Preface - About Products and the Manual

[Manual Use]

This manual introduces the product overview, installation guide, controller, start-up commissioning, maintenance and troubleshooting of air-cooled fixed-frequency room air conditioners, and provides users with information such as usage, operation and maintenance.

[Use Objects]

- ✧ Technical support engineer
- ✧ Service engineer
- ✧ Selling engineer
- ✧ Commissioning engineer

[Exemption Clauses]

1. Beyond the free warranty period;
2. Dismantling or modifying products without authorization;
3. Violation of product operation or use specifications;
4. Man-made fault;
5. Loss caused by force majeure or other external factors on the client side.
   - ✧ **Note:** Any of the above exemption clauses will not be covered by warranty.

[Related Descriptions]

1. This manual is provided with the product. Please keep it properly so that you can check it at any time when necessary. In case this manual is accidentally lost or damaged, please ask the manufacturer or local distributor directly.
2. This manual is written for air-cooled products, and the contents may not be applicable to other models;
3. Due to product version upgrade or other reasons, the contents of this manual will be updated irregularly. Unless otherwise agreed, this manual is only used as a guide, and all statements, information and suggestions in this manual do not constitute any express or implied guarantee.
4. Any changes to the contents shall not be noticed otherwise.

Contents

Chapter 1 General Introduction

1.1 Product Introduction

About the Product

Large room precision air conditioner is an intelligent temperature control product specially designed and developed for large and medium-sized data centers, computer rooms, communication computer rooms, equipment rooms and other application places. With innovative design scheme and intelligent control system, it can accurately control the temperature and humidity and create an ideal environment for the key infrastructure of data centers.

Model

The whole series of models adopt modular frame design, and are divided into upflow supply, plenum supply and downflow supply according to the air supply mode. They are divided into normal temperature indoor units and low temperature indoor units according to whether low temperature components are configured or not, which can meet different types of customer needs.

Refrigerating Capacity

The range of refrigerating capacity of this product: 25kW-100kW.

1.2 Main Components

The indoor unit is mainly composed of compressor, evaporator, expansion valve, EC fan, controller, heater, humidifier, air filter, filter drier and sight glass, etc.

1. Compressor - totally enclosed scroll compressor with superior reliability and efficiency.
2. Evaporator - a finned tube heat exchanger with high-efficiency internal threaded copper tube and aluminum fins plated with hydrophilic layer is adopted with the application of flow field analysis and optimized matching design, thus the heat exchange efficiency is greatly improved;
3. Expansion valve - electronic expansion valve is adopted, which has the characteristics of fast response, high adjustment precision, high efficiency and energy saving.
4. EC fan - the backward centrifugal EC fan is adopted, which saves more than 30% energy than ordinary fans.
5. Controller - 10-inch high-end capacitive touch true color screen is adopted, which is simple, and supports the display of temperature and humidity curve and graphic status; with linkage and group control functions, the

group control adopts high-speed and flexible CAN communication protocol, and no less than 64 units in the same area can be controlled and managed in a unified way.

6. Heater - PTC heater is adopted, which has the characteristics of fast heating start-up, large heating amount and even heat dissipation.
7. Humidifier - automatic control, energy and water saving, automatic drainage, automatic cleaning, cleanliness and sanitation and convenient maintenance.
8. Air filter - filter dust and impurities in the air to ensure the cleanliness of the environment.
9. Filter Drier - it can remove the moisture in refrigerant pipeline, filter impurities, effectively reduce the damage probability of system components, and ensure the efficient and reliable operation of components.
10. Sight glass - the circulating window of the system, which is mainly used to observe the refrigerant state and moisture content of the system.
11. Crankcase heater - used to heat the oil pool of compressor crankcase. The heating belt must be energized for at least 12 hours before starting.
12. Differential pressure switch - when the filter screen is blocked, the differential pressure sensor can trigger an alarm to prompt cleaning and replacement.
13. Temperature and humidity sensor - built-in return air temperature and humidity sensor.

1.3 Product Specifications

1.3.1 Outer size and net weight of the indoor unit

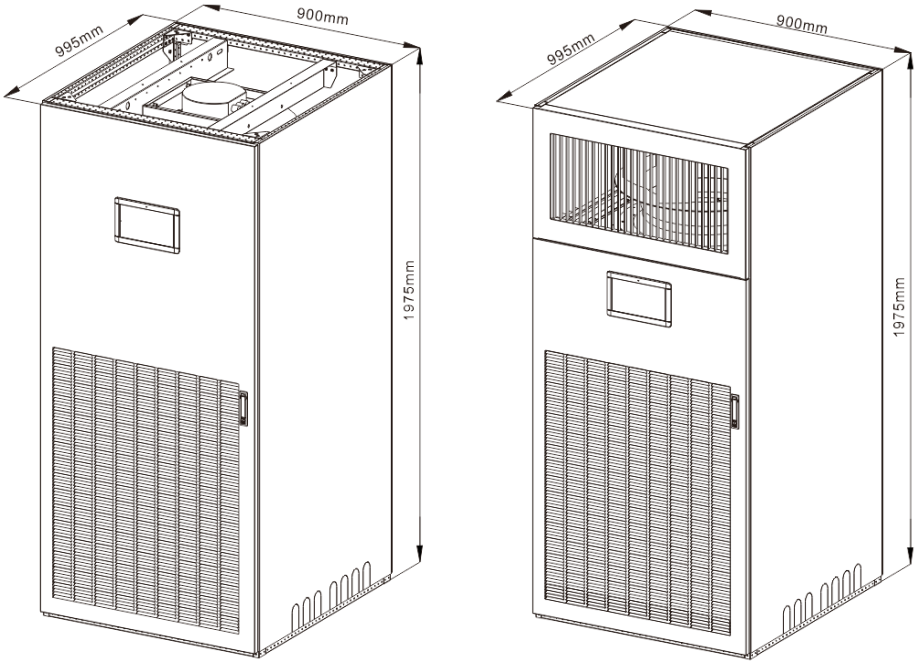
Table 0-1 Outer Size and Net Weight

Type	Model	External dimension (mm)W×H×D	Net weight (kg)
Indoor unit	25kW	900×1975×995	320
Indoor unit	30kW	900×1975×995	325
Indoor unit	35kW	900×1975×995	350
Indoor unit	40kW	900×1975×995	370
Indoor unit	45kW	1100×1975×995	450
Indoor unit	50kW	1100×1975×995	470
Indoor unit	50kW (dual sys.)	1200×1975×995	550
Indoor unit	60kW (dual sys.)	1800×1975×995	600
Indoor unit	70kW (dual sys.)	1800×1975×995	650
Indoor unit	80kW (dual sys.)	1800×1975×995	690
Indoor unit	90kW (dual sys.)	2200×1975×995	850
Indoor unit	100kW (dual sys.)	2200×1975×995	880

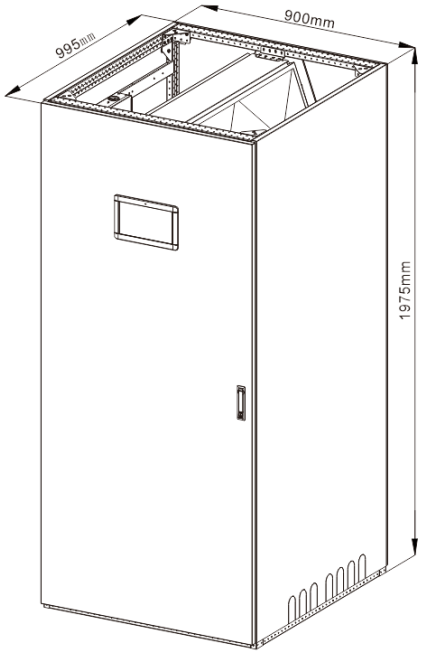
[**Note:** W-width; H-height; D-depth]

1.3.2 Outer size of the indoor unit

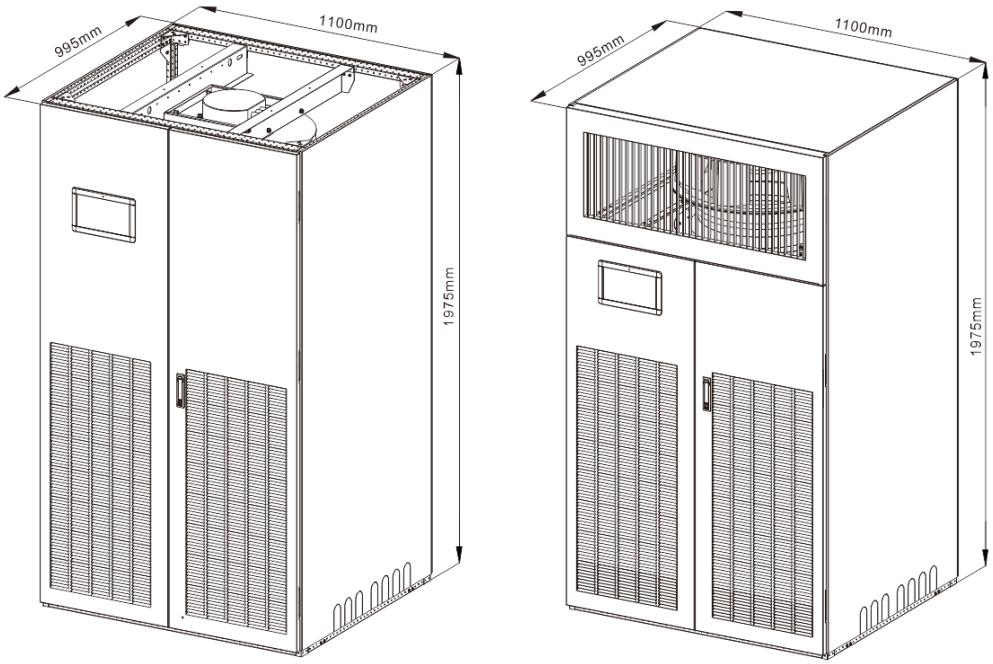
Outer size of the indoor unit is shown as the following figure.



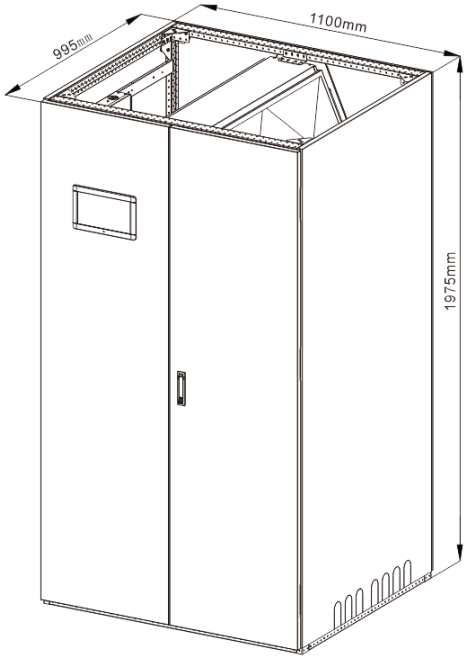
Outer Size Diagram of the Upflow Supply Indoor Unit with the Width of 900mm



Outer Size Diagram of the Downflow Supply Indoor Unit with the Width of 900mm

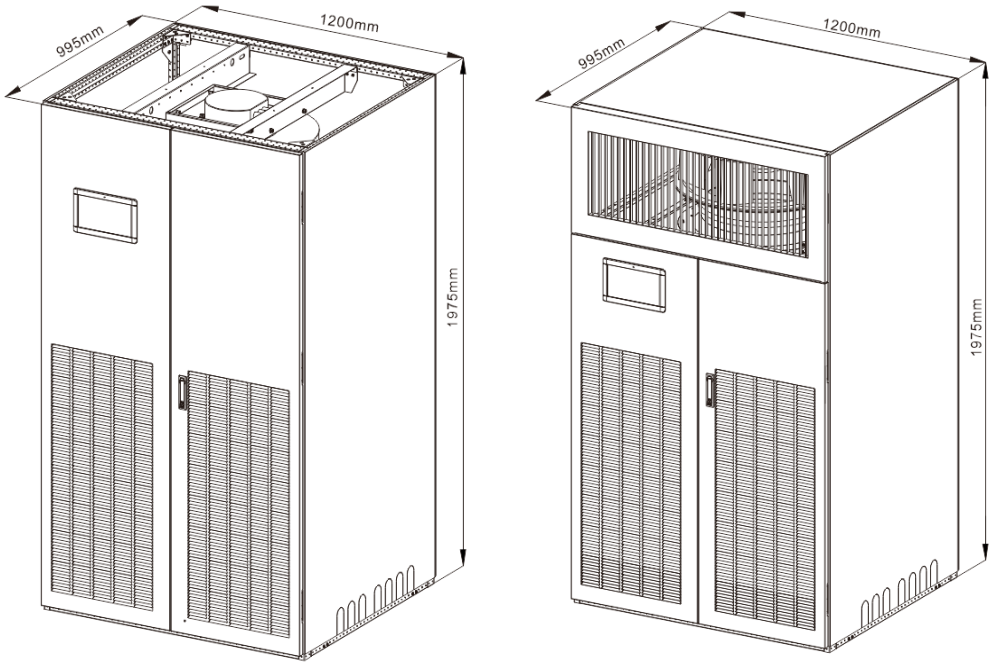


Outer Size Diagram of the Upflow Supply Indoor Unit with the Width of 1100mm

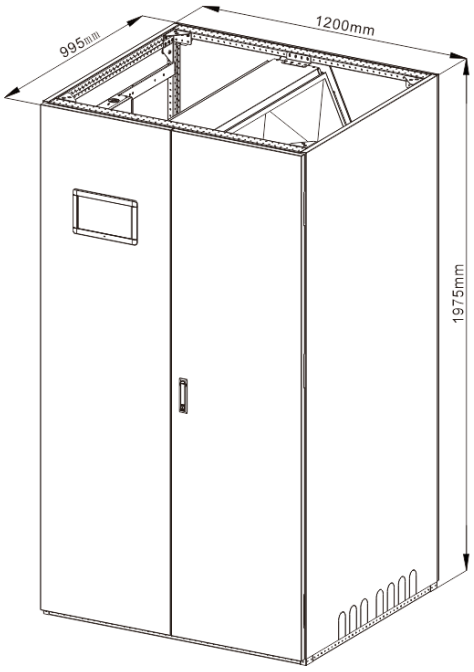


Outer Size Diagram of the Downflow Supply Indoor Unit with the Width of 1100mm

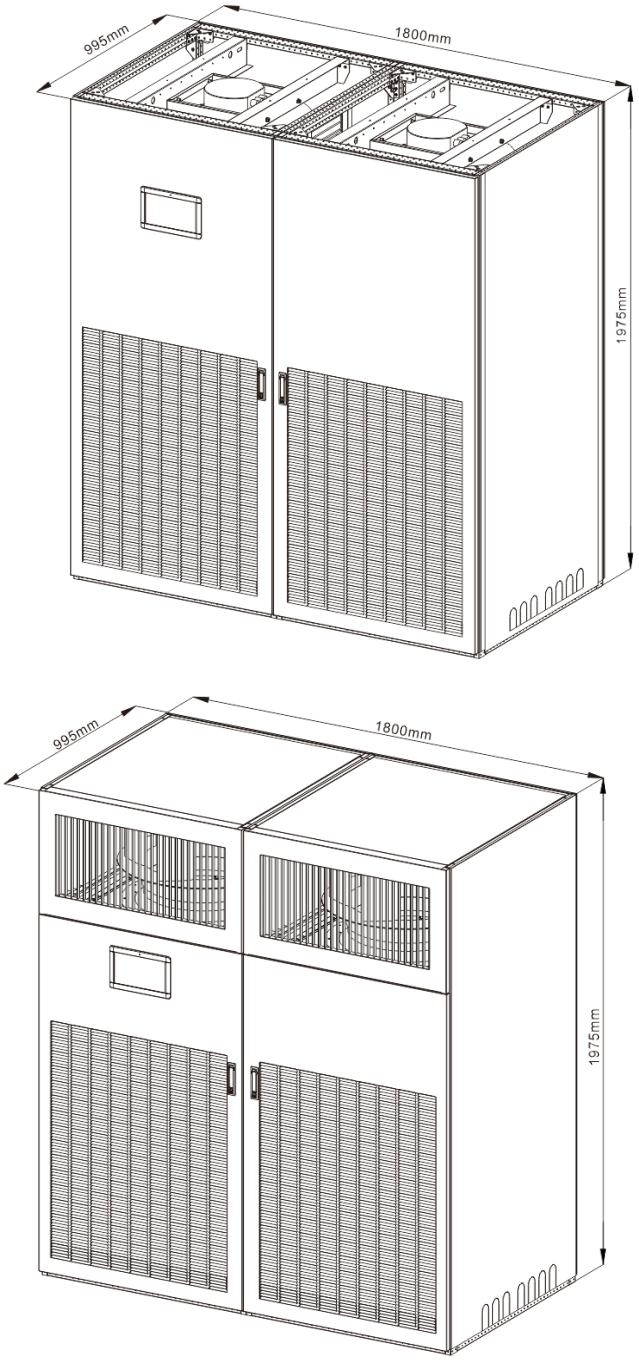
Fig. 1-1 Outer Size Diagram of 25-50kW Single System Room Air Conditioner Indoor Unit



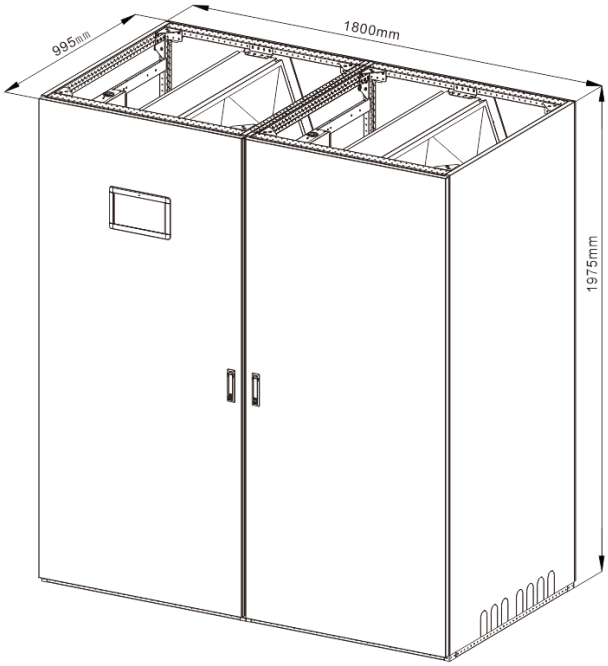
Outer Size Diagram of the Upflow Supply Indoor Unit with the Width of 1200mm



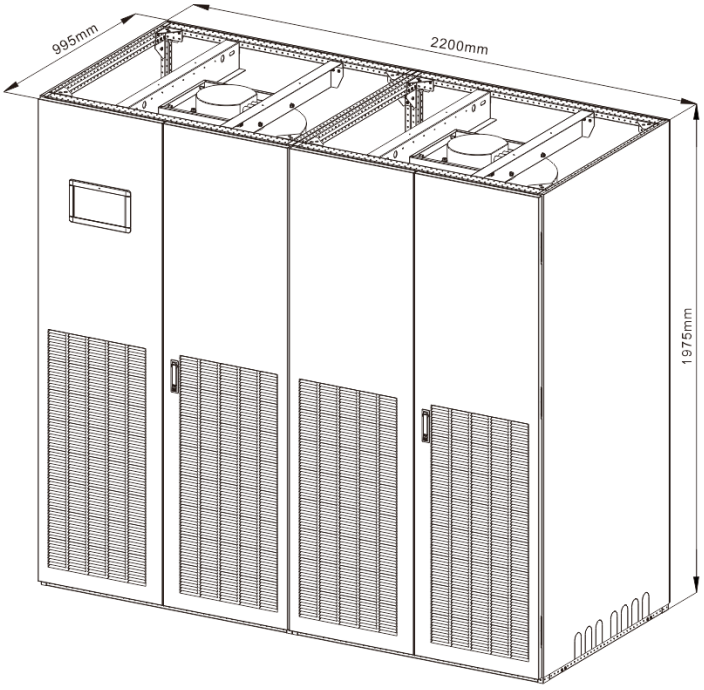
Outer Size Diagram of the Downflow Supply Indoor Unit with the Width of 1200mm

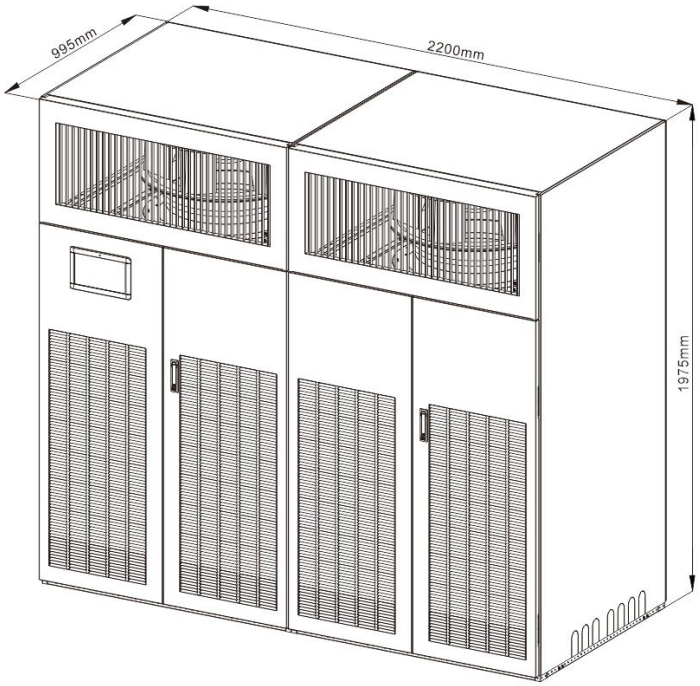


Outer Size Diagram of the Upflow supply Indoor Unit with the Width of 1800mm

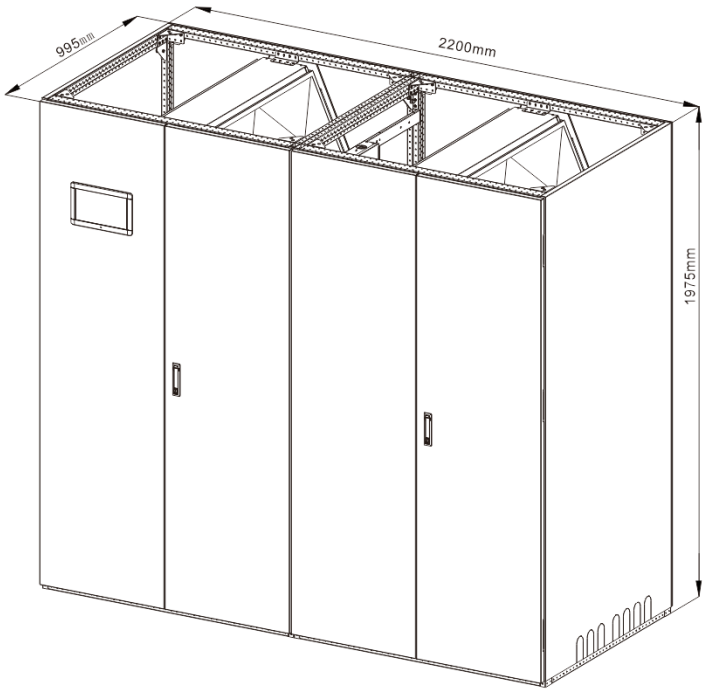


Outer Size Diagram of the Downflow Supply Indoor Unit with the Width of 1800mm





Outer Size Diagram of the Upflow Supply Indoor Unit with the Width of 2200mm

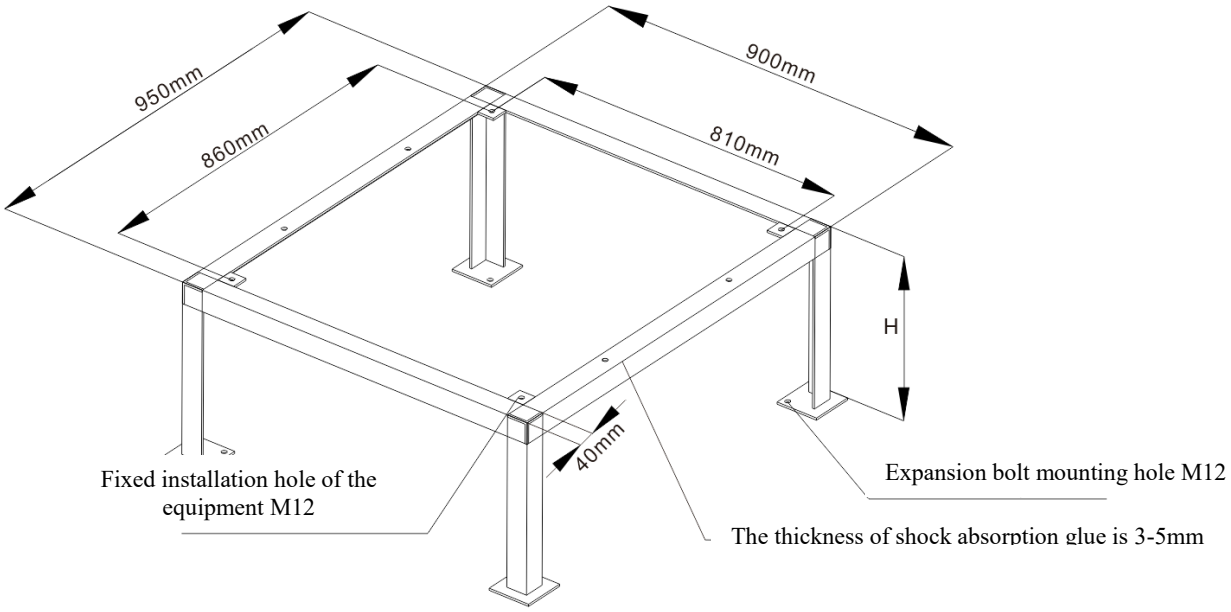


Outer Size Diagram of the Downflow Supply Indoor Unit with the Width of 2200mm

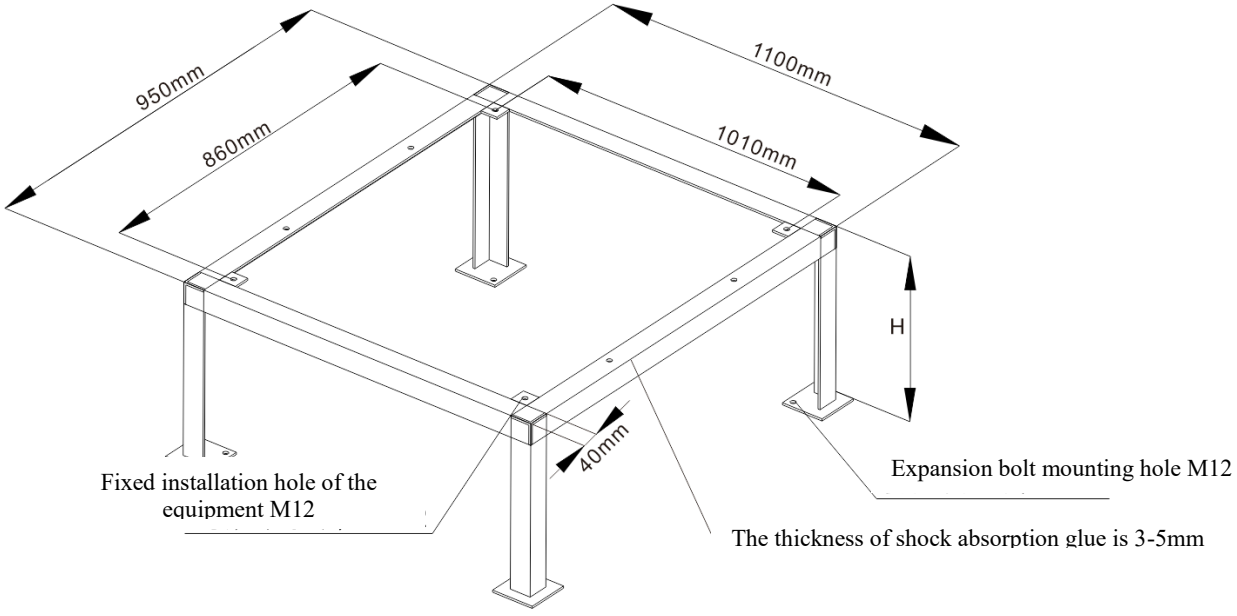
Fig. 1-2 Outer Size Diagram of 50-100kW Dual System Room Air Conditioner Indoor Unit

1.3.3 Outer size of the floor stand

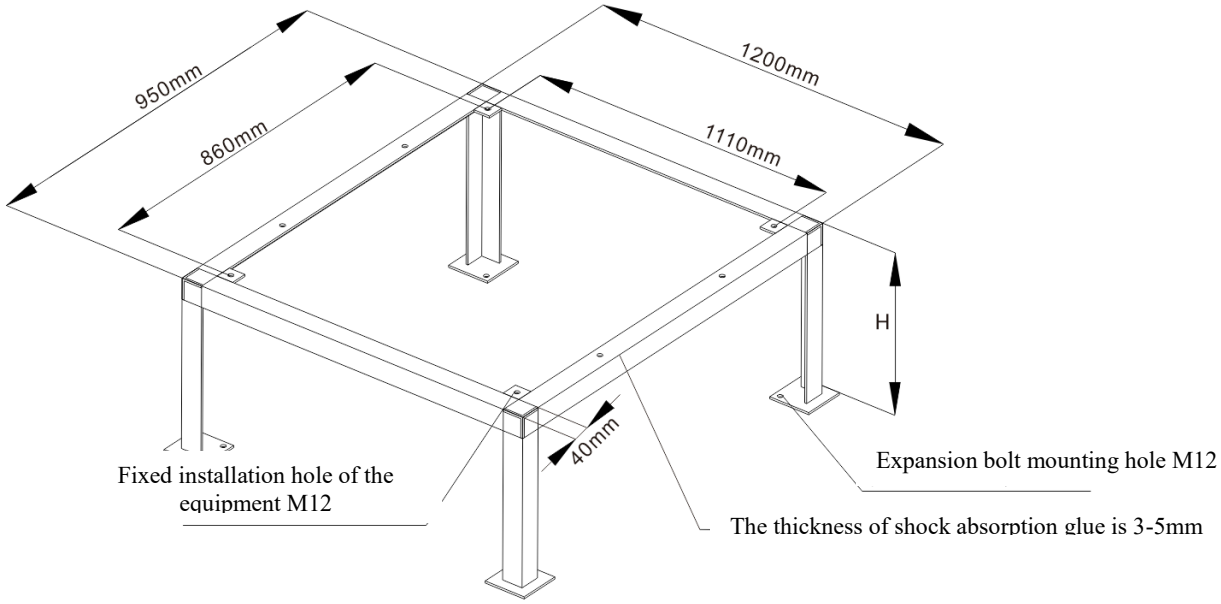
Air-cooled room air conditioner needs to be installed on the floor stand. Users can make the floor stand according to the size diagram of the floor stand in Fig. 1-3 and the suggested specifications in Table 1-2.



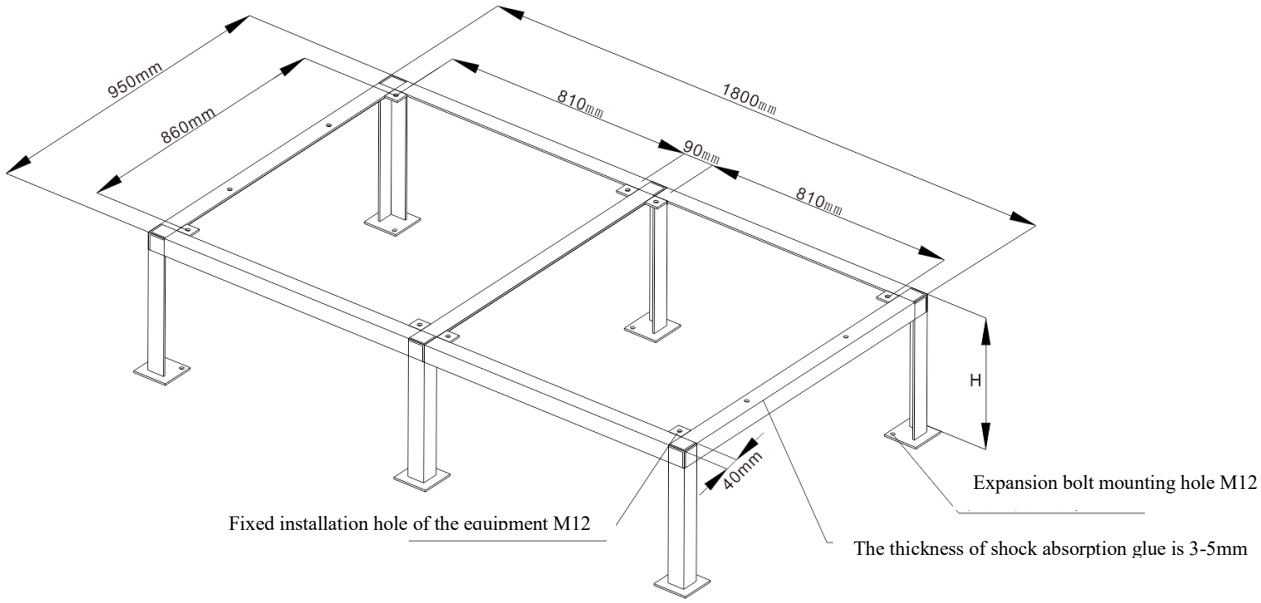
Outer Size Diagram of Floor Stand of 900mm Indoor Unit



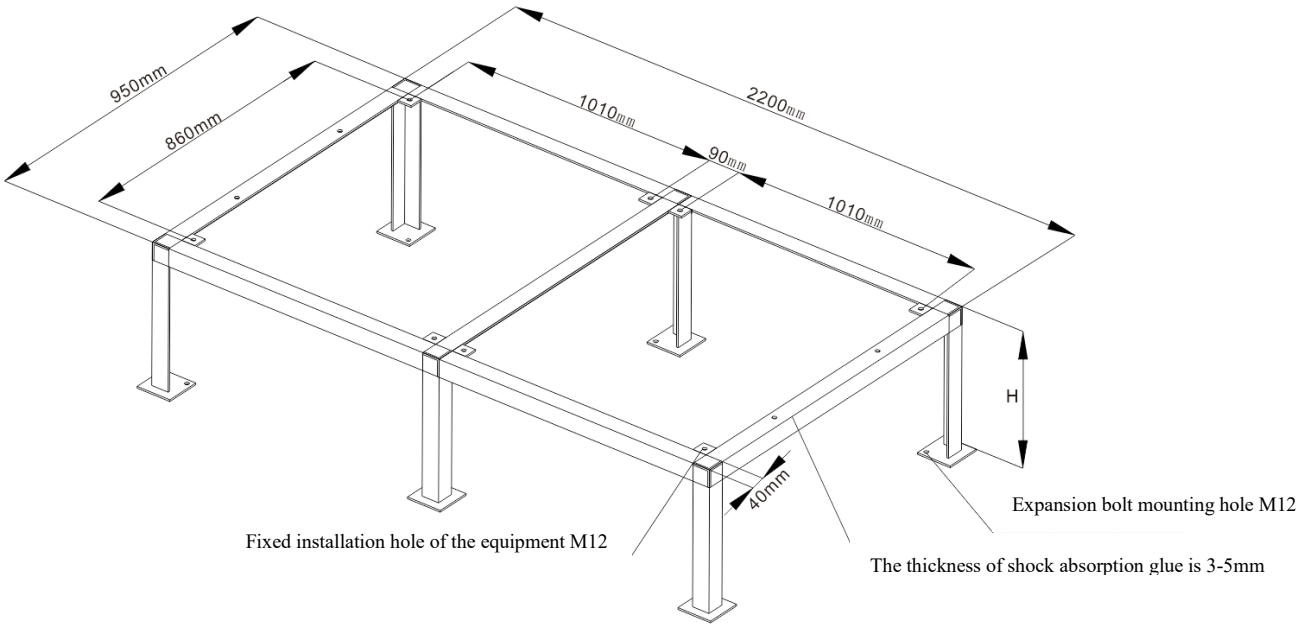
Outer Size Diagram of Floor Stand of 1100mm Indoor Unit



Outer Size Diagram of Floor Stand of 1200mm Indoor Unit



Outer Size Diagram of Floor Stand of 1800mm Indoor Unit



Outer Size Diagram of Floor Stand of 2200mm Indoor Unit

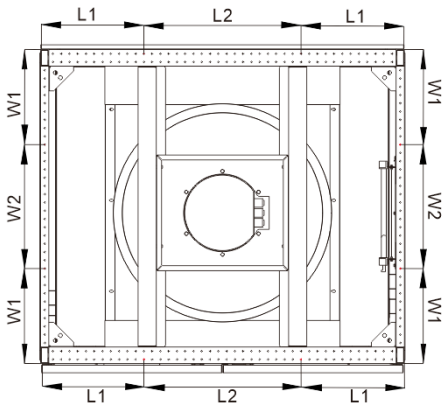
Fig. 1-3 Outer Size Diagram of Floor Stand of Room Air Conditioner Indoor Unit

Table 1-2 Related Specification of the Floor Stand

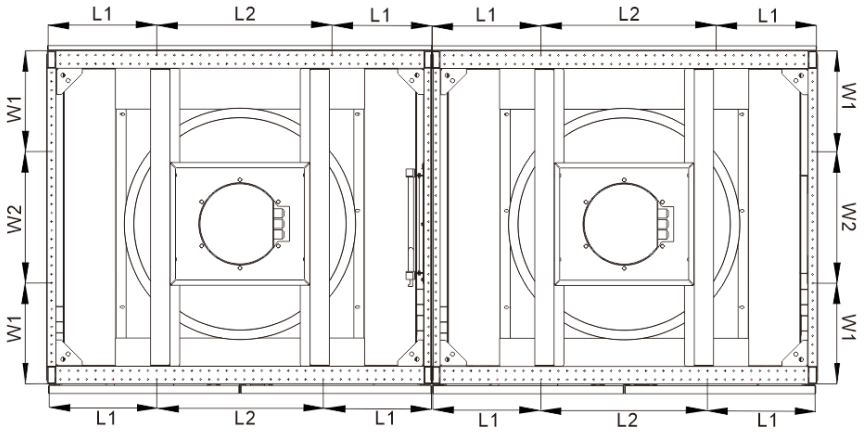
Name	Specification（mm）	Remark
Steel plate	100*100*（4~6）	—
Angle steel	40*40	If not using the recommended specifications, it is needed to consult our company
Shock absorption glue	3~5	Thickness
Height of Floor Stand (H)	Based on the on-site condition; downflow supply H≥450mm	

1.3.4 Upflow outlet size

The installation hole size of top air duct of upflow room air conditioner is shown in the figure.



Schematic Diagram of 25-50kW Top Air Duct Installation Hole Location



Schematic Diagram of 60-100kW Top Air Duct Installation Hole Location

Table 1-3 Installation Dimension Parameters of Upflow Outlet Top Air Duct

Model	L1(mm)	L2(mm)	W1(mm)	W2(mm)
25~40kW	312	276	287	376
45~50kW	312	476	287	376
50kW (dual)	312	576	287	376
60~80kW (dual)	312	276	287	376
90~100kW (dual)	312	476	287	376

1.4 Environmental Requirements

1.4.1 Requirements on operating environment

Requirements on operating parameters are shown in Table 1-4:

Table 0-4 Operating Environment and Requirements

	Item	Indoor side	Outdoor side
Operating parameters	Temperature	18℃～35℃	-20℃~+45℃ (Regular type) -40℃~+45℃ (low-temperature type)
	Humidity	20%～80%	——
Operating requirements	Altitude	Altitude is ≤1000m, and it needs derating if it is greater than 1000m	
	Power	Voltage: 380V±15%; frequency: 50 Hz±2Hz	

1.4.2 Requirements on storage environment

Requirements on storage environment are shown in Table 1-5:

Table 1-5 Storage Environment and Requirements

Contents	Requirements
Storage environment	Safe and clean
Temperature	-40℃～70℃
Humidity	<95%RH (no condensation)
Storage time	The total transportation and storage time shall not exceed 6 months. If it exceeds 6 months, the performance shall be re-calibrated.

Chapter 2 Mechanical Installation

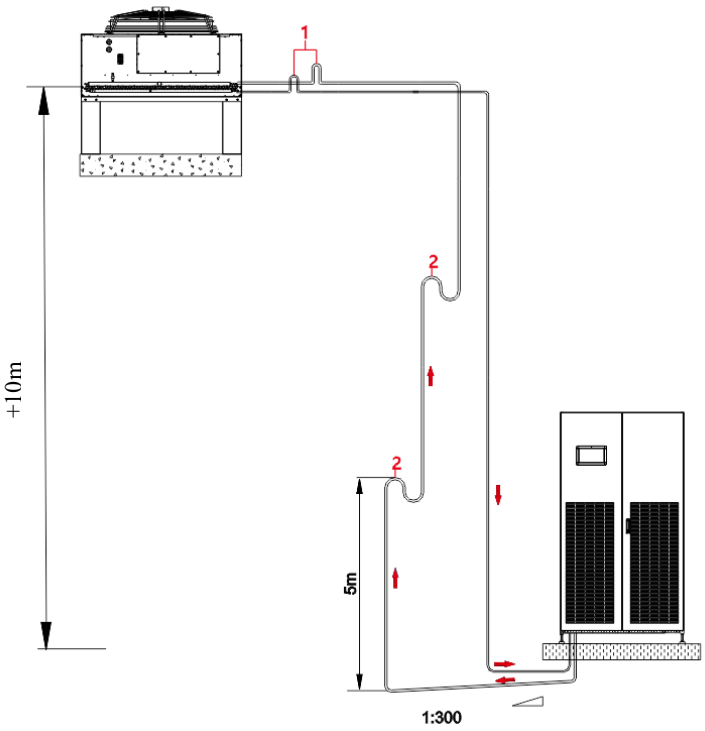
2.1 Installation and Layout Principles

Installation and layout shall follow the following principles:

1. When the outdoor unit is higher than the indoor unit: the vertical installation height difference between indoor and outdoor units shall not exceed 10m. To ensure the reliability of the system, an oil trap should be set every 5m in the vertical height of the gas pipe, and a inverted trap should be set at the inlet and outlet of the outdoor unit.
2. When the indoor unit is higher than the outdoor unit: the vertical height difference between the indoor and outdoor units should not exceed 5m.

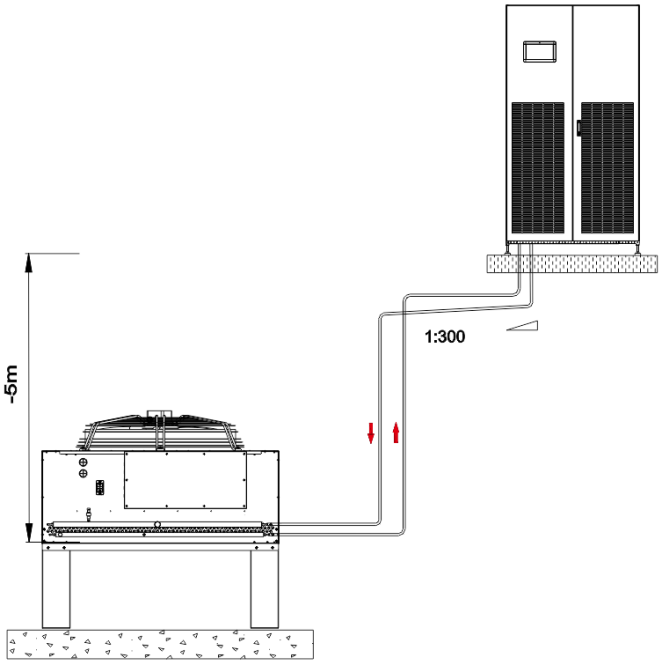
Precautions:

1. When calculating the height difference, the indoor unit is based on the bottom of the compressor, and the outdoor unit is based on the highest copper pipe of the condenser.
2. When the outdoor unit is higher than the indoor unit, a inverted trap is required.
3. The height of the inverted trap must be higher than that of the highest copper pipe of the condenser.
4. The figure  is the inclination icon. The inclination direction of the pipeline should be the same as the oblique side of the right angle, and the inclination of the pipeline it refers to should be at least 1:300.
5. Drivepipe should be set at the place where the pipeline passes through the wall and floor of the main engine room, and sealing measures should be taken between the pipeline and the drivepipe.



No.	1	2
Description	Inverted trap	Oil trap

Schematic Diagram of Installation When the Outdoor Unit Is Higher than the Indoor Unit



Schematic Diagram of Installation When the Indoor Unit is Higher than the Outdoor Unit

Fig. 2-1 Schematic Diagram of Installation Forms

2.2 External Inspection

Transportation Inspection

Upon arrival, check whether the transportation meets the transportation requirements.

Transportation requirements:

1. No rainfall
2. Put vertically
3. No stacking
4. Be careful of collision

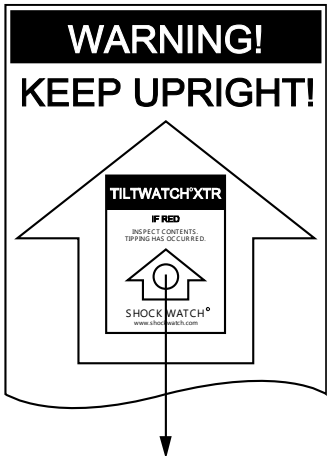
✧ Note: The specific requirements shall be subject to the packaging requirements.

External Inspection

The contents of external inspection include external product packaging and product exterior, etc.

Inspection contents:

1. Whether the external packaging has been unpacked.
2. Whether the external packaging has obvious damage and collision marks.
3. Whether the exposed parts of the equipment are damaged, such as sunken fins, structural deformation and peeling off of top paint, etc.
4. Whether the anti-tilt label turns red.



See if the circle turns red

Fig. 2-2 Schematic Diagram of the Anti-tilt Label

Tips

1. If it is found that the label that has been unsealed or the anti-tilt label has turned red, please check whether there are any information tips on the bill of lading or other aspects; if not, please contact the relevant departments.
2. If any damage is found, please indicate the corresponding damage content on the bill of lading and submit the damage claim to the transportation company.
3. The above problems may cause damage to the product and equipment, which makes the product unable to be used normally, so please check it carefully. If there is any problem, please contact Service Department's engineer.

2.3 Unpacking

Suggestions

Try to move the equipment to the nearest place to its final installation place before unpacking.

Unpacking steps

1. Remove the packaging materials

   The unit uses high-strength environmentally-friendly paper packaging, and the paper packaging, wrapping film and protective materials are removed on site in turn.

2. Remove the bottom tray

   The unit is fixed on the bottom tray of the package with M8 bolts, and can be disassembled with M8 wrench, ratchet wrench or sleeve.

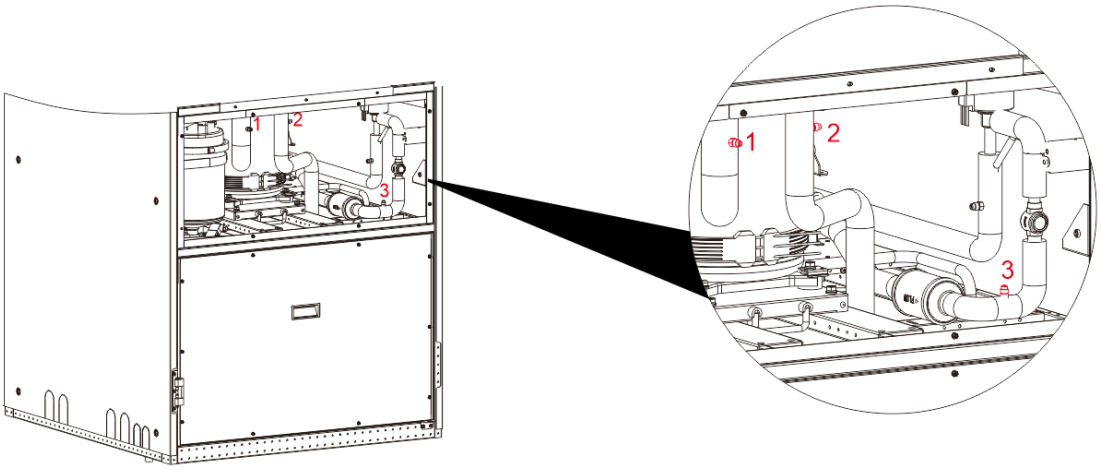
2.4 Installation of Indoor Unit

2.4.1 Inspection of nitrogent pressure

Operation steps

1. Open the front door of the cabinet.
2. Take out the desiccant.
3. Check whether the needle valve cap in Fig. 2-3 is missing in turn.
    1. If there is no needle valve cap, please contact Customer Service engineer.
    2. If there is a needle valve cap, remove the needle valve cap and press the valve core with the valve

cap in turn. If gas is discharged, the system is normal; if there is no gas discharge, please contact Customer Service engineer.



No.	Description	2	3
1	Low-pressure needle valve	Exhaust pipe needle valve	Liquid pipe needle valve

Fig. 2-3 Needle Valve Position

2.4.2 Removal of the compressor transportation fixing sheet metal parts

Operation steps

1. Loosen the transportation fixing bolts of the compressor with a wrench.

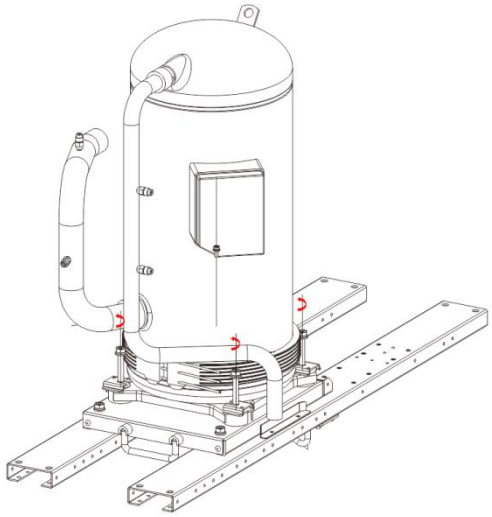


Fig. 2-4 Removal of the Compressor Fixing Sheet Metal Parts

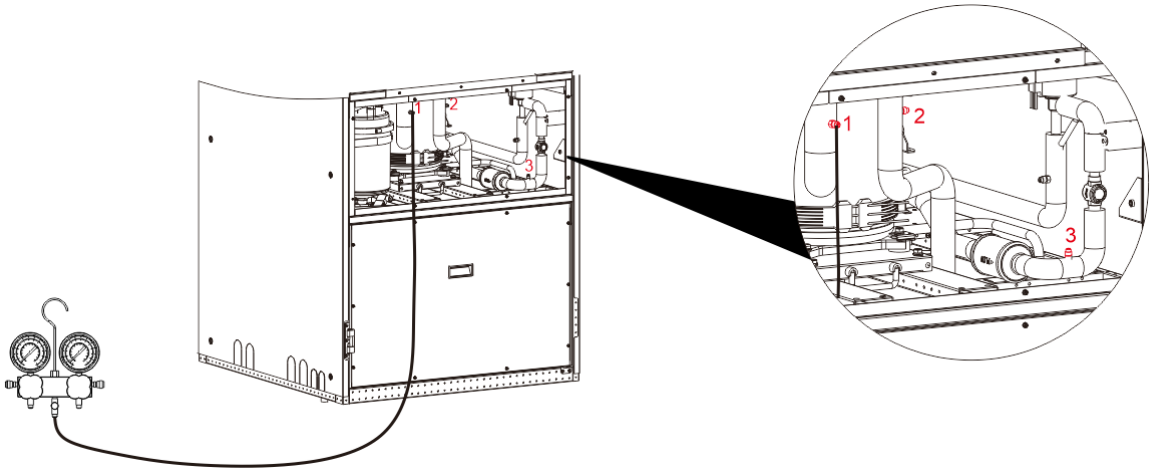
2. Remove the fixing sheet metal parts.
3. Re-tighten the compressor fixing bolt with a wrench.

2.4.3 Nitrogen discharge

Before welding, please completely release the nitrogen in the refrigerant line, so as to avoid pipe explosion, personal injury and equipment loss.

Operation steps

1. Remove the low-pressure needle valve bonnet shown in Fig. 2-5, and connect the needle valve with a rubber pipe with a pressure gauge.



No.	Description	2	3
1	Low-pressure needle valve	Exhaust pipe needle valve	Liquid pipe needle valve

Fig. 2-5 Diagrammatic Sketch of Nitrogen Discharge

2. Open the pressure gauge valve, there will be a loud airflow sound at the beginning, and then the airflow gradually disappears.
3. After the sound of airflow disappears, remove the leather hose and install the bonnet.
4. Continue to discharge nitrogen from the exhaust pipe needle valve and the liquid pipe needle valve according to steps 1 to 3.

2.5 Pipeline Connection

All refrigeration pipe joints shall be brazed with silver, and the selection, arrangement and fixing of pipes shall be in accordance with industry standards. During the design and construction, the pressure drop of pipeline, oil return of compressor, noise reduction and vibration reduction should be considered.

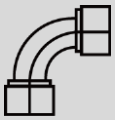
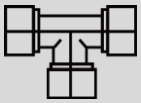
General principles

The recommended pipeline size is “equivalent length” (see Table 2-1 for the equivalent length of each local

component), including the calculation of resistance loss caused by bend. The installer should confirm whether it is suitable or not according to the site conditions.

1. If the equivalent length of one-way pipeline exceeds 30m, or the vertical height difference between indoor unit and outdoor unit exceeds the value specified in Section 2.1, please consult the manufacturer before installation to confirm whether it is necessary to add pipeline extension components and other measures.
2. The recommended pipeline size in Table 2-1 is equivalent length, and the resistance loss caused by bend and valve has been calculated. The installer should confirm whether it is suitable according to the site conditions.

Table 2-1 Equivalent Length of Each Local Component

External diameter of copper pipe（in）	**45° bend (Unit: m)**	**90° bend (Unit: m)**	**180° bend (Unit: m)**	**T-type Tee (Unit: m)**
				
3/8	0.12	0.2	0.4	0.6
1/2	0.14	0.25	0.5	0.65
5/8	0.17	0.3	0.6	0.7
3/4	0.2	0.35	0.7	0.8
7/8	0.24	0.42	0.8	1.2
1	0.28	0.5	1	1.3
1-1/8	0.32	0.6	1.2	1.4

Pipeline Connection

There are the following kinds of pipelines to be connected:

1. Condensate water drain pipe of indoor unit.
2. Water inlet pipe of electrode humidifier.
3. Connecting copper pipes (exhaust pipe and liquid return pipe) between indoor unit and outdoor unit.
4. Install extension components (optional).

Condensate drainage pipe connecting the indoor unit

The reserved condensate total drainage flexible pipe is ID15×OD22mm in size.

✧ **Note:** The water discharged from humidifier and the condensate from evaporator converge through the three-way or four-way drainage, and then are discharged through the main drainage pipe. Due to the high

temperature water flowing in the electrode humidifier, the drainage pipe must be made of materials with temperature resistance above 100℃. Generally, steel pipe, copper pipe and PPR pipe are used, and PVC pipe is absolutely not allowed.

Connection of the inlet pipe of electrode humidifier

The humidifier needs to be connected with a water pipe, and a strainer/check isolation valve should be installed in the water inlet pipe for easy maintenance. The humidifying water inlet pipe connector is G3/4 (internal thread) connector, and the connection must be sealed to prevent water leakage. The pressure range of the main pipeline is 0.1MPa~0.4MPa.

Where the pressure of the main pipeline may exceed 0.4MPa, a pressure reducer shall be installed. Where the main pipe pressure is lower than 0.1MPa, there should be a water collecting tank and a water pump system.

✧ **Note:** The water inlet pipe of the main pipeline should be made according to local regulations.

The electrode humidifier can use tap water, and it is recommended to use purified water (deionized water and distilled water are not allowed) with following specific requirements:

1. Water inlet temperature: 4~40℃
2. Water inlet pressure: 0.1~0.4Mpa
3. Electrical conductivity: 350~750μs/cm;

Copper pipe connecting the indoor and outdoor units (exhaust pipe and liquid return pipe)

Indoor and outdoor units are connected by copper pipe welding, and there are refrigeration pipe joints and labels at the bottom and side of the unit. You can choose to connect the pipes from the bottom or from the side according to the needs of the project. When welding, it is necessary to correctly connect the indoor unit gas pipe and liquid pipe according to the label instructions, and pay attention to protecting the label and thermal insulation cotton.

✧ **Notes:**

1. When this series of air conditioners leave the factory, 0.3~1.0bar of nitrogen is filled to maintain the pressure. Please empty the nitrogen in the system before welding.
2. The exposure time of the system pipeline should not exceed 15 minutes, otherwise the compressor lubricating oil will absorb moisture, which will affect the service life of the key components of the system and the

stability of the system operation.

The horizontal part of the exhaust pipe should be inclined downward after being led out of the compressor, and its inclination should be at least 1:300 (6mm every 1m). If the exhaust pipe is in a place affected by cooling equipment (including under the raised floor), it should be insulated. Considering the influence of pipe diameter on the pressure drop of the system, the pipe diameter of the connecting copper pipe between indoor and outdoor units should be selected according to the recommended pipe sizes in Table 2-2 and 2-3.

Table 2-2 Suggested Size of Pipe Diameter of Single System Connecting Pipe of System (mm)

Model	**25kW**		**30kW**		**35kW**		**40kW**		**45kW**		**50kW**	
Pipe length	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
10m	19	16	19	16	22	16	22	16	22	19	22	19
20m	19	16	19	16	22	16	22	16	22	19	22	19
30m	22	16	22	16	22	19	22	19	25	19	25	19
40m	22	16	22	19	25	19	25	19	28	19	28	19
50m	22	19	25	19	25	19	25	19	28	19	28	19
60m	22	19	25	19	28	19	28	19	28	22	28	22

Table 2-3 Suggested Size of Pipe Diameter of Dual System Connecting Pipe of system (mm)

Model	**50kW**		**60kW**		**70kW**		**80kW**		**90kW**		**100kW**	
Pipe length	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
10m	19	16	19	16	22	16	22	16	22	19	22	19
20m	19	16	19	16	22	16	22	16	22	19	22	19
30m	22	16	22	16	22	19	22	19	25	19	25	19
40m	22	16	22	19	25	19	25	19	28	19	28	19
50m	22	19	25	19	25	19	25	19	28	19	28	19
60m	22	19	25	19	28	19	28	19	28	22	28	22

Installation of extension component

When the equivalent length of the pipeline exceeds 30m, or the vertical height difference between the indoor and outdoor units exceeds the value specified in Section 2.1, it is necessary to install extension component, and the solenoid valve body is installed on the engineering pipeline outside the equipment.

✧ **Note:** When installing the extension component on site, please note that the direction of valve body

identification must be consistent with the flow direction of refrigerant.

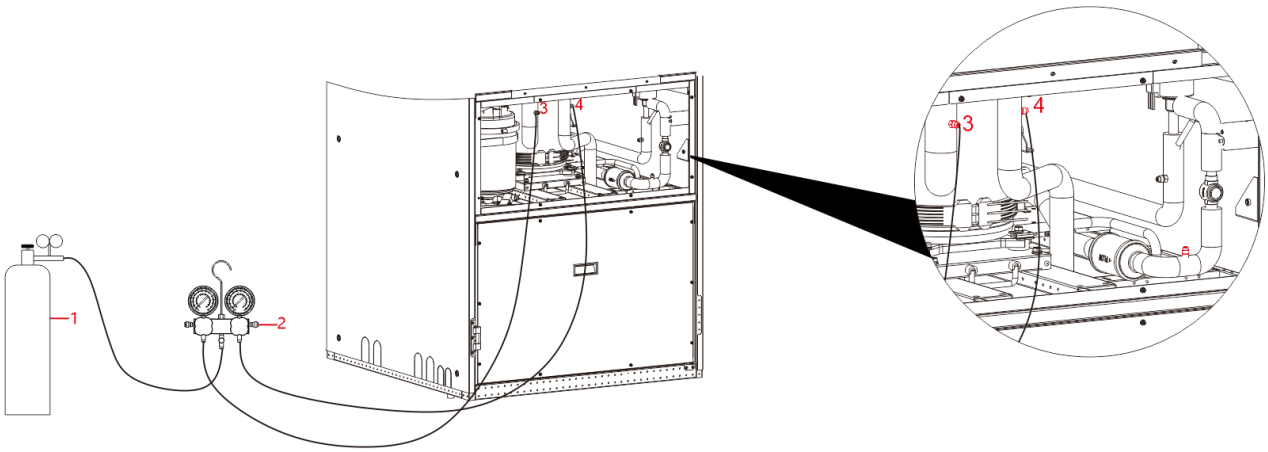
2.6 Nitrogen Filling and Pressure Maintaining

Precautions

1. Pipelines of indoor and outdoor units have been welded.
2. The valve core of the needle valve is not lost and tightened.
3. The measuring range of the pressure gauge is not less than 4.0Mpa, and the pressure resistance of the leather hose is not less than 4.5Mpa.
4. Only nitrogen can be used for pressure maintaining and leakage detection.
5. When maintaining pressure, do not remove the leather pipe and pressure gauge to prevent nitrogen from leaking at the joint.

Operation steps

1. Connect the leather pipe, pressure gauge, pressure reducing valve and nitrogen bottle on the equipment, and the pressure gauge and pressure reducing valve are closed.
2. Confirm whether the extension component is installed in the unit
   - If the extension component is not installed, connect as shown in Fig. 2-6 and simultaneously fill nitrogen from the low-pressure needle valve and the exhaust needle valve.



No.	1	2	3	4
Description	Nitrogen cylinder	Pressure gauge	Low-pressure needle valve	Exhaust needle valve

Fig. 2-6 Diagrammatic Sketch of Nitrogen Filling and Pressure Maintaining

- If the extension component is installed, nitrogen is simultaneously filled from the low-pressure needle valve and the exhaust needle valve, and the manual control of the solenoid valve is enabled to keep the solenoid valve open.

3. Open the pressure gauge and pressure relief valve, fill nitrogen with 3.0Mpa, and keep the pressure for 24 hours. Under the condition that the ambient temperature is similar before and after the pressure keeping, the system pressure should not decrease; if there is a big change in the ambient temperature, it is recommended to do the pressure maintaining test again.

   ✧ **Note:** The outlet pressure of the pressure reducing valve should not be greater than 3.0MPa, otherwise it may cause damage to the device.

4. If the pressure value decreases, soapy water must be used to find and repair the leak; if the pressure is good, please discharge nitrogen at the needle valve.

2.7 Vacuumizing

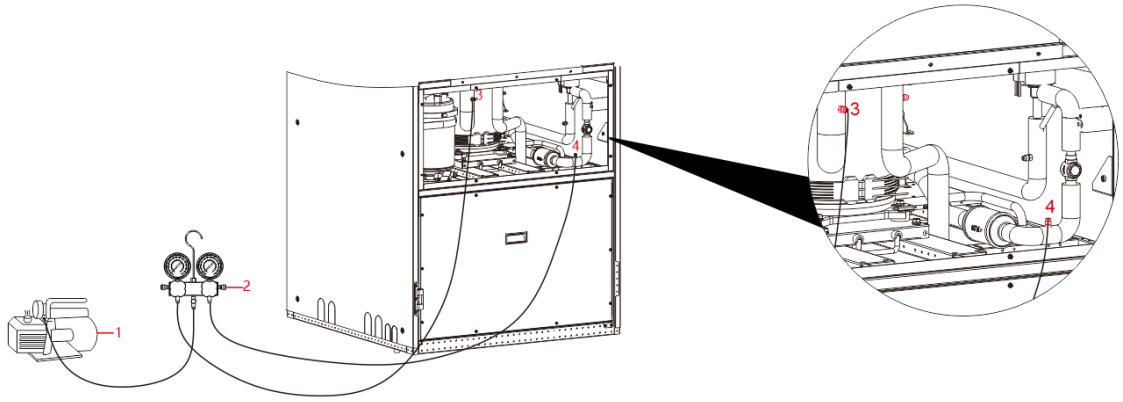
Precautions

1. Before vacuumizing, check that the refrigerant pipeline system has passed the pressure maintianing test without leakage.
2. Before vacuumizing, make sure that all joints on the equipment have been tightened.
3. Failure to vacuum or unclean vacuumizing may lead to high-pressure failure/system failure. Please ensure that the vacuum degree meets the requirements when vacuumizing.

Operation steps

1. Confirm whether the low-temp package or extension component is installed in the unit.

   - If the low-temp package or extension component is not installed, connect the pressure gauge and vacuum pump from the low-pressure needle valve and the liquid pipe needle valve, and start vacuumizing at the same time. As shown in Fig. 2-7:



No.	1	2	3	4
Description	Vacuum pump	Pressure gauge	Low-pressure needle valve	Liquid pipe needle valve

Fig. 2-7 Diagrammatic Sketch of Vacuumizing

- If the low-temp package or extension component is installed, connect the pressure gauge and the vacuum pump from two positions of the low-pressure needle valve and the liquid pipe needle valve, and conduct vacuumizing at the same time, and enable the vacuumizing mode to keep the electronic expansion valve and the liquid pipe solenoid valve open.

2. At the beginning of vacuumizing, the sound of the vacuum pump is loud, and “white smoke” emerges from the outlet. If “white smoke” still emerges after 10 minutes, it may be due to poor sealing of the refrigeration system, or excessive refrigerant and moisture remaining in the refrigeration system. It should be continuously observed for 10 minutes.
3. 20 minutes later, the pressure gauge pointer should be in the negative value area, and the sound of the vacuum pump is small. At this time, the vacuum gauge can be turned off and turned on several times repeatedly. Before and after the pressure gauge pointer is turned off, the sound of the vacuum pump should have no obvious change, otherwise the refrigeration system may be poorly sealed.
4. After confirming that there is no leakage in the refrigeration system, the vacuumizing time should generally not be less than 90 minutes, and the final pressure of the vacuum pump should not be greater than 60pa (absolute pressure). When the final pressure is no longer reduced, continue to vacuum for 10 minutes, and the moisture indicator of the liquid visual glass should show dryness (green).
5. After vacuum pumping, first close all valves of the pressure gauge, then turn off the vacuum pump, without

dismantling the connection, and keep the pressure for 10 minutes. The pressure of the refrigeration system should not be greater than 90pa (absolute pressure).

✧ **Note:** If the pressure gauge can't accurately display 60pa (absolute pressure), the pressure gauge should stay at the minimum scale when vacuumizing, and the pressure holding time should be delayed to 1 hour, and the pressure gauge should not obviously rise.

2.8 Charging of Refrigerant

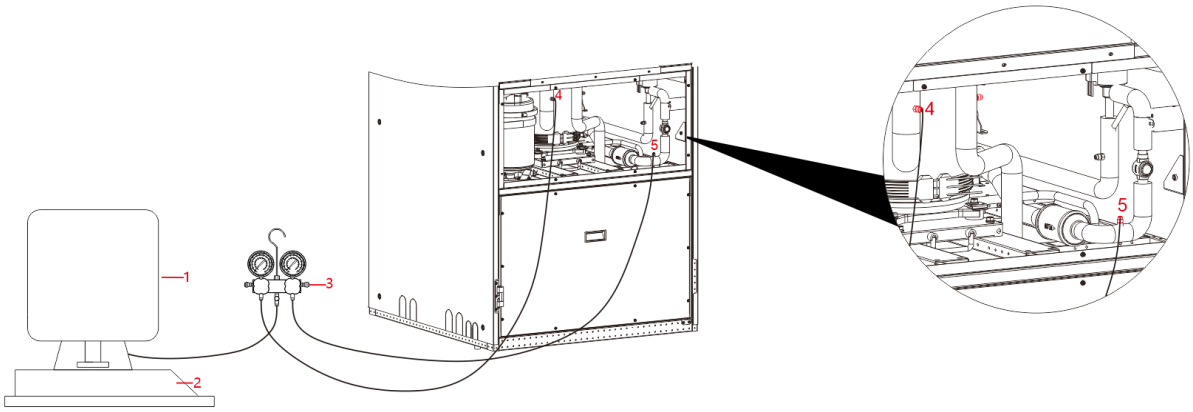
Before filling, make sure that the gas pipe connected to the refrigerant cylinder has been emptied.

Precautions

1. When filling refrigerant, it is recommended to use a safety valve to prevent frostbite caused by refrigerant leakage when removing the hose.
2. When working with refrigerant, wear anti-freezing gloves all the time.
3. After confirming that the refrigeration system has no leakage and the vacuum degree meets the requirements, the refrigerant R410a should be filled immediately.
4. Please don't use inferior refrigerant, which shall seriously damage the system. Our company shall not be responsible for any consequences caused by using inferior refrigerant.

Operation steps

1. On the basis of vacuumizing equipment, remove the vacuum pump and replace it with a refrigerant cylinder, as shown in Fig. 2-8.



No.	1	2	3	4	5
Description	Refrigerant cylinder	Electronic scale	Pressure gauge	Low-pressure needle valve	Liquid pipe needle valve

Fig. 2-8 Schematic Diagram of Refrigerant Charging

2. Slightly open the connecting nut of the refrigerant cylinder valve and the pressure gauge and the leather pipe, and tighten the connecting nut when you feel a chill coming out of the connecting nut.
3. Invert the refrigerant cylinder on the electronic scale and reset the reading on the electronic scale.
4. Open all pressure gauge valves and refrigerant cylinder valves to charge refrigerant.
5. Pre-charging amount of refrigerant shall not be less than half of the calculated total charging amount, and shall not be greater than the total charging amount. If the pre-charging amount can't complete the total charging amount, the remaining refrigerant needs to be charged during startup and commissioning.
6. After filling, close all pressure gauge valves and refrigerant cylinder valves.

Table 2-4 Refrigerant Filling of 10m Connecting Pipe System

Model of the indoor unit	**Model and quantity of supporting outdoor unit**	**Standard filling amount (kg)**	**Additional amount of refrigerant of lee-temp package (kg)**	**Additional amount of refrigerant of energy-saving module (kg)**
25kW	Outdoor unit038*1	8.7	6	15.8
30kW	Outdoor unit045*1	9.3	6	15.8
35kW	Outdoor unit056*1	13.4	7	15.8
40kW	Outdoor unit056*1	14.9	7	15.8
45kW	Outdoor unit066*1	17.9	7	15.8
50kW	Outdoor unit066*1	20.1	7	15.8
50kW (dual)	Outdoor unit076*1	9.3*2	3.5*2	15.8*2
60kW (dual)	Outdoor unit088*1	9.3*2	6*2	15.8*2
70kW (dual)	Outdoor unit056*2	13.4*2	7*2	15.8*2
80kW (dual)	Outdoor unit056*2	14.9*2	7*2	15.8*2
90kW (dual)	Outdoor unit066*2	17.9*2	7*2	15.8*2
100kW (dual)	Outdoor unit066*2	20.1*2	7*2	15.8*2

According to the system configuration and the length of the one-way connecting pipe of the system, the refrigerant charge in the system is determined.

Matching different air-cooled condensers, the charging amount of the system is also different. Table 2-4 shows the standard refrigerant charge of 10m connecting pipe system. If the length of the one-way connecting pipe of the system is within 10m, after vacuumizing on site, it is only necessary to charge the refrigerant according to the refrigerant filling amount in Table 2-4; if the one-way connecting pipe length of the system exceeds 10m, the refrigerant addition amount = standard filling amount + additional amount of refrigerant.

The additional amount of refrigerant is calculated according to the following formula:

Additional amount of refrigerant (kg) = additional amount of refrigerant per unit length of liquid pipe (kg/m) × length of extension liquid pipe (m) + additional amount of low-temp package or additional amount of energy-saving module

In which, the length of extension liquid pipe (m) = the length of one-way liquid pipe of the system - 10m

See Table 2-5 for additional amount of refrigerant per unit length of liquid pipes with different diameters.

Table 2-5 Refrigerant Charge Per Unit Length of Liquid Pipes with Different Pipe Diameters

External diameter of liquid pipe (mm)	Refrigerant Charge (kg/m)
6	0.020
9	0.060
13	0.112
16	0.181
19	0.261
22	0.362
28	0.618

✧ **Note:** The above refrigerant charge can be used as the initial budget before installation, or as the guidance for charging refrigerant after installation. The actual charge of engineering installation is subject to the final commissioning result.

2.9 Supplement of Refrigerant Oil

The addition of refrigerant will lead to the dilution of refrigerant oil in the system, which will affect the lubrication and cooling effect of refrigerant oil, so it is necessary to add refrigerant oil. The type of refrigerant oil used in room series air conditioners is shown in Table 2-6, and the formula of addition of refrigerant oil is as

follows:

- The length of one-way connecting pipe of the system is within 30m:

Supplement amount of refrigerant oil (L) = (additional amount of low-temp package refrigerant or additional amount of energy-saving module refrigerant) ×10%

- The length of one-way connecting pipe of the system exceeds 30m:

Supplement amount of refrigerant oil (L) = [(length of one-way connecting pipe of the system - 30m) × additional amount of refrigerant of liquid pipe per unit length + (additional amount of low-temp package refrigerant or additional amount of energy-saving module refrigerant)]×10%

Table 2-6 Type of Refrigeration Oil

Unit model	Type of refrigerant oil
25~100kW	Type POE (32-3MAF)

2.10 Installation Inspection

Inspection items

1. Whether there is a certain equipment maintenance space around the unit.
2. The equipment is placed vertically and the installed fastening parts have been installed firmly.
3. The drainage pipe has been connected.
4. The water supply pipe of the humidifier has been connected.
5. All coupling joints have been tightened.
6. Fasteners used for transportation have been removed.
7. After the equipment installation is completed, the sundries inside or around the equipment have been removed.

Electrical installation operation can be carried out after confirming that all contents are inspected without error.

Chapter 3 Electrical Installation

3.1 Wiring Contents

Lines that need to be connected on installation site

1. Power cord of the indoor unit;
2. Power cord of the outdoor unit;
3. Input and output control lines of the unit;

Precautions for installation

1. The connection of all lines must comply with the provisions of the national and local electrical codes.
2. Please refer to the equipment nameplate for the full-load current of relevant units. The cable size shall conform to the local wiring rules.
3. The main power supply meets the unit requirements. Please refer to the equipment nameplate;
4. Electrical installation must be carried out by qualified professional installers;
5. Before connecting the circuit, measure the input power supply voltage with a voltmeter to make sure that the power supply is turned off.

3.2 Wiring of the Indoor Unit

The bottom of the unit is reserved with a user wire inlet hole and users can wire from the bottom.

3.2.1 Location of electrical interface of the indoor unit

Open the front door of the indoor unit, and you can see two electric control boxes of strong current and weak current. The electrical interface of the indoor unit is located in the strong current electric control box. Please refer to the circuit diagram and indication label for details.

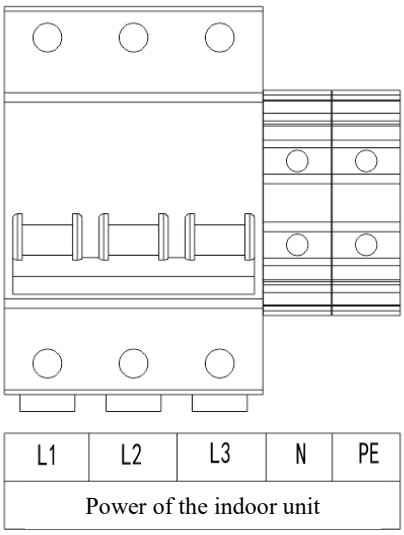
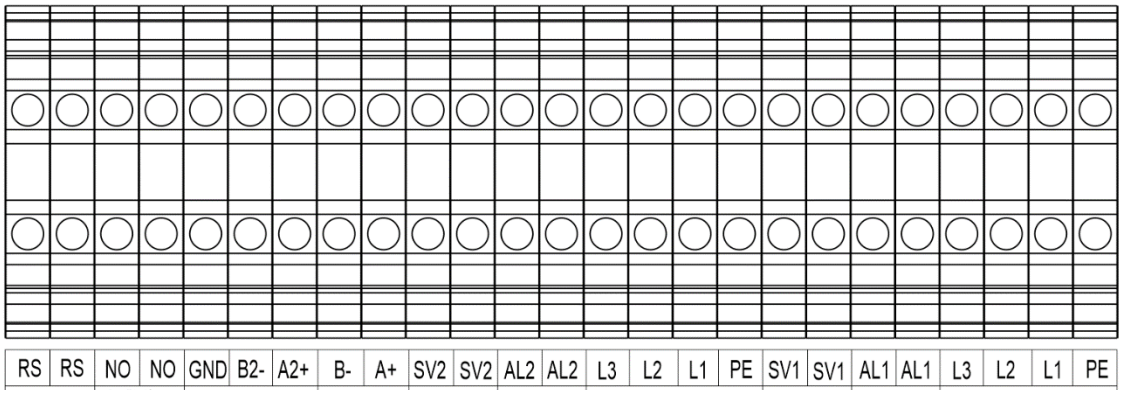


Fig. 3-1 Indoor Unit Power Wiring Terminal



RS	Remote switch	**NO**	Alarm signal	**GND, B2-,A2+**	Teamwork
B-, A+	Monitoring	**SV2**	Solenoid valve 2	**AL2**	Fan alarm 2
L3, L2, L1, PE	Outdoor unit power 2	**SV1**	Solenoid valve 1	**AL1**	Fan alarm 1
L3, L2, L1, PE	Outdoor unit power 1				

Fig. 3-2 Outdoor Unit and Signal Wire Wiring Terminal

3.2.2 Connection of the power cord of the indoor unit

The specification of the power cord is recommended to be selected according to the national standard, as shown in the following table.

Table 3-1 Parameters of Unit Power Cord

Model	Maximum working current (A)	Recommended power cable specifications (mm^2)
25kW	42	5×10.0
30kW	45	5×10.0
35kW	48	5×10.0
40kW	48	5×10.0
45kW	56	5×10.0
50kW	56	5×10.0
50kW (dual sys.)	60	5×10.0
60kW (dual sys.)	70	5×16.0
70kW (dual sys.)	78	5×16.0
80kW (dual sys.)	78	5×16.0
90kW (dual sys.)	88	5×16.0
100kW (dual sys.)	88	5×16.0

3.2.3 Connection of control line

The connection of the control line can be completed by referring to the circuit diagram and the indicating label, and the model specifications of the control line are shown in the following table.

Table 3-2 Specifications of the Control Line

Types of the signal line	Cross-sectional area of recommended signal line/mm^2
Alarm signal line of the external fan	2×0.5
Power cord of solenoid valve	2×1.0
Moving-ring monitoring communication line（shield line）	2×0.5
Group control communication line (shield line)	3×0.5

(1) Alarm signal terminal

The alarm signal terminal is controlled by the public alarm relay of the controller, and the output is used to connect external alarm devices, such as alarm lights. As long as an alarm occurs and the contact is closed, it can be used to send out a remote alarm.

（2）Remote switch

The remote switch terminal can be connected to the remote on/off switch. When remote shutdown is required, the remote switch terminal can be connected with short circuit.

3.2.4 Precautions for power cord connection of electric control box

The electric control box of air-cooled room air conditioner unit is drawable. To facilitate the drawing of the electric control box, the connecting power cord of the electric control box needs to be reserved 0.5m more and fixed under the electric control box, as shown in Fig. 3-3:

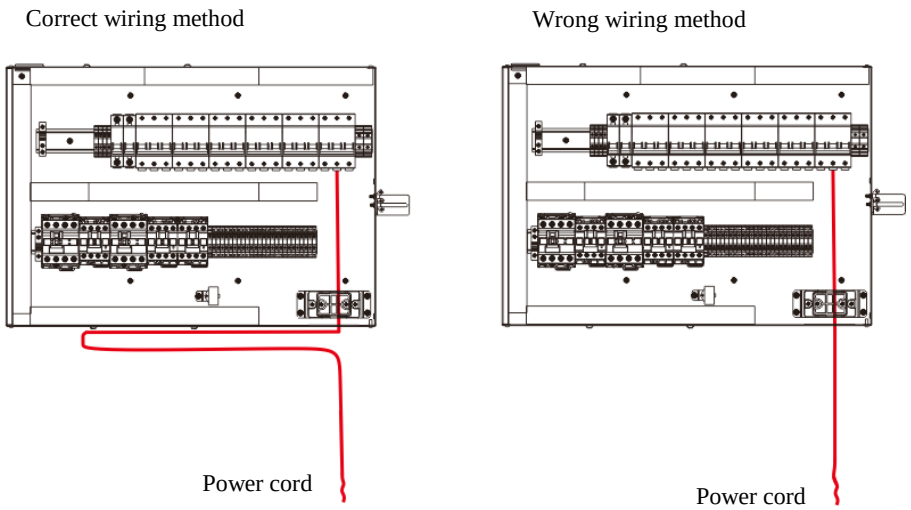


Fig. 3-3 Schematic Diagram of the Power Cord Connection of the Electric Control Box

✧ **Note:** If the unit is short-circuited or the power cord is torn due to failure to follow the instructions, our company shall not take any responsibility.

3.3 Installation Inspection

After the electrical installation is completed, check and confirm:

1. The power supply voltage is the same as the rated voltage on the equipment nameplate.
2. There is no open circuit or short circuit in the electrical circuit of the system.
3. The power cable and grounding cable of the disconnect switch, indoor unit and outdoor unit have been connected.
4. The rating of circuit breaker or fuse is correct.
5. The control cable has been connected.
6. All cables and circuit connectors have been fastened, and fastening screws are not loose.

Chapter 4 Controller

4.1 Display and Description

4.1.1 Main Interface of Display Screen

Fig. 4-1 Schematic Diagram of Main Interface of Display Screen

The main interface is mainly divided into three parts: menu bar, label bar and display area.

1. Menu bar: located at the bottom of the main interface, including 6 icons, such as home page, working status, data management, alarm management, system settings and startup/shutdown .
2. Label bar: located at the top of the main interface, showing the current state of the unit and alarm information; when the alarm beeps, click the alarm mute to cancel the alarm.
3. Display area: divided into equipment operation mode and current temperature and humidity. For example, if the heating is on, indicating that the unit is currently in the heating mode.

4.1.2 Navigation Picture of Display Screen

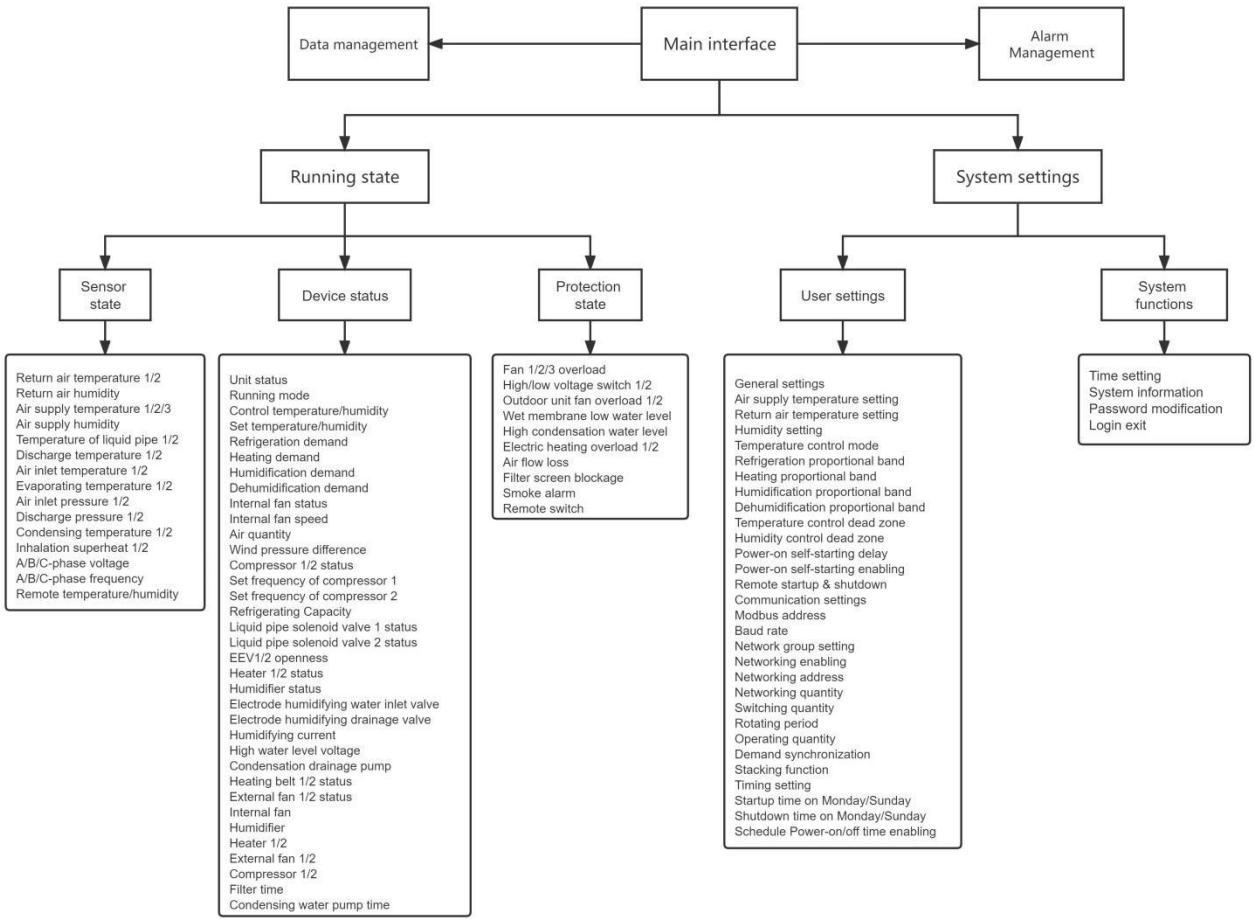


Fig. 4-2 Navigation Picture of Display Screen

4.1.3 Working Status

Click the “Status” option in the menu bar of the main interface of the display screen to view the “Equipment Status”, “Sensor Status” and “Protection Status”.

Click “Equipment Status”, “Sensor Status” and “Protection Status” to view the corresponding status parameter values. For example, click “Equipment Status” to view state parameters such as unit status, working mode, temperature/humidity control, set temperature/humidity, control mode, cooling/heating/humidification demand; click ⇨ to view the state parameters of the next page, and click ⇦ to return to the previous page.

Fig. 4-3 Diagrammatic Sketch of Equipment Status

Fig. 4-4 Diagrammatic Sketch of Sensor Status

Fig. 4-5 Diagrammatic Sketch of Protection Status

4.1.4 Data management

Click the “Data Management” option in the menu bar of the main interface of the display screen to view the “Temperature and Humidity Curve” and “Historical Data”.

The “Temperature and Humidity Curve” shows the return air temperature, air supply temperature and air return humidity curve of the day. Select the date to view at “Date and Time” and click OK to view the temperature

and humidity curve of the specified date. Click “Today” to return to view the temperature and humidity curve of that day. Click ⇦ or ⇨ to view the historical temperature and humidity curve.

“Historical Data” displays the temperature and humidity parameters in a certain time period in the past. Select the specified time period in “Date and Time” and click “Query” to view the temperature and humidity parameters in the specified time period.

Fig. 4-6 Diagrammatic Sketch of Temperature and Humidity Curve

Fig. 4-7 Diagrammatic Sketch of Historical Data

4.1.5 Alarm Management

Click the “Alarm Management” option in the menu bar of the main interface of the display screen to view the “Current Alarm” and “Historical Alarm”. “Current Alarm” displays the current alarm events and their occurrence time. After the alarm is cleared, the alarm that can be reset automatically will not be displayed in the current alarm. For the alarm that needs to be reset manually, click the “Alarm Reset” button to reset it manually.

“Historical Alarm” displays the alarm events and their occurrence times in the past time period, in which the red column is the alarm events and their occurrence times, and the green column is the alarm reset and reset time.

Fig. 4-8 Diagrammatic Sketch of Current Alarm and Historical Alarm

4.1.6 System Settings

Users can enter “System Settings” by clicking “System Settings” and entering the password 515800, and can view and modify functions such as “User Settings”, “System Functions”, “Password Modification” and “Login Exit”.

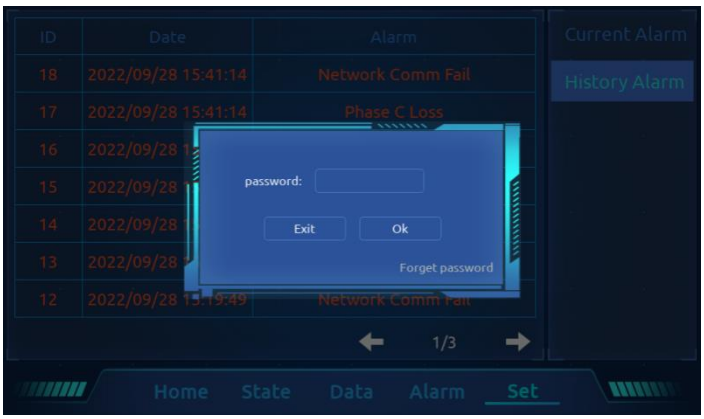


Fig. 4-9 Diagrammatic Sketch of Password Entry of System Settings

Fig. 4-10 Diagrammatic Sketch of System Settings Interface

Click “User Settings” to perform “General Settings”, “Communication Settings”, “Networking Settings” and “Timing Settings”.

Fig. 4-11 Diagrammatic Sketch of User Settings

Click “System Functions” to carry out “Time Settings” and view “System Information”.

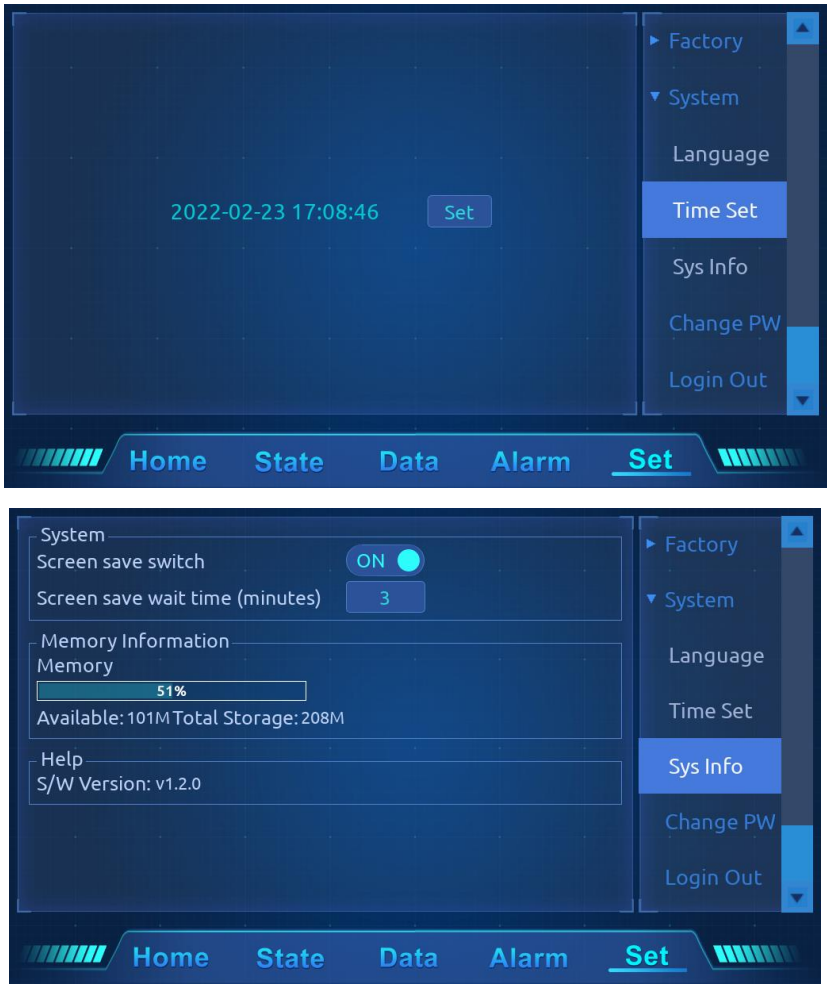


Fig. 4-12 Diagrammatic Sketch of System Functions

Click “Password Modification” and enter the original password to change the password.

For example, after logging in the system settings with the user password, enter the user password with the original password, enter the password you want to set with the new password, and click OK to change the password, and the user password will be successfully changed to the new password.

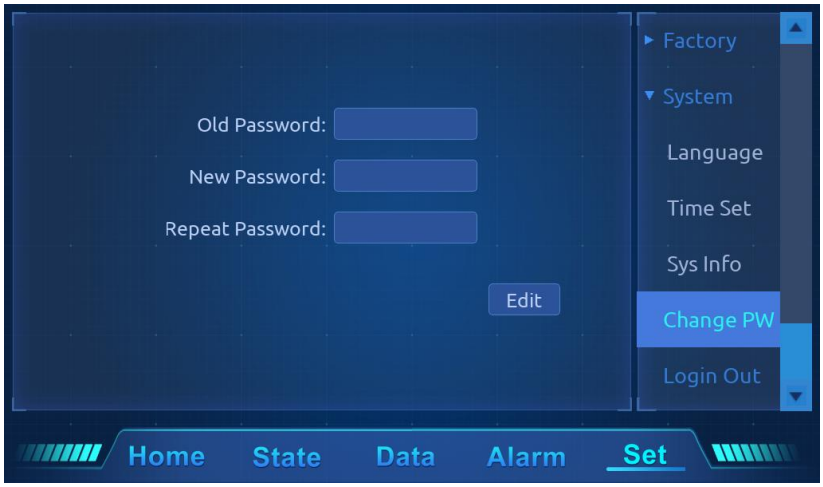


Fig. 4-13 Diagrammatic Sketch of Password Modification

Click “Login Exit” and then click “√” to exit the system settings.

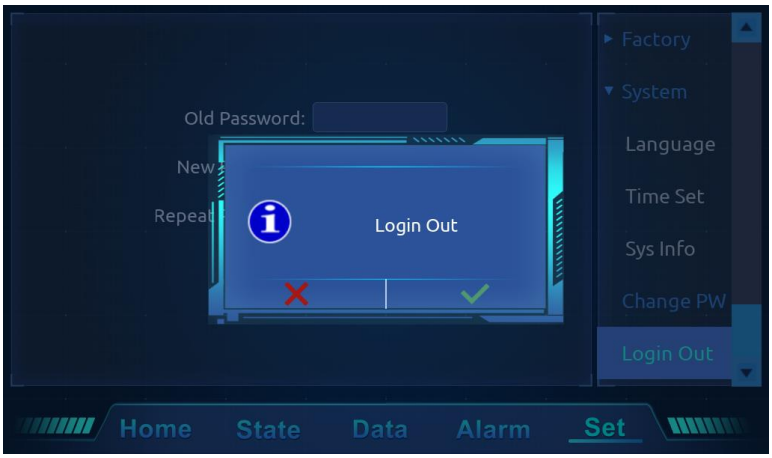


Fig. 4-14 Diagrammatic Sketch of Login Exit

4.2 Introduction and Settings of Monitoring Function

The air-cooled room precise air conditioner can be remotely monitored with the computer through the communication interface. The controller is equipped with RS485 communication interface. The twisted-pair shielded wires are used to connect the user terminals A+ and B- to the upper monitor, and the “communication address” and “baud rate” in the “Communication Settings” interface are modified.

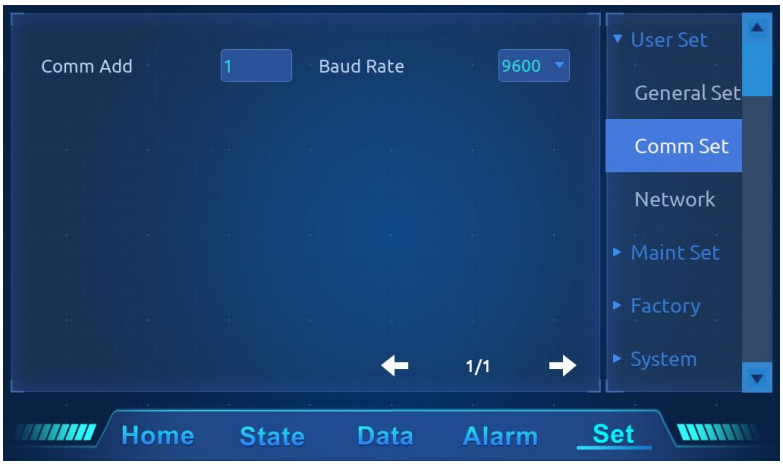


Fig. 4-15 Diagrammatic Sketch of Communication Setting

4.3 Introduction and Settings of Group Control Function

Introduction to group control function:

Time rotation: starting from the “rotation time”, every “rotation period” automatically switches the units

according to the “switch quantity”, so that the number of running units and the “running quantity” are consistent.

Alarm rotation: when the running unit has a serious alarm, the same number of standby units will be turned on. If the turned-on standby unit also has a serious alarm, the same number of standby units will be turned on until the number of units without serious alarm reaches the set “running quantity”. When the running unit is shut down, the same number of standby units will be turned on.

✧Note: Stop all units in case of fireworks alarm.

Demand synchronization:

The demand synchronization can be set to be enabled or not. When enabled (the demand synchronization can only be enabled if the running number is ≥2), it has the following functions:

When networking units are in the refrigeration mode, other units are restricted from entering heating mode.

When networking units in the network are in dehumidification mode, other units are restricted from entering humidification mode.

Group control function setting

Enter the networking setting parameter interface and the parameters to be set are as follows.

Fig. 4-16 Diagrammatic Sketch of Networking Settings

Parameter definition:

Networking enable: the units participating in networking need to enable this function;

Networking address: the address of each unit during networking rotation, and the address setting must start from 00 and be continuous;

Number of networking: the total number of all networking units K (including main unit and standby unit), 1-64, automatically synchronize the parameter settings of main unit;

Switch quantity: switch the number of units when the rotation time is up. If the rotation time is set to 2, when the rotation time is up, two running units will stop, and two standby units will start, and the parameter settings of the main machine will be automatically synchronized.

Rotation period: set the rotation time, and how often it is rotated. When it is set to 0, the rotation will enter the test mode, and it will rotate every 8 minutes according to the set parameters, and automatically synchronize the parameter settings of the main unit;

Running number: set the number of enabled units N, 0-63, N≤K-1, and automatically synchronize the parameter settings of the main unit;

Demand synchronization: manage the operation modes of all units in a unified way to avoid competitive operation;

Cascading function: when the running units can’t meet the requirements of the computer room, the number of operating units will be automatically increased;

Chapter 5 Commissioning

5.1 Preparation before Commissioning

Mechanical part

1. Ensure that the protective materials in the transportation process of the dismantled equipment have been removed.
2. The refrigeration pipeline system has passed the pressure leak test and is confirmed to be qualified.
3. The total charge of the refrigeration system has been roughly calculated, and the refrigerant oil has been added to the system.
4. The water supply pipeline of humidification system has been reliably connected and leak-checked according to the specified material requirements.
5. After the refrigerant is statically charged, the compressor heating belt has been preheated for more than 12 hours.
6. Ensure that the temperature of the computer room is above 20℃ and has a certain heat load. If it is not available, first, other heating devices or heaters of the unit itself and adjacent equipment should be forced to operate manually to preheat the environment of the machine room and ensure the rated heat load necessary for commissioning.
7. In some cases in winter, it is necessary to artificially block part of the condensation area of outdoor heat exchanger to increase the condensation pressure to 26Bar.

Electrical part

1. Confirm that the input voltage of main power supply is within the nominal range of ±15% of rated voltage; the outdoor unit power isolating switch has been closed.
2. Confirm that all electrical or control wiring is correct, and tighten all electrical and control connections.

5.2 Commissioning Steps

1. Disconnect the breaker corresponding to each component, close the isolating switch and the control air switch, and check the control voltage.
2. Fan commissioning:

Turn off the air switch of the fan, click on the touch screen to start and check whether the fan runs normally after the fan runs.

3. Electric heating commissioning:

Turn off the fan air switch and turn on the electric heating, click on the touch screen to start the heating mode, and feel whether the supply air temperature rises, so as to judge whether the electric heating works.

Trigger method of heating mode:

Enter the "User Settings" page and set "Temperature Settings" to 5℃ higher than the current ambient temperature.

4. Humidifier commissioning:

Triggering method of humidification mode:

Adjust the humidity set value to 10% higher than the indoor relative humidity. At this time, the control system should be able to trigger the humidification demand and the humidifier will start working. When the set value is lower than the humidity of the computer room, if the humidifier stops working, it indicates that the humidification function is normal.

5. Compressor commissioning:

1） If the static filling of refrigerant does not reach the calculated filling amount, dynamic filling is required. Operate as follows:

a. Connect the refrigerant bottle, pressure gauge and the needle valve on the compressor suction pipe through the refrigerant flexible pipe.

b. Ensure that the external unit is in the power-on state, turn on the fan and compressor of the indoor unit, enter the "User Settings" page, set the "Temperature Set Value" to the lowest value, return to the main page of the touch screen, click on the power on, and run the refrigeration mode. After the compressor is turned on for 5 minutes, slightly open the valve on the pressure gauge to slowly fill the refrigerant until the total refrigerant filling amount reaches the calculated filling amount, close the pressure gauge valve, and the compressor runs continuously for 10 minutes.

2） If the refrigerant has been added before commissioning, trigger the refrigeration (compressor is on) as follows:

Enter the "User Settings" page and adjust the temperature setting value to be 5℃ lower than the indoor computer room temperature. The control system should be able to trigger refrigeration demand and

compressor operation.

✧ **Warning**

1. Before starting the compressor, it must be ensured that the heating belt of the crankcase of the compressor is preheated for more than 12 hours, so as to avoid starting the compressor with liquid and affecting the service life of the compressor.
2. After the test, adjust the temperature set value back to the default set value or the initial set value.

5.3 Check after Commissioning

1. Confirm that all points of the unit are firmly connected without water leakage.
2. Check that all output functions are automatic.
3. Check that the set value of temperature and humidity and the control precision are reasonable.
4. Check that other settings are reasonable.

Chapter 6 Operations and Maintenance

6.1 System Diagnosis Test

Precautions

1. During the operation of the air conditioner system, there may be fatal voltage in the equipment; all precautions and warnings on the component equipment and in this manual must be observed; otherwise, casualties may be caused.
2. Only qualified professional repair and maintenance personnel can operate and handle these equipment.

6.1.1 Electric control part

Electric maintenance

According to the following items, make a visual inspection of the electrical connection and deal with it.

1. Electrical insulation test of the whole machine: find the unqualified contacts and deal with them. During the test, attention should be paid to disconnecting the safety or air switch of the control part to avoid the damage of high voltage to the control device.
2. Static test whether the suction of each contactor is flexible and whether there is any jam.
3. Dust the electrical and control components with a brush or dry compressed air.
4. Check whether there is arcing and burn marks in the contact attraction of contactor and replace the corresponding contactor when serious.
5. Fasten all electrical connection terminals.
6. Check whether the butt joint is in good contact and replace the terminal if any looseness is found.

Control maintenance

According to the following items, make visual inspection, simple function test and handle the control part.

1. Check the appearance of switching power supply and test the output voltage.
2. Check the surface of control interface board and display control board for obvious aging.

3. Clean the dust and dirt on all electrical control elements and control panels, and clean them with a brush combined with electronic dust remover.
4. Check and tighten the input and output plug interfaces of the control interface board, including the connection between the display control board and the control interface board and the connection between the control interface board and the temperature and humidity sensor.
5. Check the connection between the user terminal and the control interface board.
6. Check the output connection from the control interface board to each contactor, and the input connection of low-pressure sensor, high-voltage switch, low-voltage switch (when configured) and filter plug switch. For the plug-in terminal, it should be checked emphatically and it should be replaced immediately in case of looseness and poor contact.
7. Replace the control fuse (or air switch), control panel and other electrical components that have been detected to have problems.
8. Check the specifications and aging of the control connection or power connection and replace the wiring if necessary.
9. Use a temperature and humidity measuring instrument with higher measurement accuracy to check and calibrate the reading of the temperature and humidity sensor; during calibration of humidity sensor reading, attention should be paid to the relative humidity control.
10. Adjust the set point and detect the action of each functional component according to the control logic.
11. Simulate and detect the working state of protection units such as high and low voltage alarm, high and low temperature alarm and high water level alarm.

✧ **Warning**

1. Before fastening any assembly connection and line connection, it must be ensured that the power supply of the control unit is turned off.

6.2 Maintenance of Fan Components

Check the fan parts regularly, including items such as fan motor and impeller, etc. If necessary, please consult the manufacturer for more detailed information.

6.2.1 Fan impeller

The fan should be checked regularly and the fan impeller should be rotated to ensure that it will not rub

against the air guide ring.

6.2.2 Motor

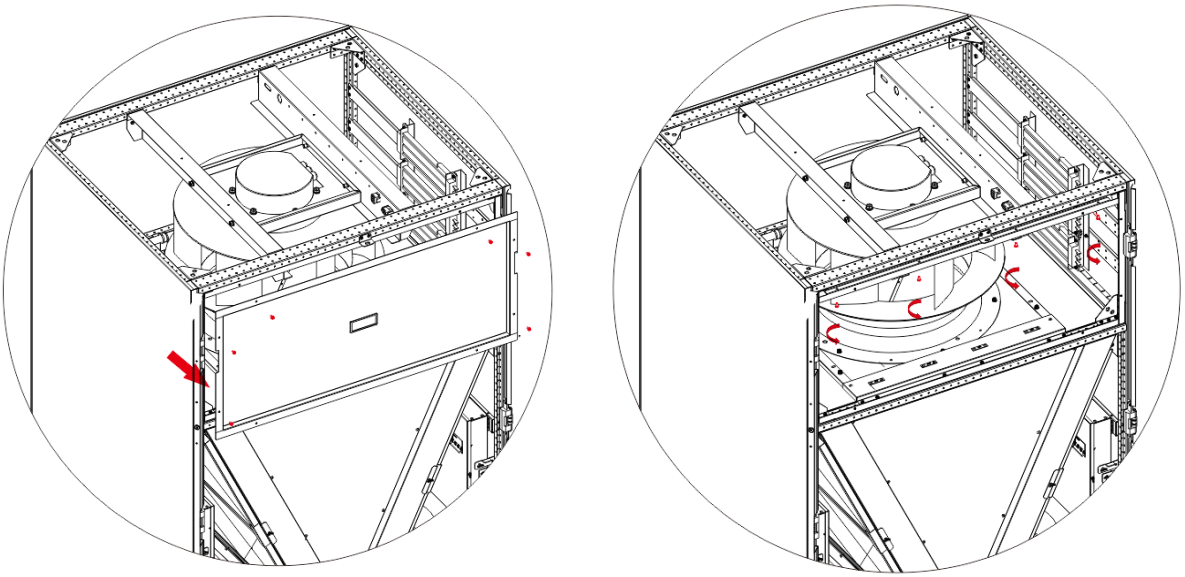
When the motor needs to be replaced due to abnormal sound, burnout and other factors, attention should be paid to safety.

6.2.3 Fan replacement steps

Tools: Phillips screwdriver, flat screwdriver, diagonal pliers and cable tie;

Replacement steps of upflow supply fan:

1. Open the front door and cut off the power supply of the unit.
2. Remove the front sealing plate and the front panel fixing bracket of the fan.
3. Pull out the plug terminals of the fan power cord and signal line and cut off the cable ties of the corresponding fan harness to facilitate the following operation.
4. Remove and sink the screws of the air guide ring fixer.
5. Use a Phillips screwdriver to loosen the screw of the fan fixing frame and then take out the fan assembly.
6. Install the new fan assembly according to steps 5-1.



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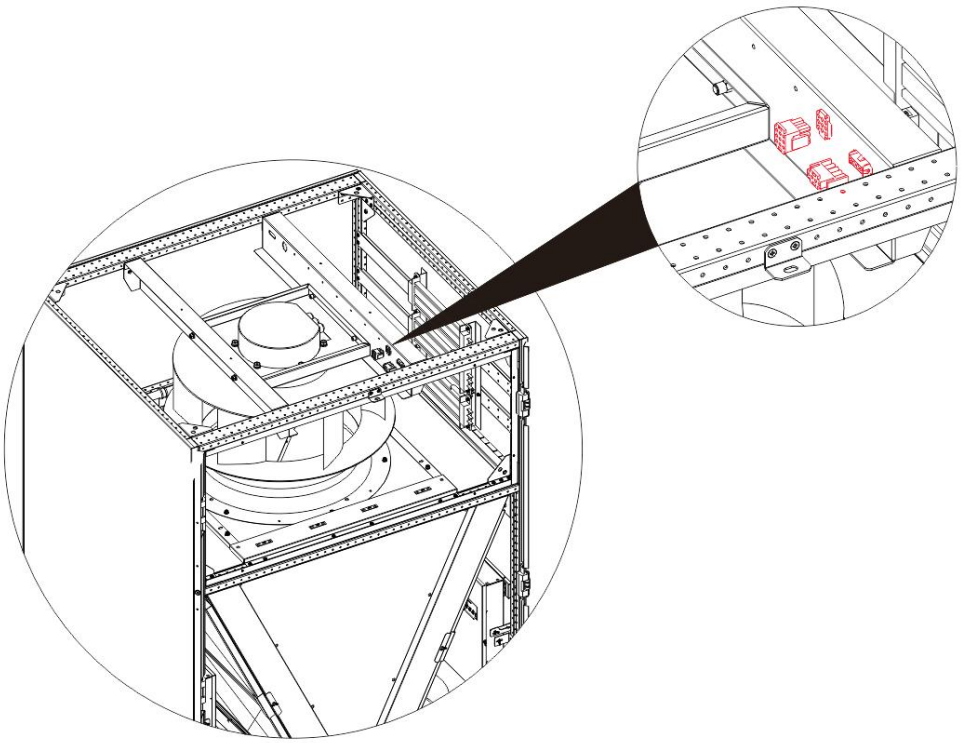

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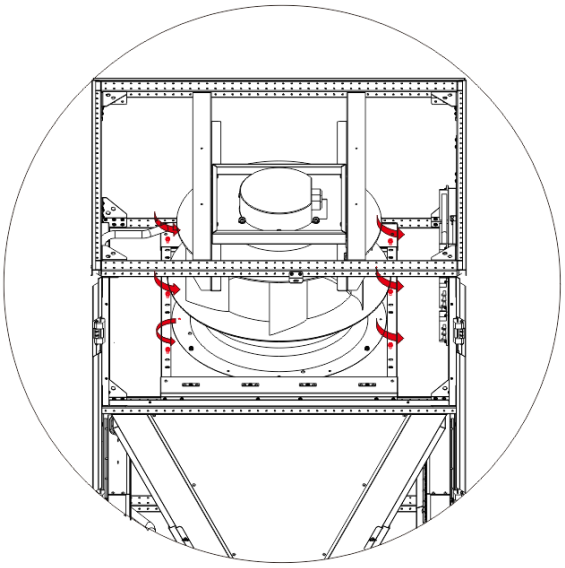

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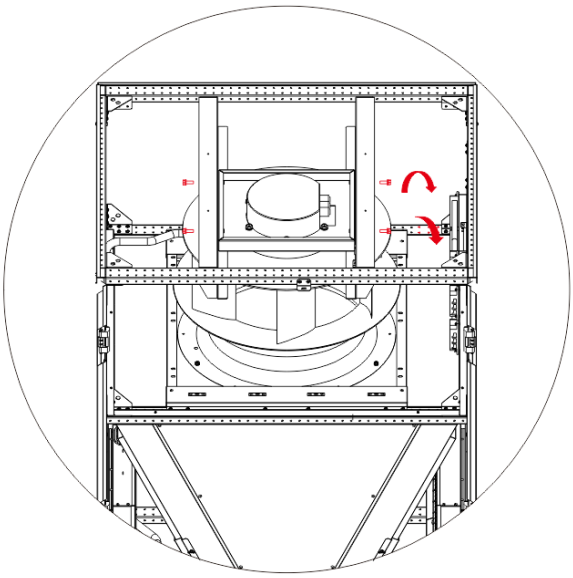
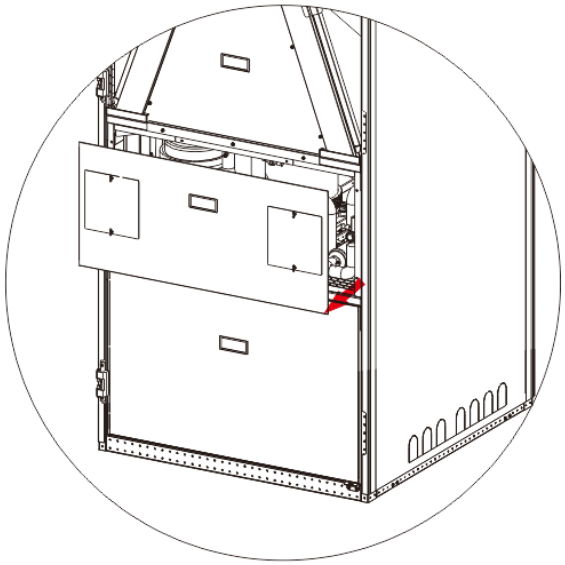


Step 5

6-1 Diagrammatic Sketch of the Maintenance of Upflow Supply Fan

Replacement steps of downflow supply fan:

1. Open the front door and disconnect the power air switch of the unit.
2. Remove the front seal plate of the fan and the front seal plate of the compressor.
3. Pull out the plug terminals of the fan power cord and signal line and cut off the cable ties of the corresponding fan harness to facilitate the following operation.
4. Use cable. One end of the cable is fixed on the beam of the fan air inlet and the other end passes through the pulley. The cable passes through the beam and pulley twice. Remove the screws for fixing the sheet metal of the fan, drag the fan obliquely downward and lift it out.
5. Install the new fan assembly according to steps 4-1.



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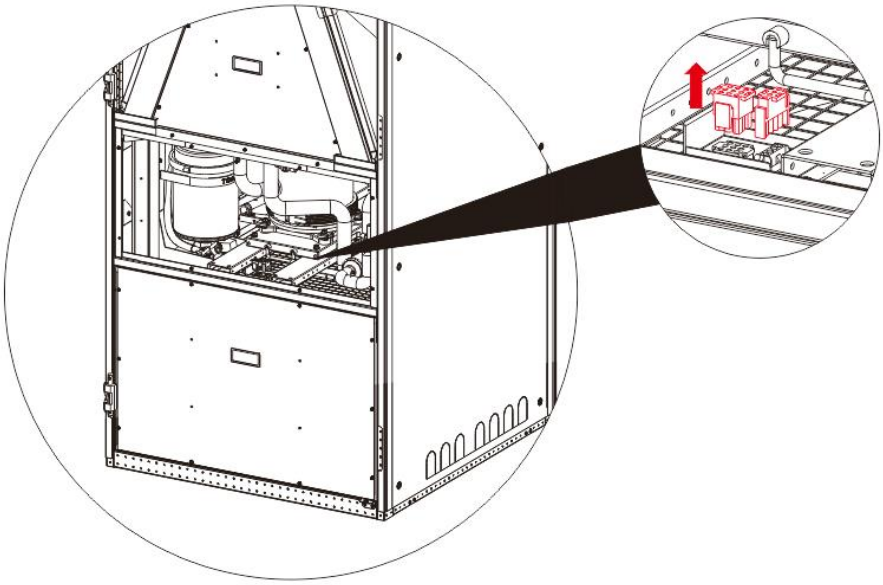

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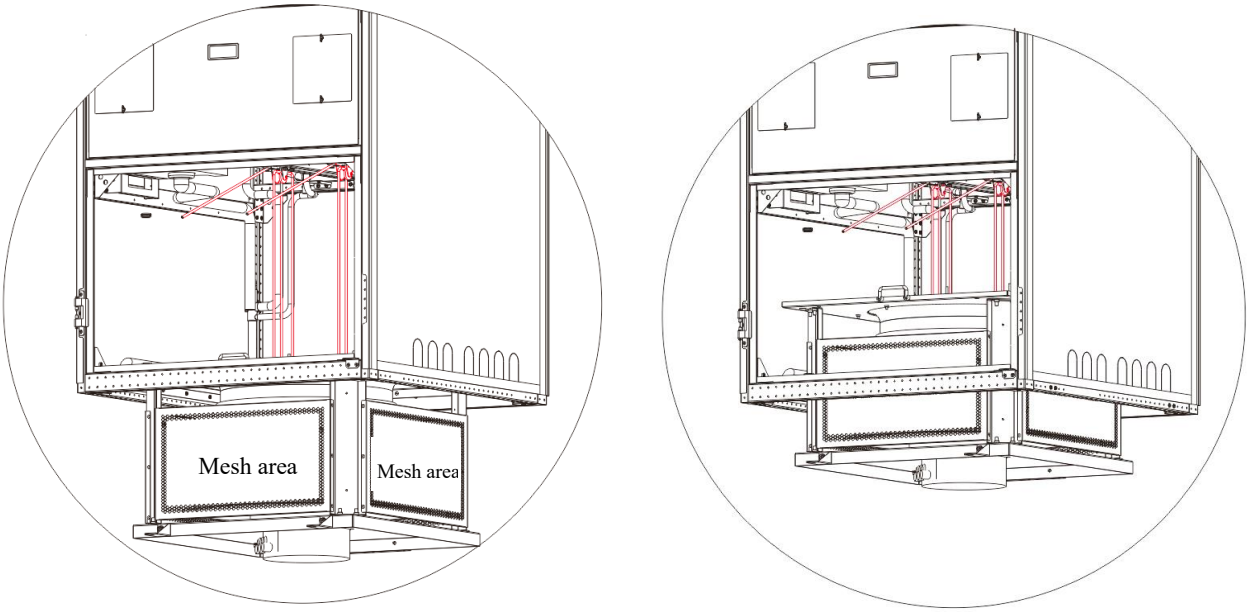


Step 4

6-2 Diagrammatic Sketch of the Maintenance of Downflow Supply Fan

6.3 Filter Maintenance

When there is a warning of filter blockage or filter maintenance time, it is necessary to remove the filter for cleaning or replace it with a new one.

Operation: Open the front door of the unit, screw off the butterfly nut for fixing the filter and remove the

fixing sheet metal to take out the filter.

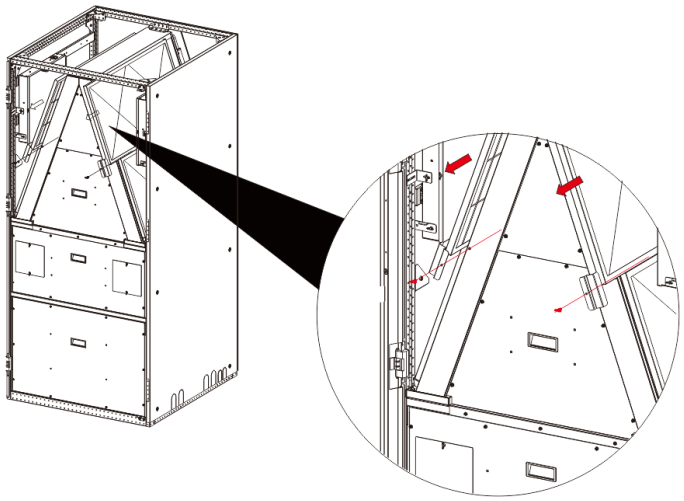


Fig. 6-3 Diagrammatic Sketch of the Film Maintenance Steps

6.4 Maintenance of Differential Pressure Switch

1. Remove the fixing screws of the wiring cover of the differential pressure switch and take out the wiring cover.
2. Loosen the screws of the wiring terminals (1-3) and remove the connecting line of the differential pressure switch.
3. Remove the four fixing screws of the base of the differential pressure switch and pull out the pressure taking pipe to remove the differential pressure switch.
4. Adjust the pressure difference of the new differential pressure switch to 400Pa (turn the middle knob to “400” to align with the red arrow).

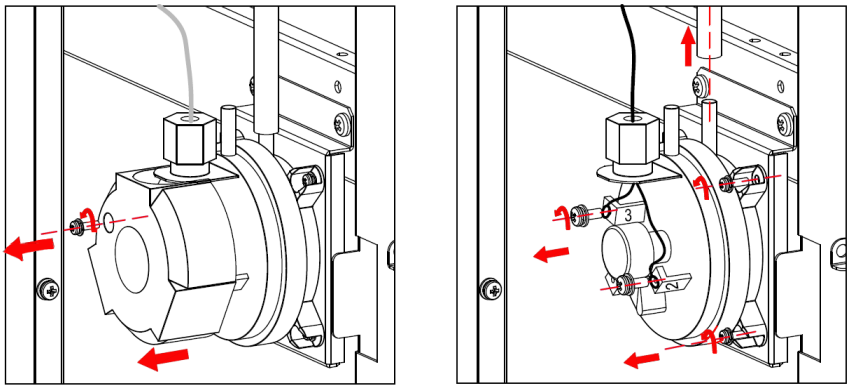
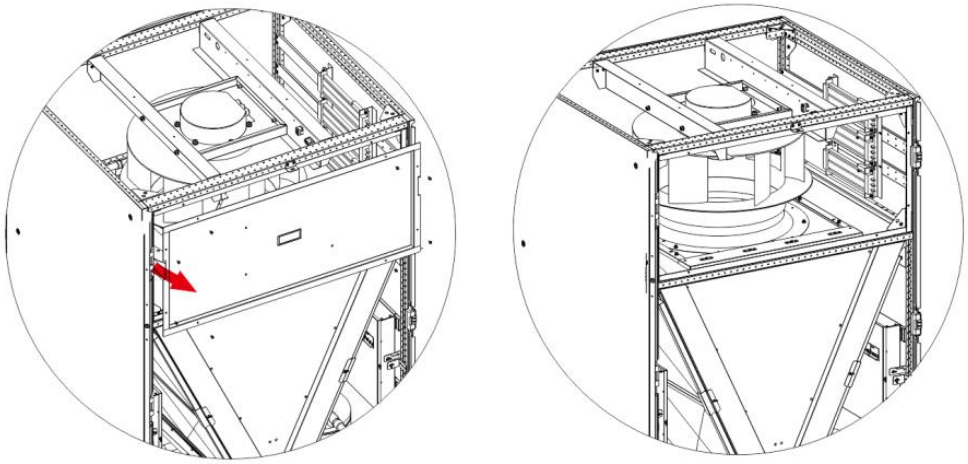


Fig. 6-4 Schematic Diagram of Maintenance Operation Steps of Differential Pressure Switch

6.5 Maintenance of Electric Heating

Maintenance of electric heating of upflow supply fan

1. Turn off the electric heating air switch. After the electric heating is cooled, disconnect the power air switch of the unit.
2. Remove the front sealing plate of the fan to see the PTC electric heater.
3. Remove the electric heating wiring.
4. Remove the fixing screw of electric heating, first pull it out, then gently push it up, and then take out the electric heating.
5. Install the new electric heating assembly according to the above steps 4-1.



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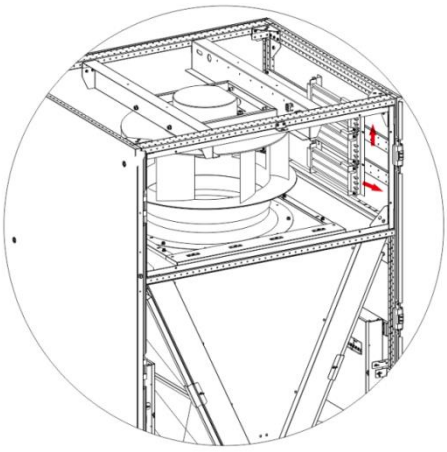
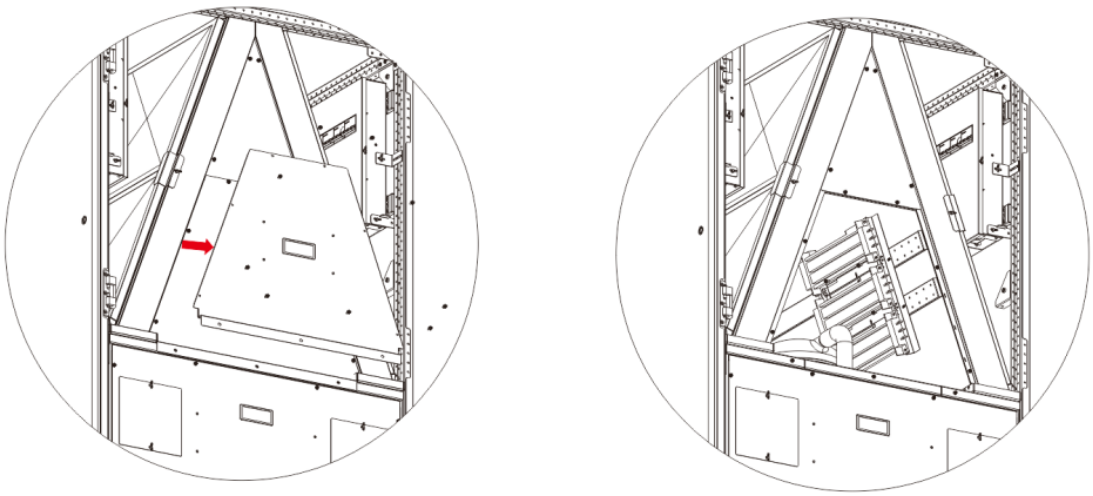


Step 4

6-5 Diagrammatic Sketch of Maintenance of Electric Heating of Upflow Supply Fan

Maintenance of electric heating of downflow supply fan

1. Turn off the electric heating air switch. After the electric heating is cooled, disconnect the power air switch of the unit.
2. Remove the front sealing plate of the evaporator to see the PTC electric heater.
3. Remove the electric heating wiring.
4. Remove the fixing screw of electric heating, first pull it out, then gently push it up, and then take out the electric heating.
5. Install the new electric heating assembly according to the above steps 4-1.



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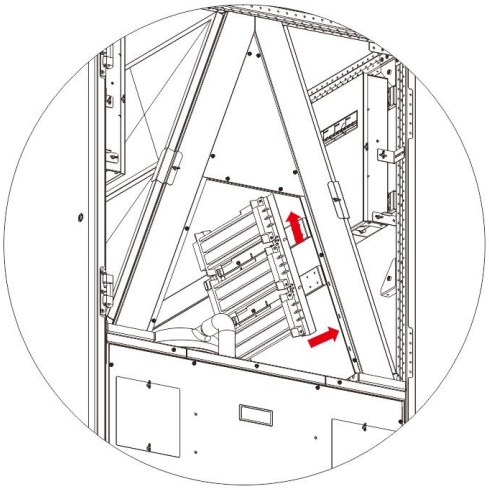


Step 4

Fig. 6-6 Diagrammatic Sketch of Maintenance of Electric Heating of Downflow Supply Fan

6.6 Maintenance of Electrode Humidifier

Steps to clean or replace humidification barrel

Components of humidifier include: humidifier bracket (including water inlet solenoid valve and drainage solenoid valve, etc.), humidification tank, humidification water inlet pipe, humidification drainage pipe and humidification steam pipe, etc., as shown in Fig. 6-7.

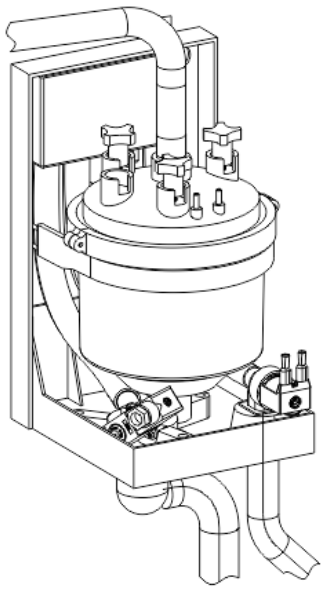


Fig. 6-7 Diagrammatic Sketch of Electrode Humidifier

Humidifier is a consumable part and needs to be cleaned regularly. Because the humidifying drainage contains some scale, in order to prevent the accumulation of scale in long-term operation and block the water collecting tray and drainage pipeline, the humidifying water collecting tray needs to be cleaned regularly. The cleaning cycle varies with the water quality and humidification operation time. It is recommended to carry out monthly cleaning.

If the humidifier keeps feeding water or the input voltage of the humidifying electrode is normal, but the water can’t boil all the time, it means that the humidifier has reached its service life and needs to be replaced.

The specific replacement steps are as follows:

1. Disconnect the power air switch of the unit.
2. Remove the power cord of the electrode humidifier.
3. Remove the fixing belt that fixes the humidifier and take out the humidifier directly.
4. Check the electrode condition in the humidifying barrel and replace it if it is seriously corroded.
5. Reassemble the humidifier according to the reverse process of steps 1-4.

6.7 Maintenance of Refrigeration System

The components of the refrigeration system must be checked monthly to see whether the system functions normally and whether there are signs of wear. Because the failure or damage of devices is often accompanied by corresponding failures, regular inspection is the main means to prevent most system failures. The refrigerant pipeline must have proper supports, and it is not allowed to lean against the place where the ceiling, floor or fixed frame vibrates. Check the refrigerant lines every six months to confirm whether they are worn or whether the existing fixing structures are loose.

The pipeline is equipped with sight glass, through which the flow rate of liquid refrigerant and the water content of the system can be observed. Whether the water content in the system exceeds the standard can be judged by the background color of the sight glass.

When the refrigeration system fails, the failure can be judged according to some parameters of the system operation.

6.7.1 Suction pressure

When the suction pressure drops below the action value of low-pressure protection, it may cause compressor protection shutdown. On the other hand, too high suction pressure will also reduce the cooling of the compressor motor by refrigerant, which may cause the compressor to be damaged. See Table 6-1 for the minimum (low-pressure protection action value) or maximum (designed operation) suction pressure value.

Table 6-1 Suction Pressure

System	Minimum pressure bar, R410A	Maximum pressure bar, R410A
25~100kW	4.0	16.0

6.7.2 Discharge pressure

The discharge pressure may increase or decrease due to the load condition or condenser efficiency. When the discharge pressure reaches the high-pressure protection action value, the compressor will be shut down for protection. Please refer to Table 6-2 for details.

Table 6-2 Discharge Pressure

System design	System designed high-pressure switch action value bar
25~100kW	40

6.7.3 Expansion valve

The automatic adjustment of the electronic expansion valve ensures that enough refrigerant is supplied to the evaporator to meet the requirements of load conditions. Whether the electronic expansion valve is working normally can be judged by measuring the superheat. If the refrigerant supplied to the evaporator is too little, the suction superheat will be very high; If too much refrigerant is supplied to the evaporator, the suction superheat will be very low.

✧**Notice**

1. Suction superheat has great influence on the life of compressor. If the compressor runs for a long time with little or no suction superheat, it may cause “liquid hammer” and damage to the compressor.
2. Customers are not advised to adjust the parameters of electronic expansion valve by themselves on site. If it is needed to adjust, please contact the technical support engineer.

6.7.4 Compressor

The motor of compressor is seldom burnt out due to insulation failure. Most of the events in which the motor is burnt out are caused by machine or poor lubrication, that is, high temperature and overheating. If the problems that may lead to compressor failures can be found and corrected early, most compressor failures can be avoided. Maintenance personnel regularly check the possible abnormal operation. Instead of replacing the compressor after it fails, it is better to take necessary steps to prevent it.

Check of the electrical part

When diagnosing the compressor, check whether all the electrical components of the compressor operate normally:

1. Check the circuit breaker.
2. Check the work of high-pressure switch and low-pressure sensor.
3. If the compressor fails, find out whether the compressor failure is caused by electrical failure or mechanical failure.
4. Check the relevant historical alarm information and historical operation records.

✧ **Notice**

1. The replacement of the compressor needs to be guided by professionals. If it needs to be replaced, please contact the technical support engineer.
2. The damage of the compressor caused by improper cleaning behavior belongs to the improper use referred to in the warranty clause, and the warranty will not be granted.

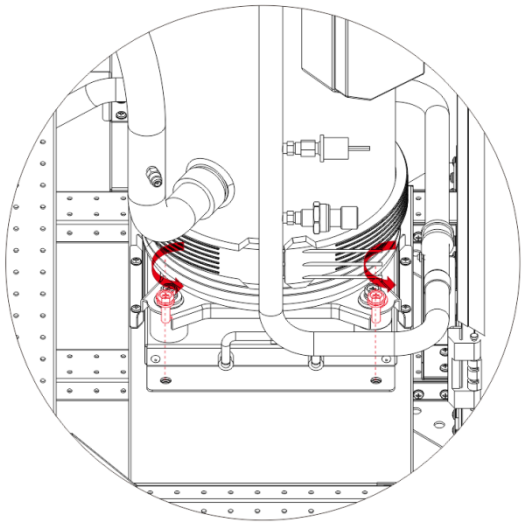
When replacing the compressor, the filter drier should also be replaced, and the expansion valve should be checked. If there is a failure, it should also be replaced. Before replacement, it is necessary to clean the system. If you don't know the cleaning method, please consult our professional technicians.

Replacement steps of the compressor

1. Cut off the power air switch of the unit.
2. Dismantle the damaged compressor, remove the filter drier and clean the system.
3. Install and replace the compressor and filter drier.
4. Carry out pressurized leak detection test on the system with the leak detection pressure of 30bar. If there is no problem, the system shall be evacuated.
5. Charge the system with refrigerant according to the charging requirements of evaporator, condenser and refrigeration pipeline.
6. Turn on the power supply and run the air conditioner unit. Check whether the refrigeration operation is normal. Please refer to the suction and discharge pressure range of normal refrigeration cycle, and dynamically charge a certain amount of refrigerant when necessary.

Replacement of upflow supply fan compressor:

1. Remove the fixing screws of the compressor chassis.
2. Remove the welded copper pipes at parts 1, 2 and 3 of the compressor exhaust pipe and suction pipe.
3. Take out the compressor.



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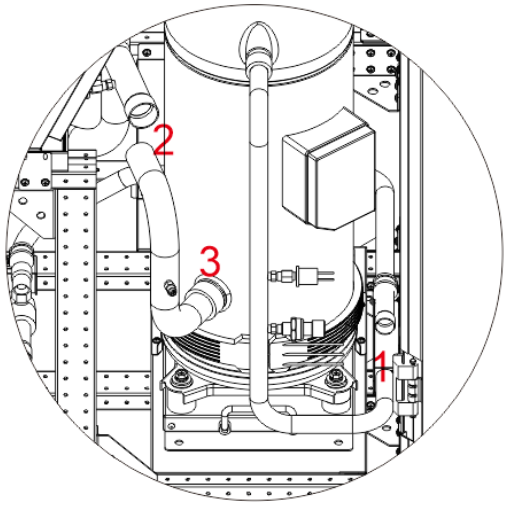

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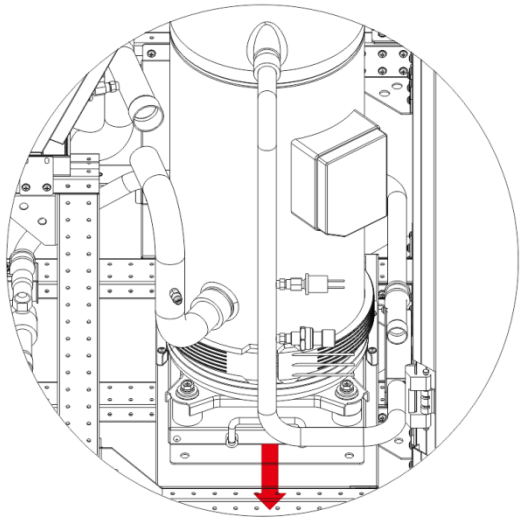
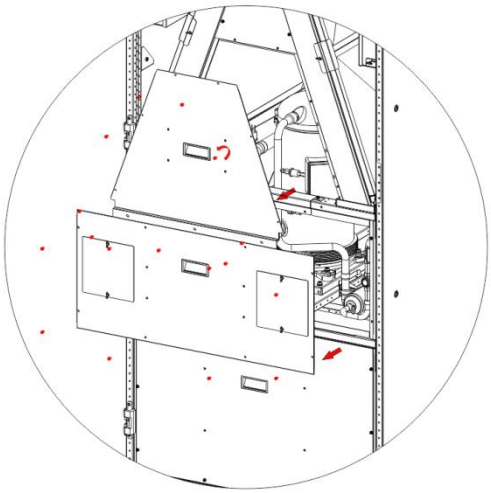


Step 3

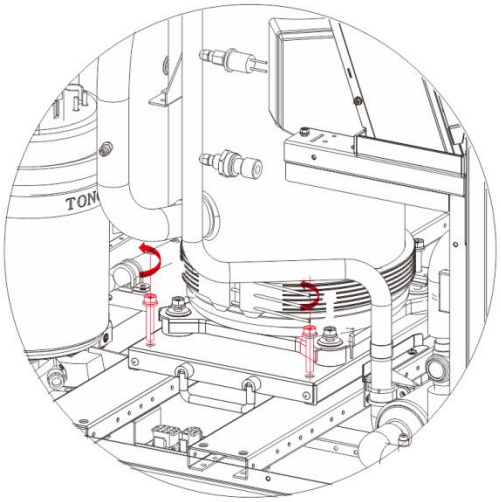
Fig. 6-8 Diagrammatic Sketch of Upflow Supply Fan Compressor Removal

Replacement of downflow supply fan compressor:

1. Remove the front seal plate of compressor, the front seal plate of evaporator and the first three beams of compressor propulsion.
2. Remove the fixing screws of the compressor chassis.
3. Remove the welded copper pipes at parts 1 and 2 of the compressor exhaust pipe and suction pipe.
4. Take out the compressor.



Step 1



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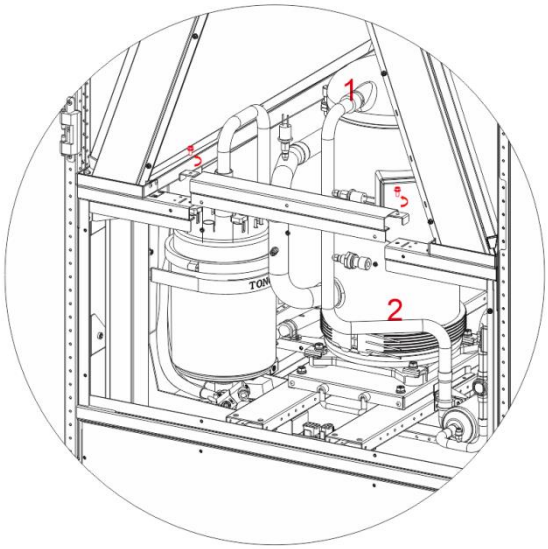

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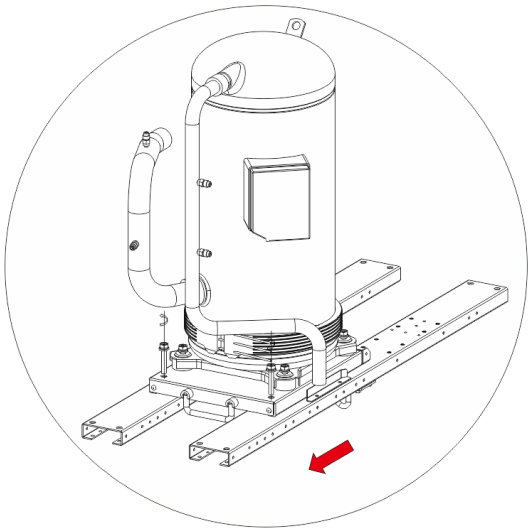

Step 4

Fig. 6-9 Diagrammatic Sketch of Downflow Supply Fan Compressor Removal

Chapter 7 Fault Diagnosis and Treatment

✧ **Warning**

Some circuits have deadly high voltage, so only professional technicians are allowed to maintain the unit, and special care must be taken when troubleshooting live faults.

See Table 7-1 to Table 7-5 for the fault diagnosis and treatment of each component.

Table 7-1 Fault Elimination of Fan

Symptom	Possible reason	Items to be checked or treatment method
Cannot start the fan	No main power supply	Check the rated voltages of L1, L2 and L3
	Circuit breaker trips	Check the circuit breaker
	Overload and the air switch trips	Manually reset and check the average current
	Control panel failure	According to the contents of the circuit diagram, check whether there is output at the control end of the motherboard
	The fan itself fails	Replace the fan

Table 7-2 Fault Elimination of Compressor and Refrigeration System

Symptom	Possible reason	Items to be checked or treatment method
Compressor cannot be started	No power supply (shutdown)	Check the main power switch, circuit breaker and connecting wires
	Loose circuit connection	Fasten circuit connector
	Compressor coil short circuit burned out	Check the motor and replace it immediately if any defects are found
Compressor does not operate	No refrigeration demand	Check the controller status
	High pressure protection action	Check the high-pressure switch and high-pressure value
Discharge pressure is high	Condenser blockage	Clean condenser
	Condensing equipment does not operate	Check the condensing fan
	Excessive refrigerant charge	Check whether the degree of super-cooling is too high
Discharge pressure is low	Refrigerant leakage	Check and repair the leakage and add refrigerant
	The outdoor fan speed controller fails, and the output voltage is always full load voltage, which does not change with the change of condensing pressure.	If any defects are found, replace the speed controller immediately
The suction and discharge pressures are not	Compressor rotates reversely or internal blow-by	When the compressor is reversed, any two L lines of the compressor shall be replaced, and the compressor shall be replaced for internal blow-by

changed after startup		
The suction pressure is low or the liquid flows back	Refrigerant in the system is insufficient	Check whether there is leakage and repair and add refrigerant
	The air filter screen is too dirty	Replace the filter screen
	Filter drier blockage	Replace the filter
	Improper superheat regulation	Adjust according to strict expansion valve adjustment steps
	Poor air flow distribution	Check the air supply and return system
	Low condensation pressure	Check the condenser fault
Compressor noise is too large	Return liquid	See the treatment method of “low suction pressure or liquid return”
	Loss of lubricating oil causes bearing wear	Add lubricating oil
	Fixing of compressor or pipeline is loose	Fasten fixation clip
Overheating of compressor operation	Compression ratio is too high	Check the setting of high-pressure and low-pressure protection values, check whether the condenser is blocked and check whether all evaporators and condenser fans are working normally
	Suction temperature is too high	Adjust the expansion valve or add an appropriate amount of refrigerant

Table 7-3 Fault Elimination of Dehumidification System

Symptom	Possible reason	Items to be checked or treatment method
No dehumidification effect	The control system does not carry out dehumidification function as required	Check the control system status
	The compressor does not run and the circuit breaker trips	Please refer to Table 7-2 Check the circuit breaker and its contacts and check the line voltage

Table 7-4 Fault Elimination of Electrode Humidifier

Symptom	Possible reason	Items to be checked or treatment method
No humidifying effect	No water adding	Check the water source Check whether the water adding solenoid valve works Check whether the water inlet pipe is blocked
	No humidifying demand	Check the controller status

Table 7-5 Fault Elimination of Heating System

Symptom	Possible reason	Items to be checked or treatment method
The heating system does not run and the contactor does not pull in	Do not meet heating startup conditions	Check the controller status
The contactor pulls in without heating effect	Heater is burnt out	Cut off the power supply and check the resistance characteristics of the heater with an ohmmeter

Annex I Electrical Schematic Diagram of Indoor Unit