BlackShields®

CABINET AIR CONDITIONER
USER MANUAL

[MODEL:AC3000P]

※ please read the manual before using the air conditioner.
※ please keep the manual safe after reading.

Contents

1 Introduction

1.1 Preface

This manual introduces the important methods to use cabinet air conditioner. Please read carefully the manual before using and following the usage and note to make sure use the cabinet air conditioner safely and correctly. After reading, please keep the manual safe for reference at any time.

1.2 Product summary

The air conditioner is one kind of refrigeration product self-developed for communication cabinet. It is applicable in the place where the cabinet internal heat is very large, the internal electronic equipment is sensitive to the environment temperature and which should be isolated internally and externally completely. This product has multiple functions, high reliability, and has the feature that it can start to work without complex debugging after powering.

1.3 Working principle

After powering on, the low pressure steam from the refrigerant in the refrigeration system is inhaled by compressor, compressed into high pressure steam and then discharged to the condenser. Meanwhile, the air inhaled by external fan goes through condenser and takes away the heat given off by refrigerant and makes high pressure refrigerant steam condensed into high pressure liquid. High pressure liquid is sprayed into evaporator by throttle device and evaporated under the corresponding low pressure and absorbs the heat around. Meanwhile, the fan in cabinet makes air heat exchange by evaporator fins and sends the cooled air into cabinet. By so, the air in cabinet can cycle to achieve the purpose of lowering the temperature.
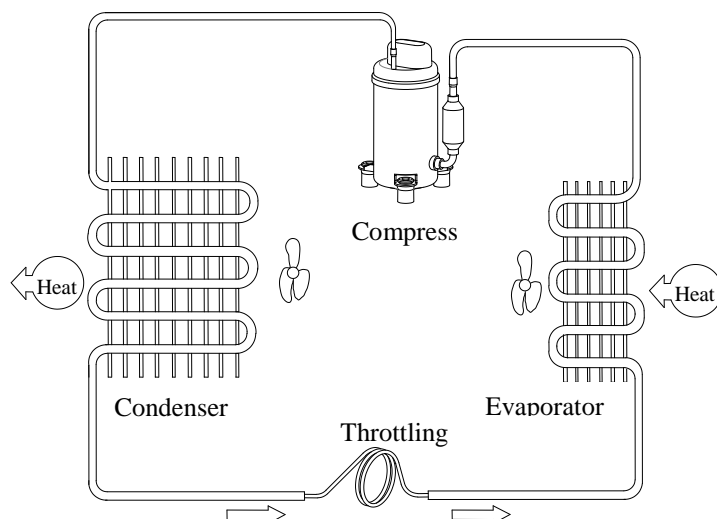
1.4 Standards

No.	Standard No.	Standard Name
01	GB 4208	Enclosure Protection Class
02	GB4706.1	Safety of household and similar electrical appliances

03	GB 9237-2001	Mechanical refrigerating systems Used for cooling and heating--Safety requirements
04	GB/T17626.8	Electromagnetic compatibility-Testing and measurement techniques--Power frequency magnetic field immunity test
05	GB/T 4798.1、2、3	Environmental conditions existing in application of electric

2 Product function

2.1 Cooling

Air conditioner can be set parameters by display or backend software: refrigeration setting temperature and refrigeration deviation temperature. When the temperature inside cabinet is higher than refrigeration setting temperature+ refrigeration deviation temperature, it starts refrigerating; when the temperature inside cabinet is lower than refrigeration setting temperature, it stops refrigerating.

Refrigerating Parameter Set

Parameter	Default value	Set Scope	Unit
Refrigeration setting temperature	29	[16～38]	℃
Refrigeration deviation temperature	6	[1～10]	℃

2.2 Heating

Air conditioner can be set parameters: heating setting temperature and heating deviation temperature. When the temperature inside cabinet is lower than heating setting temperature, it starts heating; when the temperature inside cabinet is higher than heating setting temperature+ heating deviation temperature, it stops heating.

Heating Parameter Set

Parameter	Default value	Set Scope	Unit
Heating setting temperature	5	[5～26]	℃
Heating deviation temperature	10	[1～10]	℃

2.3 Air supply

Air conditioner can make the temperature inside cabinet uniform by air supply and avoid partial overheating. When cabinet inside cabinet is lower refrigeration starting temperature, the air supply function starts automatically.

2.4 Dehumidification

When the humidity in the cabinet is(Default Values 80%,Range Values 50%~99%) greater than that of dehumidification,The electric heating dehumidification and compressor are opened at the same time.; When the humidity in the cabinet fall to the dehumidification(Default Values 75%,Range Values 45%~95%), stop the heating and compressor.

Parameter	Default value	Set range	Unit
Dehumidification starting humidity	80	50～99	%
Dehumidification stopping humidity	75	45～95	%

Note: During dehumidification, electric heating and compressor are opened at the same time.

2.5 Self-inspection

Self check in two ways:

1 the first run on electricity

2 click control panel with the test button (see chapter sixth)

Self check program logic is as follows: LED lamp post 2 seconds, check whether the normal display, 2 seconds after the red light stop, green light 2Hz flash, a fan run 5S, then fan, compressor and fan operation, 30 seconds after the self inspection system is normal, the green light, if the red light indicates the system has fault alarm. 3 minutes after the compressor temperature based on logic to automatically determine whether operation.

3 Product parameters

3.1 Product technology parameters

Item	Unit	Parameter
Working environment temperature	℃	-40 ～+55
Rated input voltage	—	220VAC~60Hz
Refrigerating capacity(L35/L35)	W	3000
Heating capacity	W	1600
Body outline dimension (height* width*depth)	mm	1274*487*250
Contain flange dimension(height* width*depth)	mm	1380*593*251
Installation method	—	Door mounted micro inlay
Refrigerant	—	R134a
Life	Years	> 10
Surface treatment	—	Electrostatic coating（RAL7035）

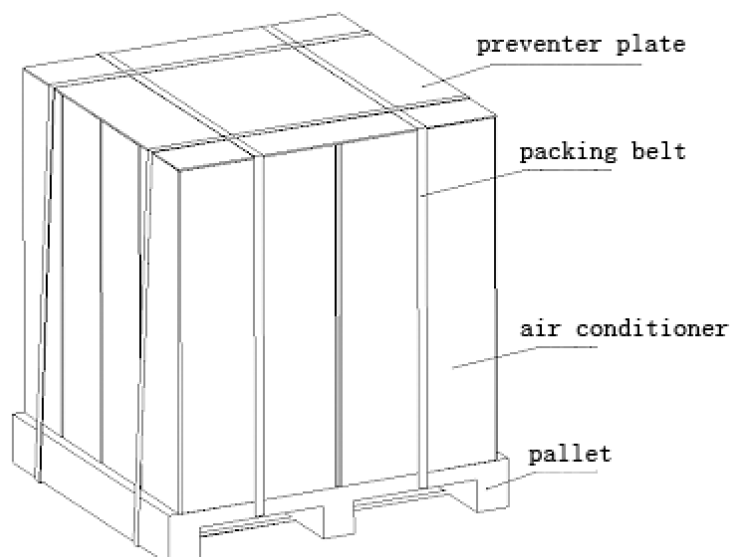Note:Detailed parameters for nameplate

3.2 Product dimension drawing
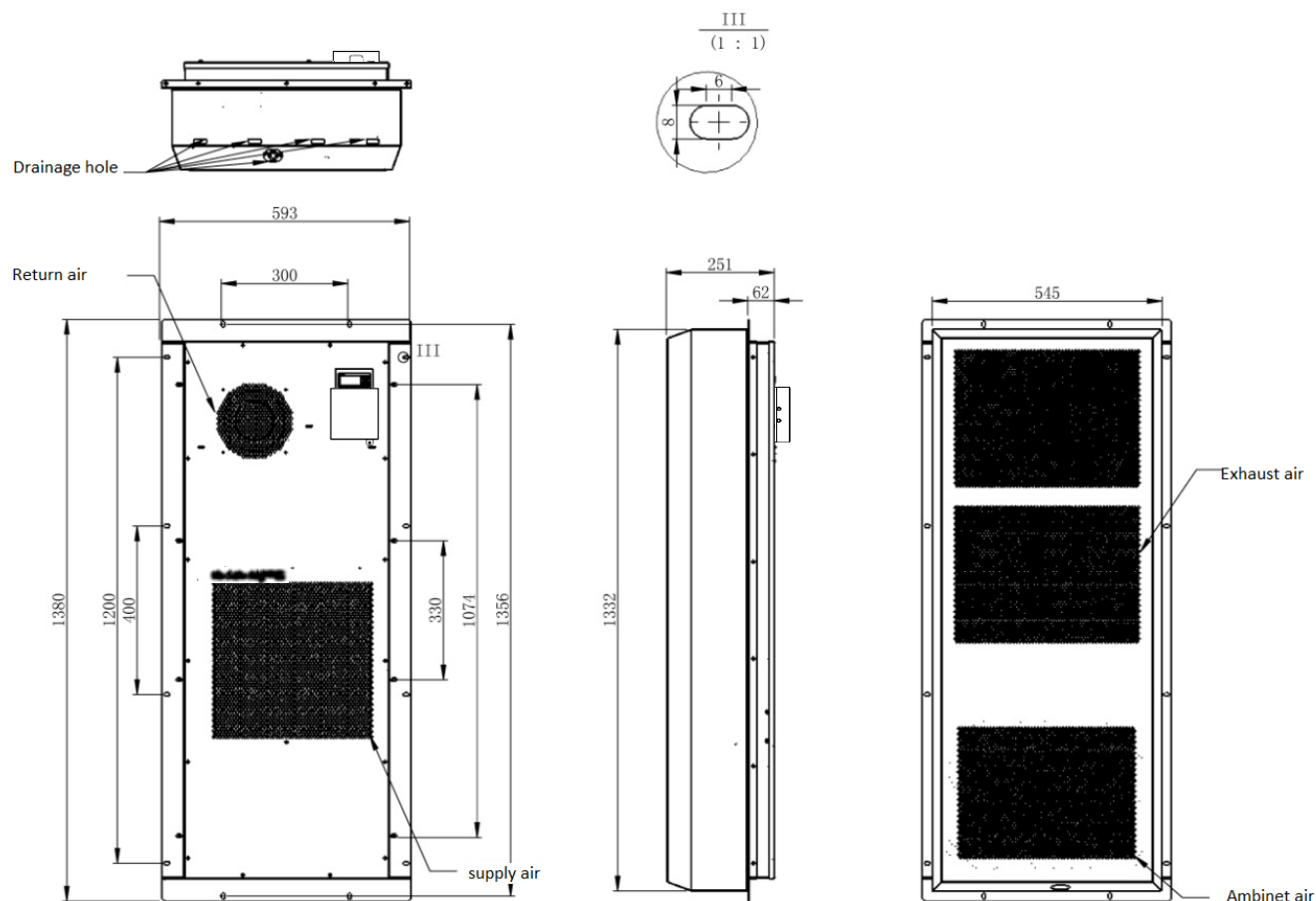
4 Installation preparation

4.1 Packing diagram

The packing includes the bottom pallet, top protection plate, wrapping film and packing belt. The packing diagram is as following:

4.2 Disassemble packing and inspect

1. Prepare tools to disassemble: protective gloves, scissors and knives;
2. Wear protective gloves, remove wrapping film and packing belt;
3. Take air conditioner and make OBA: check whether the air conditioner model is right and the appendix is complete;
4. Please read carefully the 5.3 article-Preparation before installation in the manual in order to finish installation successfully.

4.3 Packing list

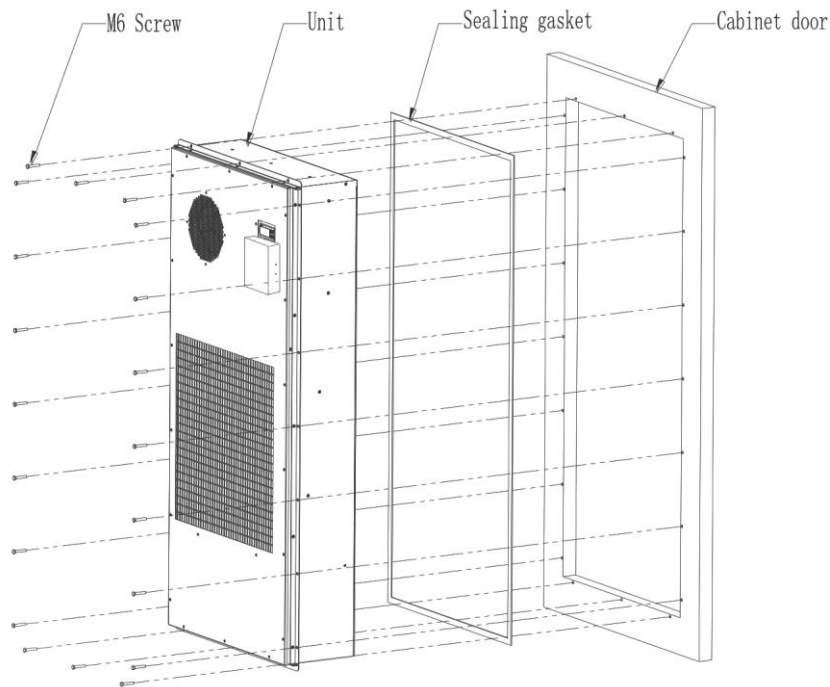| No.	Name	Qty	Note
1	Cabinet air conditioner	1	
2	Manual	1	
3	AC Power Cable	1	Match
4	Alarm Cable	1	Match
5	RS485 Cable	1	Match

5 Product installation cut size diagram

5.1 Installation diagram

5.2   Installation diagram

M6 Screw — Unit — Sealing gasket — Cabinet door
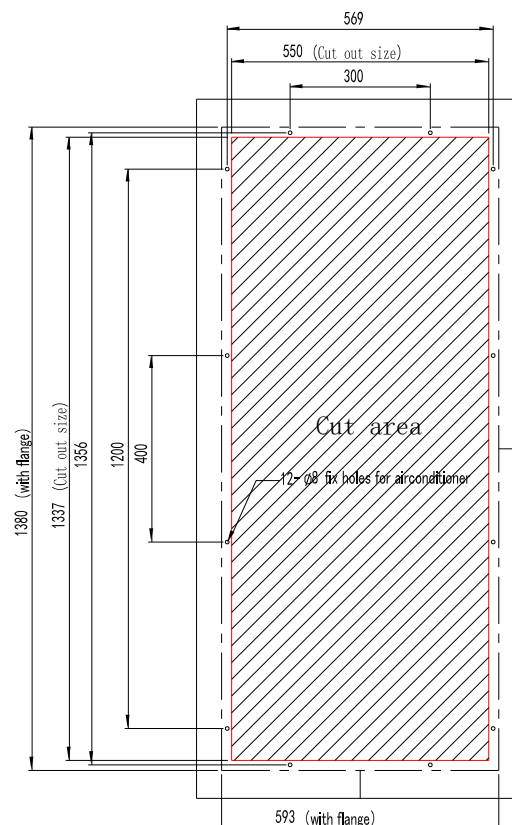
Note: the installation diagram is just for reference. It depends on the site condition to install.

5.3   Preparation before installation

Installation notes:

➢   Keep air conditioner vertical during installation, the inclination is less than 3°;

➢   When moving, handle with care and avoid collision in case of scratching the surface coating;

➢   After removing package, check whether the cosmetic is good, if damaged or deformed, please contact professional personnel   to check and repair;

➢   Count the accessory according to the appendix list and prepare installation tools;

➢   When choosing installation place, make sure the ventilation is good, keep the distance from air-out side to equipments inside cabinet more than 30cm, otherwise, it may cause short circuit and bad heat exchange effect;

➢   The mechanical and electrical installation should be operated by professional person strictly referring the manual;

➢   Check whether air conditioner drainage loop is smooth, in case that drainage is blocked;

➢   To build clean and environmental installation site, please recycle the package after installation.

5.4   Mechanical installation

➢   Choose cut location on cabinet door according to cabinet cut size, resection of middle rectangular part and play the corresponding air conditioning installation hole.

➢   Place air conditioner and cover at the cut location as installation diagram, make air conditioner flange close to cabinet door, fix it with M6 stainless steel screwdriver.

➢   Check whether air conditioner is installed levelly, firmly and finish the mechanical installation.

5.5   Electrical installation

AC power supply input port, alarm terminal port, temperature and humidity sensor output port,   I/O port ,RS485 communication port
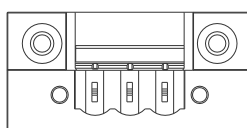
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(1) AC power supply input port
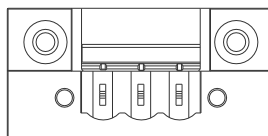
L N PE
220V AC

Port	Definition
L	L-AC220V
N	N-AC220V
PE	Earth wire

(2)   Alarm terminal port

NO COM NC
ALARM

port	Definition
NO	Dry contact output normally open port
COM	Dry contact output common port
NC	Dry contact output normally closed port

(3) Temperature and humidity sensor output port
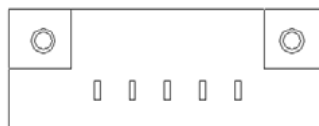
SW1 SW2   OUT1 OUT2

| port	Definition
SW1	Normally open(Disconnect without high humidity alarm)
SW2	High humidity switch out contacts: COM
/	/
OUT1	Normally open(Disconnect without high temperature alarm)
OUT2	High temperature switch out contacts: COM

(4)   I/O port
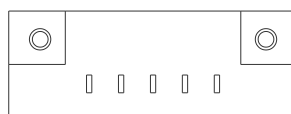
1 2 3 4 5
I/O

port	Definition
1	RS485A
2	RS485B

3	/
4	Dry contact input （normally working when open,Stop working when closed) /
5	

6 Interface

6.1 Interface diagram
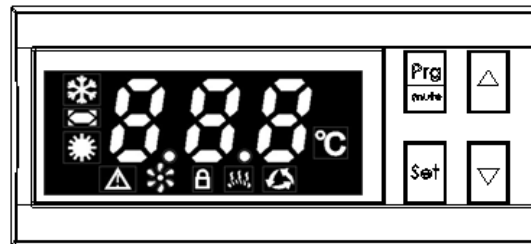
No.	Icon	Function	Function explanation
1	❄	Refrigerating running	Shows whether refrigerating runs
2	⚠	Alarming	Shows whether air conditioner alarms
3	✳	dehumidify	Shows whether dehumidification on or not
4	✴	Starting running	Shows whether air conditioner is on or not
5	⟲	Fan running	Shows whether fan runs
7	*-8.8.8*	Temperature/fault display	Shows temperature numerical or malfunction symbol display content
8	**Prg/mute**	Function key	Function selection key or backspace key（from low level menu to high level menu）
9	**Set**	enter key	Select function and enter parameter set
10	▲	Up key	Increase value, page up
9	▼	Down key	Decrease value, page down

6.2 Operation instruction

Under standby status, no press any key for 1 minute to enter into power saving mode and turn off LED,

show ✴ mark. Press any key to quit power saving mode and turn on LED.

Under running status, the '*-8.8.8* ' in the main interface shows the temperature value outside cabinet.The

unit is ℃.

6.3　Self-inspection

Start self-inspection function by the below methods：

Function key：**Prg/mute** ⟶ ᴛ5ᴛ ⟶ enter key：**Set**

6.4　Parameter set

Function key：**Prg/mute** ⟶ 5Eᴛ ⟶ Enter key：**Set,** enter the password entry interface.

6.4.1　Enter the password

a) Under this interface ,press the function button　**Prg/mute** again to return to the main interface.

b)Press the confirmation key **Set** to perform the numeric conversion.

c)Press the ascending ▲ or desending ▼ keys to add and subtract.

Name	Nmerical	Unit	Parameter	Definition
Password	111	––	––	Enter the parameters to run the device at the user level

6.4.2　User level setting

Prg/mute ⟶ 5Eᴛ ⟶ **Set** ⟶ ▲ or ▼⟶**Set**， enter the user level setting interface.

After entering the user level setting interface, press ▲or▼ in turn, show S1 S2 S3 S4……,select the corresponding symbol and press the confirm key **Set**,enter the parameter modification interface,after setting,press the confirmation button to save the parameters.

Code	Name	Value	Unit	Parameter	Definition
S1	Refrigeration setting temperature	[16～38]	℃	29	Refrigeration setting temperature value
S2	Refrigeration deviation temperature	[1～10]	℃	6	Refrigeration deviation temperature value
S3	Interior high temperature alarming	30～60	℃	45	Interior high temperature alarming setting value
S4	Interior low temperature alarming	-45～10	℃	0	Interior low temperature alarming setting value
S5	Heating setting temperature	[5～26]	℃	5	Heating setting temperature value
S6	Heating deviation temperature	[1～10]	℃	10	Heating deviation temperature value
S7	Dehumidification starting	20~40	℃	25	Dehumidification starting Temperature setting value
S8	Dehumidification stopping	20~45	℃	30	Dehumidification stopping Temperature setting value
S9	Dehumidification starting humidify	50~99	%	80	Dehumidification starting humidify setting value

S10	Dehumidification stopping humidify	45～95	%	75	Dehumidification stopping humidify setting value

6.5 Fault alarm inquiry

When there is alarm, the mark ⚠ is on. The fault alarm can be inquired by follow methods:

Function key：**Prg/mute** ⟶ ＡＬｎ ⟶ enter key：**Set** ⟶ Up key：**▲** or Down key：**▼**

If several alarms one time, they will be shown successively at '*-8.8.8* ' area.

Fault code	Fault name	Fault code	Fault name
E1	Temperature sensor fault inside cabinet	E8	Cabinet temperature sensor fault
E2	Temperature sensor fault in the middle part of evaporator	E9	System low pressure alarm
E3	Temperature sensor fault in the middle part of condenser	E10	Heater fault
E4	Environmental temperature sensor failure	E11	Compressor fault
E5	The voltage is too high or too low	E12	Dry contact input alarm
E6	Temperature in cabinet is too high or too low	E13	Temperature sensor fault
E7	System high pressure alarm	E14	Humidify alarming

7 Product running

7.1 Check before product running

➢ Check whether air conditioner is installed as direction in installation diagram and is not installed upside down;

➢ Check whether air conditioner structure is complete, installation is stable or not;

➢ Check whether air conditioner input power, dry contact alarm output and communication cable are installed as electrical installation requirement and whether connector is plugged wrong or loss;

➢ Check whether cabinet input power voltage and frequency meets the requirement of air conditioner.

➢ After checking, prepare to run.

7.2 Product running

After the air conditioning on power, automatic operation. Please check the user manual for the first 2.5 items. If the system is no alarm, air conditioning will be based on the current detected within the circulating return air temperature automatically determine whether the air conditioning operation logic; if there is alarm, please refer to the user manual in 6.5 content view, preliminary determination of specific content of air conditioning and alarm, please refer to the user manual section 8.2 content analysis and treatment failure; then please dispose of or contact the manufacturers of professional personnel for maintenance.

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8 Fault analysis and handling

8.1 Fault alarm content and actions

Fault status	Reset mode	Whether output from dry contact	Whether upload
Temperature sensor fault inside cabinet	Automatic	Yes	Yes
Temperature sensor fault in the middle part of evaporator	Automatic	Yes	Yes
Temperature sensor fault in the middle part of condenser	Automatic	Yes	Yes
Temperature in cabinet is too high	Automatic	Yes	Yes
Temperature in cabinet is too low	Automatic	Yes	Yes
System high pressure alarm	Automatic	Yes	Yes
Evaporator freezing up	Automatic	Yes	Yes

8.2 Common fault analysis and handling

Fault status	Cause analysis	Fault handling
Temperature sensor fault inside cabinet	1. sensor fault broken down or short circuit; 2.Sensor damaged	1. Check sensor circuit; 2. Change sensor.
Temperature sensor fault in the middle part of evaporator	1. sensor fault broken down or short circuit; 2.Sensor damaged	1. Check sensor circuit; 2. Change sensor.
Temperature sensor fault in the middle part of condenser	1. sensor fault broken down or short circuit; 2.Sensor damaged	1. Check sensor circuit; 2. Change sensor.
Temperature in cabinet is too high	1. Condenser is jammed or scaled; 2. Working temperature is too high; 3. Refrigeration system fault; 4. New equipment with large heating capacity; 5.Temperature is set improperly; 6. False alarm by temperature sensor in cabinet	1. Regularly clean condenser heat exchanger; 2. Reduce working temperature properly, or add shading device;. 3. Ask professional personnel to inspect and repair; 4. Re-evaluate heating capacity and adjust; 5. Re-evaluate temperature set value and deviation; 6. Change temperature sensor

Temperature in cabinet is too low	1. Temperature is set improperly; 2. Refrigeration system cannot be turned off; 3.False alarm by temperature sensor in cabinet	1. Re-evaluate temperature set value and deviation; 2. Check whether refrigeration system main control board and relay contact are adjoined; 3. Change temperature sensor
System high pressure alarm	1. Condenser is jammed or scaled; 2. External fan fault; 3.external air recycling short circuit or shaded; 4. Add too much refrigerant when repairing; 5. Working temperature is too high; 6. False alarm by sensor in the middle part of condenser;	1. Regularly clean condenser heat exchanger; 2.Check/change condensing fan; 3. External cover air inlet and outlet should be separated well, make sure there is no shade at front; 4. Ask professional person to repair and add proper refrigerant by nameplate requirement; 5. Reduce working temperature properly, or add shading device;. 6. Change sensor in the middle part of condenser;
Evaporator freezing up	1. Internal air recycling short circuit; 2. Air inlet and outlet is not smooth； 3. Internal fan fault; 4. refrigeration system cannot be turned off; 5. False alarm by sensor in the middle part of evaporator;	1. make sure there is some distance from internal recycling air inlet to equipments in cabinet and Add partition; 2. Make sure internal recycling air inlet and outlet smooth and no serious block; 3. Change internal fan; 4. Check refrigeration system main control board and related electric; 5. Change temperature sensor
Internal fan fault	1. Internal fan stalls; 2. Internal fan damaged	Change internal fan
External fan fault	1. External fan stalls; 2. External fan damaged.	Change external fan
Heater fault	Heater damaged	Change heater
Compressor fault	1. Condenser is jammed or scaled; 2. Rough handling impact ;	1.Regularly clean condenser heat exchanger; 2. Move vertically and handle with care;

9   Check and maintenance

9.1   Regular inspection

➢   Check whether cabinet air conditioner power supply wire and communication wire is Ok or not;

➢   Check whether cabinet air conditioner running is normal, whether the air inlet and air outlet mouth temperature difference is obvious when starting refrigeration system;

➢ Check whether fan and compressor work normally and whether there is obvious noise or shake;

➢ Check whether mechanical structural parts are damaged or deformed;

➢ Check whether air conditioner inner and outer circulation air inlet and outlet, cabinet outer protective cover air inlet and outlet screen are jammed;

➢ According to the actual air quality, please arrange maintenance personnel to inspect cabinet air conditioner every 3-6 months;

9.2 Regular maintenance

During air conditioner running, dust may cover on the fins of heat exchanger, which may affect the heat exchange and even cause degradation of air conditioner performance seriously. It is suggested to clean and maintain heat exchanger each 3-6 months. The cleaning and maintaining interval depends on the air pollution and running time in different regions. When cleaning, do not use hot water or gasoline and other organic solvent

10 After-sale service and warranty

10.1 Warranty period

Under the condition using cabinet air conditioner correctly, the contracted warranty period shall prevail.

10.2 Warranty range

During warranty period, manufacture will repair for free the quality faults caused by product itself and customer should provide the S/N. But the faults under below conditions are out of warranty for free:

➢ Warranty period expire;

➢ S/N cannot be provided;

➢ Faults caused under abnormal condition or circumstance, or caused by improper installation, maintenance or other operations;

➢ Faults not caused by air conditioner itself, such as the user's equipment, software and others;

➢ Damaged caused by replacing or disassembling by user, or by unauthorized repairing service persons;

➢ Faults caused by majeure force such as fire, earthquake, flood and others.

10.3 Disclaimer

The warranty is only for the delivered products. Air conditioner manufacturer is responsible for any loss which   is derived from equipment fault.

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Appendix: Electrical Diagram
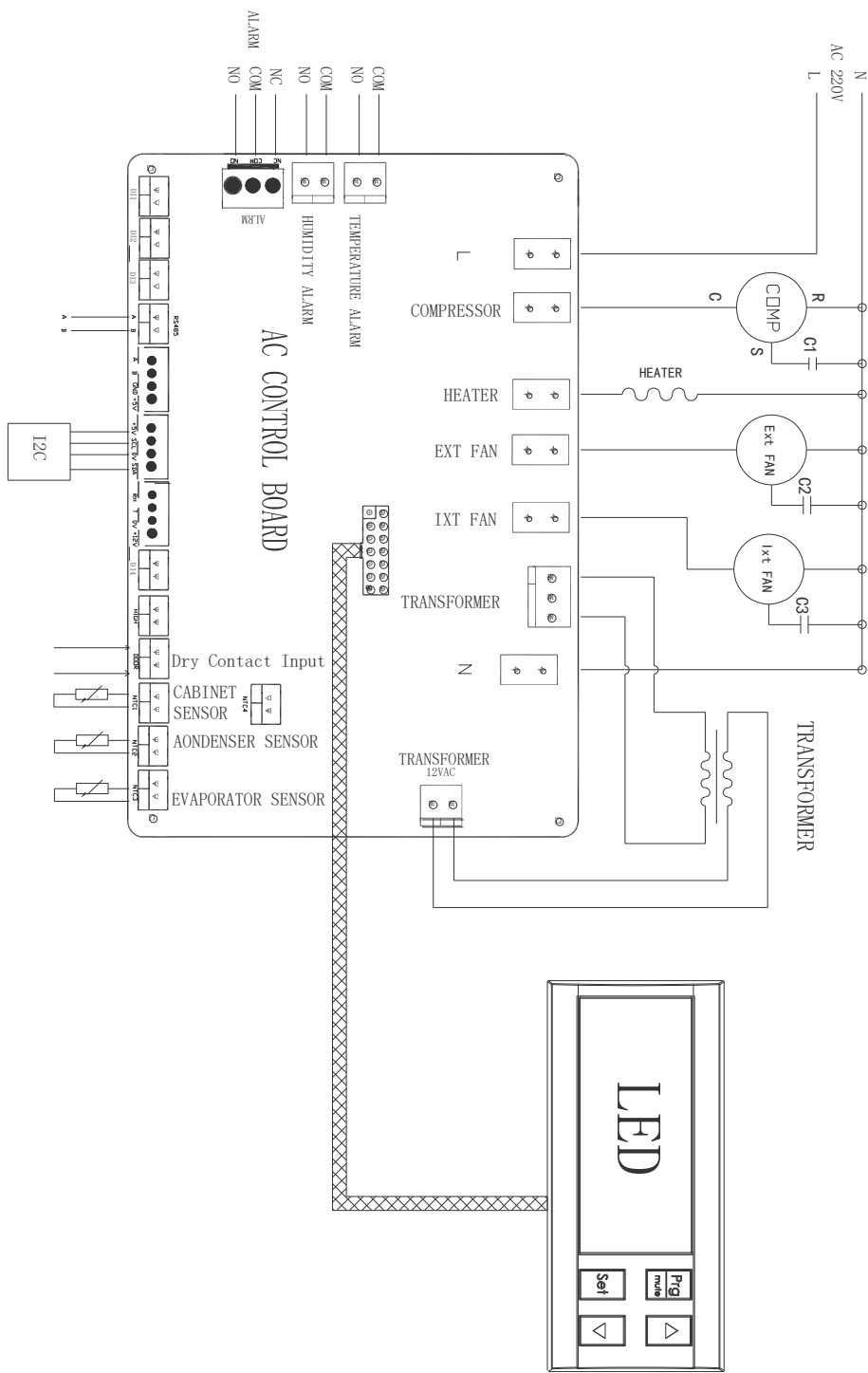
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