unit are blocked. If blocked, immediately clean them.
2. Regularly check whether piping between the outdoor 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.

Appendix 5: Mapping Table of the Temperature Sensor Resistance and Temperature

The following tables list 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 ±5°C.

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

Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)
-20	144	16	22.53	53	4.802	89	1.408	125	0.505
-19	138.1	17	21.51	54	4.625	90	1.363	126	0.492
-18	128.6	18	20.54	55	4.456	91	1.322	127	0.48
-17	121.6	19	19.63	56	4.294	92	1.282	128	0.467
-16	115	20	18.75	57	4.139	93	1.244	129	0.456
-15	108.7	21	17.93	58	3.99	94	1.207	130	0.444
-14	102.9	22	17.14	59	3.848	95	1.171	131	0.433
-13	97.4	23	16.39	60	3.711	96	1.136	132	0.422
-12	92.22	24	15.68	61	3.579	97	1.103	133	0.412
-11	87.35	25	15	62	3.454	98	1.071	134	0.401
-10	82.75	26	14.36	63	3.333	99	1.039	135	0.391
-9	78.43	27	13.74	64	3.217	100	1.009	136	0.382
-8	74.35	28	13.16	65	3.105	101	0.98	137	0.372
-7	70.5	29	12.6	66	2.998	102	0.952	138	0.363
-6	66.88	30	12.07	67	2.898	103	0.925	139	0.355
-5	63.46	31	11.57	68	2.797	104	0.898	140	0.346
-4	60.23	32	11.09	69	2.702	105	0.873	141	0.338
-3	57.18	33	10.63	70	2.611	106	0.848	142	0.33
-2	54.31	34	10.2	71	2.523	107	0.825	143	0.322
-1	51.59	35	9.779	72	2.439	108	0.802	144	0.314
0	49.02	36	9.382	73	2.358	109	0.779	145	0.307
1	46.8	37	9.003	74	2.28	110	0.758	146	0.299
2	44.31	38	8.642	75	2.205	111	0.737	147	0.292
3	42.14	39	5.997	76	2.133	112	0.717	148	0.286
4	40.09	41	7.653	77	2.064	113	0.697	149	0.279
5	38.15	42	7.352	78	1.997	114	0.678	150	0.273
6	36.32	43	7.065	79	1.933	115	0.66	151	0.266
7	34.58	44	6.791	80	1.871	116	0.642	152	0.261
8	32.94	45	6.529	81	1.811	117	0.625	153	0.254
9	31.38	46	6.278	82	1.754	118	0.608	154	0.248
10	29.9	47	6.038	83	1.699	119	0.592	155	0.243
11	28.51	48	5.809	84	1.645	120	0.577	156	0.237
12	27.18	49	5.589	85	1.594	121	0.561	157	0.232
13	25.92	50	5.379	86	1.544	122	0.547	158	0.227
14	24.73	51	5.179	87	1.497	123	0.532	159	0.222
15	23.6	52	4.986	88	1.451	124	0.519	160	0.217

Mapping between the temperature and resistance of 20 kΩ (tube sensor and gas suction temperature sensor)

Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)
-30	361.8	-6	89.17	18	27.39	42	9.803	66	3.998
-29	339.8	-5	84.61	19	26.17	43	9.42	67	3.861
-28	319.2	-4	80.31	20	25.01	44	9.054	68	3.729
-27	300	-3	76.24	21	23.9	45	8.705	69	3.603
-26	282.2	-2	72.41	22	22.85	46	8.37	70	3.481
-25	265.5	-1	68.79	23	21.85	47	8.051	71	3.364
-24	249.9	0	65.37	24	20.9	48	7.745	72	3.252
-23	235.3	1	62.13	25	20	49	7.453	73	3.144
-22	221.6	2	59.08	26	19.14	50	7.173	74	3.04
-21	208.9	3	56.19	27	18.32	51	6.905	75	2.94
-20	196.9	4	53.46	28	17.55	52	6.648	76	2.844
-19	181.4	5	50.87	29	16.8	53	6.403	77	2.752
-18	171.4	6	48.42	30	16.1	54	6.167	78	2.663
-17	162.1	7	46.11	31	15.43	55	5.942	79	2.577
-16	153.3	8	43.92	32	14.79	56	5.726	80	2.495
-15	145	9	41.84	33	14.18	57	5.519	81	2.415
-14	137.2	10	39.87	34	13.59	58	5.32	82	2.339
-13	129.9	11	38.01	35	13.04	59	5.13	83	2.265
-12	123	12	36.24	36	12.51	60	4.948	84	2.194
-11	116.5	13	34.57	37	12	61	4.773	85	2.125
-10	110.3	14	32.98	38	11.52	62	4.605	86	2.059
-9	104.6	15	31.47	39	11.06	63	4.443	87	1.996
-8	99.13	16	30.04	40	10.62	64	4.289	88	1.934
-7	94	17	28.68	41	10.2	65	4.14	89	1.875

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

Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)
-30	911.56	6	119.08	42	24.128	78	6.542	114	2.2409
-29	853.66	7	113.37	43	23.186	79	6.3315	115	2.1816
-28	799.98	8	107.96	44	22.286	80	6.1288	116	2.1242
-27	750.18	9	102.85	45	21.425	81	5.9336	117	2.0686
-26	703.92	10	98.006	46	20.601	82	5.7457	118	2.0148
-25	660.93	11	93.42	47	19.814	83	5.5647	119	1.9626
-24	620.94	12	89.075	48	19.061	84	5.3903	120	1.9123
-23	583.72	13	84.956	49	18.34	85	5.2223	121	1.8652
-22	549.04	14	81.052	50	17.651	86	5.0605	122	1.8158
-21	516.71	15	77.349	51	16.99	87	4.9044	123	1.7698
-20	486.55	16	73.896	52	16.358	88	4.7541	124	1.7253
-19	458.4	17	70.503	53	15.753	89	4.6091	125	1.6821
-18	432.1	18	67.338	54	15.173	90	4.4693	126	1.6402
-17	407.51	19	64.333	55	14.618	91	4.3345	127	1.5996
-16	384.51	20	61.478	56	14.085	92	4.2044	128	1.5602
-15	362.99	21	58.766	57	13.575	93	4.0789	129	1.522
-14	342.83	22	56.189	58	13.086	94	3.9579	130	1.485
-13	323.94	23	53.738	59	12.617	95	3.841	131	1.449
-12	306.23	24	51.408	60	12.368	96	3.7283	132	1.4141
-11	289.61	25	49.191	61	11.736	97	3.6194	133	1.3803
-10	274.02	26	47.082	62	11.322	98	3.5143	134	1.3474
-9	259.37	27	45.074	63	10.925	99	3.4128	135	1.3155
-8	245.61	28	43.163	64	10.544	100	3.3147	136	1.2846
-7	232.67	29	41.313	65	10.178	101	3.22	137	1.2545
-6	220.5	30	39.61	66	9.8269	102	3.1285	138	1.2233
-5	209.05	31	37.958	67	9.4896	103	3.0401	139	1.1969
-4	195.97	32	36.384	68	9.1655	104	2.9547	140	1.1694
-3	188.12	33	34.883	69	8.9542	105	2.8721	141	1.1476
-2	178.65	34	33.453	70	8.5551	106	2.7922	142	1.1166
-1	169.68	35	32.088	71	5.9676	107	2.715	143	1.0913
0	161.02	36	30.787	72	7.9913	108	2.6404	144	1.0667
1	153	37	29.544	73	7.7257	109	2.5682	145	1.0429
2	145.42	38	28.359	74	7.4702	110	2.4983	146	1.0197
3	135.96	39	27.227	75	7.2245	111	2.4308	147	0.9971
4	131.5	40	26.147	76	6.9882	112	2.3654	148	0.9752
5	126.17	41	25.114	77	6.7608	113	2.3021	149	0.9538

NOTE CONCERNING PROTECTION OF ENVIRONMENT



This product must not be disposed of via normal household waste after its service life, but must be taken to a collection station for the recycling of electrical and electronic devices. The symbol on the product, the operating instructions or the packaging indicate such disposal procedures. The materials are recyclable in accordance with their respective symbols. By means of re-use, material recycling or any other form of recycling old appliances you are making an important contribution to the protection of our environment. Please ask your local council where your nearest disposal station is located.

In case of quality problem or other please contact your local supplier or authorized service center.
Emergency number: 112

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This product was manufactured in China (Made in China).

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