

invest[®]

R410A

Air to water model



*Direct-current Frequency
Conversion Heater*

User's manual

Before operating this product , please read the instructions carefully and save this manual for future use.

LVEI-18
380V/50Hz/3PH

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1.1 Safety precautions

Thank you for choosing our quality product. Please read this instruction sheet carefully before use and follow the sheet to operate the unit in order to prevent damages on the device or injuries to staff.

Specifications are subject to change without notice for further improvement. Please refer to the name plate on the unit for updated specifications.

Safety precautions

Symbols used



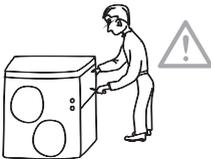
----- Warning



----- Prohibition

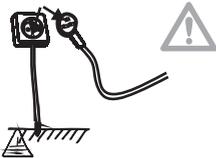


----- Suggestion



The installation, dismantlement and maintenance of the unit must be performed by qualified personnel. It is forbidden to do any changes to the structure of the unit. Otherwise injury of person or unit damage might happen.

Grounded

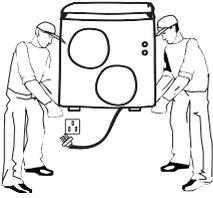


The power supply to the heat pump unit must be grounded.

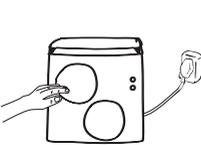


The water inside the heat exchanger should contains no chloridion inside, and PH value among 6~8.

1.1 Safety precautions



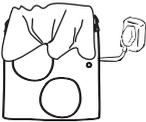
Make sure the power supply to the heat pump unit is off before any operations are done on the unit.



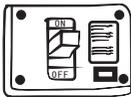
Do not insert any foreign objects into the air outlet grill when the fan motor is running. Otherwise injury of person or unit damage might happen.



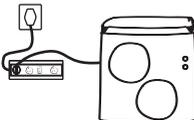
Make sure no water or other liquid drips into the electric box of the unit. Otherwise the unit might be damaged.



Do not clog the evaporator by paper or any other foreign objects, to keep the unit well ventilated.



It is mandatory to use a suitable circuit-breaker for the heat pump and make sure the power supply to the heater corresponds to the specifications. Otherwise the unit might be damaged.



Make sure to use a dedicated power line for the heat pump only. Do not add other appliances to the line.

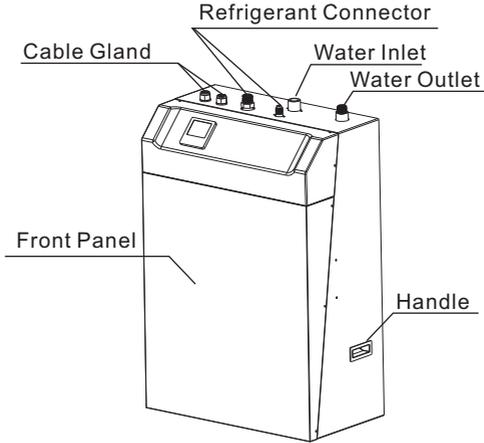
1.2 Advantages

Advantages

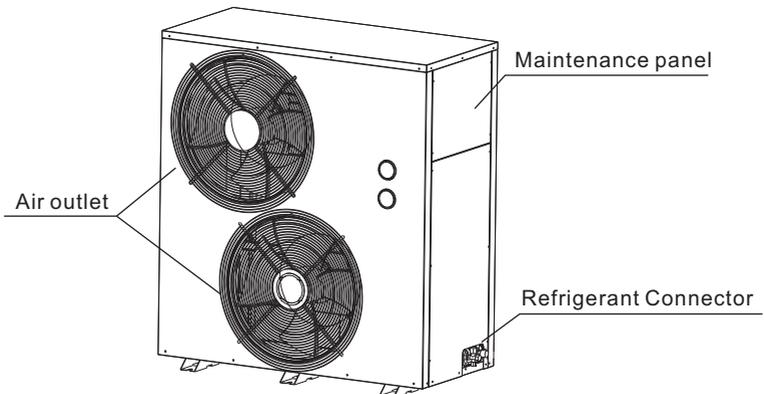
- ☑ This unit is using the latest DC inverter technology. It can adjust its working frequency, so to give out its output according to the loading. It can work down to -25°C with good COP.
- ☑ The unit is designed with easy installation that no refrigerant charging or copper pipe brazing is required on site. It can be widely used in house and villa.
- ☑ This unit is with environment-friendly refrigerant R410A, which also provides one of the highest energy efficiency ratings in the industry. Output of the compressor and therefore the energy input requirements are constantly monitored and adjusted at the most optimum level for the given indoor and outdoor environmental conditions and the user's desired demands from the system.
- ☑ Microprocessor control system contains several enhanced software features to make the operation of the system most advantageous and pleasing, under varying environmental conditions.
- ☑ Special vibration absorbers on the compressor allow operation of the system with ultra low noise.
- ☑ Auto-restart function keeps all settings in memory and automatically resumes the operation after a power failure.
- ☑ Compressor crankcase heater and bottom plate heater are available as options for extreme cold conditions, enabling the unit to work in very low ambient temperatures with much lessened defrost frequencies. Both these optional heaters are electronically controlled based on the outdoor ambient temperatures and a sophisticated logic.
- ☑ Programmable timer function provides unattended operation of the system.
- ☑ Acrylic coated enhanced aluminum fins on the coil heat exchanger extends the fin life against corrosion and allows easier rainwater wash-down as well as faster defrosts.
- ☑ Copper tubing in all heat exchangers are made by using the latest developments in the technology of inner grooved tubing by extending the area of heat exchange in a more compact coil, therefore increasing the operational efficiency.

1.3 Main components

Indoor unit

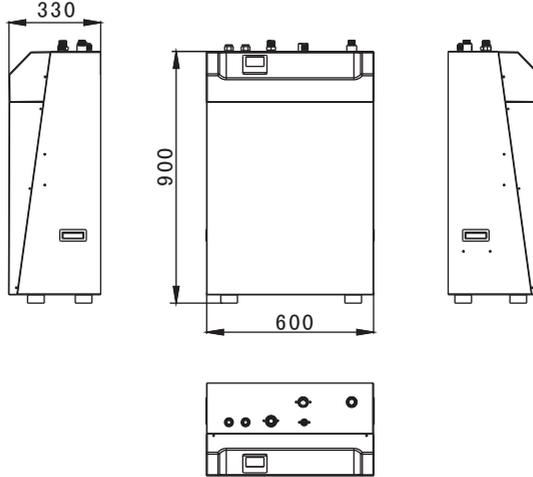


Outdoor unit

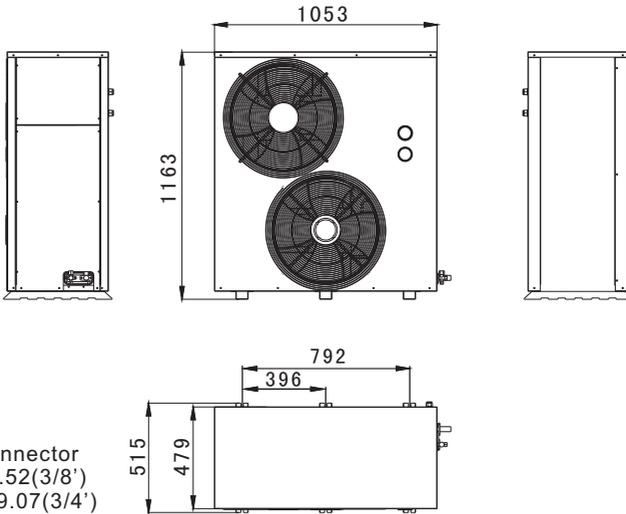


1.4 Outlines and dimensions

Indoor unit



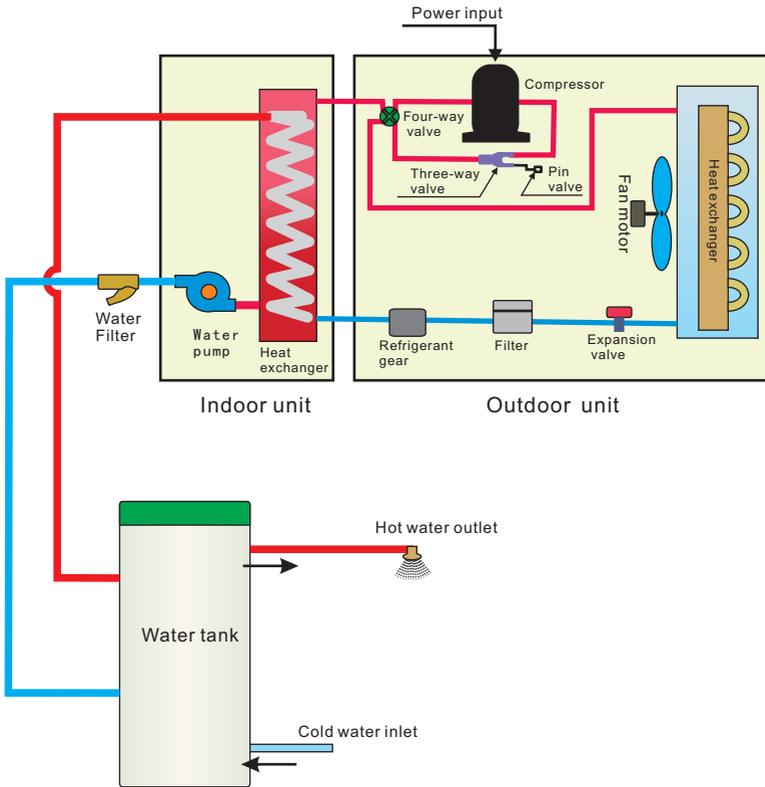
Outdoor unit



Refrigerant connector
dimension: $\Phi 9.52(3/8')$
 $\Phi 19.07(3/4')$

1.5 Working principle

Working principle



1.6 Specifications

INSTALLATION AND INSTRUCTION

Type				LVEI-18	
Function				Cooling	Heating
Power supply				380V/50Hz/3PH	
Refrigerant				R410A/3.185	
Capacity	COP		W/W	3.2-4.3	
	E. E. R		Btu/h.W	7.96-12.3	
	Cooling(heating)capacity		KW	3.5-13	7.3-18
Btu/h			11942-44356	24907-61416	
Power	Cooling	Input power	W	1500-5600	
		Input current	A	2.3-8.5	
	Heating	Input power	W	1850-5700	
		Input current	A	2.8-8.66	
Dimension	Indoor	Net dimension	mm	600(L)x300(D)x900(H)	
		Packing dimension	mm	700(L)x380(D)x990(H)	
	Outdoor	Net dimension	mm	1000(L)x460(D)x1200(H)	
		Packing dimension	mm	1159(L)x555(D)x1234(H)	
	Water connector		inch	G1	
	Gas connector		inch	3/4"	
	Liquid connector		inch	3/8"	
Temp.	Working range in cooling		°C	0°C~55°C	
	Working range in heating		°C	-25°C~33°C	
	Water outlet temp.		°C	7°C~52°C	
Weight	Indoor		Kg	50	
	Outdoor		Kg	126	
Others	Noise	Indoor unit	dB	35	
		Outdoor unit	dB	56	
	Fan speed	Outdoor unit	r pm	7500	
	Flow rate(Max./Nor./Min.)		L/s	0.4/0.23/0.13	
	Room temp sensor		KΩ	5K(25°C)	
	Indoor coil temp sensor		KΩ	5K(25°C)	
	Outdoor temp sensor		KΩ	5K(25°C)	
	Outdoor coil temp sensor		KΩ	5K(25°C)	
	Outdoor discharge temp sensor		KΩ	50K(25°C)	

Rated condition of test:

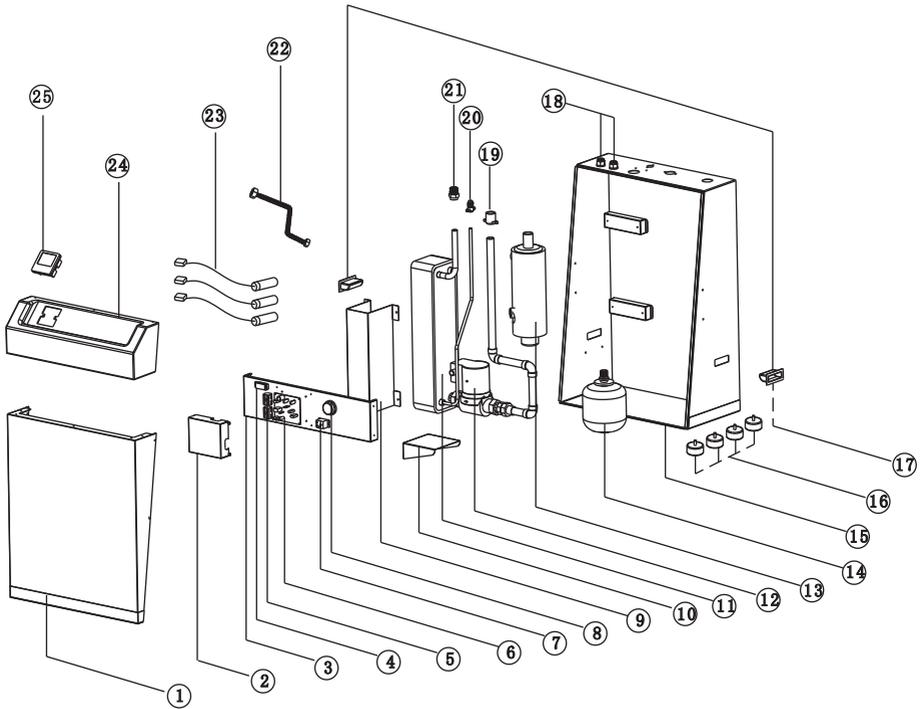
Cooling: water inlet/outlet: 12°C / 7°C, ambient temperature: DB/WB 35°C / 24°C;

Heating: water inlet/outlet 40°C / 45°C, ambient temperature: DB/WB 7°C / 6°C;

The specifications air subject to change without prior notice. For actual specifications of the unit, please refer to the specification stickers on the unit.

1.7 Exploded view

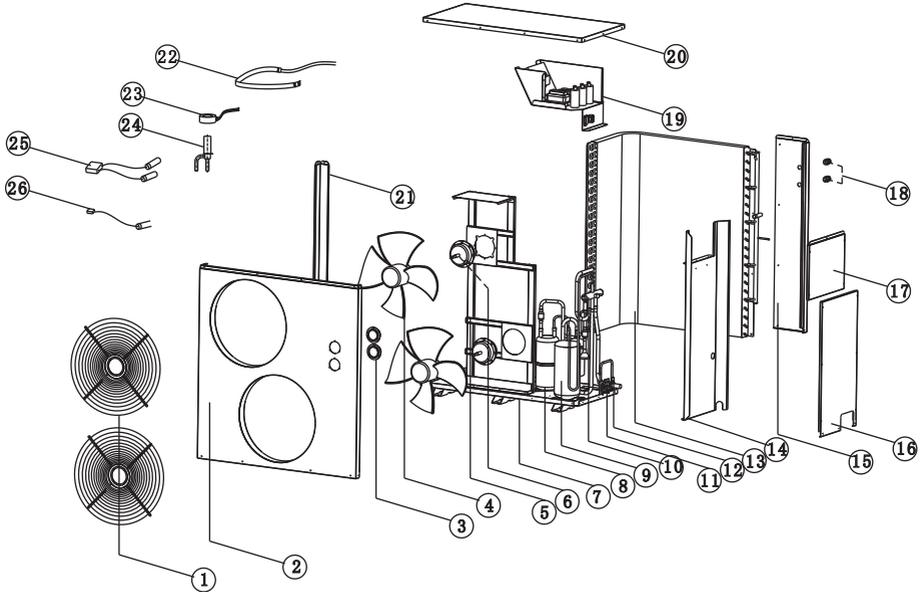
Indoor unit



NO	Name	NO	Name
1	Front panel	14	Expansion tank
2	Electric box cover	15	Gasing
3	Bracket for Electronics	16	Rubber feet
4	Wire Clip	17	Small Handle
5	Terminal block	18	Cable gland
6	Main processor PCB	19	G1" water pipe connector
7	Relay	20	3/8" refrigerant connector
8	Mechanical temp. controller	21	7/8" refrigerant connector
9	Plate heat exchanger fixture	22	Soft pipe
10	Plate heat exchanger support	23	Temperature sensor
11	Plate heat exchanger	24	Top cover
12	Water pump	25	Wired controller
13	Electric heater		

1.7 Exploded view

Outdoor unit



NO	Name	NO	Name
1	Fan guard	14	Bulkhead
2	Front panel	15	Back panel
3	Pressure gauge (High/Low pressure)	16	Valve plate
4	Fan blade	17	Maintenance panel
5	Motor bracket	18	Cable gland
6	Fan motor	19	Controller
7	Bottom plate	20	Top panel
8	Liquid receiver	21	Support
9	Compressor	22	Compressor crank heater
10	Four-way valve	23	Electronic expansion valve
11	3/8" refrigerant connector	24	Temperature sensor (dual head)
12	7/8" refrigerant connector	25	Wired controller
13	Evaporator	26	Temperature sensor (single head)

1.8 Main functions

Basic Operation Functions

The two basic operation functions are cooling and heating operations, either of which can be controlled by either room temperature or water temperature.

In cooling operation, Temperature setting range is 16°C - 31°C if you use room temperature as the index, Temperature setting range is 7°C - 25°C if you use water temperature as the index .

In heating operation, Temperature setting range is 16°C - 31°C if you use room temperature as the index, Temperature setting range is 26°C - 52°C if you use water temperature as the index .

Memory function

The unit will recover its latest working settings automatically after power failure. The compressor restart interval time is 3 minute, to protect the compressor.

Compressor crankcase heater

When the unit is powered on the first time and the compressor is not working, if outdoor ambient temp is lower than -5°C, compressor starts to preheat by itself. After compressor works, 3 hours after it stops, if outdoor ambient temp is lower than -3°C, compressor starts to preheat by itself.

When compressor is in preheating, if outdoor ambient temp is over 0°C, or unit needs to start the compressor , compressor preheating stops.

Output for external electric heater

When system runs in heating mode (heat pump), ambient temperature is below 10°C, and compressor has been running for 25 minutes, the controller will check the system temperature in every 15 minutes. The auxiliary electrical heater turns on when below conditions are met:

- A. Compressor has been running at its highest speed ;
- B. Set temperature is 3°C higher than water temperature.
- C. Water temperature rises less than 1°C in over 15 minutes.

1.8 Main functions

When water temperature reaches the preset value, and keeps stable for 1 minute or compressor stops running, this auxiliary electrical heater turns off, when system begins to do the checking as above.

Limit on Water outlet temperature (when air temperature works as the set temperature)

When WOT (water outlet temperature) $\geq 34^{\circ}\text{C}$, the controller will set a limit on compressor's running speed, with its current running speed as maximum.

When WOT $\geq 36^{\circ}\text{C}$, compressor's running speed will be lowered down towards its lowest speed, until water outlet temperature drops below 34°C . Then the controller stops lowering compressor's running speed and begin to raise it back, but its maximum speed will be one level lower than its previous speed before this lowering process.

When WOT $\leq 32^{\circ}\text{C}$ and compressor keeps on running 60 minutes without any frequency drop or system shutdown for protection, then the limit on compressor's running speed will be released.

When WOT $\geq 38^{\circ}\text{C}$ or compressor's running speed is lowered to its lowest speed but water outlet temperature is still higher than 34°C after 2 minutes, then compressor stops. After water outlet temperature drops below 32°C , compressor restarts.

Defrosting function in heating mode

When the unit works in heating, it will start defrosting automatically according to the coil temperature and defrosting interval time.

a) Defrosting operation starts when below conditions are met, when defrosting light flickers.

- 1) Condensing coil temperature below -3°C and lasts for 3 minutes.
- 2) Compressor has been running for not less than 5 minutes
- 3) Total running time of compressor is longer than interval between two defrosting operations

b) When one of below condition is met, the system quits from defrosting operation

- 1) Defrosting operation lasts more than 8 minutes;

2) Defrosting operation lasts for more than 10 seconds, and condensing coil temperature is higher than 17°C.

Evaporator overheating protection

When evaporator temperature $\geq 52^{\circ}\text{C}$, system enter into evaporator overheating protection, and compressor lowers down its running speed towards F1, until this temperature drops lower than 49°C. Then compressor takes the speed 1 level lower than its previous speed before overheating protection as its maximum running speed.

When this Temp drops down to 47°C and lasts for 5 minutes, the limit on compressor running speed will be released.

If evaporator temperature rises above 55°C and lasts for 5 seconds, then compressor stops. And it will resume its normal operation until this temperature drops down below 47°C.

Protection against Compressor' s improper operation

During compressor' s start-up or running, if the controller detects no feedback from compressor, or abnormal loads inside compressor, or improper start-up, compressor will stops for 3 minutes and then re-start. (Compressor can re-start at most three times when fed with power; if this problem still exists, the controller will judge it as compressor driving-failure, and relevant protection will be triggered. Then compressor can only be turned on after problem solved and system re-fed with power.

Protection against Improper Current

When system running current is bigger than a certain value, controller will impose relevant limits on compressor' s running frequency, then its running speed will stop rising.

When this current 0.5A smaller than this certain value, system' s running speed drops by 1Hz/second towards 30Hz, until running current is smaller than 16A.

When this current is 1A bigger than this certain value, controller will stop the compressor no matter at what speed it runs.

Compressor gas discharge temperature protection

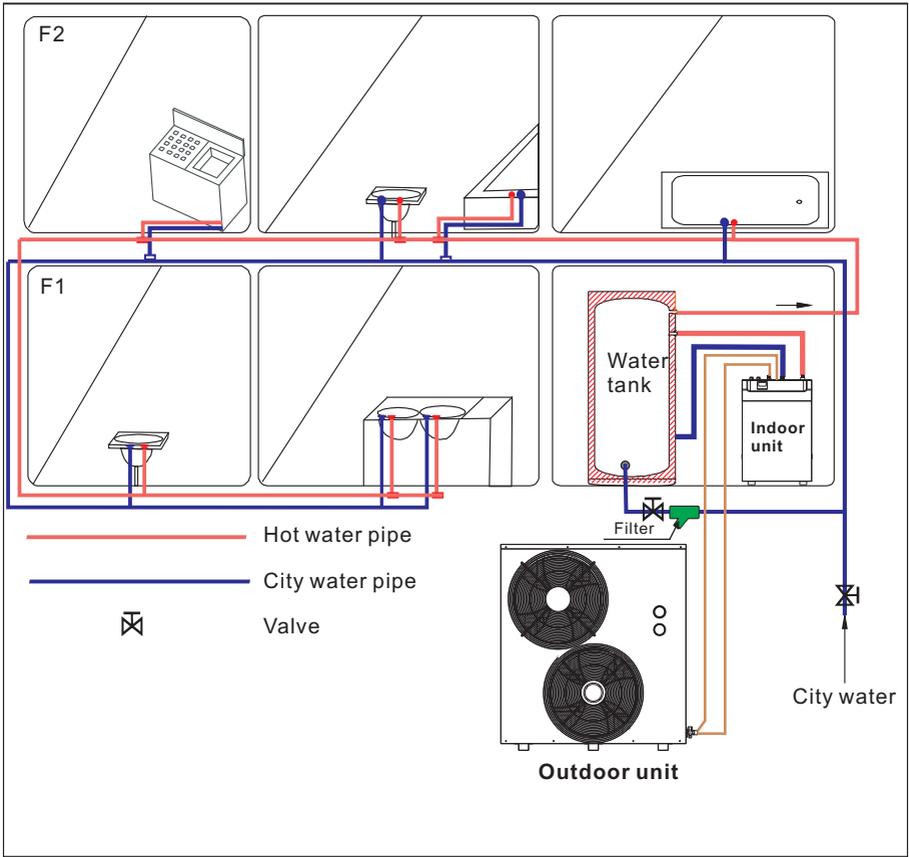
When compressor gas discharge temperature exceeds 92°C, the controller will keep its running frequency from rising. When this temperature exceeds 97°C, the controller will record the compressor's running speed, and lower it down towards 30Hz. If compressor gas discharge temperature drops below 87°C, then this process stops and controller adjusts compressor's running speed according to difference between room temperature and preset temperature; However, its maximum running frequency will be 1 level lower than recorded value.

When compressor gas discharge temp. is below 92°C and lasts for 10 minutes, its maximum running frequency will increase by 1 level. If this discharge temperature exceeds 103°C, the compressor stops, and outdoor fan motor turns off in 15 seconds. And the system turns on until gas discharge temperature drops below 90 °C and compressor has been off for 3 minutes.

Delayed Start-up of Compressor

After compressor stops, it can only restart in 3 minutes (this protection is functional in cooling mode or when system changes its operation mode between dehumidification and heating). However, when the unit is powered the first time, compressor starts up in 1 minute instead, to ensure proper communication between indoor and outdoor unit.

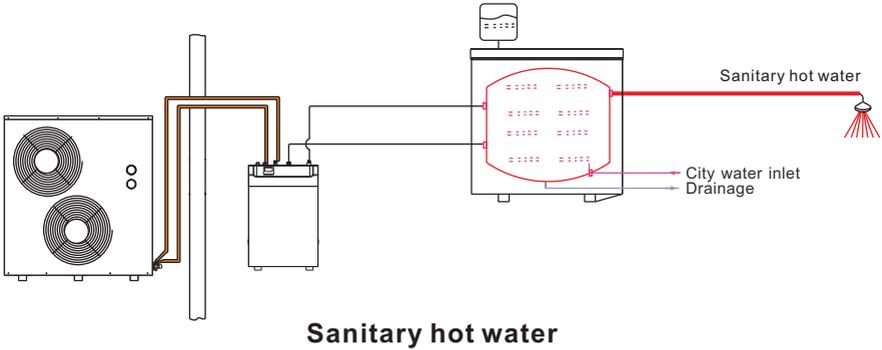
2.1 System figure



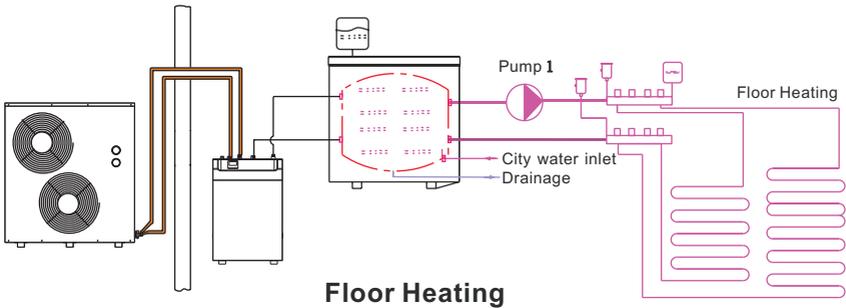
2.2 Applications

Applications

Application 1: This installation is for supplying sanitary hot water only.

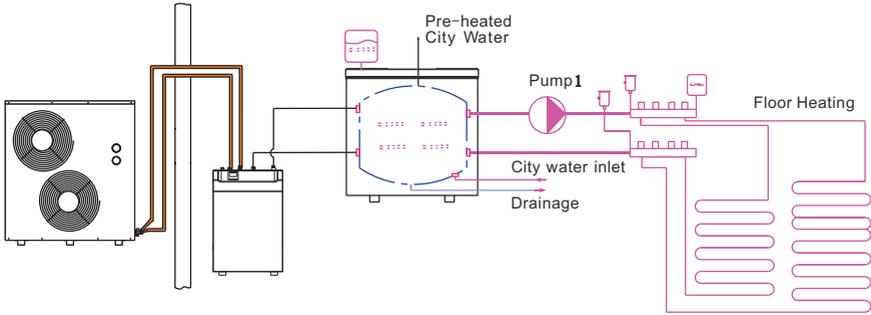


Application 2: This installation is for supplying floor heating hot water only.



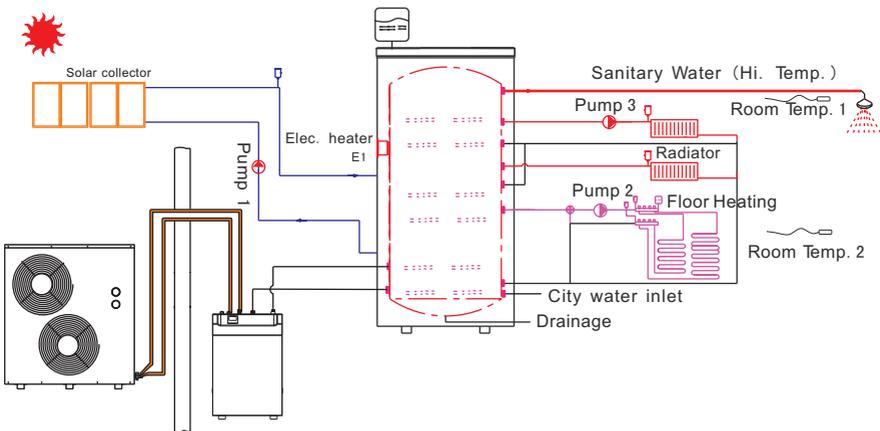
2.2 Applications

Application 3: It provides both floor heating hot water and pre-heated sanitary water.



Floor Heating and Pre-heated Sanitary Water

Application 4: It provides hot water for central house heating and hot water system.



Heat Pump and Solar System for Heating & Sanitary Water

2.3 Installation

Location of indoor unit

1. Indoor unit can be placed at any free space in the house, like the room, garage, or basement.
2. Indoor unit can be hang on the wall, or placed on a flat and solid ground.
3. Free space should be left on the device, for future maintenance.
4. Install the indoor unit close to the outdoor unit as much as possible, so to reduce the energy loss.
5. The unit should be free from corrosive and moisture surrounding. Otherwise the lifetime of the unit might be shortened.
6. Unit should be away from explosive and flammable gas and liquid.
7. Indoor unit should be away from direct sunshine. Otherwise the leifetime of LCD display maybe shortened.
8. Ensure that the electrical supply corresponds to the specification indicted on the unit's name plate. The unit must be earthed to avoid any risks caused by insulation defects.

Moving of the unit

Moving the unit by lifting two handles.



Connection of power cable

Warning:

1. It is recommended to use a suitable breaker for the heat pump and make sure the power supply to the heater corresponds to the specifications. Otherwise the unit might be damaged.
2. The power supply to the heat pump unit must be grounded.
3. Cable should be fixed tightly, to ensure it won't get loosen.

2.3 Installation

Installation of cable between indoor&outdoor unit at indoor side



1. Take off the front panel.



2. Make a four core cable ready (4*1.5mm²), and insert this cable into indoor unit through the cable gland on top of the unit.



3. Connect the cable to the terminal block. Blue cable must be connected to terminal "N", while other cables can be connected to port "R" "S" and "T" arbitrarily.



4. Fix the cable with cable fixture, and install the front panel back.

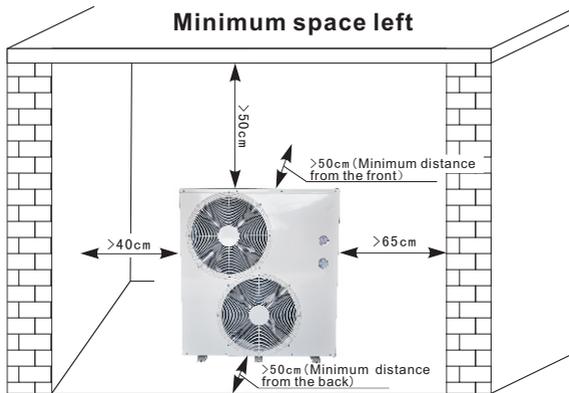
After connect the power cable to the terminal block correctly, please install the power cable clip back to lock up the power cable.



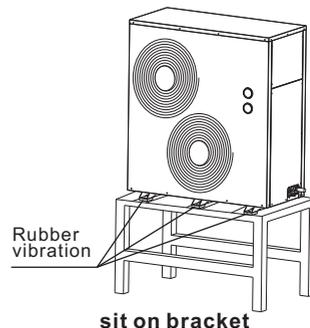
2.3 Installation

Location of outdoor unit

1. The installation, dismantlement and maintenance of the heat pump must be performed by qualified personnel.
2. Indoor unit can be placed at any free space in the house, like the room, garage, or basement.
3. The unit must be installed outdoors in an area with sufficient clearance to provide free air circulation through the coil. Please refer to the following figure to choose the right place for the unit. .



4. The unit should be free from corrosive and moisture surrounding. Otherwise the lifetime of the unit might be shortened.
5. Install the indoor unit close to the outdoor unit as much as possible, so to reduce the energy loss.
6. Unit should be away from explosive and flammable gas and liquid.
7. Ensure that the electrical supply corresponds to the specification indicated on the unit's name plate. The unit must be earthed to avoid any risks caused by insulation defects.
8. when installing the unit, introduce a tilt of 1 cm/m for rain water evacuation.
9. when installing the unit in harsh climatic conditions, sub-zero temperatures, snow, humidity.., it is recommended to raise the unit off the ground by about 20 cm .
10. Rubber vibration absorbing mountings are recommended.
11. When sitting the unit, take care to leave sufficient free space all around it for carrying out maintenance.



2.3 Installation

Cable connection of outdoor unit

Installation of cable between indoor&outdoor unit at outdoor side



1. Take off the maintenance panel on the right side of the unit.



2. Insert the cable between indoor & outdoor unit into the outdoor unit through the cable gland. Connect this cable to the 4-position terminal block.

Note: Please ensure the connection of this cable in the indoor unit corresponding to the connection in the outdoor unit.

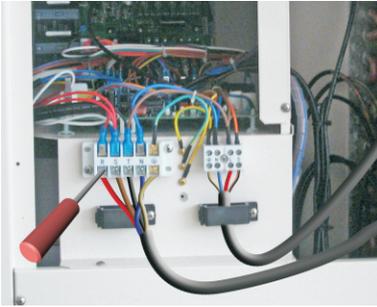


3. Fix the cable with cable fixture.

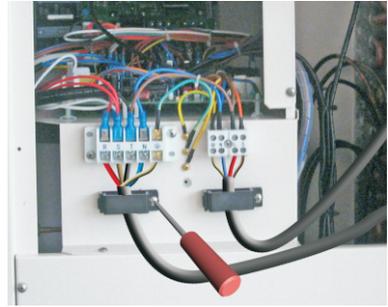


4. Make a 5 core power cable ready ($5 \times 1.5\text{mm}^2$), and insert this cable into outdoor unit by through the cable gland on the outdoor unit.

2.3 Installation



5. Connect this power cable to the 5-way terminal block in the outdoor unit. Please note blue wire must be connected to port 'N', and yellow/green cable must be connected to port "⚡".



6. Fix the power cable with cable fixture, and install back the maintenance panel.

2.3 Installation

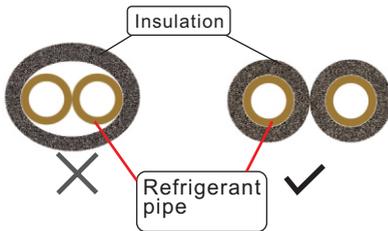
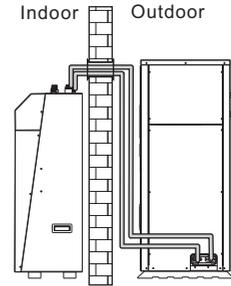
Connection of refrigerant pipe

Refrigerant pipe transfers not only the refrigerant, but also the energy, between indoor and outdoor unit. If the refrigerant system is not fully vacuummed, or gas amount is not correct, the unit performance may be influenced.

Note the followings when choosing a refrigerant pipe:

1. Ensure good quality copper pipe is used. This copper pipe must be thick enough to bear the pressure of R410A refrigerant.
2. Refrigerant pipe must be well insulated.
3. Connector of refrigerant pipe must be checked to ensure no leakage happens.
4. When pipe bending is needed, bend the pipe in a gentle way.
5. Dry the pipe before installation, to ensure no water remains

6. It is recommended to have the refrigerant pipe go through the wall by using a wall sleeve.



7. Two refrigerant pipes should be packed with insulation separately, otherwise GREAT heat loss may happen.

Installation of refrigerant pipe:

1. The size of the refrigerant pipe is $\frac{3}{8}$ "($\Phi 9.52$) and $\frac{3}{4}$ "($\Phi 19.07$). Both should be well insulated before installation.

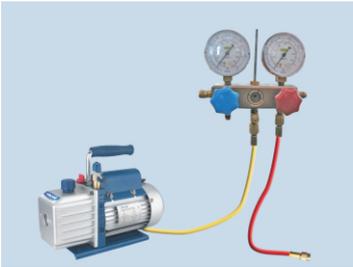
2.3 Installation



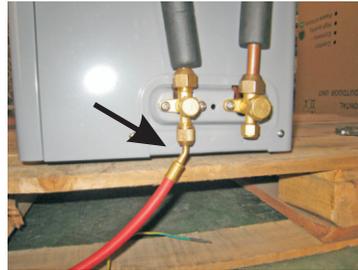
1. Connect one side of refrigerant pipe to the indoor unit.



2. Connect the other side of refrigerant pipe to the connectors on the outdoor unit, as shown in the picture.



3. Make a vacuum pump and pressure gauge set ready. Connect one soft pipe of the pressure gauge to the vacuum pump.



4. Connect the other soft pipe of pressure gauge set to the unit, as shown in the picture. Open the pressure gauge and start the vacuum pump.



5. Vacuum the unit by at least 10 minutes. Close the pressure gauge and stop the vacuum pump, till minus pressure shown on the pressure gauge ($<0\text{Mpa}$).

2.3 Installation



6. Take off the copper nuts on both connectors, and open both connectors by using a hex wrench. Be ensure that both connectors are fully opened.



Size of Hex Wrench:5mm

Note: Connectors can only be opened after vacuum finished!

7. Install the copper nuts back.



Leakage detecting

Put some suds on all connectors of indoor and outdoor unit, for leakage detecting after installation.

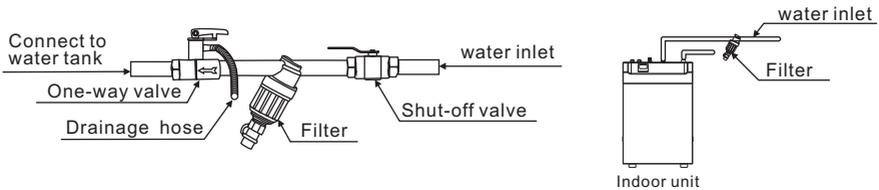
2.3 Installation

Water pipe connection

The designing, installation, commissioning and maintenance of water system should be performed by professional installer having good knowledge of standards and local regulations, as well as experience of this type of equipment.

Filter installation

A mesh filter must be installed in front of the water inlet of the unit and water tank, for keeping the water quality and collecting impurity contained in the water. Take care to keep the water filter mesh towards the bottom. Check valve is recommended to be installed at both sides of the filter, so as to clean or change the filter in a easier way.



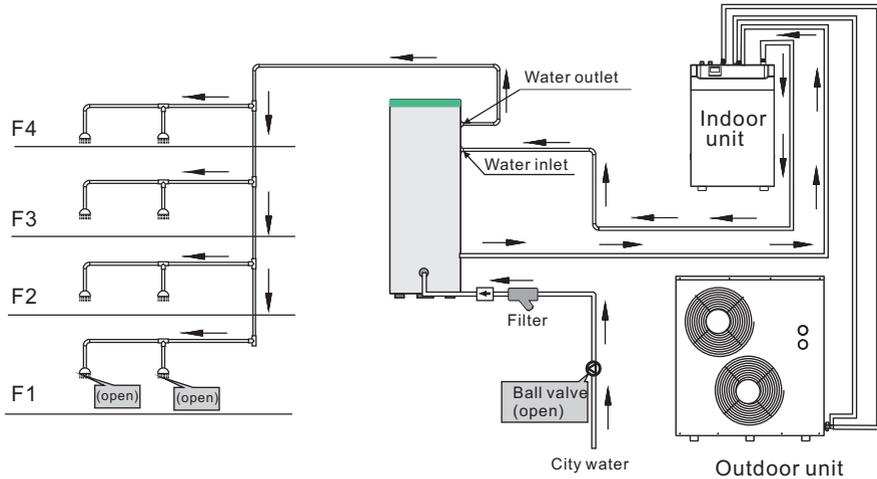
Note : All the hot water pipe and water connections should be insulated, to reduce the energy loss.



Please ensure the flow rate of the water system should be no lower than the minimum allowable flow rate required by the unit. Add one pump to the water system, if flow rate is too small().

2.4 Air purging figure

Air purging figure



Air purging

The whole water system of this unit should be a closed water system. Because of this, please purge the air inside as following after all the water pipe connection work finished:

1. Open the water tap at the lowest level, so the air inside the sanitary water system can be purged out by the pressure of water.
2. Open the filling valve to fill the whole water tank and the water system with water (this process may take around 20 minutes).
3. Close all the valves when there is water coming out from the end of the water system.
4. Air purging finished!

Note: *If the water supply is cut off, the unit will show protection code on its screen. The customer should cut the power off till the water coming again. It is necessary to purge the air again when restart the unit after the water was cut off.*

2.5 Pre Start-up

Pre Start-up

Before starting up the unit, a certain number of verifications must be performed on the installation to ensure that the unit will operate under the best possible conditions. The check list below is not exhaustive and should only be used as a minimum reference basis:

1. Make sure fan rotates freely.
2. Inspect all water piping for flow direction.
3. Verify all system piping is correct for operation as per installation requirements.
4. Check voltage of the unit power supply and make certain voltage is within authorized limitations.
5. Make sure the unit is properly grounded.
6. Check the presence of protective and breaking devices.
7. Check all electric connections for tightness.
8. Check all piping for leaks and air is well ventilated.

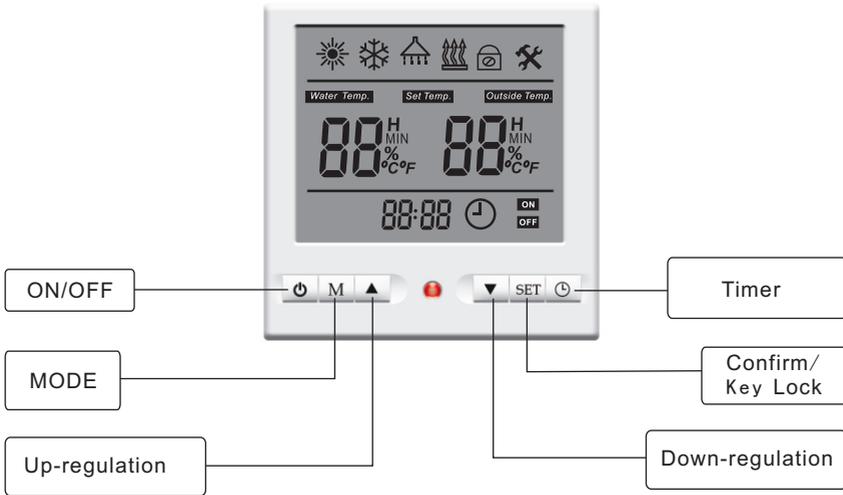
Unit Start-up

After ensuring all electric connections conform to the local regulations, follow the Operation Instructions to start-up the unit.

After start-up the unit, if there is an abnormal sound, please shut off the power supply immediately to ensure the safety of the unit.

3.1 Introduction of operation panel

Introduction of operation panel



Display	Meaning	Function
	Heating	When the unit works in heating mode , is ON.
	Cooling	When the unit works in cooling mode , is ON.
	Hot water	When the unit works in hot water mode , is ON.
	Defrosting	When the unit works in defrosting , is ON.
	Key lock	When buttons are locked , is ON.
	Parameter setting	When parameter setting is activated , is ON.
	value or code	To display temperature, timer, parameter, error code and so on.
	Time	The unit will clear its clock time when power failure happens.
	Water temperature	When water temperature mode is activated , is ON.

3.2 Operation instruction

INSTALLATION AND INSTRUCTION

	Set temperature	When changing the set temperature, Set Temp. is ON.
 	Timer function	When timer function is activated,   is ON.

1 Standby

The unit is standby when it is fed with power.

※The unit will clear its clock time when power failure happens. The customer needs to set the time again.



2 ON/OFF

When the unit is standby, press  to turn on the unit. The unit will work in its last working mode. Press  again to turn off the unit.

※ The unit will recover its latest working settings automatically after power failure.



3 Mode selection

Keep on pressing  button to choose water temperature or air temperature as the set temperature. When water temperature works as the set temperature, **Water Temp.** is ON; When air temperature works as the set temperature, **Water Temp.** is OFF.



4 Mode selection

Press  to choose the unit operation mode. It comes in the sequence:  (Heating) →  (Cooling) →  (Hot water).

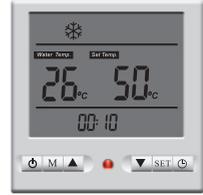


3.2 Operation instruction

INSTALLATION AND INSTRUCTION

5 Temperature setting

When the unit is ON, press ▲ once, the set temperature increases by 1°C; press ▼ once, the set temperature decreases by 1°C. Keep on pressing ▲ or ▼, the temperature can be increased or decreased by 5 °C. When changing the set temperature, **Set Temp.** is ON.



6 Parameter setting

When power is fed and unit is off, press ▲ or ▼ to choose target Parameter.

Press **SET** to activate parameter setting process when parameter flickers. User can set its value with button ▲ or ▼; Press **SET** again to confirm the setting work, otherwise the setting Value will not be saved. and the system will exit this parameter Setting program automatically in 10 seconds, or by pressing **⏸**.



Parameter 1

Parameter 1 indicates the local time. The time is always presented in the 24-hour system



Parameter 2

This parameter has no function in this unit.



Parameter 3

Parameter 3 indicates the duration time for back light. It can be set to 00, 10, 20, and 30. While 00 means the back light is always ON, and 10, 20, and 30 means the duration time for back light is 10 seconds, 20 seconds and 30 seconds.

3.2 Operation instruction

INSTALLATION AND INSTRUCTION

7 Timer function

To set the ON timer, press button. turns on and blinks. Press to set the timer in hours, and to set the time in minutes. After it is done, press to confirm the ON timer setting and enter the OFF timer setting, with blinks. Set the OFF timer by pressing and . After this done, press to confirm the OFF timer setting, with shown on the operation panel, indicating that the timer setting is finished.



If the ON timer or OFF timer setting is not confirmed by pressing , the setting value is not saved.

The timer setting can be cancelled by keeping on pressing , with fading from the operation panel.



▲Timer ON

Timer ON setting doesn't function when the unit is working. It will be activated when the unit is turned OFF.



▲Timer OFF

Timer OFF settings only functions after the unit starts. It can be activated when the unit is turned ON.

8 Key lock

When the unit is ON, press for 5 seconds, to lock all the buttons, with shows. Press for 5 seconds again, to unlock all the buttons.



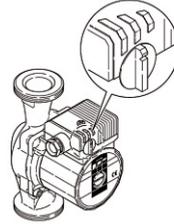
3.3 Setting the pump speed

Setting the pump speed

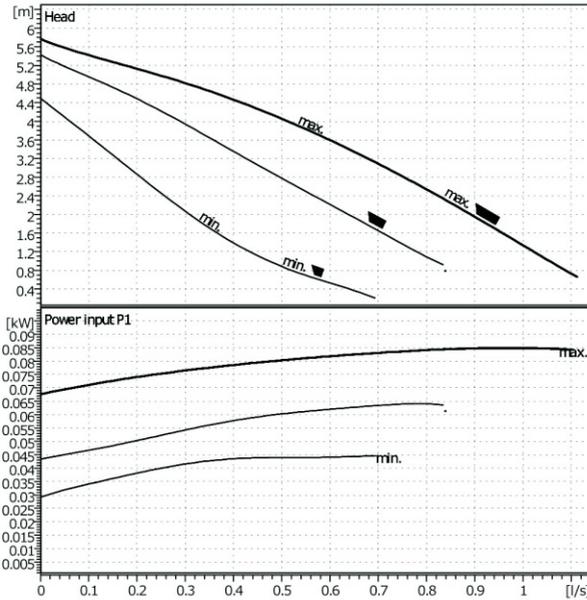
The pump speed can be selected on the pump.

The default setting is highest speed (III). If the water flow in the system is too high (e.g.: noise of running water in the installation) the speed can be lowered (I / II).

The available external static pressure (ESP, expressed in mH_2O) in function of the water flow (l/min) is shown in the graph below.



water pump performance curve



4.1 Failure codes

Failure codes

Error Codes	Causes	Ways to check and remedies
E0	1.Wire connection between wired controller and PCB open or short-circuited	1.Check whether the wire connection gets loose. Fasten it.
	2.Wired controller failure.	2.Change it.
E1	1.Wire connection between wired controller and PCB open or short-circuited	1.Check whether the wire connection gets loose. Fasten it.
	2.Wired controller failure.	2.Change it.
E2	1. temp. sensor open or short-circuited	1. Measure with a multimeter at 20K to check whether it is short-circuited or open. If yes, change it..
	2.temp. sensor resistance drifting	2.Measure with a multimeter at 50K to check the sensor resistance. Take ambient temp. into consideration. If it is drifting, change it.
	3.Temperature sensors not well connected to the wired controller.	3.Check whether the sensor connection gets loose. Fasten it.
F2	1. water inlet Temp sensor failure	1. Check whether the sensor connection gets loose. Fasten it. 2. Wire connection between wired controller and indoor PCB open or short-circuited. 3. water inlet Temp sensor resistance drifting.
	2. water outlet Temp sensor failure	1. Check whether the sensor connection gets loose. Fasten it. 2. Wire connection between wired controller and PCB open or short-circuited. 3. water outlet Temp sensor resistance drifting.
	3. Coil Temp sensor failure	1. Check whether the sensor connection gets loose. Fasten it. 2. Wire connection between wired controller and indoor PCB open or short-circuited. 3. Temp sensor resistance drifting. temp. sensor resistance drifting.
F1	Communication failure	1. Check whether port gets loose. Fasten it. 2. Change the PCB. 3. Change the outdoor PCB
F4	Compressor drive failure、IPM failure、IPM protection (overload)、drive protection	1.Check whether PFC transducer gets loose. Fasten it. 2.Change PFC transducer.
F3	Current or Voltage detector failure	1.Change PCB
F5	EEPROM failure	1. Check whether EEPROM gets loose. Fasten it. 2.Change EEPROM

4.1 Failure codes

F6	Too high coil Temp in heating	1. Check the water flow of the unit 2. Too high ambient and water Temp. Reduce the set water Temp.
	Too high pipe Temp in cooling	1. Check the water flow of the unit 2. Too low ambient and water Temp. Increase the set water Temp.
	Over-current protection	1. Check the water flow of the unit. 2. Too high (low) ambient, and too high (low) set water Temp. Decrease or increase the set water Temp.
F7	Too high or too low voltage	1. Check the voltage of the power supply. 2. Change the outdoor PCB
F8	Pressure switch failure	1. Check the pressure of the system 2. Change the pressure switch
F9	EEPROM failure	1. Check whether EEPROM gets loose. Fasten it. 2. Change outdoor EEPROM
Fb	Ambient temp. sensor failure	1. Check whether the sensor connection gets loose. Fasten it.
	Pipe temp. sensor failure	2. Wire connection between wired controller and PCB open or short-circuited.
	Compressor discharge temp. sensor failure	3. Temp sensor resistance drifting.
Fc	System protection caused by too high (low) pressure	1. Measure the high (low) pressure switch with a multimeter to check whether it is short-circuited or open. If yes, change it. 2. Check the water flow of the unit.
Fd	System protection caused by the ambient Temp.	1. Check the ambient Temp sensor. 2. Check whether the ambient Temp is too high (low) for working (Ambient lower than -1°C or higher than 65°C in cooling, lower than -25°C or higher than 33°C in heating).

Maintenance

1. It is forbidden to change the inner structure and wiring of the unit. Otherwise injury of person or unit damage might happen.
2. If the unit fails to work properly, please cut the power supply immediately. The maintenance work must be performed by qualified people.
3. "Failure check list" in this manual is helpful to find out and fix the failure of the unit.
4. After long time running, the evaporator coil may get dirty, which will affect the performance of the unit. It is suggested to clean the surface of the coil occasionally.

4.2 Maintenance

Maintenance of the electric components

For maintenance of electric components in indoor unit:



Figure 1

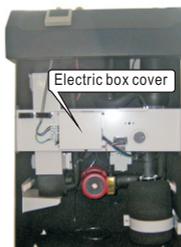


Figure 2

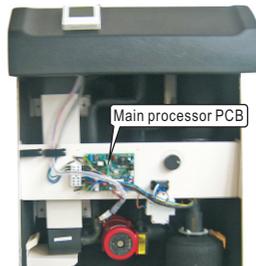


Figure 3

1. Cut off the power supply.
2. Take off the front panel.
3. For maintenance of main processor PCB, please open the electric box cover.

For maintenance of electric components in outdoor unit:



1. Cut off the power supply.
2. Take off the maintenance panel.
3. Take off the electric cover .
4. Do the checking of electric components.

4.2 Maintenance

Condenser Coil

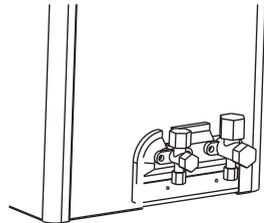
The condenser coils do not require any special maintenance, except when they are clogged by paper or any other foreign bodies. Cleaning is by washing with detergent and water at low pressure, and then rinsing with clean water:

1. Before cleaning, make sure the unit is off.
2. Inner of the unit must be cleaned by qualified person.
3. Do not use gasoline, benzene, detergent etc. to clean the unit. And do not spray with insecticide. The unit may be damaged. The cleanser special made for air conditioner cleaning is recommended.
4. Spray air conditioner cleanser into the coils. Let the cleanser sit for 5~8 minutes.
5. Then, spray the coil with clean water.
6. An old hairbrush works well for brushing surface dirt and lint off the fins. Brush in the same direction as the slots between the fins so the bristles go between the fins.
7. After cleaning, use a soft and dry cloth to clean the unit.

Gas Charging

even under severe operating conditions. If your unit needs recharging, then it has a leak, and adding refrigerant will not solve the problem. The leak must be located and repaired.

1. Gas charging must be performed by qualified person.
2. One can find out whether the system has enough refrigerant inside by checking the low pressure inside the system.



Cleaning of the filter

The Y-filter must be cleaned occasionally to ensure the water flow of the water system.

4.3 Trouble shooting

Trouble shooting

Malfunction	Possible Causes	Remedies
Heat pump unit is out of operation	1. Power supply cut-off	1. Check the power supply.
	2. Power fuse burnt out	2. Check whether the unit is well grounded. If yes, check the fuse and change it if necessary.
	3. Unit protection	3. If the protection is caused by the failure, please refer to the failure code list and fix the failure before restarting the unit.
	4. Loose connection of power cables	4. Check the connections.
	5. Compressor failure	5. Replace the compressor.
Fan is out of operation	1. Fan motor wire loose	1. Check the wire connections.
	2. Fan motor burnt	2. Change the fan motor.
	3. Fan motor relay fails	3. Change the fan motor relay.
Low heating capacity	1. Coil fins are dirty	1. Clean the evaporator coil
	2. Air inlet/outlet blocked	2. Remove any object that blocks the air circulation of the unit.
	3. Lacking of refrigerant.	3. Inspect the unit for leakage and fix it if any. Discharge all refrigerant and charge the unit again with right amount.
Too high noise from the water pump, or no water flow when the water pump is running.	1. Lacking of enough water.	1. Check the water filling device. Fill the system with enough water.
	2. Air inside the water system.	2. Purging the air out.
	3. Water valve closed.	3. Check all the valves to ensure they are fully opened.
	4. Filter is blocked	4. Clean the filter
Too high compressor discharge pressure	1. Too much refrigerant.	1. Discharge all refrigerant and charge the unit again with right amount.
	2. Air inside the refrigerant system.	2. Discharge all refrigerant and charge the unit again with right amount.
	3. Too small water flow	3. Check the water flow of the system. Use a bigger pump if necessary.
	4. Too high water temperature	4. Check the value of the water temperature sensor, to ensure it works properly.
Too low suction pressure	1. Drier filter blocked	1. Change the drier filter
	2. Expansion valve failure	2. Check and replace the expansion valve.
	3. Lacking of enough refrigerant	3. Inspect the unit for leakage and fix it if any. Discharge all refrigerant and charge the unit again with right amount.

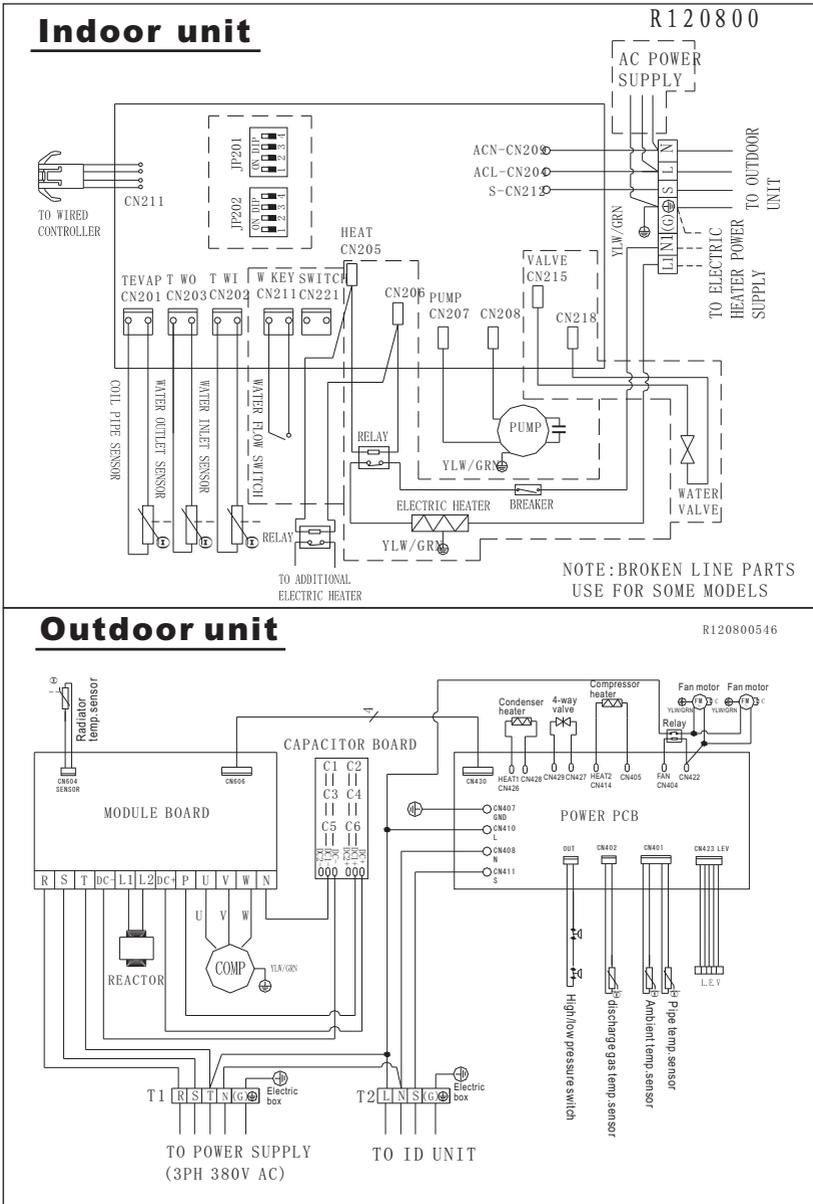
4.3 Trouble shooting

Unit can not defrost properly	1.Coil temperature sensor failure	1.Check the position and value of the coil temperature sensor. Replace it if necessary.
	2.Air inlet/outlet blocked	2.Remove any object that blocks the air circulation of the unit. Clean the evaporator coil occasionally.

The following phenomenon may not be problems. Please contact with a professional maintenance staff.

NO	Malfunction	Possible Causes
1	The unit is not running	1. May be caused by compressor restart protection. The interval time of compressor restart is 3 minutes. 2. Please check whether the circuit breaker, the power supply is open.
2	The unit is too noisy	When the unit is running, if sound of the running water can be heard from the system of the unit, it is the sound of running of the refrigerant. This is not a failure.
3	The unit output is too small	Check whether the air inlet/outlet is blocked. Check whether the temperature setting is too high in cooling mode, or too low in heating mode. Check whether the room is too big. Check whether there are too many people inside the house when unit is in cooling operation.

5.1 Wiring diagram



TAKE CARE!

This diagram is correct at the time of publication. Manufacturing changes could lead to modifications. Always refer to the diagram supplied with the product.

