Preface-About the product and manual

[Manual purpose]

This manual introduces the main features, performance, and working principle of the new generation of intelligent rack-mounted precision air conditioners and provides users with information on usage, operation, and maintenance.

[User]

Technical Support Engineer
Maintenance Engineer
User

[Disclaimer]

1. Outside the free warranty period;
2. Disassemble or modify the product without authorization;
3. Violation of product operation or use specifications;
4. Man-made faults;
5. The product suffered losses caused by irresistible or other external factors on the client-side.

[Note: Any of the above exemption clauses will not be covered by the warranty.]

[Related description]

1. This manual is provided with the product, please keep it in a safe place so that you can check it at any time when you need it. In case this manual is accidentally lost or damaged, please obtain it directly from the manufacturer or local distributor;
2. This manual is written for rack air-cooled products, and the content may not be applicable to other models;
3. Due to product version upgrades or other reasons, the content of this document will be updated from time to time.
   Unless otherwise agreed, this document is only used as a guide, and all reports, information, and suggestions in this document do not constitute any express or implied guarantee.
4. The content is subject to change without notice.

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Chapter 1. General

1.1 Product Introduction

About the product

The rack air conditional is highly compatible with the micro-module product application scene. The product is embedded in a standard cabinet, realize near-end cooling, and reduce the data center PUE value. The rack AC has energy-efficient, easy to install, highly integrated, flexible combination, safe and reliable characters and so on.

Model description

This product models are divided to models with humidification and not have humidification, humidification is an optional feature. Models with humidification has main functions: cooling, dehumidification, humidification, heating; Models without humidification only have refrigeration and dehumidification as well as heating function.

Cooling capacity range

The rack AC cooling level is: 3.7kW～12.5kW.

Features

1. High reliability, high heat ratio, wind volume;
2. Adapt lean back centrifugal EC fan, high wind volume, high efficiency, low noise;
3. Adapt R410A green refrigerant, meet international green refrigerant requirements；
4. The large V-type evaporator design makes heat exchange faster and more efficient;
5. Adapt electronic expansion valve which has fast response speed, high adjustment accuracy and energy efficiency
6. Adapt international well-known brand DC frequency conversion inverter compressor, its excellent quality ensure the efficiency and stability of the unit;
7. High-quality refrigeration valves are used for more reliable;
8. A variety of optional accessories to provide users with a variety of options.

1.2 Running parameters and requirements

Table 1-1 Running parameters and requirements

Item		Indoor	Outdoor
Operating Parameters	Temperature/T	0℃～45℃	-20℃～+45℃，Low temperature components are required when not in the range
	Humidity /RH	5%～95%RH	——
Operating Requirements	Altitude/M	Altitude <1000M, more than 1000M need to be derated	
	Power supply/V	220V ±10%, 50 ±2Hz	

1.3 Type Description

Please refer to Table 12 for the matching relationship between the indoor unit and outdoor unit of the rack air conditioner.

Table 1-2 Product matching models

Indoor unit model	Standard outdoor unit model
Indoor 3.7kW	Outdoor 5kW
Indoor 7.5kW	Outdoor 10kW
Indoor 12.5kW	Outdoor 18kW

1.4 System Composition

The rack air conditioners are mainly composed of refrigeration system, control system, ventilation system, humidification system, and heating system. The unit is mainly composed of the following components:

1. Compressor——adapt energy-efficient DC frequency conversion inverter compressors, adapt R410A refrigerant，green and pollution-free；
2. Evaporator——Large area V-type evaporator design, heat exchange faster and more efficient；
3. Expansion valve——Electronic expansion valve, wide adjustment range, accurate flow regulation, high operational reliability;
4. Heater——Adopting PTC heater, the heat is fast and uniform
5. Wet film humidification components (optional)——Adopting wet film evaporation and humidification, environmental protection and energy saving, low maintenance cost;
6. Filter drier——Protect the refrigeration system to ensure that the system is free of moisture, acid and solid impurities;
7. Compressor heating belt——Used for heating the oil sump of the compressor crankcase, the heating belt

must be energized for at least 12 hours before starting;

8. EC fan——Step-less speed regulation and a wide range of adjustment;
9. Air filter——Filter dust and impurities in the air to ensure the cleanliness of the environment in the cabinet;
10. Controller——Standard RS485 communication interface, support remote centralized control, automatic startup of incoming calls, password protection, timing on/off, etc.;

1.5 Product appearance and specification parameters

1.5.1 Product appearance

Please refer to Figure 1.3, Figure 1.4, and Figure 1.5 for the appearance of the rack air conditioner indoor unit.

Figure 1.3 Appearance of indoor 3.7KW

Figure 1.4 Appearance of indoor 7.5kW

Figure 1.5 Appearance of indoor 12.5 kW

For the appearance of the outdoor unit of the rack air conditioner, please refer to Figure 1.6, Figure 1.7, and Figure 1.8.

Figure 1.6 Appearance of outdoor 5kW

Figure 1.7 Appearance of outdoor 10kW

Figure 1.8 Appearance of outdoor 18kW

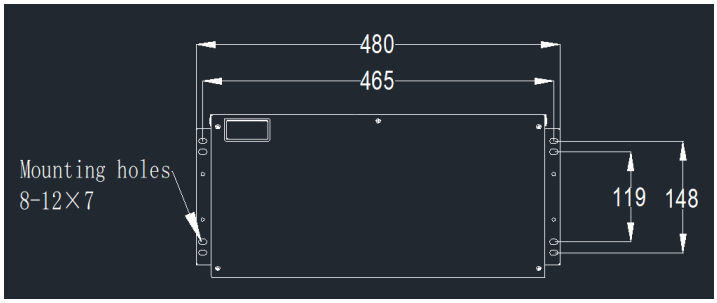
1.5.2 Dimensions and Net Weight

Refer to Table 1.3 for the overall dimensions and net weight of the rack products.

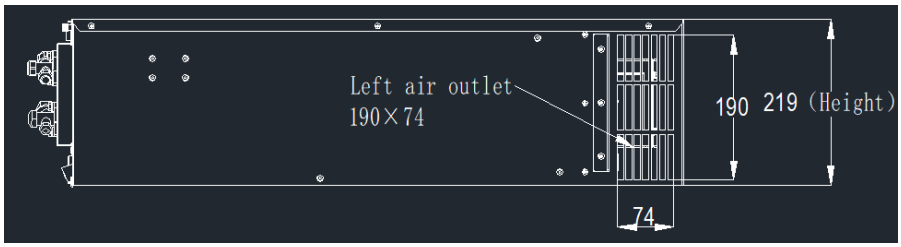
Table 1.3 Dimensions and net weight

Product	Type	Dimension (mm)W ×H ×D	Net Weight (kg)
Indoor unit	3.7kW	440 ×219 ×800	26
	7.5kW	440 ×310 ×800	35
	12.5kW	440 ×440 ×800	47
Outdoor unit	5kW	886 ×605 ×340	38
	10kW	882 ×720 ×380	42
	18kW	995 ×1256 ×440	66

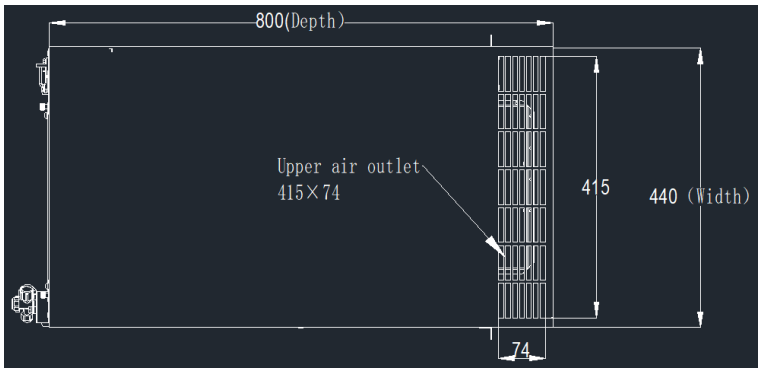
The overall dimensions of the indoor unit are shown in Figure 1.9, Figure 1.10, and Figure 1.11 (unit: mm).



Front view

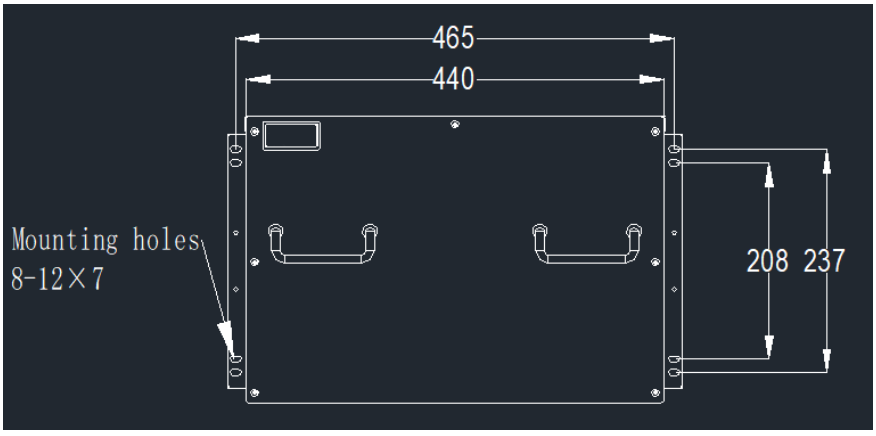


Left view

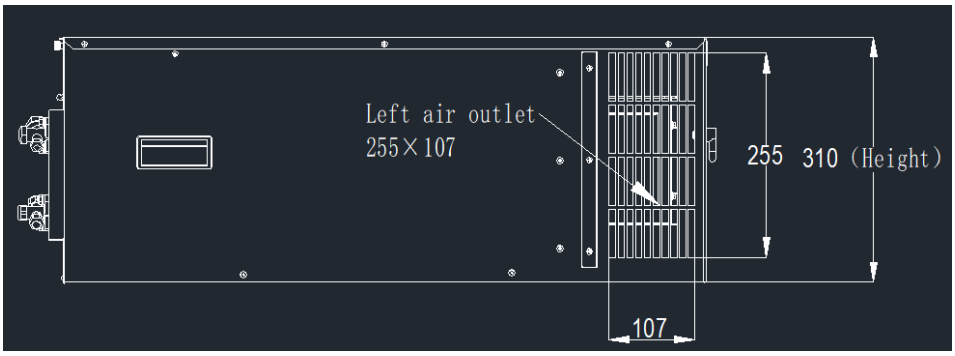


Top view

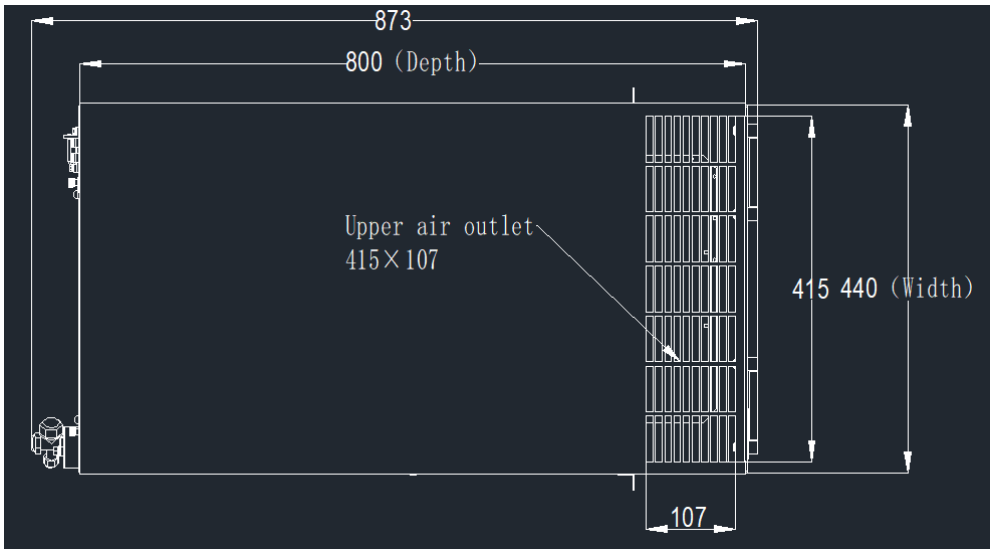
Figure 1.9 indoor 3.7KW outline dimension drawing



Front view

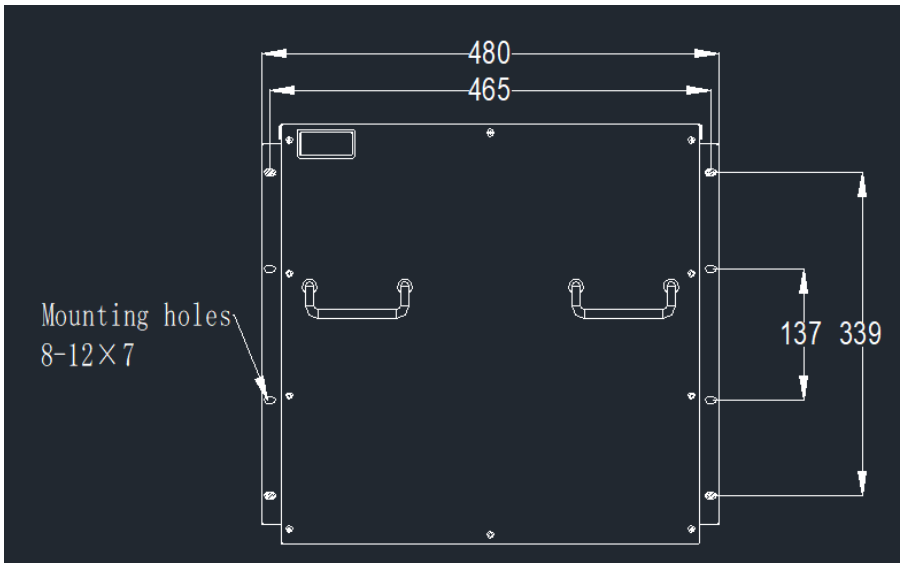


Left view

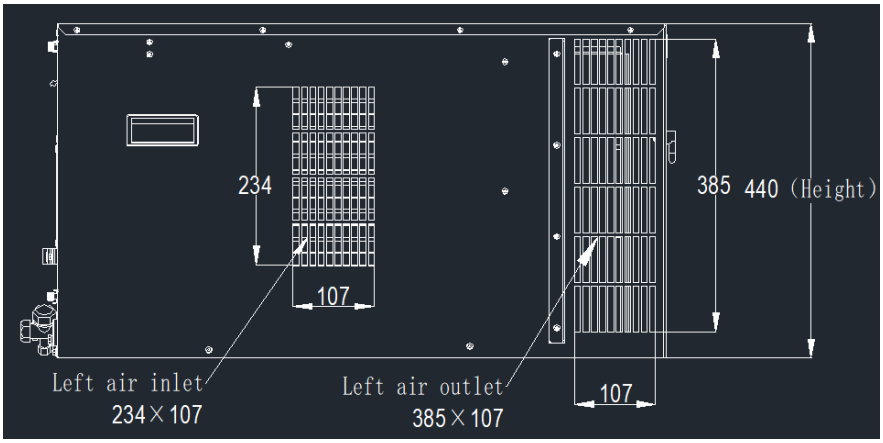


Top view

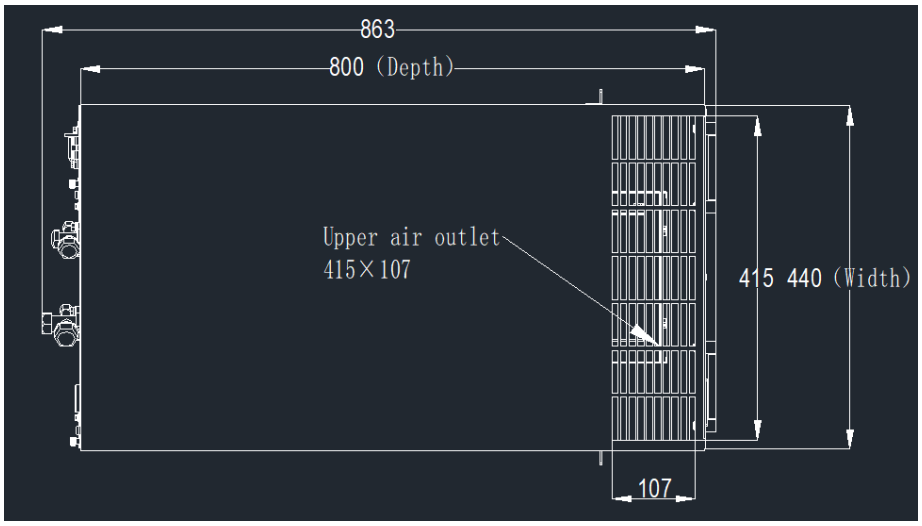
Figure 1.10 indoor 7.5kW outline dimension drawing



Front view



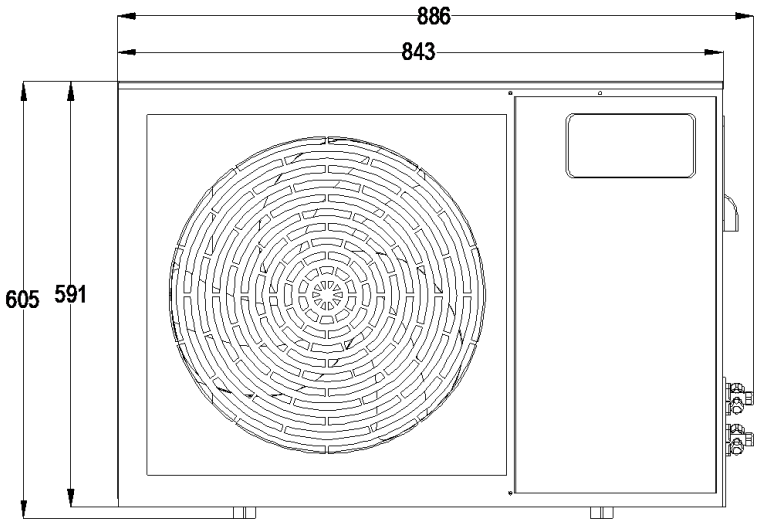
Left view



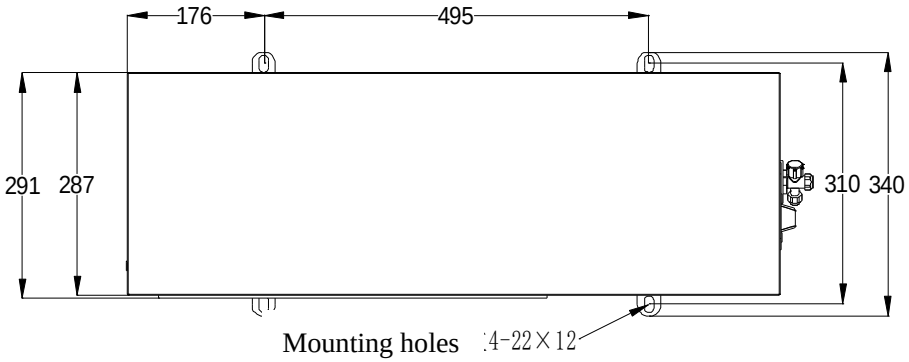
Top view

Figure 1.11 indoor 12.5kW outline dimension drawing

The outline dimensions of the outdoor unit are shown in Figure 1.12, Figure 1.13, and Figure 1.14.

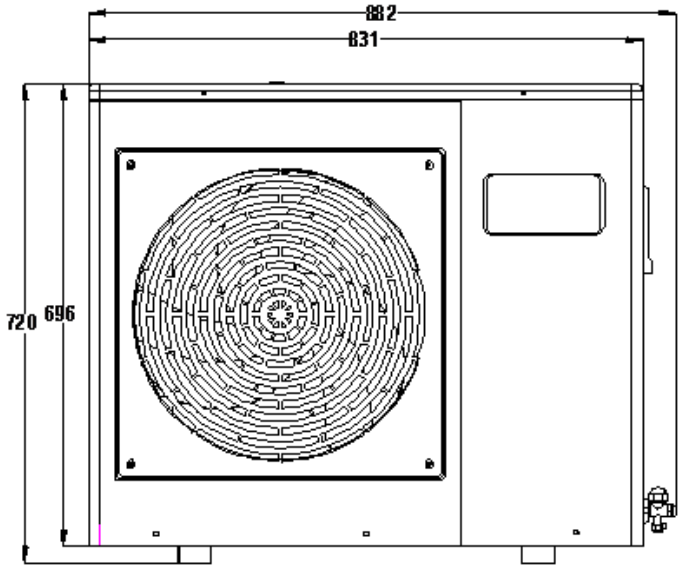


Front view

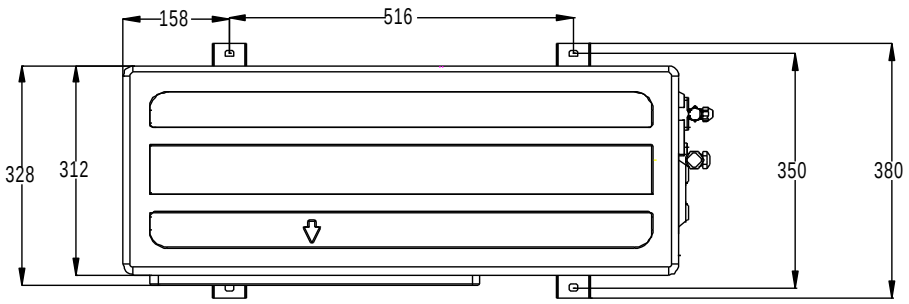


Left view

Figure 1.12 Dimensions of Outdoor 5kW

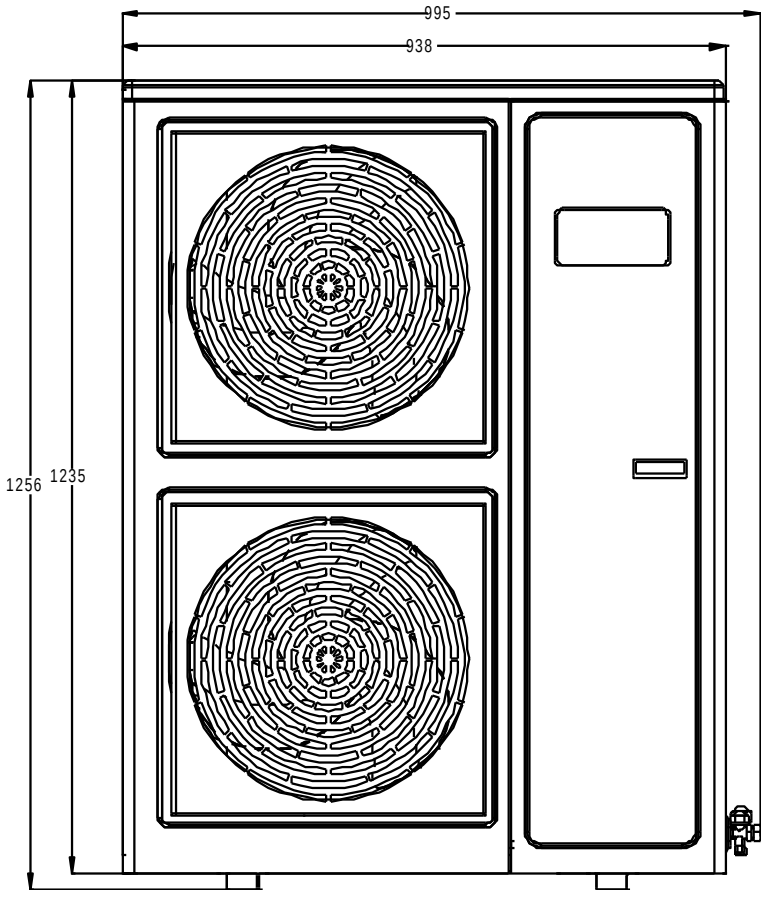


Front view

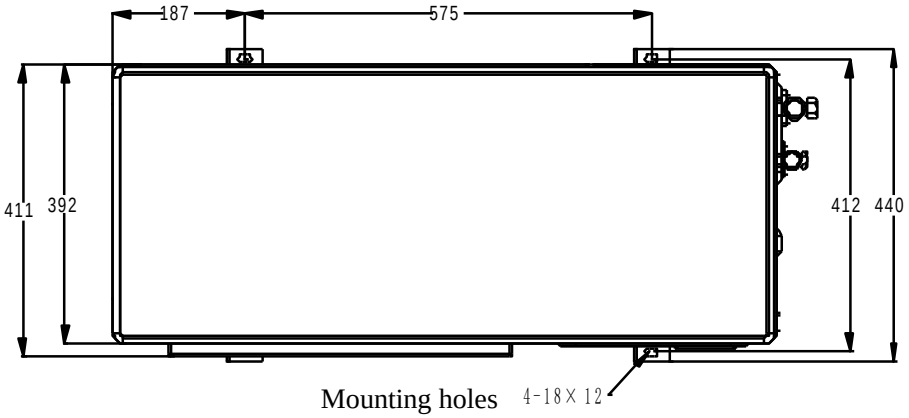


Top view

Figure 1.13 Outdoor 10kW Dimensions



Front view



Top view

Figure 1.14 Outdoor 18kW Dimensions

1.5.3 Product packaging dimensions and gross weight

Table1.4 Packaging dimensions and gross weight of precision air conditioners

Model	Packaging Dimensions (mm)W×D×H	Gross Weight (kg)
Indoor 3.7kW	537×315×929	32
Indoor 7.5 kW	537×403×929	44
Indoor 12.5kW	537×535×929	53
Outdoor 5kW	380×980×760	43
Outdoor 10kW	390×945×755	54
Outdoor 18kW	490×1085×1400	80

Chapter 2. Product Transportation and Receiving

2.1 Product Transportation

About product

The rack air conditioners contain mechanical, electrical and other equipment. Improper transportation and handling may damage the product and cause the equipment to fail to operate normally. Please strictly observe the following precautions during transportation and handling.

Transport requirements

1. Keep out of the rain;
2. Stand upright;
3. Can not be stacked;
4. Anti-collision.

Precautions

1) Specific requirements other than packaging requirements shall prevail;

2) Please try to choose a better transportation method (such as railway transportation, shipping). When choosing automobile transportation, you should choose a road with better road conditions to prevent excessive bumps;

3) The transportation environment and placement requirements should be implemented in accordance with relevant requirements;

4) Please try to use mechanical handling tools when unloading and transporting.

2.2 Receiving

The Rack Air Conditioners have passed strict quality assurance tests and inspections before leaving the factory. Please check the equipment carefully when receiving the products to ensure that the equipment has not been damaged during transportation.

Receiving process

It is recommended to operate according to Figure 2.1 for the receiving process of products. If the user immediately after unpacking the unit installation, there is no need to carry out the process of "sealing" operation, check if there is no problem can be directly acceptance; If the unit installation is not carried out temporarily after unpacking, the "sealing" operation described in the process shall be carried out after inspection, and the products

shall be stored as required.

Figure 2.1 Schematic diagram of receiving process simulation

Please refer to the following instructions to operate the related process described in Figure 2.1.

- External Checking

The content of the external inspection includes the outer packaging of the product and the exterior of the product, etc. The content of the inspection:

1. Whether the outer packaging has been opened;
2. Whether the outer packaging has obvious damage and collision marks;
3. Whether the exposed parts of the equipment are damaged, such as: fins are recessed, the structure is deformed, and the topcoat is peeled off.`

Note

1) If you find that it has been opened, please check whether there is any information on the bill of lading or other aspects. If not, please contact the relevant department;
2) If the product is found to be damaged, please indicate the corresponding information on the bill of lading and submit a damage claim to the transportation company.

- **Unpacking**

Unpacking suggestions:

1. It is recommended that the user move the product to a place close to the installation site (or move it to the storage place) before unpacking;
2. When opening the box, it is recommended that the user consider the recycling of the box.

Note

1) The products are packed in cartons. The user must operate carefully when unpacking the box to avoid damage to the equipment due to improper operation and affect the normal use of the unit;
2) If the equipment is damaged due to man-made improper operation, the product is not covered by the manufacturer's warranty.

- **Internal Checking**

Check content:

1. After unpacking, please carefully check whether all the internal components of the equipment are complete and damaged;
2. Check whether the accessories are complete according to the packing list.

Note

1) If any part is found missing or damaged during the check it should be reported to the carrier immediately; if any hidden damage is found, please also report to the carrier and product supplier;
2) If the packing list is not complete, please contact the after-sales service department of the product supplier immediately.

2.3 Product storage

When the user does not need to install the product after receiving the product, it should be properly stored according to the following requirements.

Table 2.1 Equipment storage requirements

Content	Requirement
Storage environment	Safe and clean (no dust)
Storage temperature	-40℃～70℃
Storage humidity	<95%RH（No condensation）
Storage time	The total transportation and storage time does not exceed 6 months, and the performance needs to be re-calibrated if it exceeds 6 months

Note

1) Exposing the device to the outside environment for a long time after being taken out of the packaging box may cause damage to the device. If the device has been unpacked, it must be repackaged and placed in accordance with the original packaging requirements.

Chapter 3. Installation

3.1 Installation Site

In order to make the unit easy to install and run in the best condition, before the installation of the equipment, users need to consider the relevant factors in the installation place to ensure that the room and outdoor meet the requirements of use.

Before installation, please confirm whether the installation site meets the following requirements:

1. Whether the equipment is convenient to enter the air-conditioned place, and whether the piping and wiring are convenient;
2. Heat preservation and insulation treatment should be carried out in the air conditioning places to minimize the heat load; Maintain positive pressure, prevent dust from entering through the gap, to reduce the load of other heat and humidity, dust filtration;
3. Ensure that the air supply and return channels of air conditioning units are unobstructed;

Note

1) The above factors are for reference only, please hire a professional engineering company to design according to the relevant specifications according to the site conditions.

2) When the actual total load of the server corresponding to a single air conditioner is less than 50% of the cooling capacity of the air conditioner or the IT room is not well sealed, the humidity in the IT room may be too high. This situation does not belong to the category of product quality. It is suggested to add a dehumidifier in the IT room.

3.2 Installation Form

The installation forms of the rack air conditioners are divided into two forms: positive drop and negative drop. The installation layout should follow the following principles:

- Positive drop height:

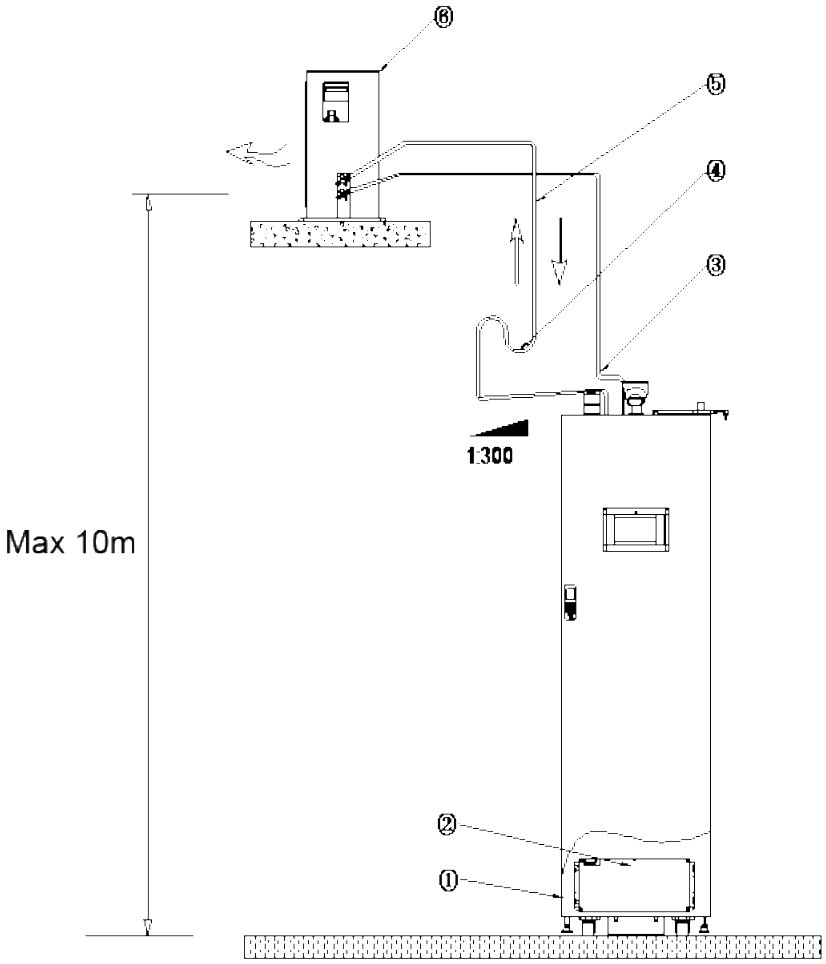
1) The scene in which the outdoor unit is higher than the indoor unit. The vertical height difference between indoor and outdoor unit is not more than 10m.

2) In order to ensure the reliability of the system, an oil trap is set every 5m on the vertical height of the air pipe.

3) When the vertical height of indoor and outdoor units exceeds 10m, please contact our technical

department for solutions.

1) Negative drop height: the scene in which the indoor unit is higher than the outdoor unit. The vertical height difference between indoor and outdoor unit should not exceed 5m.



① Cabinet	④ Oil trap
② Indoor unit	⑤ Gas pipe
③ Liquid pipe	⑥ Outdoor unit

Figure 3-1 Installation diagram of positive drop height

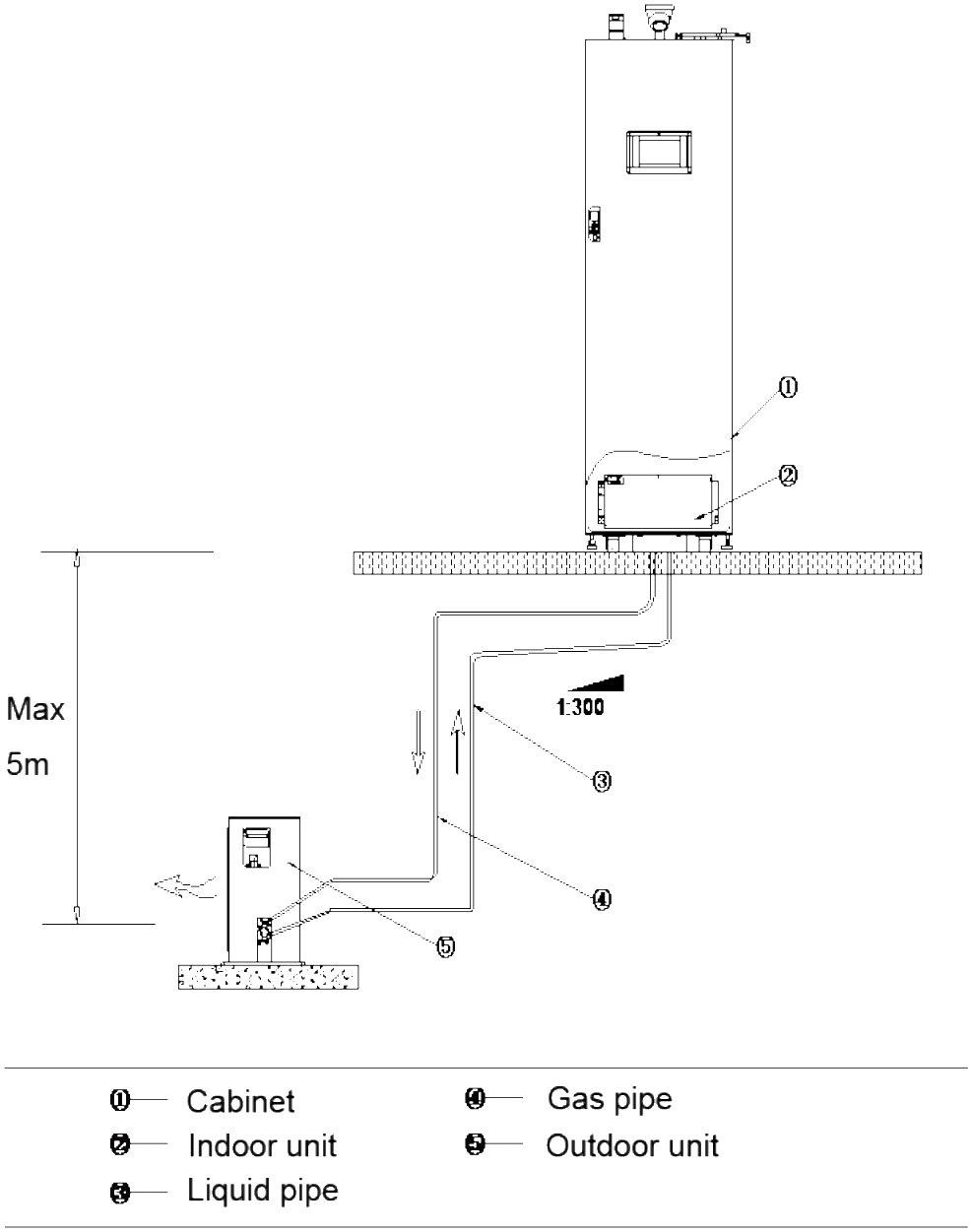


Figure 3- 2 Installation diagram of negative drop height

3.3 Mechanical Installation

3.3.1 Install Indoor Unit

1. Install the guide rail at the bottom of both sides of the cabinet respectively, and fix the front and back ends of the guide rail with screws;

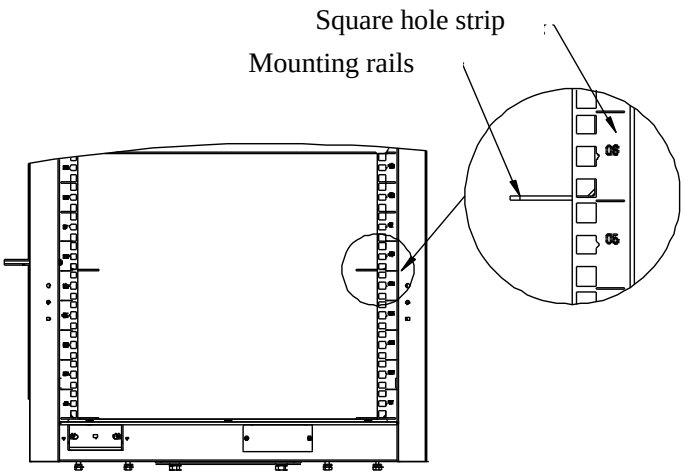
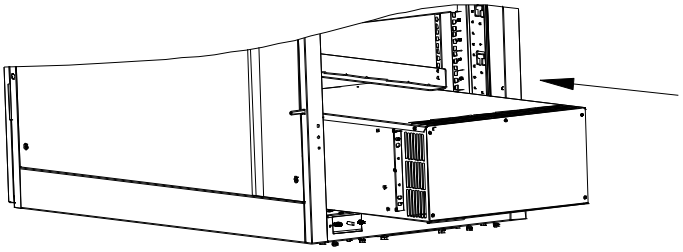


Figure 3-2 Mounting rail

2. Push the indoor unit along the guide rails into the bottom of the cabinet until the hanging ears coincide with the square hole bars, as shown in Figure 3-4。



Note

Make sure that the air conditioner is placed horizontally in the cabinet to avoid abnormal drainage of the air conditioner due to inclined installation.

Figure 3-3 Install indoor unit

3. Fix the air conditioner to the cabinet and buckle the nut into the mounting hole corresponding to the column hole of the cabinet, as shown in Figure 3-5.

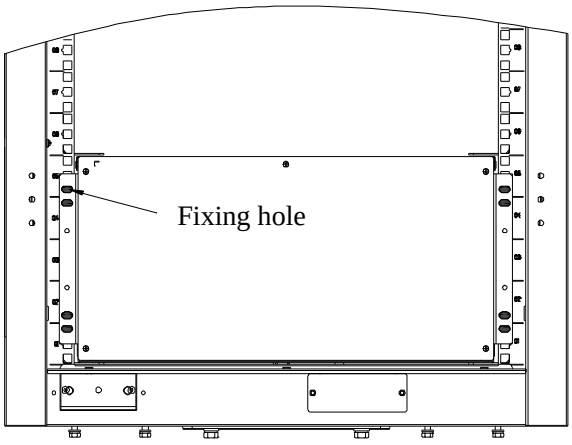


Figure 3-4 Fixed indoor unit

Note

The illustration is for reference only. Please refer to Figure 1.9, Figure 1.10, and Figure 1.11 for the height dimensions and mounting hole dimensions of different models.

3.3.2 Install outdoor unit

Installation requirements

1. When installing the outdoor unit, it is necessary to ensure that the inlet and outlet of the condenser have no dirty plugging, and try to install it in a clean place and as far away from residential areas as possible.
2. Should avoid installation in more salt or corrosive gas and other places.
3. The installation site should be dry and ventilated without flammable gas leakage to avoid fire disasters caused by flammable gas leakage.
4. The distance between the outdoor unit and walls, obstacles, or adjacent equipment should be kept above 250mm.
5. The outdoor unit should be installed on a base that can bear the weight of the outdoor unit (see Table 1-2 for specific weight). The base should be at least 50mm higher than the surrounding ground, and the base size should be 50mm larger than the outdoor unit.

Installation Steps

1. Place the outdoor unit on the base.
2. Fix the outdoor unit on the base with an expansion bolt, and the size of the mounting hole of the base is shown in Figure 1.12, Figure 1.13 and Figure 1.14.

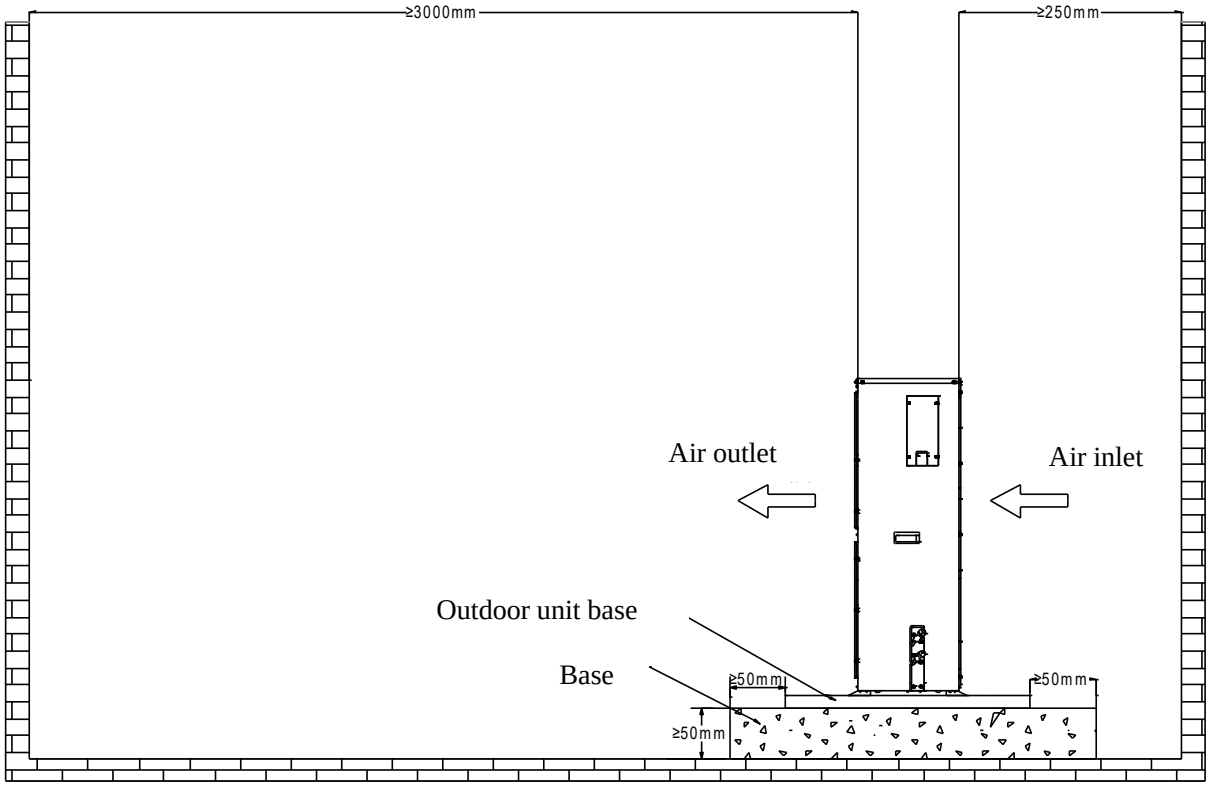


Figure 3-5 Schematic diagram of overlapping placement and installation of 5kW outdoor unit

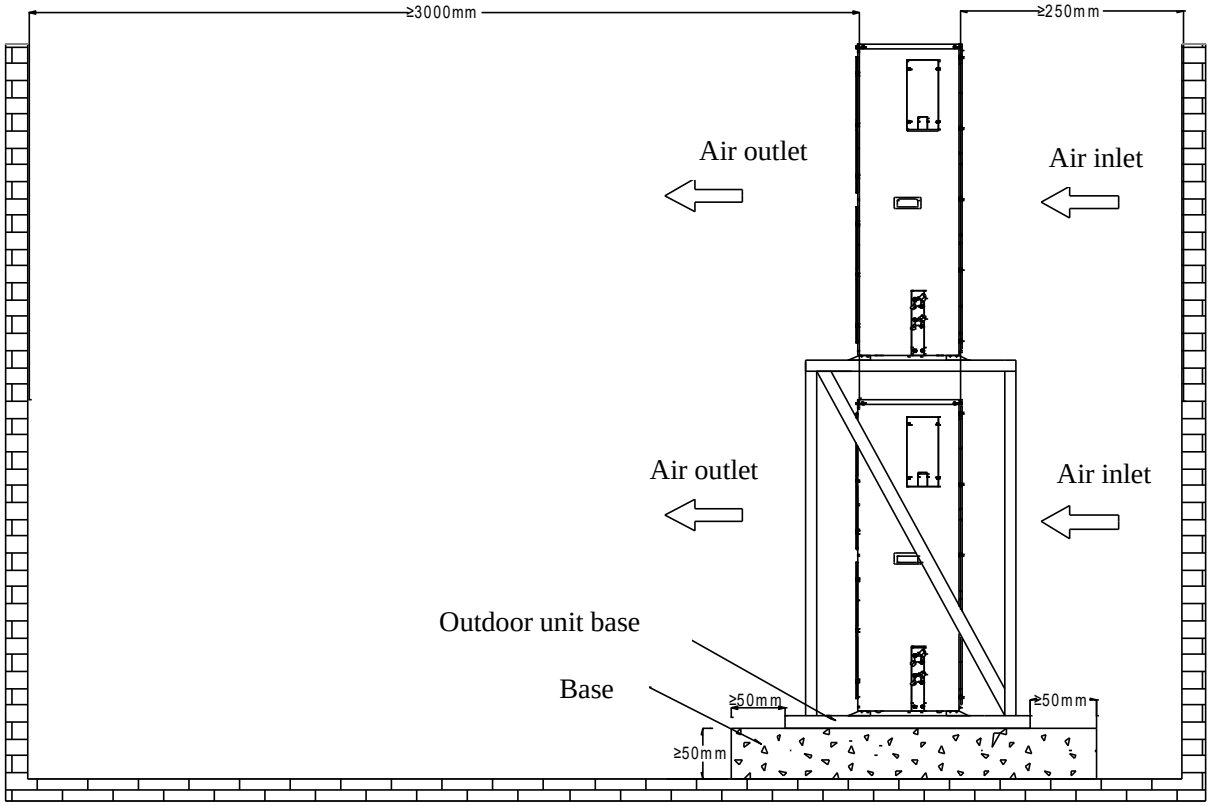


Figure 3-6 Schematic diagram of overlapping installation of outdoor units

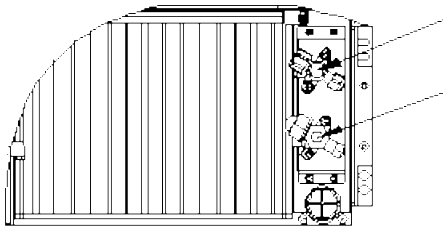
Note

1) When the outdoor unit needs to be overlapped for installation, the upper unit must be installed on the bracket (as shown in Figure 3-7), and a cushion pad should be installed between the unit and the bracket to play the role of shock isolation. It is forbidden to stack two units directly through screw connection!

3.3.3 Connecting the copper pipes of the unit

3.3.3.1 Pipe interface size

The pipe connections of the indoor and outdoor units are all external threaded joints. The pipe connection dimensions of the indoor and outdoor units are shown in Figure 3-8. When installing on site, connect the indoor and outdoor unit connecting pipes to the corresponding pipe connections of the indoor unit and outdoor unit.



3.7 kW indoor connector

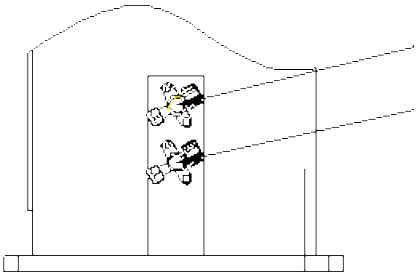
Liquid pipe stop valve

Gas pipe stop valve

Size Description:

Liquid pipe stop valve: Pipe diameter 1/4”, Connector 7/16-20UNF

Gas pipe stop valve: Pipe diameter 3/8”, Connector 5/8-18UNF

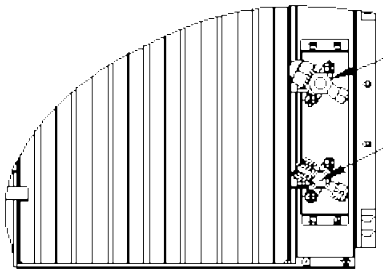


5 kW outdoor connector

Gas pipe stop valve

Liquid pipe stop valve

3.7kW A.C. interface size

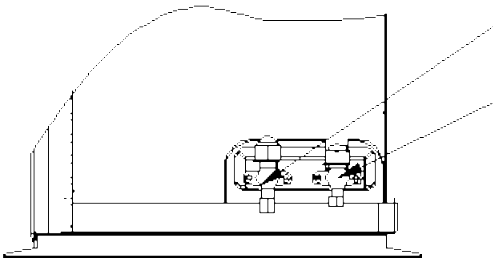


7.5 kW indoor connector

Size Description:

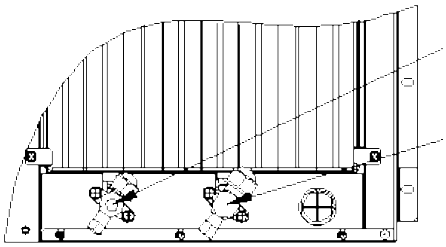
Liquid pipe stop valve: Pipe diameter 3/8”, Connector 5/8-18UNF

Gas pipe stop valve: Pipe diameter 1/2”, Connector 3/4-16UNF



10 kW outdoor connector

7.5 kW A.C. interface size

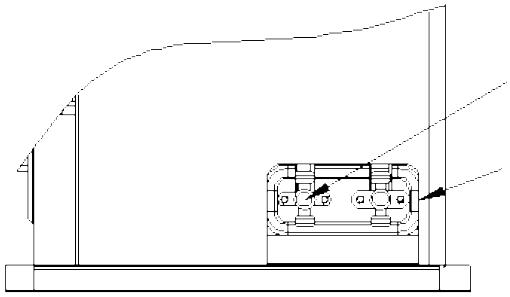


12.5 kW indoor connector

Size Description:

Liquid pipe stop valve: Pipe diameter 3/8”, Connector 5/8-18UNF

Gas pipe stop valve: Pipe diameter 5/8”, Connector 7/8-14UNF



18 kW outdoor connector

12.5kW A.C. interface size

Figure 3-8 Schematic diagram of indoor and outdoor unit pipeline interface

3.3.3.2 Matters needing attention

Precautions for connector installation

Be especially careful when installing quick-thread couplings. Before operation, please read the following precautions carefully:

1. Remove the dust cover of the valve connector;
2. Wipe the connection seat and threaded surface carefully with a clean cloth;
3. Lubricate the mating surface of the joint with refrigerated oil;
4. Screw the connecting nut onto the joint and make sure that the front of the thread is matched;
5. Tighten the hexagonal nut of the connecting body and the connecting valve until there is obvious resistance;
6. During the installation process, two wrenches must be used together. The operation of one wrench can easily damage the connecting copper pipe of the valve.

Refer to Table 3-1 for recommended tightening torque values.

Table 3-1 Recommended tightening torque values for quick threaded joints

Thread Joint Dimensions	Torque Values（N.M）
1/4"	10~12
3/8"	15~18
1/2"	20~23
5/8"	28~32
3/4"	35~40
7/8"	45~47

Precautions for pipe installation

1. Copper pipe is used for connecting the indoor unit with the outdoor unit. The joints of an indoor unit and outdoor unit are quickly threaded joints of British standards (when the pipe length exceeds the standard pipe length of 5m, the increased copper pipe needs to be connected by welding).
2. The refrigerant pipeline should be as short as possible, beautiful, neat, horizontal and vertical, minimize the elbow, and be fixed.
3. In line with the installation requirements of positive or negative drop height.
4. The equivalent length of local components is shown in Table 3-1, and the resistance loss caused by the elbow and valve has been calculated.

Table 3-2 Local component equivalent length

Fluid Pipe Diameter（Mm）	Equivalent Length (M)		
	90 ℃Elbow	45 ℃Elbow	T type Triple valve
10	0.21	0.10	0.76
13	0.24	0.12	0.76
16	0.27	0.15	0.76

5. Care should be taken to install and remove refrigerant piping so that the piping is not twisted or damaged.
6. The refrigerant pipeline support should be arranged before the erection of the pipeline. The refrigerant pipeline and the support frame should be connected and fixed with pipe clamps and pipe hoops to avoid direct contact. See Table 3-3 for support intervals.

Table 3-3 Pipeline support interval reference table

Pipe Diameter		Maximum Distance of Fulcrum (m）
mm	inch	
6～12	1/4"～1/2"	1.2
16～22	5/8"～7/8"	1.5
28～35	1-1/8"～1-3/8"	2.0
42～54	1-5/8"～2-1/8"	2.5

7. When the refrigerant pipeline passes through the wall or other obstacles, it is necessary to avoid direct contact between the copper pipe and the wall by means of a shock-absorbing pad, so as to avoid damage to the pipeline and reduce vibration.
8. The slope of the horizontal pipeline should meet the design requirements to facilitate the oil return of the unit.
9. When the installation position of the outdoor unit is higher than 5m of the indoor unit, the gas side pipe should be installed with an oil trap.
10. Leak detection, pressure retention and vacuum should be carried out before the refrigerant pipeline is used, and the refrigerant pipeline should be separated from the building with an anti-vibration isolation frame.

3.3.3.3 Insulation of refrigeration pipes

The connecting pipes of the refrigeration system must be well insulated, and the gas side pipe and the liquid side pipe must be insulated. The proper insulation measures will directly affect the performance of the unit. Please follow the following requirements during the operation process:

1. Please choose insulation pipes with good heat insulation performance, suitable size, environmental

protection and durability. The thickness of the insulation pipe is selected with reference to engineering design standards.

2. When the insulation pipe is pasted, it must be ensured that the insulation pipe is pasted tightly, firmly and close to the pipeline.

Note

The heat preservation project should be carried out after the unit refrigeration system has been inspected for leaks, pressure keeping and vacuum pumping. For details, see 5.2 Nitrogen filling and pressure keeping.

3.3.4 Connect the water inlet and drain pipes of the unit

3.3.4.1 Connect the indoor unit drain pipe

The rack air conditioners are pre-installed with drain pipes when they leave the factory. If longer pipes are required for on-site installation, just connect them according to the size of drain pipes indicated in Table 3-4.

Table 3-4 Drain size

Model		Drain(Outer Diameter ×Inner Diameter × Length)
Indoor 3.7KW/ 7.5 kW / 12.5kW	without drain pump	Ø20×Ø15×1000mm
	Equipped with drain pump	Ø14×Ø10×5000mm

If the drain pipe needs to be re-disassembled on site, please follow the relevant instructions below.

- Without drain pump

When disassembling, loosen the fastening screw of the hose clamp and remove the drain pipe.

When installing, connect one end of the drain pipe to the drain port of the drain pan and fasten it with a hose clamp (refer to Figure 3-9).

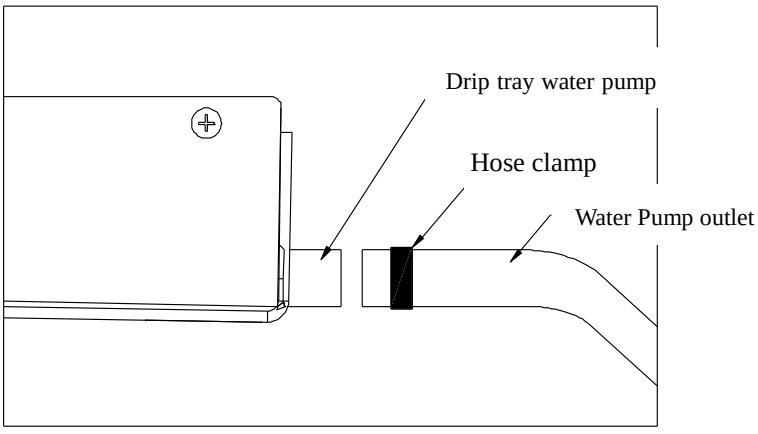


Figure 3-9 Drainage of standard unit

- Equipped with drain pump

When disassembling, you need to disconnect the drain pump wiring first, loosen the screws of the drain pump mounting parts, then loosen the fastening screws of the hose clamp shown in Figure 3-10, and then remove the drain pump, drain pipe, and connect the drain pipe in turn.

When installing, first fix the drain pump, and then connect one end of the connecting water pipe to the drain port of the drain pan, and the other end to the water inlet of the pump, and both need to be fastened with a hose clamp, and then the drain pipe is fastened to the pump with a hose clamp. On the outlet. Finally, reconnect the drain pump wiring (refer to Figure 3-10).

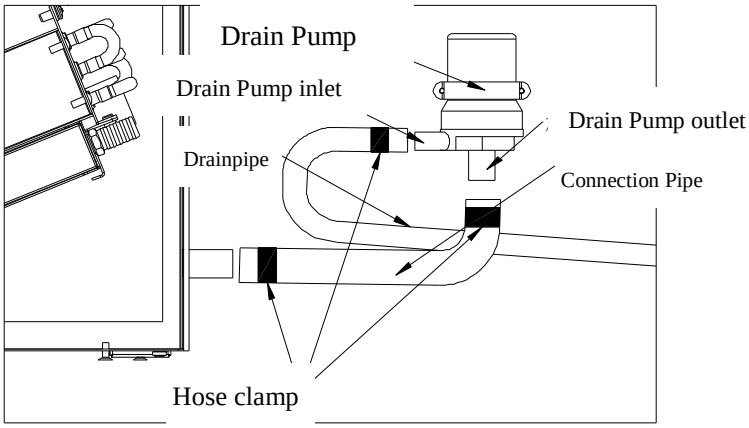


Figure 3-10 Drainage of optional drain pump unit

Note

1) The drain pipe cannot be placed where the temperature is at the freezing point!
2) Strictly ensure the pipe diameter and slope when installing the drainage pipe.
3) To do a water retention and drainage test, it is required that the drainage is unblocked, and the drainage pipe should be installed with a trap.

3.3.4.2 Connect the indoor unit water supply pipe

For models equipped with humidification function, see Figure 3-11 for the layout of the water inlet pipe. Before installing the unit, please pre-set the water supply pipeline as required.

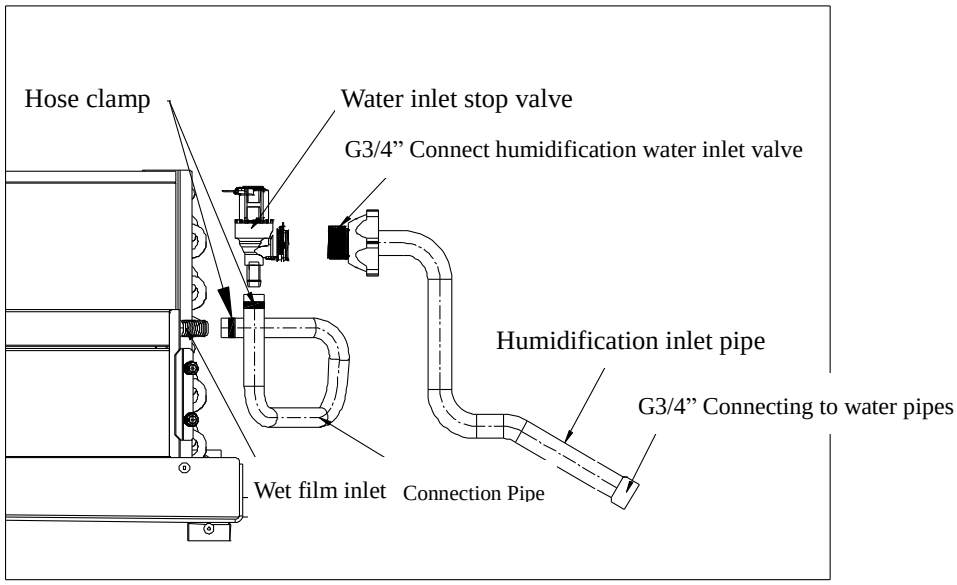


Figure 3-11 Humidification water inlet pipe

The wet film humidifier can use tap water, and it is recommended to use softened water or purified water.

Water quality requirements:

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

3.4 Electrical Installation

Operating the Project

1. Main power line connection of the unit;
2. Outdoor unit line connection;
3. Communication line connection.

Matters Needing Attention

1. The connection of all lines must comply with national regulations;
2. For the full load current of related units, please refer to the nameplate of the equipment;
3. The main power supply meets the requirements of the unit, please refer to the nameplate of the equipment;
4. Electrical installation must be carried out by trained professional installers;
5. Before connecting the circuit, use the voltmeter to measure the input voltage to make sure the power supply is turned off.
6. If the power cord is damaged, in order to avoid danger, it must be replaced by professionals from the manufacturer or other professional organizations;
7. When wiring on-site, strictly follow the wiring method of the wiring diagram, and do not make mistakes

or random connections.

Detection

1. Make sure that the indoor and outdoor cables are connected correctly.
2. The power supply voltage is consistent with the rated voltage on the nameplate;
3. Tighten all connections;
4. The rating of the air conditioning front-end circuit breaker is correct.

Wiring instructions

The internal electrical control interface is shown in Figure 3-12~Figure 3-14; the external electrical control interface is shown in Figure 3-15. The specific wiring steps are as follows:

1. The indoor power inlet L/N/PE is correspondingly connected to the L/N terminal at the main power interface A and the ground hole (indoor input PE);
2. One end of the indoor and outdoor cables is correspondingly connected to the OL/ON/FL terminal and the ground hole at the main power interface A (Indoor and outdoor unit are connected to PE), The other end is connected to the L/N/FL terminal of the outdoor unit and the corresponding ground hole (Indoor and outdoor unit are connected to PE);
3. A2+ and B2- in the signal interface B are the communication ports of the internal and external units, which need to be connected to the A2+/ B2- terminals of the outdoor unit; in addition, A+ and B- are the upper computer ports, and A3+ and B3- are the networking ports .

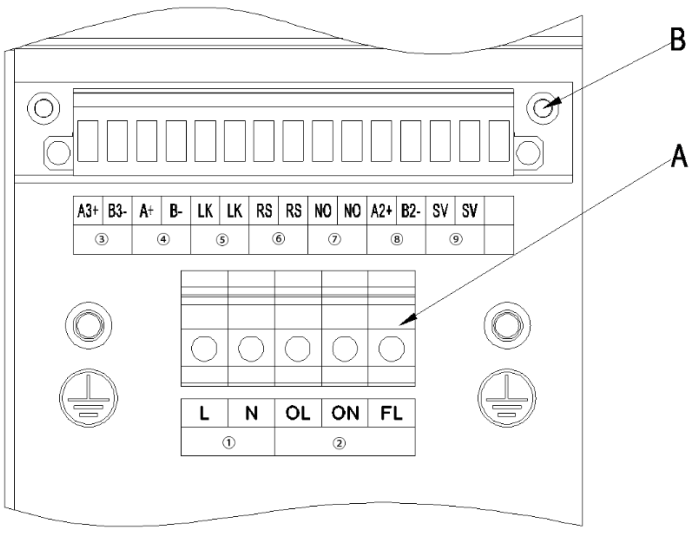


Figure 3-12 Schematic diagram of indoor electrical control interface

A——Main power interface

B——Signal interfaces

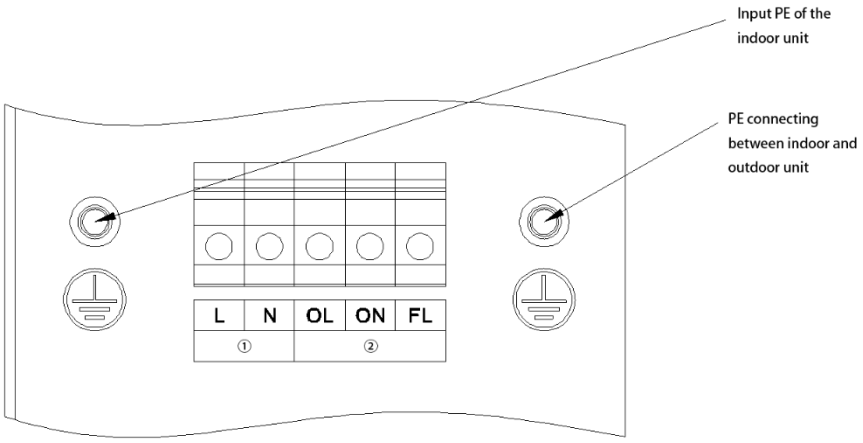


Figure 3-13 Enlarged view of main power interface A

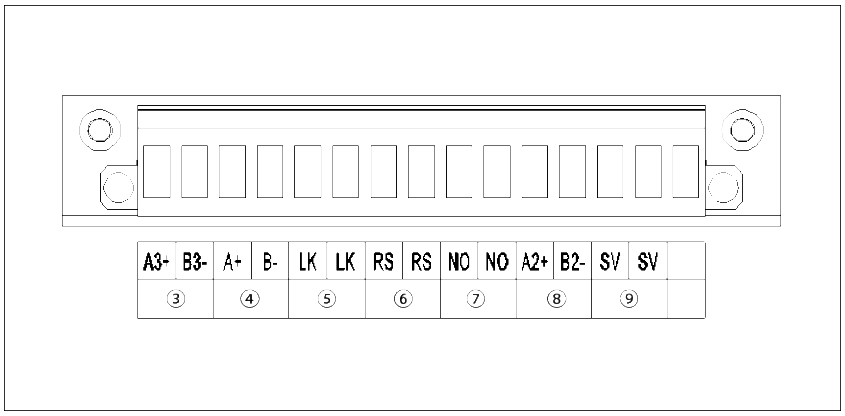


Figure 3-14 Enlarged view of signal interface B

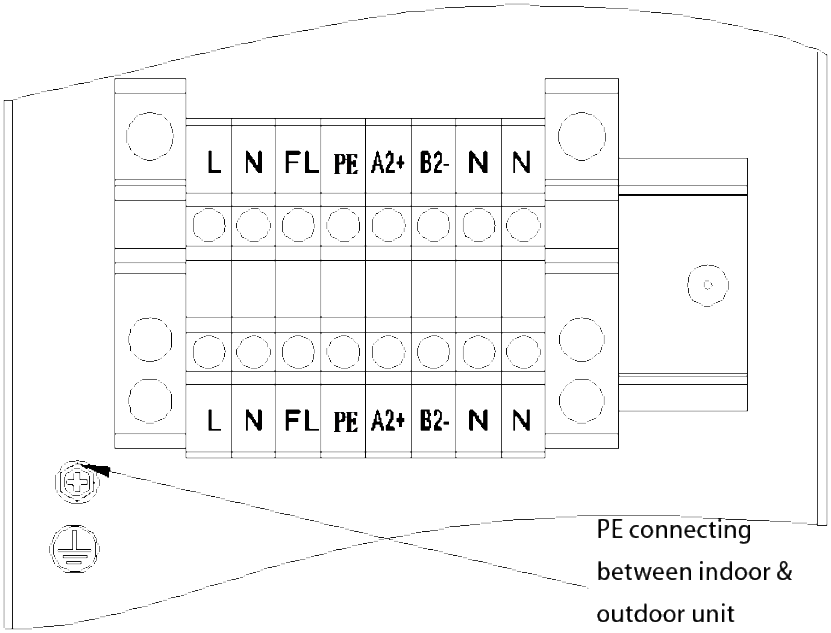


Figure 3-15 Schematic diagram of outdoor electrical control interface

Cable specifications

Table 3-5 Cable specifications

Model	Full load current	Cable specifications	Remark
3.7kW a.c.	13.6A	Electronic power cable -3×2.5mm^2(3 cores: brown, blue, yellow/green)	Comes with accessories
7.5 kW a.c.	27.5A	Electronic power cable -3×4mm^2(3 cores: brown, blue, yellow/green)	Comes with accessories
12.5kW a.c.	30.5A	Electronic power cable -3×6mm^2(3 cores: brown, blue, yellow/green)	Comes with accessories

Connection explained

①	Main power of indoor unit	②	Power connect between indoor & outdoor
③	Rotation	④	Upper monitor
⑤	Water leakage	⑥	Remote power on/off
⑦	Alarm output signal	⑧	Communication of indoor & outdoor unit
⑨	Solenoid valve		

Chapter 4. Controller

Summary--This chapter mainly describes the features of the controller, display screen, control keys, switch operation, status query, and user settings, etc.

4.1 Features

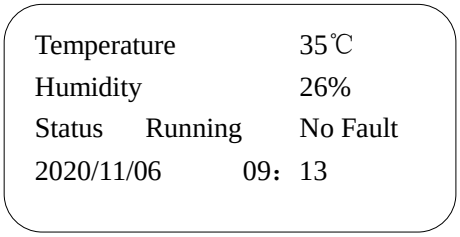
The rack air conditioner adopts an advanced micro-processing controller, which can achieve the purpose of precise temperature control and humidity control and can ensure the stable and reliable operation of the unit. The controller stores the programmable control program and all operating parameters, which can be viewed on the display screen.

Features：

1. It has the functions of self-start and delayed start after incoming calls;
2. With remote boot function;
3. With multi-level password protection to prevent misoperation;
4. Flexible main and standby machine switching function, realizing the automatic switching of the unit and the function of shifting on duty;
5. Manual operation of main components is allowed;
6. Integrated RS485 communication port, support remote monitoring, and remote on/off the group.

4.2 Display (optional)

The display screen adopts a Chinese or English menu, and the display screen is composed of liquid crystal display and function keys. 10 seconds after power-on, the display will switch to the main page to display:



The first line shows the current temperature.

The second line shows the current humidity.

The third line displays the current system switch status and fault information. The power on and off states include: running, stopping, shut down due to failure, and standby; if the unit has a failure, "no failure" will become "fault", and "no fault" will be displayed again after the current failure is eliminated.

The fourth line shows the current date and time.

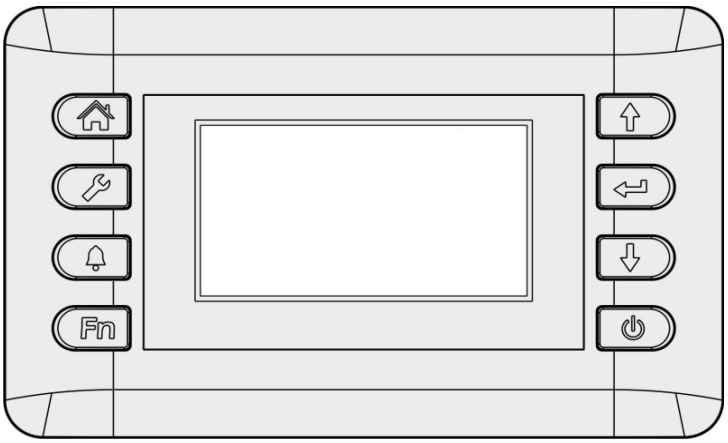


Figure 4-1 Display appearance of SL108S

4.3 Control Key

Table 4-1 Description of SL108S display control keys

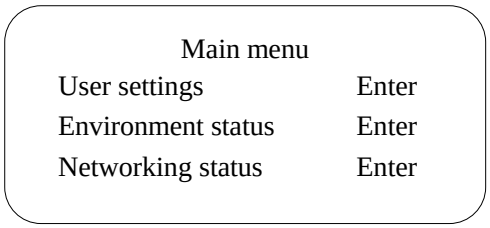
Button	Meaning	Function description
	HOME	1) In the viewing or setting page, press this key to return to the main page; 2) When setting parameters, press this key to abandon the data set; 3) Long press this button on the main page to display the main version information;
	UP	1) On any page if there is a "⇧" prompt, press this key to enter the previous page; 2) In the parameter setting state, short press this key to set the parameter to increase, long press this key to set the parameter to increase quickly;
	DOWN	1) In the main interface, press this key to enter the analog output and input, digital output, and input query page; 2) On any page if there is a "⇩" prompt, press this key to enter the next page; 3) In the parameter setting state, short press this key to set the parameter to decrease, long press this key to set the parameter to decrease quickly;
	ENT	1) When on the main page, the faults that have been eliminated outside this button can be reset; 2) When setting parameters, press this key to confirm the setting parameters and automatically skip to the next parameter setting value; 3) On the main page, press and hold "⏎" and "🔧" at the same time to enter the password page, and enter the factory setting page after entering the correct password;
	SET	1) When on the main page, short press this key to enter the user settings page; 2) In the setting parameter page, press this key to set the parameter and enter the setting state; if there is no parameter to set in the current screen, a no-operation will be performed. 3) On the main page, press and hold "⏎" and "🔧" at the same time to enter the password page, and enter the factory setting page after entering the correct password; 4) Press this key on the historical fault record page to enter the clear historical fault record page;
	ALARM	1) On the main page, short press this key to enter the current fault query page;
	POWER	1) Press this key on any page to switch the air conditioner;

4.4 Switch Operation

Press the "⏻" key on the main page to enter the running state, the unit status display on the interface changes from "stop" to "running", press "⏻" again to shut down the unit, and "running" changes to "stop".

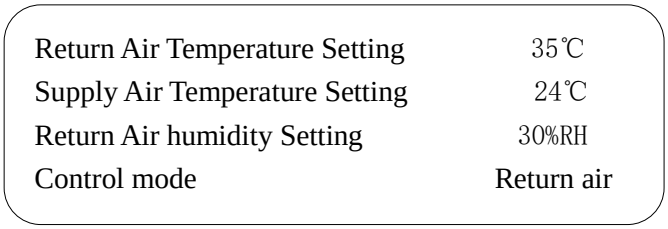
4.5 Status Query

Press the “🔧” key on the main page to enter the "Main Menu" page, and then enter the corresponding function page to query the current environment, networking, equipment and fault protection status, as shown in the following figure:



4.6 User Settings

On the main page, press the "🔧" key to enter the "Main Menu" page, press the "🔧" key to select user settings, the current function page option background is black, press "⏎" to enter the corresponding page, if you press "🔧" to proceed A no-operation, switch to the next function page, the "User Settings" page is as follows:



On the setting page, press the “🔧” key to enter the setting parameter state. At this time, the first setting parameter will be highlighted. Press the “⇧” and “⇩” keys to adjust the set value. Long press the “⇧” and “⇩” to quickly “increase, Decrease" to adjust the set value. After the setting is completed, press the "⏎" key to confirm the set value. If you do not press “⏎” but press “🔧”, a no-operation will be executed, that is, the current setting parameter will not be saved and the next setting parameter will be automatically switched to. After finishing, you can press "🏠" to return to the main page. The specific user settings are as follows:

Table 4-2 User parameter usage range

Heading	Numerical value	Unit	default	Meaning
Return Air Temperature Setting	10.0～40.0	℃	30.0	Return air temperature set point
Supply Air Temperature Setting	10.0～40.0	℃	24.0	Supply air temperature set point

Return Air humidity Setting	0.0～80.0	%RH	30.0	Return air humidity set point
Way To Control	Return air/supply air	--	Return air	Choice of control temperature
Incoming Call Self-Initiated	Disable/Enable	--	Enable	There is a delay function for the automatic start of the incoming call, refer to the factory parameter setting item
Incoming Call Self-Start Delay	1～240	second	5	Set the delay time after the call is started
Remote Control Function	Disable/Enable	--	Disable	//When the remote control is enabled, the remote control is turned on, and manual shutdown is prohibited. When the remote control is turned off, manual power-off is allowed //When the remote control is enabled, it can be turned off after closing and disconnecting the remote control point.
Network Address Setting	1～32	--	1	The default network address is 1
Buzzer Settings	Silent/Short beep /Long beep	--	non	\
Time Setting	--	--	--	Set current time
Timing Setting	--	--	--	Set timing switch time
Contrast Setting	20～40	--	32	\
Evacuation Mode	Disable/Enable	--	Disable	When the A.C. is turned on for the first time, it is used under a vacuum.
Rotation Function Enable	Disable/Enable	--	Disable	Both master and slave boards need to be set
Number Of Rotations	2～12	PCS	2	Set the number of crews on duty
Rotating Address	0～11	--	0	If the address is 0, it is the master; if the address is 1～11, it is the slave; Both master and slave boards need to be set
Number Of Runs	1～11	PCS	1	Host settings are valid
First Unit	0～11	--	1	Host settings are valid
Rotation Period	0～720	H	24	When the duty time is 0, it is the duty test time, and the corresponding duty time is 5 minutes;
Demand Synchronization	Disable/Enable	--	Disable	

Chapter 5. Inspection and Debugging

5.1 Inspection

Mechanical installation inspection

1. The installed fastening parts have been locked;
2. The pipe connecting the indoor and outdoor units has been installed, and the shut-off valve of the indoor and outdoor units has been fully opened;
3. The drain pipe is connected;
4. The water supply pipe connected to the humidifier has been connected;
5. All pipe joints have been tightened;
6. After the equipment is installed, the debris in or around the equipment has been removed (such as transportation materials, structural materials, tools, etc.);;

Electrical installation inspection

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 cables, signal cables, and ground cables to the indoor unit and outdoor unit have been connected;
4. All cables and circuit connectors have been tightened, and the tightening screws are not loose.

5.2 Nitrogen to Maintain Pressure

5.2.1 Matters needing attention

1. The indoor unit and outdoor unit of the rack air conditioner are pre-charged with refrigerant at the factory, so nitrogen charging and pressure maintaining only need to be carried out for the connecting pipe part;
2. It is strictly forbidden to use oxygen or other flammable gas for air tightness test;
3. The pressure of nitrogen charged into the system for leak detection cannot exceed the maximum working pressure stated on the nameplate of the unit;

5.2.2 Steps:

1. After ensuring that the shut-off valve of the indoor and outdoor units is closed, connect the indoor and outdoor unit connecting pipes;
2. Connect the connecting pipes of the pressure gauge to the gas and liquid pipe shut-off valves and nitrogen cylinders of the indoor unit;
3. Fill with nitrogen 3.0MPa and keep the pressure for 24 hours. The system pressure should not decrease

when the ambient temperature before and after the pressure is similar; if the pressure is slightly deviated due to a large change in the ambient temperature, it is recommended to perform the pressure holding test again;

4. If it is determined that there is a welding leak, the leak must be found and repaired in time. Refer to Figure 5-1 for operation.

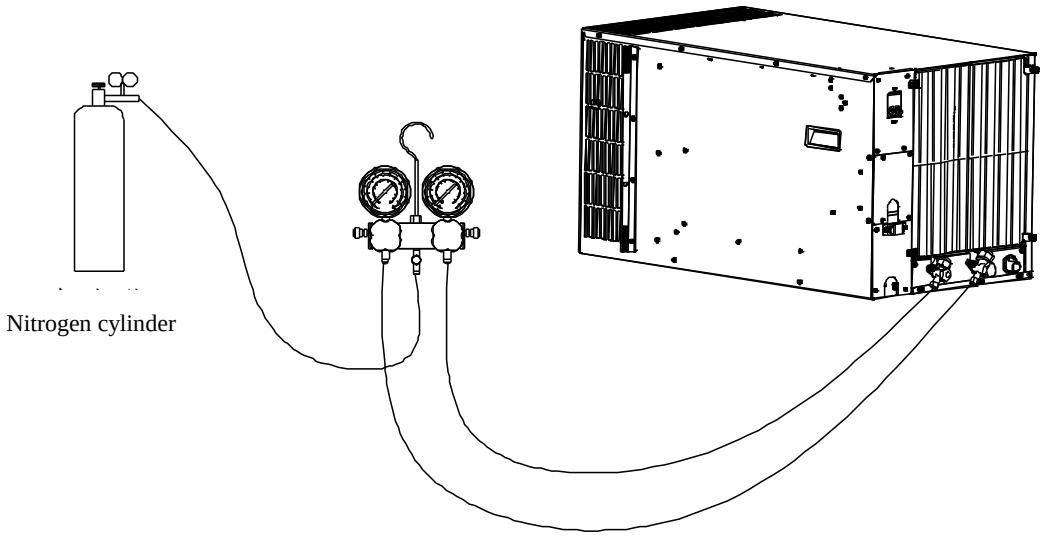


Figure 5-1 Schematic diagram of nitrogen filling and pressure maintaining operation

5.2.3 Operation steps of vacuum pumping

1. If the pressure is maintained well, discharge nitrogen from the shut-off valve of the indoor unit, and then connect the pressure gauge connecting pipes to the shut-off valve of the gas and liquid pipes and the vacuum pump of the indoor unit respectively;
2. Open the shut-off valve of the indoor unit and start vacuuming;
3. When starting to vacuum, the vacuum pump makes a loud noise and emits white smoke from the exhaust outlet. If white smoke is still emitted 10 minutes later, observe for 10 minutes because the cooling system may be improperly sealed or there may be too much refrigerant and moisture left in the cooling system.
4. After 20 minutes, the pointer of the pressure gauge should be in the negative value area, and the vacuum pump sound is low. At this time, you can repeatedly close and open the vacuum pressure gauge several times. The position of the pressure gauge pointer before and after closing, the vacuum pump sound should not change significantly. Otherwise, the refrigeration system may be poorly sealed.
5. After confirming that there is no leakage in the refrigeration system, the vacuuming time should generally not be less than 90 minutes, and the final vacuum pump display pressure should not be greater than

60Pa(Absolute pressure, if the pressure gauge cannot accurately display to 60pa, the vacuum should keep the pressure gauge at the minimum scale, and the pressure holding time should be delayed to 1h, and the pressure gauge should not rise significantly.)

6. After vacuuming, close all valves of the pressure gauge first, and then close the vacuum pump. There is no need to remove the connection. Keep the pressure for 10 minutes. The pressure of the refrigeration system should not exceed 90pa (absolute pressure). Refer to Figure 5-2 for operation.

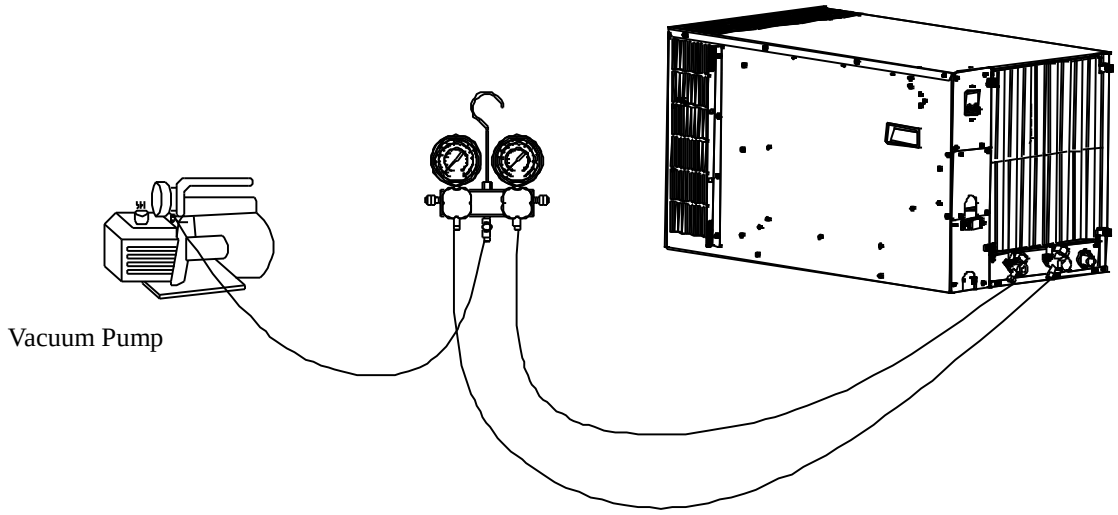


Figure 5-2 Schematic diagram of vacuum operation

5.3 Refrigerant Charging

When the length of one-way connecting pipes of indoor and outdoor units exceeds 5 meters, the refrigerant must be supplemented on site. The amount of refrigerant replenishment can refer to the following calculation formula:

Refrigerant supplement（kg）= Liquid pipe refrigerant addition amount（kg/m）×The length of the extend liquid pipe（m）

The amount of refrigerant added per unit length of liquid pipe is shown in Table 5-2. The amount of refrigerant added per unit length of liquid pipe of different pipe diameters is shown in Table 5-2.

Table 5- 1 Refrigerant charge

Indoor Unit Model	Outdoor Unit (Standard Configuration)	Refrigerant Charge (Kg)
3.7kW	5kW	1.3
7.5kW	10kW	1.5
12.5kW	18kW	3.0

Table 5-2 the amount of refrigerant added per unit length of liquid pipes with different pipe diameters

The Outer Diameter Of The Liquid Pipe (Mm)	The Amount Of Refrigerant Added (Kg/M)
6	0.020
9	0.060
12	0.112
16	0.181
19	0.261
22	0.362
28	0.618

Note

1) Whether the refrigerant charge is appropriate, it will directly affect the performance of the unit, and must be operated by a professional engineer;

2) The above refrigerant charge can be used as the initial budget before installation, or as a guide for a refrigerant charge after installation. The actual charge for engineering installation is subject to the final commissioning result.

5.4 Lubricating Oil Supplement

When the connecting pipe between the indoor and outdoor units is long enough, the amount of lubricating oil adhering to the pipe wall along with the compressor suction and mixing in the refrigerant affects the oil return cycle, we must add lubricating oil to the refrigeration system to ensure the compressor can operate normally and efficiently. Generally, when the length of the connecting pipe exceeds 10m, it is necessary to add lubricating oil. Please consult the manufacturer for the amount of lubricating oil added to the unit.

5.5 Function Test

Reminder

Before starting the unit, please make sure that the unit has been inspected strictly as required.

Test Content

a) Detect the voltage at the power connection point, and the voltage reading shall not exceed ±10% of the rating on the nameplate;

b) Check whether the rotation of the compressor and fan is correct;

c) Control function test.

5.6 System Debugging

Reminder

The compressor heating belt must be energized and preheated for at least 12 hours before system commissioning, otherwise, it will cause irreparable damage to the compressor.

1、Accurate refrigerant charge

According to the design parameters of the unit (Subcooling, superheating degree, pressure, etc.), the refrigerant charge amount of the unit is started and operated accurately, so that the refrigerant charge amount reaches the requirement.

2、Debug content

a) Measure and record the operating parameters of the unit;

b) Compressor operation and debugging;

c) Operation and commissioning of the fan;

d) Humidifier operation and debugging (Only applicable to units with humidification function);

e) Operation and debugging of an electric heater.

[**Note:** System debugging should be completed by professional engineers]

Chapter 6. Maintenance and Troubleshooting

6.1 Daily Maintenance

1. Electric control system
   a) Statically test whether the suction of each contactor is flexible and whether it is stuck;
   b) Dust removal of electrical and control components with a brush or dry compressed air;
   c) Check whether the contactor contact pulling is an arc and burn mark phenomenon. When serious, replace the corresponding contactor;
   d) Fasten each electrical connection terminal;
   e) Check whether the fast connector of the socket is in good contact. If it is loose, the terminal should be replaced;
2. Indoor fan
   a) Confirm that the net cover of the indoor fan has no deformation;
   b) Confirm that there is no damage to indoor fan blades;
   c) Confirm that the running sound of the indoor fan is normal;
   d) Confirm that there is no loosening or deformation of the mounting screws of the indoor fan;
3. Humidifier
   a) Confirm that the valve on the inlet water pipe is in an open state;
   b) Check whether the humidification inlet solenoid valve works normally;
   c) Confirm that there is no scaling in the wet film;
   d) Confirm that there is no timeout alarm of humidifier operation;
4. The heater
   a) Confirm no loosening of electric heating fixation;
   b) Confirm that the electric heating surface is free from corrosion;
5. Return air filter
   a) Confirm that there is no dirty blocking on the return air filter;
   b) Confirm no damage or deformation of the return air filter;
   c) Confirm that there is no timeout alarm for the return air filter;

6. Compressor

a) Confirm that the fastening of the compressor is not loose;

b) Confirm that the running sound of the compressor is normal;

c) Confirm that the refrigerant pipeline is free of oil stains and rust;

7. Outdoor unit

a) To ensure a firm connection with the ground;

b) Ensure that the fan runs without abnormal sound, abnormal vibration and blade stuck;

a) Confirm that there are no obstacles in the air inlet and outlet of the fan

6.2 Common Troubleshooting

Common faults are mainly manifested as faults of refrigeration system, control system, ventilation system and heating and humidification devices. See Table 6-1~6-5 Common Alarm and Measures for some common faults and treatment suggestions.

Note

1) Part of the circuit of the system is 220V/ 50Hz alternating current, only professional technicians are allowed to carry out maintenance operation on the unit, and special care must be taken during live operation.

2) When the unit is out of order and cannot be simply eliminated, please contact the service department of the company for technical support.

6.2.1 Fault diagnosis and treatment of the whole product

Table 6-1 Fault diagnosis and treatment of the whole product

Fault Phenomenon	Possible Reasons	Solution
Unit not start	Power if the unit is not connected	Check the input fan

6.2.2 Fan fault diagnosis and treatment

Table 6-2 Fan fault diagnosis and treatment

Fault Phenomenon	Possible Reasons	Solution
The fan is not running	Abnormal power input	Detect whether the fan L, N is not energized, voltage is too low or lack of phase
	No fan control signal output	Check whether the analog output of the fan output

		(port 33 and port 31) is within the range of 0~10Vdc
	Fan motor is overheated	Check whether the motor is overheated, if it is, the fan needs to be powered off, and after cooling down, it can be restored by powering on again
	Damage of fan	Replace the fan

6.2.3 Compressor and refrigeration system failure and treatment

Table 6-3 Compressor and refrigeration system failure and treatment

Fault Phenomenon	Possible Reasons	Solution
Compressor not work	No refrigeration or dehumidification requirements	Check whether the temperature and humidity set points meet the compressor demand status
	Compressor driver failure	Replace compressor driver
	Indoor unit and outdoor unit communication failure	Check whether the wiring of the unit is correct
	Unit related alarms cause the compressor to stop	1) Check whether there are high pressure and low pressure alarms 2) Check whether there is a high-pressure pressure sensor, low-pressure pressure sensor failure alarm 3) Check whether there is a fault alarm of the suction temperature probe 4) Check whether there is an external fan failure alarm
	Compressor damage	Replacement of compressor
Excessive compressor noise	The liquid flow	1. Check whether the return air temperature is too low 1) 2. Check the air supply and return system
	Bad lubrication	Add lubrication oil
High-pressure alarm	Condenser filth blockage	Cleaning condenser
	The condensing fan does not operate	Check the static resistance and grounding resistance of the condensing fan. If the coil is burned out, the fan should be replaced
	Too much refrigerant injection	Exclude many refrigerants and control the high pressure at 2.1~3.7MPa

Low-pressure alarm	Insufficient refrigerant charge	Increase the refrigerant charge
	Refrigerant leakage	Repair welding of leakage points
	Return air temperature is too low	Increase the return air temperature setpoint
	Air volume is too small	Increase the speed of the blower to ensure smooth ventilation
	Expansion valve coil failure	Replace the expansion valve coil
Excessive exhaust temperature	The system mixes with air	Re-vacuum the system and fill it with refrigerant
	Too little refrigerant charge	Increase the refrigerant charge
	Failure of outdoor fan	Check the operation of the outdoor fan
	Dirty plugging of condenser leads to poor heat dissipation	Cleaning condenser
High-temperature alarm	Temperature sensor failure	Check and calibrate the temperature sensor
	Compressor not working	Check the working state of the compressor
	The setting of high-temperature alarm value is not reasonable	Reset the high-temperature alarm value
	The unit load design is too small	Check the seal of the cabinet and add refrigeration equipment if necessary
Low-temperature alarm	Temperature sensor failure	Check and calibrate the temperature sensor
	Low-temperature alarm value setting is not reasonable	Reset the low-temperature alarm value
	The electric heating doesn't work	Check the working state of electric heating
High humidity alarm	Humidity sensor failure	Check and calibrate the humidity sensor
	Dehumidification is not enabled	Check and enable dehumidification
	The high humidity alarm value is not set properly	Reset the high humidity alarm value
	The room was not protected against moisture	Make the room moisture-proof
Low humidity alarm	Humidity sensor failure	Check and calibrate the humidity sensor
	The low humidity alarm value is not set properly	Reset the low humidity alarm value
	The humidifier is not working	Check the working state of the humidifier

6.2.4 Heating system failure and treatment

Table 6-4 Heating system failure and treatment

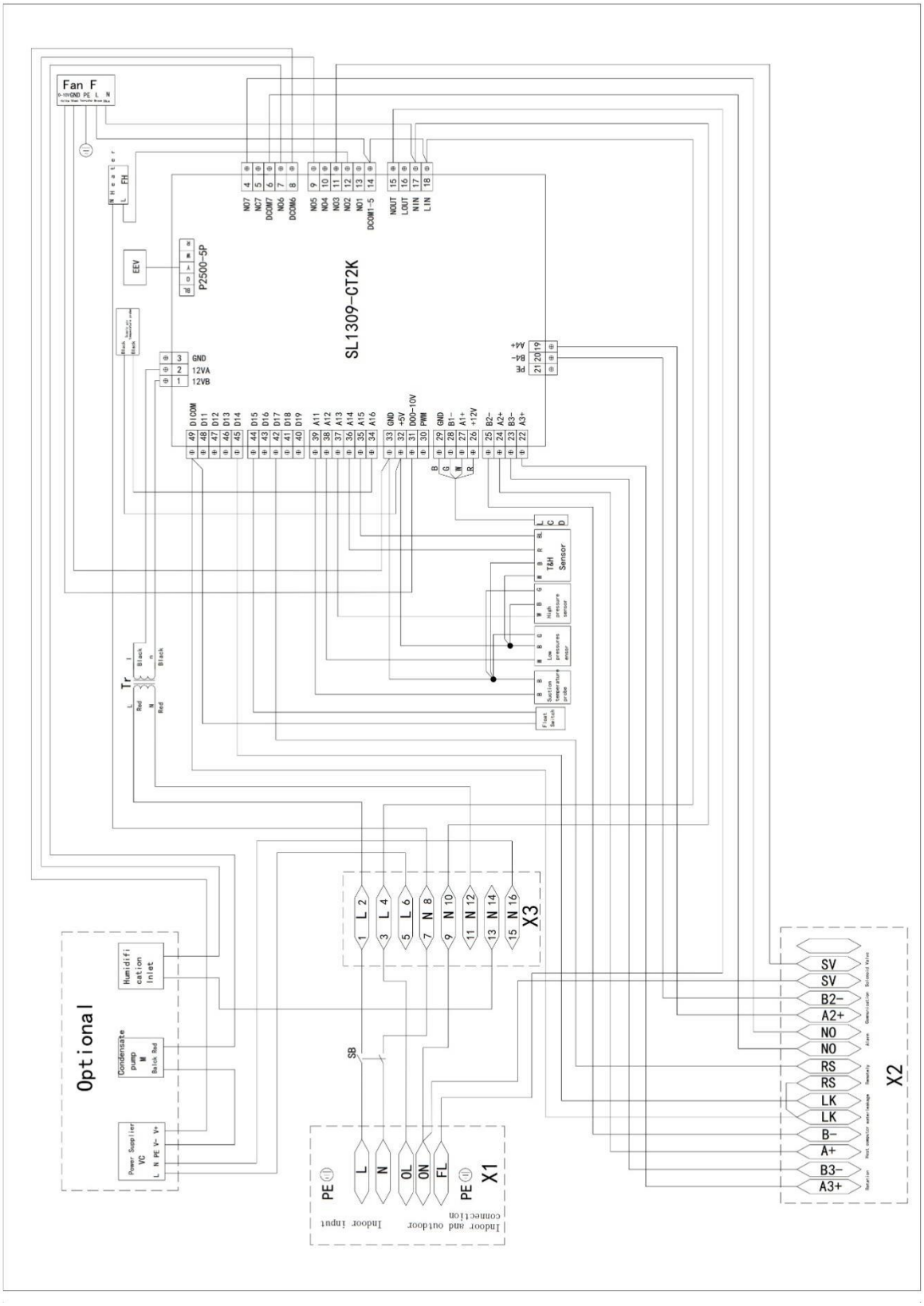
Fault Phenomenon	Possible Reasons	Solution
The electric heating function fails	Contactor or relay failure	Check whether the voltage of the electric heating digital output (port 12 and neutral terminal) is 220VAC. If yes, the contactor or relay is faulty and needs to be replaced; otherwise, the controller is faulty and needs to be replaced
	Electric heating overload	Check whether the blower works normally to ensure smooth airflow
	No heating requirement	Check whether the temperature set point meets the heating start demand
	Electric heating fault	Replace electric heating

6.2.5 Humidification system failure and treatment

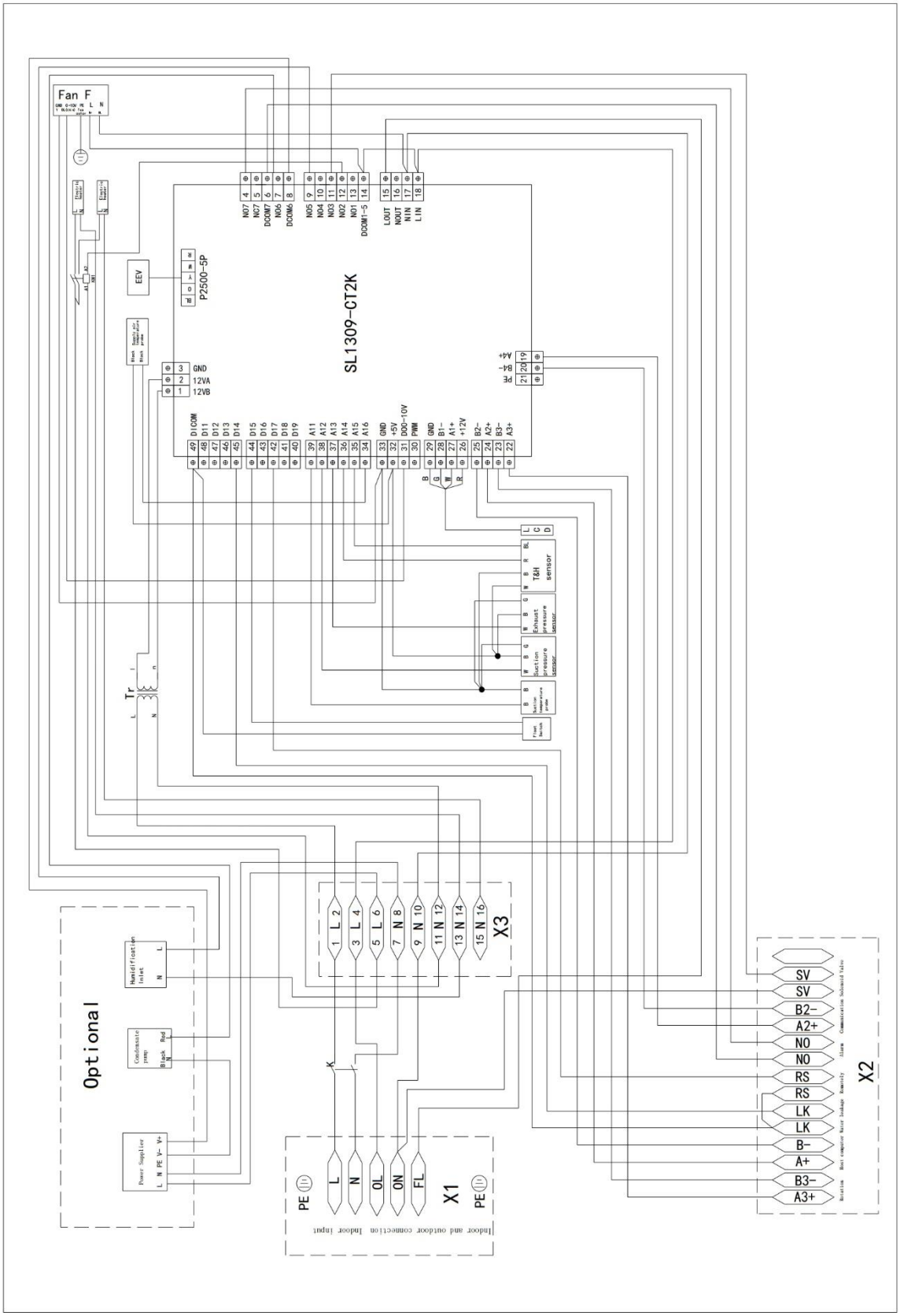
Table 6-5 Humidification system failure and treatment

Fault Phenomenon	Possible Reasons	Solution
Humidification function fails	Inlet solenoid valve failed	Replace the inlet solenoid valve failed
	The humidifier runs overtime	Replace the humidifier
	Failure of water supply	Check water supply source and piping and dispose of it
	Inlet valve power is not connected	Check whether the digital output of the humidifier inlet valve (port 9 and neutral terminal) is 220VAC, then the inlet solenoid valve is faulty and needs to be replaced; otherwise, the controller is faulty and needs to be replaced

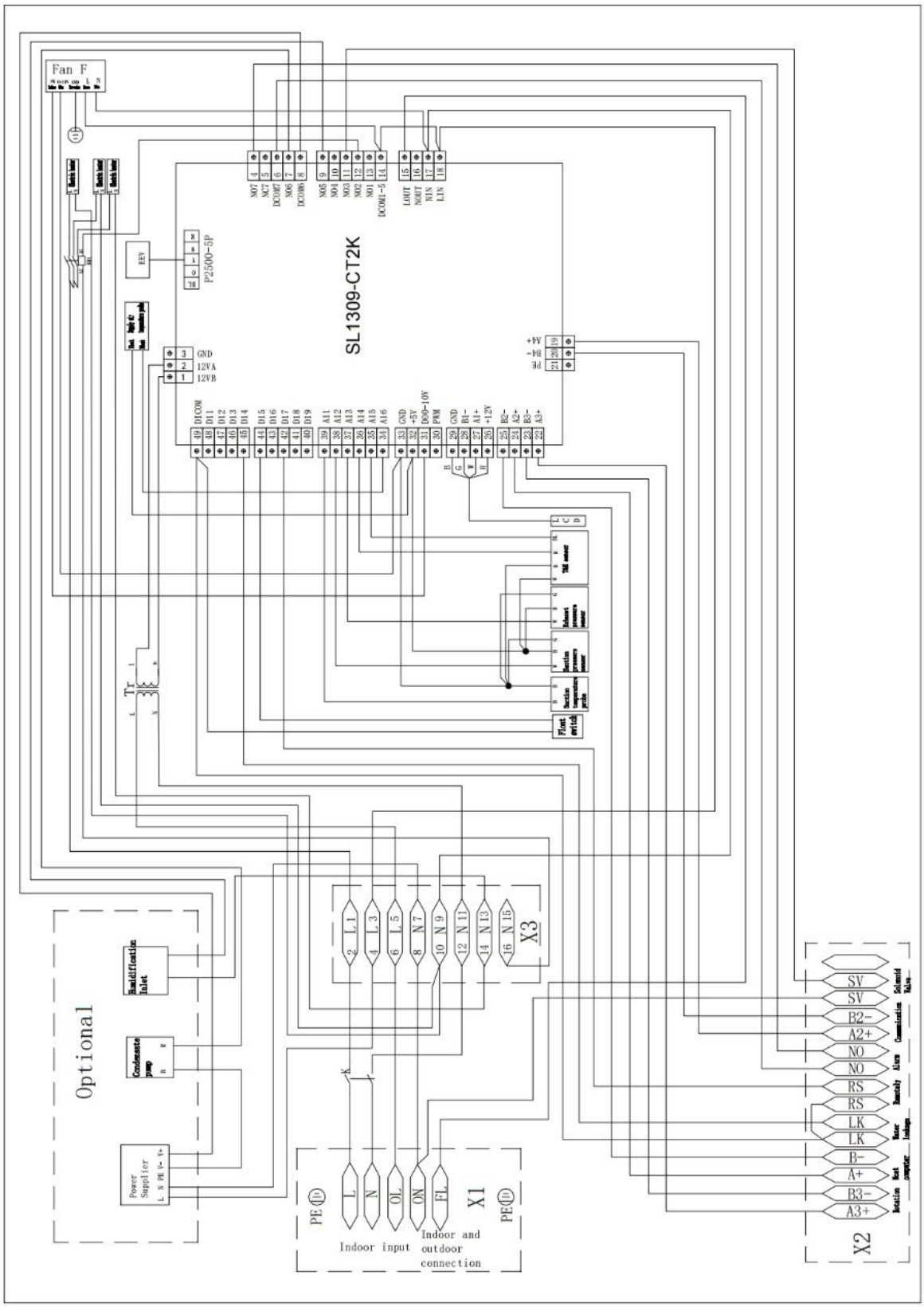
Annex Ⅰ Electrical Schematic Diagram of the Indoor Unit



3.7KW electrical schematic diagram

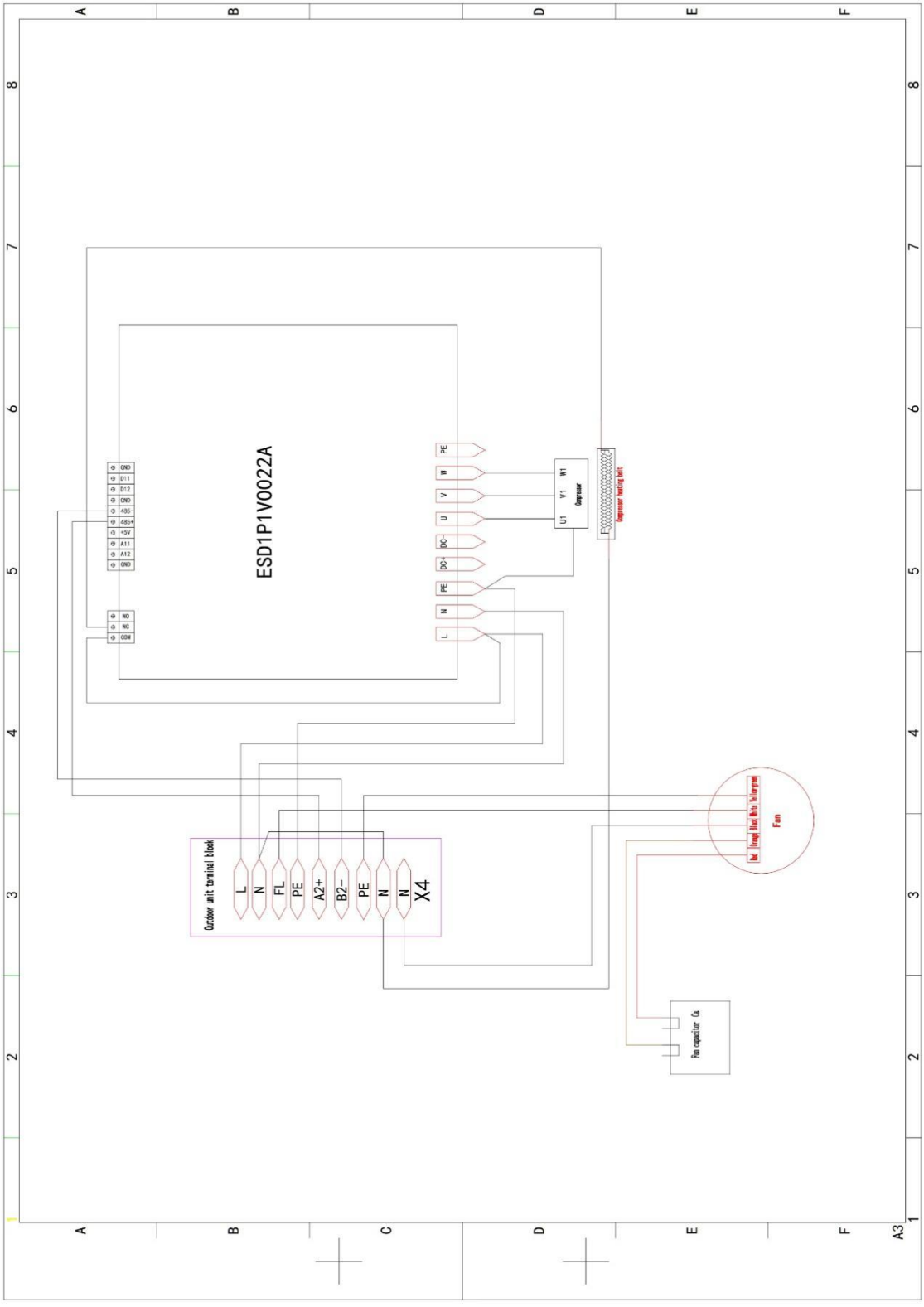


7.5 kW electrical schematic diagram

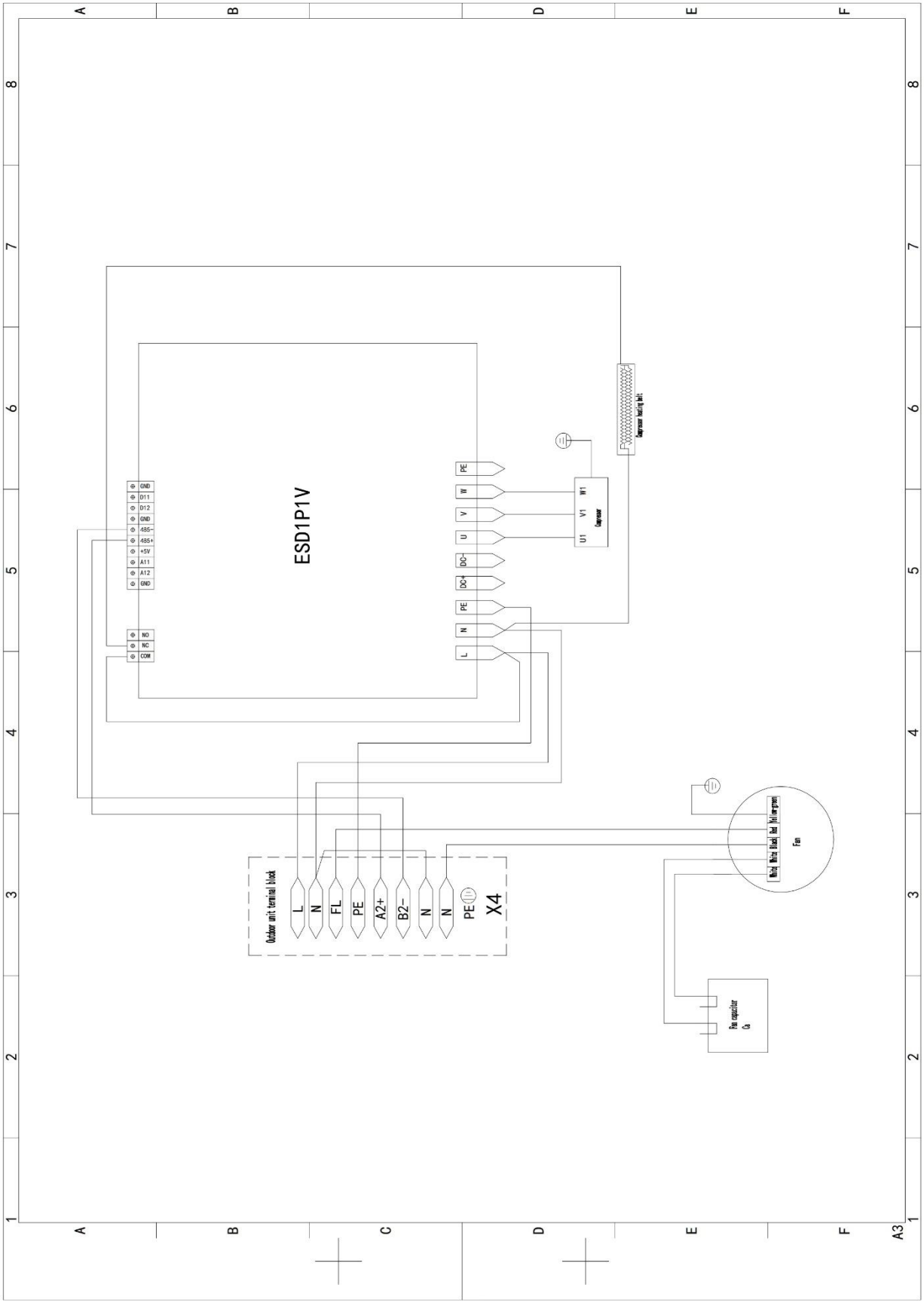


12.5kW electrical schematic diagram

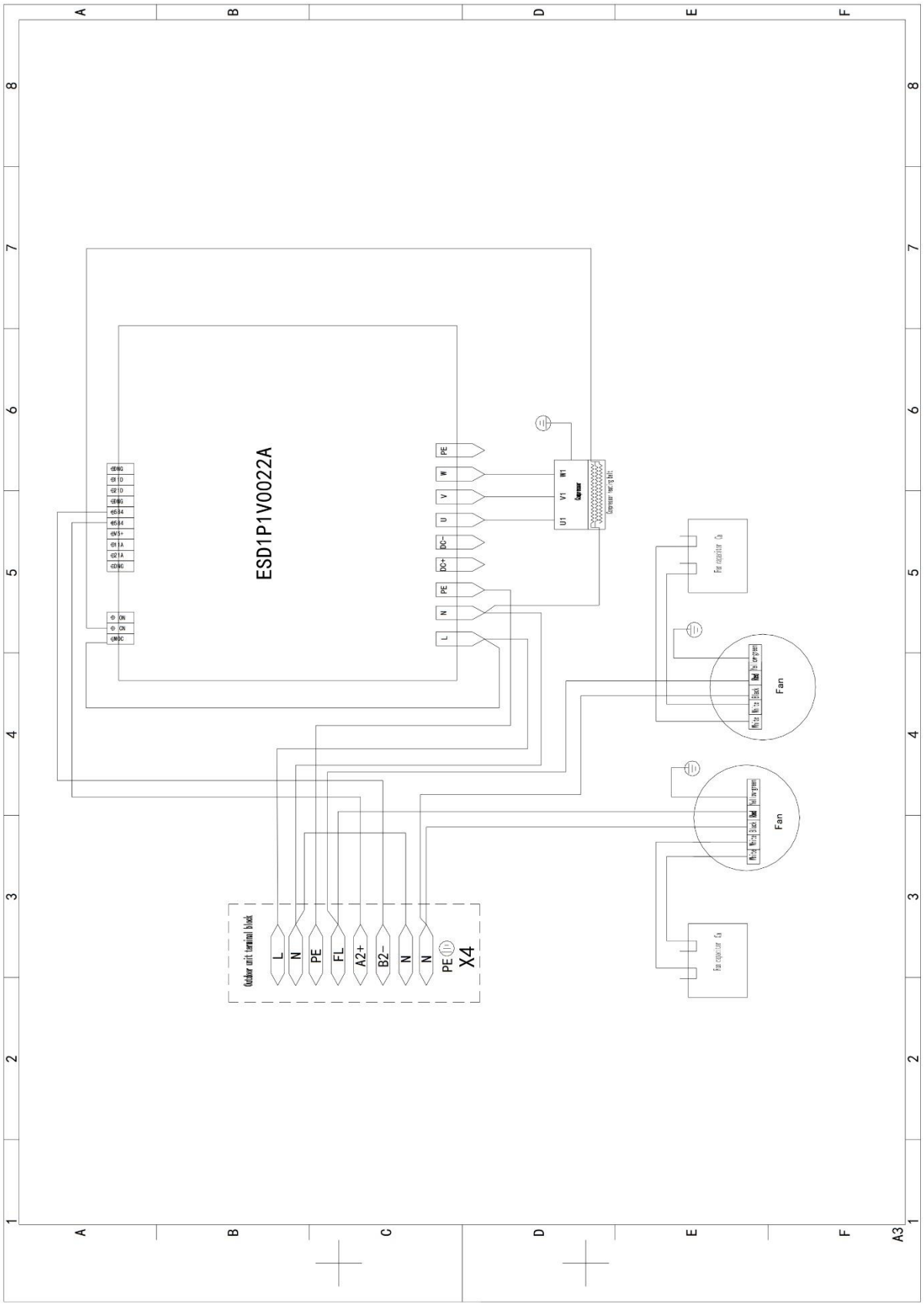
Annex Ⅱ Electrical Schematic Diagram of the Outdoor Unit



5KW Outdoor Electrical Schematic Diagram



10KW Outdoor Electrical Schematic Diagram



18KW Outdoor Electrical Schematic Diagram

Annex III Name and Content Table of Hazardous Substances in Products

Part Name	Harmful materials					
	Pb	Hg	Cd	Cr（VI）	PBB	PBDE
Cabinet	×	○	○	○	○	○
Cooling accessories	×	○	○	○	○	○
Fan units	×	○	×	○	○	○
Heating unit	×	○	○	○	○	○
Electronic control unit	×	○	×	○	○	○
Display screen	×	×	○	○	○	○
Made into board	×	○	○	○	○	○
Heat Exchanger	×	○	○	○	○	○
Copper pipe	×	○	○	○	○	○
Cable	×	○	○	○	○	○

This form is compiled in accordance with the provisions of SJ/T 11364.

O：Indicates that the content of the toxic and hazardous substance in all homogeneous materials of the part is below the limit requirement specified in GB/T 26572;

X： Indicates that the content of the toxic and hazardous substance in at least one of the homogeneous materials of the part exceeds the limit requirement of GB/T 26572.

The following components or applications containing toxic and hazardous substances are limited to the current technical level and cannot be reliably replaced or there is no mature solution:

1. The reasons for the lead content in the above components: the copper alloy of the parts contains lead; the high temperature solder contains lead; the high temperature solder in the diode contains lead; the resistance body glass uranium contains lead (exempt); the electronic ceramic contains lead (exempt);

2. The backlight tube contains mercury;

3. The switch contacts of the power distribution section contain cadmium and its compounds.

Note on the environmental protection use period: The environmental protection use period of this product (marked on the product body) refers to under normal use conditions and compliance with safety precautions of this product, from the date of production, the toxic and hazardous substances or elements contained in this product (except batteries) will not have a serious impact on the environment, people, and property.

Scope of application: Rack precision air conditioner

Annex IV Equipment Maintenance Checklist (Monthly)

Component	Check content	Remark
Filter	Check if the filter is damaged or blocked	
	Clean the filter	
Fan	Confirm that the fan net cover is not deformed	
	Confirm whether the fan blades are damaged	
	Confirm that the fan is fixed and not loose	
	Confirm that the fan is running without abnormal noise	
	Confirm that the fan circuit connector is not loose	
Compressor	Confirm that the compressor fasteners are not loose	
	Confirm the running sound and observe the running vibration for no abnormalities	
	Confirm that the compressor circuit connector is not loose	
Air-cooled condenser	Confirm that the condenser fins are not dirty and blocked	
	Confirm that the condensing fan is tightly fastened and not loose	
	Confirm that the condensing fan is not damaged	
	Confirm that the condensing fan circuit connector is not loose	
Wet film humidifier	Confirm that the wet curtain is not dirty	
	Confirm that the wet curtain is not severely damaged or mildewed	
	Confirm whether there is too much dust on the wet curtain and cannot be cleaned	

Date: _____

Device model: _____

Checker: _____

Appendix 5 Equipment Maintenance Checklist (Semi-annual)

Component	Check content	Remark
Filter	Check if the filter is damaged or blocked	
	Clean the filter	
Fan	Confirm that the fan net cover is not deformed	
	Confirm whether the fan blades are damaged	
	Confirm that the fan is fixed and not loose	
	Confirm that the fan is running without abnormal noise	
	Confirm that the fan circuit connector is not loose	
Compressor	Confirm that the compressor fasteners are not loose	
	Confirm the running sound and observe the running vibration for no abnormalities	
	Confirm that the compressor circuit connector is not loose	
Air-cooled condenser	Confirm that the condenser fins are not dirty and blocked	
	Confirm that the condensing fan is tightly fastened and not loose	
	Confirm that the condensing fan is not damaged	
	Confirm that the condensing fan circuit connector is not loose	
Wet film humidifier	Confirm that the wet curtain is not dirty	
	Confirm that the wet curtain is not severely damaged or mildewed	
	Confirm whether there is too much dust on the wet curtain and cannot be cleaned	
Heating system	Confirm that the fixing parts of the electric heater are not loose	
	Confirm that there is no excessive dust on the surface of the electric heating meter	
	Confirm the surface corrosion condition of electric heater	
Electric control system	Confirm that the electric heater circuit connector is not loose	
	Confirm that the wiring of electrical components is not loose	
	Confirm that the cables are not aging	
	Confirm that the contactor and relay coil are working properly	

Date: _____

Device model: _____

Checker: _____