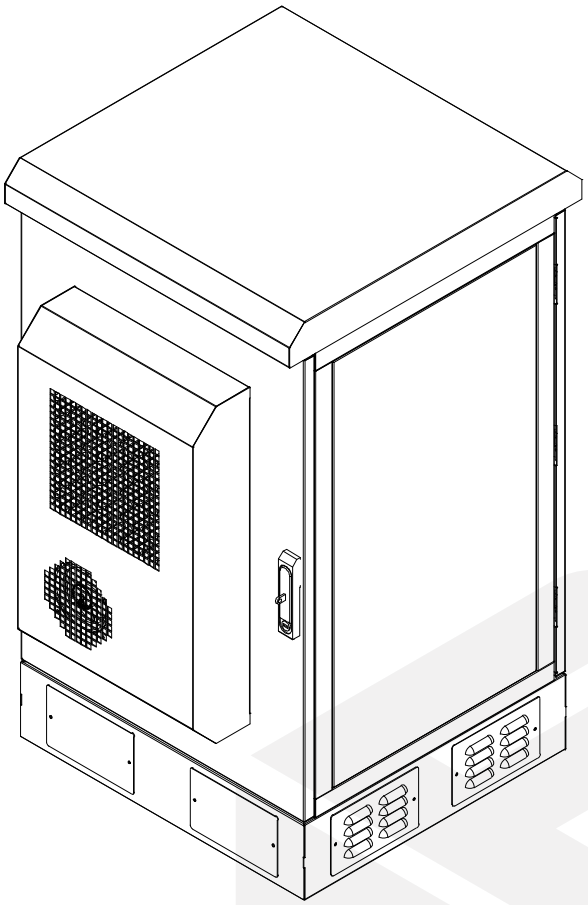
IP Rated Air-Conditioner DC Power Type

Outdoor Cabinet Manual



Thank you for buying our air-con. outdoor cabinet, this manual introduces important methods to use cabinet air conditioner, please read carefully the manual before using and following the usage/note to make sure use air conditioner safely and correctly. After reading, please keep the manual safe for reference at any time.

Contents

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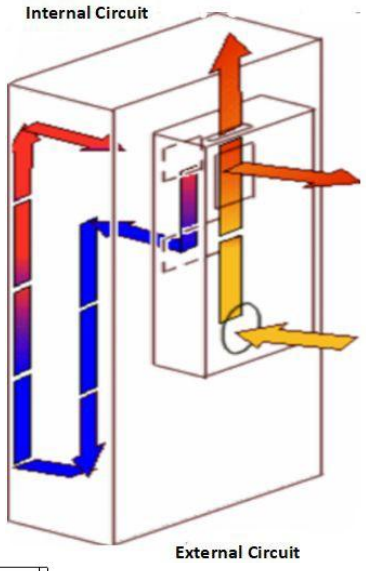
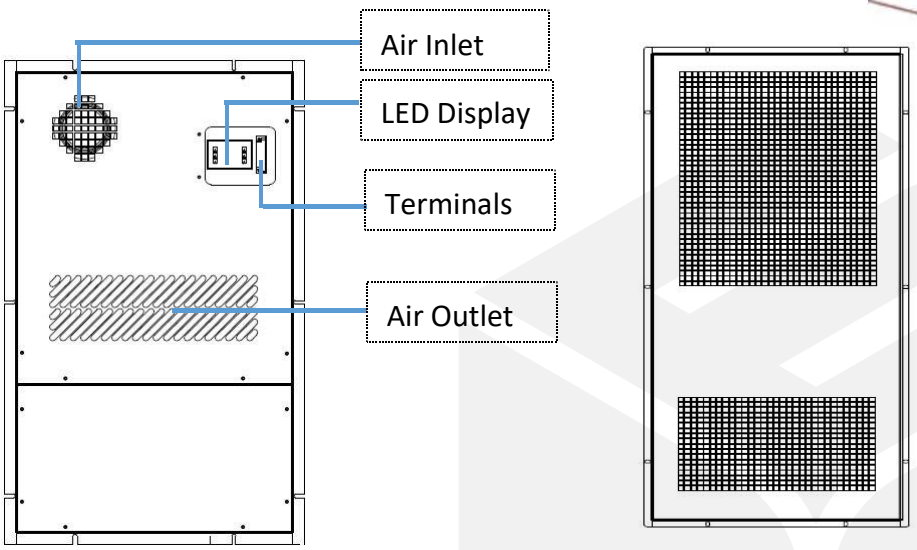
Introduction

Different from the traditional commercial and household air conditioner, outdoor cabinet air conditioner is a full automation temperature control product, it used intelligent controller to control the whole system of the air conditioner and widely deployed in telecommunication outdoor base stations, power station outdoor cabinet, outdoor LED screen, where require the temperature level below than 35℃ situation.

Feature



- This series of products can be widely used for outdoor communication cabinets, battery cabinets, electric cabinets and industry control cabinets etc.
- The protective level of internal and external circulation is IP55, which can protect cabinet to avoid moisture, dust, water. The air conditioner can also be indoor or outdoor installed.
- R134a system.
- R134a system fits working conditions of high/low temperature 55℃/-5℃.
- Digital temperature controller and high precision of temperature control.



Front View　　Back View

(The image shown above is of the 2000W air conditioner)

DC Powered Air Conditioner Specification

Cooling Option	DC48V 300W	DC48V 400W	DC48V 500W	DC48V 600W	DC48V 800W
Cooling Capacity (L35/L35) (Watts)	300	400	500	600	800
Voltage	-48VDC ± 20%				
Rated Current(Amp)	2.7	3.5	4.4	5	5.4
Max. Working Current(Amp)	4.05	5.25	6.6	7.5	8.1
Rated Power (L35/L35) (Watts)	130	170	215	240	260
Rated Power (L35/L55) (Watts)	160	210	280	280	320
Circuit Max Pressure	26 Bar				
Refrigerant	R134a				
Working Temperature	-5 ~ 55℃				
	-40 ~ 55℃(with heater)				
Heating Capacity(Watts)	500	500	500	N/A	N/A
Noise (dB)	55	56	55	58	58
IP Grade	IP55 Rated				
Dimension(W×D×H) (mm)	353×165×583				

Cooling Option	DC48V 1000W	DC48V 1200W	DC48V 1500W	DC48V 2000W	DC48V 2500W	DC48V 3000W	DC48V 3500W
Cooling Capacity (L35/L35) (Watts)	1000	1200	1500	2000	2500	3000	3500
Voltage	-48VDC ± 20%						
Rated Current(Amp)	5.8	6.77	8.2	10.8	12.7	16.25	18.75
Max. Working Current(Amp)	8.7	10.155	12.3	16.2	19.05	24.375	28.125
Rated Power (L35/L35) (Watts)	280	325	395	520	610	780	900
Rated Power (L35/L55) (Watts)	380	400	490	630	740	945	1100
Circuit Max Pressure	26 Bar						
Refrigerant	R134a						
Working Temperature	-5～55°C						
Heating Capacity(Watts)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Noise (dB)	63	65	68	68	68	70	70
IP Grade	IP55 Rated						
Dimension(W×D×H) (mm)	492x187x792			467 x 228 x 1067		508x 219 x 1167	

Note:

1, Above model are powered by DC power air conditioner, if you need AC powered air conditioner, please contact the representative or other distributors from whom you purchased your product.

2, Heating function is optional, and the heater power is manufacturer's default (heater power capacity also can be customized), please consult the representative or other distributors from whom you purchased your product.

Air Conditioner Parameter Selection Method

Formula:

Qt = (Qi + Qr) ×1.2

Qt: Heat released by the cabinet (W)
Qi: Heat released by the inner cabinet (W)
Qr: Heat spreads from outside to the inside of cabinet (W)
Qi: Heat released by the inside of the cabinet (W)

The calculation of the heat released by the components in the cabinet is based on the following (related to the components installation)：

(1) Heating of variable-frequency drive, transformer, drive and servo amplifier etc.If the equipment is rated power 1K, it will generate approx. 30~50W heat (depending on the load and divided by fan pump load and mechanical load);
(2) PLC is about 35~50W heating(group as a unit), heat of industrial personal computer is controlled by its size. All calculated of 300W/ unit;
(3) Heat of contact components: rated power 1KW is about 5~20W heat, can be ignored compared with large power components;
(4) Heat of common server is about 280-500W. Heat of UPS is 20% of its power; When the variable-frequency drive is working with load, its loss (transformed into heating) is about 3%~5% of system rated power, which can be calculated. When the variable-frequency drive is of 1KW, the loss maybe 30W to 50W;
(5) Heat of SCR: 2W/A,1KW DC Drive is about 7W~10W.

Qr =k×A×ΔT

k---Heat transfer coefficient

k=5.5W/ m2 Steel cabinet
k=12.0W/ m2 Aluminum-magnesium alloy enclosure
k=0.2W/ m2 Plastic material cabinet

A ---Surface area of the cabinet（unit---m2）

ΔT=T1 - T2 （unit---℃）

T1---maximum temperature of outside cabinet
T2---controlled temperature of inside cabinet

The air-con. outdoor cabinet cooling requirement:

Steel cabinet dimension(L×H×D)：1500×2000×800 mm

Heat of the inside element is 1000W,controlled temperature inside cabinet is 28 ℃, outside temperature is 35 ℃.

The calculation process of air conditioner parameter :

Surface area of the cabinet---A=1.5×2×2+0.8×2×2+ 1.5×0.8=10.4 m2.
Heat rumored from out to inside of cabinet---Qr = k ×A×Δ T = 5.5×10.4×(35-28) =400.4 W
Total heat produced by the cabinet---Qt =(Qi + Qr) ×1.2=(1000+400.4)×1.2 = 1680.48 W

So choose the cabinet air conditioner with cooling capacity of 2000W.

Installation Instruction

Terms of Usage(Important ! Suggest to read carefully before operation)

Important Safety Information

Read the instructions carefully to become familiar with the equipment before trying to install, operate, service, or maintain it. The following special messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

Installation instruction

- ✧ Please do not use this equipment in hot, dusty, moist or corrosive environment. The ambient temperature should not be higher than 45℃ and also should not be less than 0℃. The humidity should not be more than 85%. Starting voltage should not be higher or lower than 10% of the rated voltage.
- ✧ Follow the instruction, otherwise inappropriate installation will cause leakage、electric shock、fire and equipment loosening etc.
- ✧ The air conditioner should not be pressed or heat. Never pull the power cable or the drainpipe heavily.
- ✧ the ground wire cannot be connected to gas pipe, water pipe, lightning rods and telephone line etc.
- ✧ Use screws to fix the air conditioner on the cabinet.
- ✧ The drainpipe of the cabinet air conditioner should not be warped or pressed heavily. After the installation, please make sure the drainpipe can drain water smoothly.

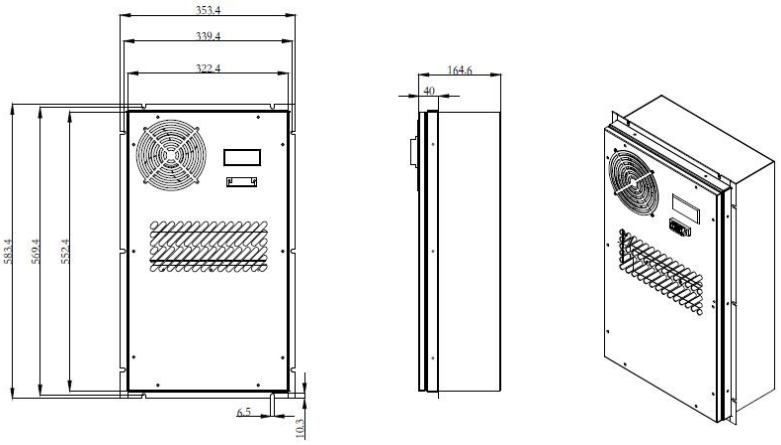
Note

- ✧ Please keep the right side up. Do not tilt or collide.
- ✧ The installation and circuit connection must be operated by the professionals according to the instructions strictly.

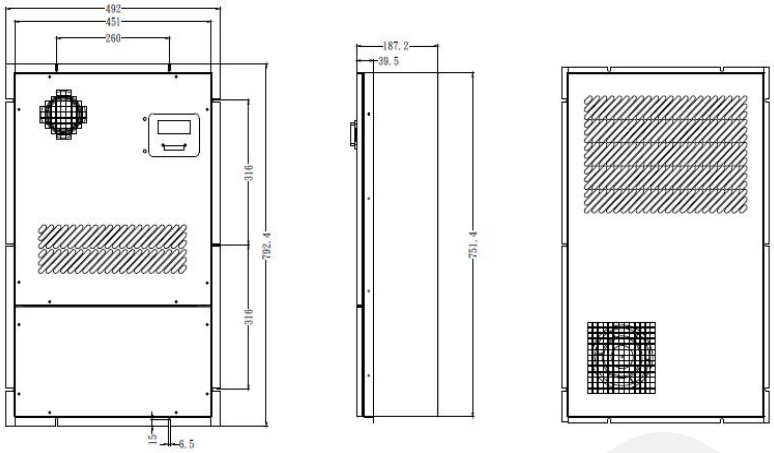
Security Alarms

- ✧ Putting goods on the air conditioner is strictly prohibited. No pressing.
- ✧ Please cut off the power before cleaning, dis-assembly or maintenance in case of electric shock accident.
- ✧ Installation or usage is strictly prohibited when there is flammable gas, aggressive gas, oil mist or electrically conductive powder in the air.
- ✧ If smoke, abnormal noise or not work long time after starting up, cut off the power ,stop unit running and turn to the professionals for examine and fix.

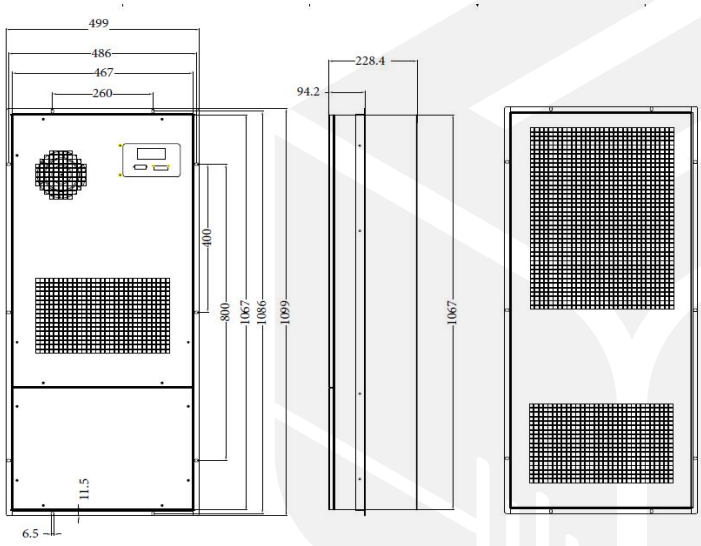
Installation Drawing



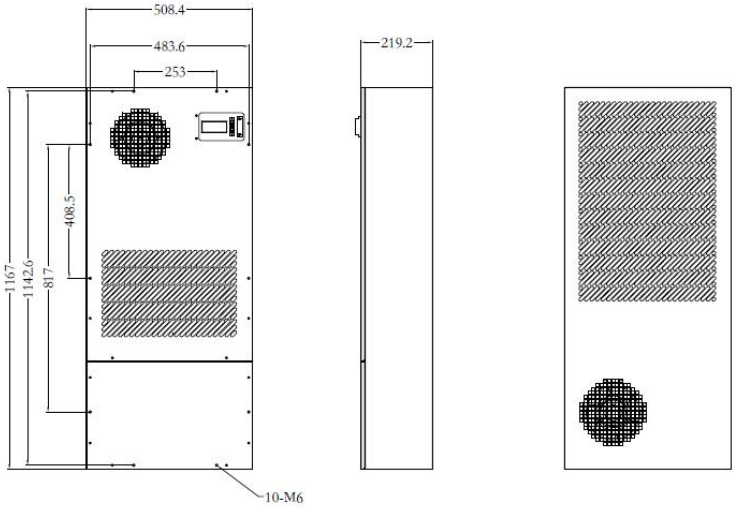
DC48V 300W/DC48V 400W/DC48V 500W/DC48V 600W/DC48V 800W



DC48V DC 1000W/DC48V DC 1200W/DC48V DC 1500W



DC48V 2000W/DC48V 2500W



DC48V 3000W/DC48V 3500W

Installation Steps

a. Dig square holes on the installation place (the oblique part) of the base metal (usually control box) according to the dimension of the air conditioner. Please check the dimension before digging.

b. Drilling M6 holes next to the square hold according to the dimension of the flange (door mounted) and cover (side mounted).

c. Label sponge on the edge of the square holes.

d. Push the air conditioner by its positive side through the inside of the square holes and then fix it with bolt.

e. Connect the power (according to the following terminals)

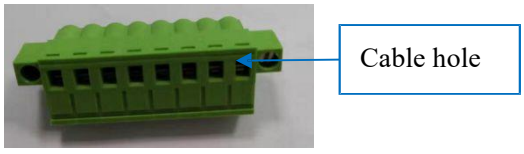
1	2	3	4	5
+	-	*	*	*
-48VDC				

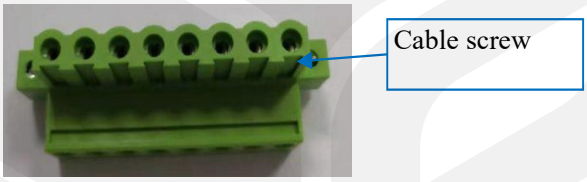
1	2	3	4	5	6	7	8
NC	COM	NO	B-	A+	*	*	*
ALARM			RS485				

Com, NO: Normally open, connected in case of failure
Com, NC: Normally closed, disconnect in case of failure

Terminal Definition

Removal Terminal





a. After stripping 7mm plastic insulation of power cable, insert it into the cable hole, use a screwdriver to tighten the screw thread (same way to sensor).

b. Fix the mobile terminal into the fixed terminal with a flat-head screwdriver

c. Finishing power cable and ensure their safety and aesthetics.

Note: The power must be shut off before installation. Choose appropriate cables and circuit protection device according to the nameplate.

Connect the Water Tube

Screw the water tube to the bottom of the drain, connect the drain with the water tube and tighten them with a hoop (install the drain at a proper position, not exceed the bottom of the air conditioner).

Instruction of Control System

Current Operating

Current Query of Heater

In the return air temperature status display (main) interface, click on the "▼" button, the system will show the current running current of the heater, then a "▼" button to return to the return air temperature is the main interface.

System Power Supply Voltage Inquiry

In the display of return air temperature (main interface), press the "Set" key, and the system will input current dc voltage value in the display format: LXXX, unit V. Press "M" once to return to the main interface showing return air temperature.

Compressor Speed Inquiry

In return air temperature status display (main interface), at the same time hold down the "▲" and "▼" button, the system will display the current compressor rotate speed, unit for RPM. Press "M" to return to the main interface showing return air temperature.

Inner Fan Speed Inquiry

In return air temperature status display (main interface), at the same time hold down the "▲" and the "Set" key, the speed of the system within the current fan 1, unit for RPM, then " " button once, flashing shows the speed of the fan in 2, according to "▲" button, once again return to display the speed of the fan in 1, press the "M" key, return to the return air temperature is the main interface.

Inquiry of External Fan Speed

In return air temperature status display (main interface), at the same time hold down the "▼" and "Set" button the system will be outside the fan speed, 1 unit for RPM, then "▼" button, once displayed flashing fan speed of 2, press the "▼" button, once again and return according to the speed of the fan 1, press the "M" key, return to the return air temperature is the main interface.

Control Parameter Setting

Please refer to appendix 1 for detailed parameter items. The system parameter items are all locked with password, and are divided into manufacturer password and user password according to the security level. When the parameters are reset, the manufacturer password can be modified so that the user password can only be modified with the parameter item marked "*". No password input, only parameters can be viewed, cannot be modified. The user password defaults to 1111.

On the main display interface, long press the "M" button for 5 seconds to enter the parameter setting state, which is the function code F+ displayed on the display screen. Use "▲ ▼" key code selection parameters, select a code after press

"Set" key then the corresponding parameter values shows that the code; At this time by "▲ ▼" button to set the parameter value can be (press and hold"▲"or"▼" key not to put to Winchester); Press the "Set" button after setting, the display will display 0000, and the first blinking button on the left will prompt for the password. By adjusting the "▲ ▼" button, change the numerical and password is the same as the first on the left, press the "Set" key flashing a change to the next, adjust again "▲ ▼" key, the value of the bit and the password is the same, four such an adjustment, the data with the same password, if the correct password will be automatically entered into the next step. At this time, the display displays the data to be modified again. Press the "Set" key again. The system saves the newly Set parameters and displays the End, and then returns to the display of the parameter code.

When setting parameters, press the "M" key to give up, and return the display code without changing the parameter value. Press "M" for 3 seconds to exit the parameter setting state.

During this process, if no key is pressed within 30 seconds, the controller exits the system Settings menu.

The Error Code

When the temperature of the controller or controlled part and the environment is abnormal, the controller will generate alarm signal. At this point, the controller's dry contact alarm output will act. At the same time, the alarm sign on the display panel of the hand controller is lit up. The LED will display the current display and alarm code values alternately, and when multiple alarms are generated at the same time, the operator will display these alarm code in turn. When the external input generates alarm, the system will enter the standby state, and the LED will display the return air temperature and the "--" interface alternately. See appendix 2 for more information about the LED warning code.

Operating Instructions

Refer to “Appendix 1” & “Appendix 2” for operation instructions. When the controller runs without warning, it displays return air temperature.

Appendix 1 System Setting Code Meaning

Code	Parameter name	Scope	Default	Unit	Note
F01	Step speed of internal fan		0	RPM	
F02	High speed of internal fan		3400	RPM	Type determination
F03	Slow speed of internal fan		1800	RPM	Type determination
F04	Step temperature of internal fan		0	℃	Type determination
F05	Internal fan speed temperature point		40	℃	Type determination
F06	Temperature of internal fan at low speed		30	℃	Type determination
F07	Stop temperature of internal fan		-42	℃	Type determination
F08	Temperature return-on of internal fan		50	℃	Type determination
F09	Number of feedback pulses per revolution of internal fan		2		Type determination
F10	Internal fan 1 enable		1		Type determination
F11	Internal fan 2 enable		0		NA
F12	Step speed of external fan		0	RPM	Type determination
F13	High speed of external fan		4500	RPM	Type determination

F14	External fan speed at low speed		2000	RPM	Type determination
F15	Step speed temperature of external fan		0	℃	Type determination
F16	High speed temperature of external fan		40	℃	Type determination
F17	External fan low speed temperature point		30	℃	Type determination
F18	Stopping temperature of external fan		-42	℃	Type determination
F19	Open temperature return of external fan		5	℃	Type determination
F20	Number of feedback pulses per revolution of external fan		4		Type determination
F21	External fan 1 enable		1		Type determination
F22	External fan 2 enables		0		NA
*F23	Heating temperature of heater		0	℃	Type determination
*F24	Heater stop temperature error		5	℃	Type determination
F25	Heater overcurrent value		10	A	Type determination
F26	Undercurrent of heater		0.5	A	Type determination
F27	The heater holds the energy level	0/1	0		Type determination
*F28	The communication address	1~255	1		
*F29	High temperature alarm temperature	35~100	55	℃	
*F30	Low temperature alarm temperature	-42~25	-42	℃	
F31	reserve		---		
F32	reserve		---		
F33	reserve		---		
F34	Return air temperature deviation		0	℃	
F35	Condenser temperature deviation		0	℃	
F36	Heater current deviation		0	A	
F37	System voltage deviation		0	V	
*F38	External input enable	0/1	1		
*F39	External input options	0/1	1		
*F40	Voltage warning high limit	50~70	60	V	
*F41	Voltage warning low limit	24~47	42	V	
*F42	Starting temperature of compressor	18-50	30	℃	
*F43	Compressor stop error	1-5	2.5	℃	
F44	Maximum speed of compressor		3600	RPM	
*F45	password	0000-9999	1111		

Note:
The code with "*" in the front is can be adjusted according to users' needs. Other codes are not suggested to be adjusted.

Appendix 2 Meaning of Indicator Light on Panel

Indicator Light	Lamp Name	Bright	Flashing
	Temperature	Parameter setting status	Self-inspection
	System of cold	Compressor drive	Compressor failure
	System heat	Heater on	Heater failure
	---	---	---
	Outdoor fan	Outdoor fan open	Fault of external fan
	Alarm	Has the alarm	---

Cooling System

Basic Components

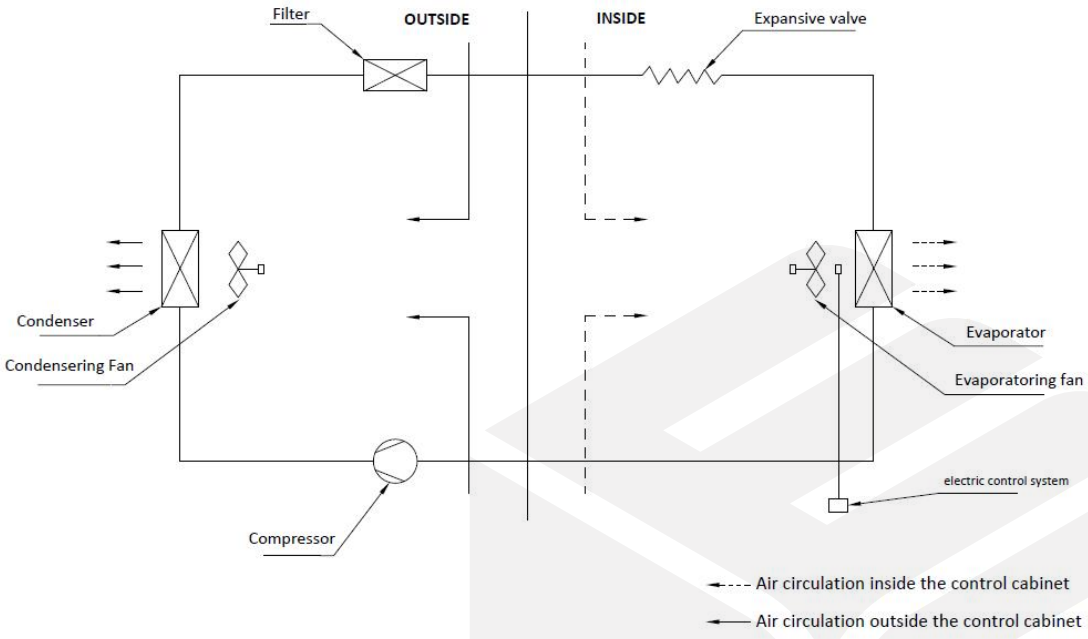
Air conditioner is composed of compressor, condenser, evaporator, electric control system, expansion valve and capillary tube, dry filter and fans etc.

Cooling Theory

A. The compressor takes in the gas refrigerant from the evaporator and compresses it into high temperature and high pressure then sends it into the condenser. The refrigerant will release heating in the condenser and then the cold high pressure liquid goes through capillary throttling and turns into low temperature and low pressure and then flows in to the evaporator. The refrigerant will absorb heat and then turns into gas in the evaporator. Thus forms the cooling cycle system.

B. The condenser and evaporator has circulation fan to enhance air convection and heat exchange efficiency. The heat exchange between condenser and air is outside the control box and that of evaporator and air is inside the control box.

C. The electrical system is mainly monitoring the temperature of the cooled closed cabinet and controls the cooling circulation by setting temperature.



Drawing of cooling theory

Air Conditioner Operation

Check before Operation

Please check the following after the electrical and air conditioner installation:

a. No barrier before air inlet and outlet.

b. The air conditioner is installed vertically, and all mounting screws have been tightened.

c. Air conditioner drain has been securely mounted and connected with the drain line cabinet (optional).

d. Connecting power cord has been connected reliably.
e. Fans can freely rotate with no strange noise.
f. AC input voltage matches with the contents of the nameplate parameters

Start to Operate

a. Turn on the power breaker and start running.
b. AC input power closed, the inside fan runs. If the inside temperature reaches the operation conditions, the cooling and heating systems start to operate. When the cooling system starts to operate, the outside circulation fan is controlled by condenser thus it will start after the compressor.

Fault Analysis & Handling

Code	Meaning	Instructions
E01	Fault of internal fan	
E03	Fault of external fan	
E05	Compressor alarm	
E06	Communication alarm	
E07	---	
E11	Return air temperature sensor failure	
E12	Condenser temperature sensor failure	
E13	High voltage alarm	
E14	Low voltage alarm	
E15	High temperature alarm	
E16	Low temperature alarm	
E17	High system pressure alarm	
The air conditioner runs normally but the cooling effect is not ideal.		Choose another air conditioner or correct cooling capacity according to the heat loading.
		Make sure the air conditioner works within its normal working temperature range.
		Contact professional people for help.
The air conditioner runs normally, it suddenly stops cooling and no electrical control system failures.		Normal phenomenon. It monitor the temperature inside the cabinet temperature and then decides whether star or stop cooling according it.
		Contact professional people for help.

Notes :

- Please install leakage circuit breaker
- Do not put your fingers or objects in the air outlet because the running air conditioner will cause injury to human beings or damage to the air conditioner.
- Do not repair without professionals.
- The air conditioner can not be inverted in any case, otherwise it may cause damage to the machine.
- Try to remain stable during handling process. The tilt angle should not exceed 45 degrees.

Check and Maintenance

Regular Inspection

A. Check whether cabinet air conditioner power supply wire and communication wire is ok or not;
B. Check whether cabinet air conditioner running is normal, whether the air inlet and air outlet mouth temperature difference is obvious when starting refrigeration system;
C. Check whether fan and compressor work normally and whether there is obvious noise or shake;
D. Check whether mechanical structural parts are damaged or deformed;
E. Check whether air conditioner inner and outer circulation air inlet and outlet, cabinet outer protective cover air inlet and outlet screen are jammed;
F. According to the actual air quality, please arrange maintenance personnel to inspect cabinet air conditioner every 3-6 months;

Regular Maintenance

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

After-sale Service and Warranty

Warranty Period- One Year

Under the condition using cabinet air conditioner correctly, the contracted warranty period shall prevail. During warranty period ,the electronic components are free of charge for replacing if damaged occur.

Warranty Range

During warranty period, the manufacturer 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:

A. Warranty period expire;
B. S/N cannot be provided;
C. Faults caused under abnormal condition or circumstance, or caused by improper installation, maintenance or other operations;
D. Faults not caused by air conditioner itself, such as the user's equipment, software and others;
E. Damaged caused by replacing or disassembling by user, or by unauthorized repairing service persons;
F. Faults caused by majeure force such as fire, earthquake, flood and others.

Disclaimer

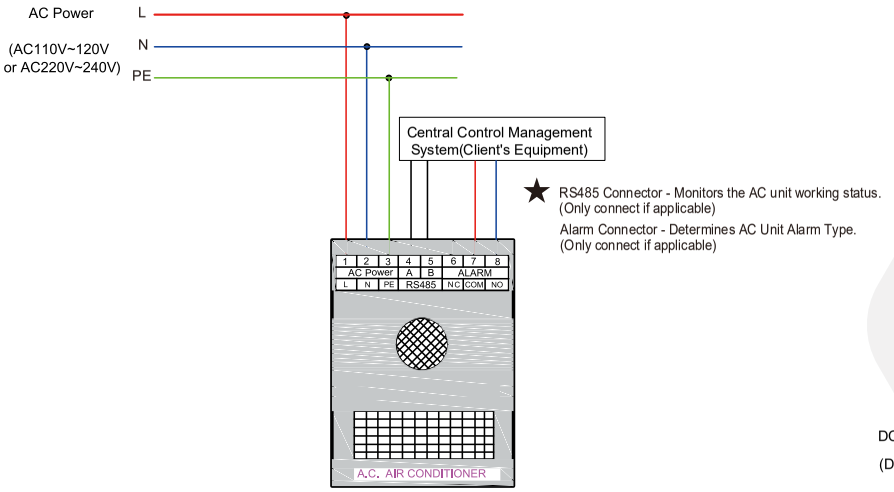
The warranty is only for the delivered products. Air conditioner manufacturer is not responsible for any loss which is derived from equipment fault.

For information on how to obtain local customer support, contact the representative or other distributors from whom you purchased your product.

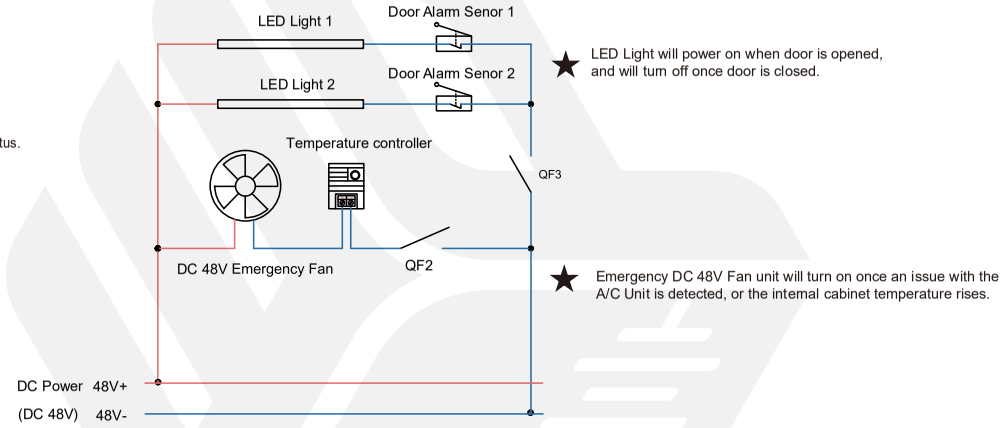
ENEPOWER

Wiring Diagram for A/C Unit and Sensors

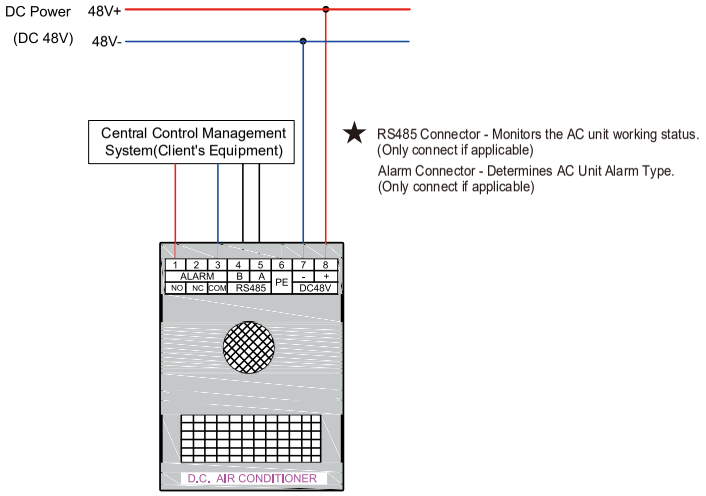
WARNING: PROFESSIONAL INSTALLATION REQUIRED



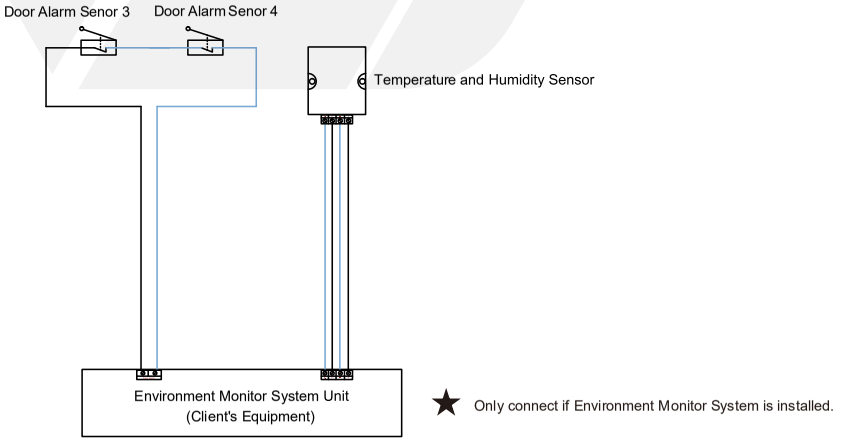
Wiring Diagram for AC Power Air Conditioner



Wiring Diagram for Emergency Fan Unit and LED Lighting



Wiring Diagram for DC Power Air Conditioner



Wiring Diagram for Door Alarm/Temperature/Humidity Sensors

CAUTION: Please read the complete operation manual prior to use to avoid accidents and injury.