P/N: 207187090E3-A

Air-conditioner with heat-exchanger

User Manual

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Read this manual carefully before installation and using!

Foreword

Summary

The manual describes the TAE 030 /120/ N /E/ A Air-conditioner with heat-exchanger instructions, product composition, working principle, wiring, operating instructions, routine maintenance, troubleshooting, and technical indicators.

Audience

This manual applies to the following engineers:

- Technical support Engineer
- Maintenance Engineer
- Marketing Engineer
- Service Engineer

Change History

Version	Documents History	Date
A	Created	2019-11-08
B	Change to English version	2019-11-12

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1 Instructions

- This manual is especially for：TAE 030 /120/ N /E/ A
- Be sure to read this manual before using the unit。
- Only when the user operate the unit in accordance with the user manual in warranty period Huarui can offer maintenance with free of charge.

2 Declaration

RoHS Compliance Declaration of Air-conditioner with heat-exchanger

European Guidelines 2011/65/EU (RoHS)

Legal regulation for Substances

Dear Sir/Madam,

Referring to the European guideline of 2011/65/EU, we confirmed that according to the current status of our knowledge and in accordance with the regulations, we could produce products complying with above mentioned guidelines especially for below type:

☒ **TAE 030 /120/ N /E/ A**

Declaration of Conformity

We herewith declare the following products:

Product Name: TAE 030 /120/ N /E/ A

series products is in conformity with the following directives:

2006/ 42 / EC	Machine Directive	EN ISO 12100, Machine Safety
2006 / 95 / EC	Low Voltage Directive	EN 60 335-1:2012, Voltage
2004 / 108 / EC	EMC-Directive	EN 60 335-2-40：2012 Safety
2009/ 105 / EC	Simple Pressure Vessels	EN 61000-6-1:2007, Immunity
97/23/EEC	The Pressure Equipment Directive, article 3, section 3.	EN 61000-6-4, Emission
	The Pressure Equipment Directive, category 1	
	The Pressure Equipment Directive, category 2	

and was manufactured in conformity with the following harmonised standard:
furthermore manufactured in conformity with the following disharmonised standard:

2011/65/EU	RoHS Directive
2002/96/EC	Waste of Electrical and Electronic Equipment (WEEE)

and furthermore declares that it is not allowed to put the machinery into service until the machinery into which it is to be incorporated or of which it is to be a component has been found and declared to be in conformity with the provisions of above-mentioned Directives and with national implementing legislation i.e. as a whole, including the machinery referred to this
declaration.

Place and date

Technical Responsible person

3 Product Overview

About this chapter

This chapter describes the product dimensions of the **TAE 030 /120/ N /E/ A** Air-conditioner with heat-exchanger, application, product nameplates, product features, technical parameters, working principle, duct design, control logic, communication protocols and user parameters, alarm and fault processing of information. It is required to strictly operate the unit according to this user manual.

3.1 Application

Important

- The product is designed for communication or related industrial equipment applications and design of high performance Air-conditioner with heat-exchanger , Please use the AC and DC power （Please refer to the nameplate）, The installation is the significance of the control cabinet (normal work to a closed state) of internal temperature control, The cabinet temperature control between 20 to 45 degrees Celsius, To ensure that the cabinet all thermal element can work normally, Play the best performance.
- Any damage caused by any other applications outside of the application object described above, Responsibility is not assumed.

Warning

- Transport: In the process of handling or transport of the product, do not overturn or tilt of the product excessively.
- Store: Don't open storage, or stored for a long time at high temperature @70℃, high humidity environment @RH 95%.
- Shutdown: If not using this product for a long time, please turn off the main power
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- If the power supply cord is damaged, it must be replaced by the manufacturer, or service agency or similarly qualified person in order to avoid a hazard.
- Don’t use the product under the condition of high oil, burning gas, explosive gas, strong corrosively condition area. Otherwise the product warrantee service is not been offered by manufacture.

3.2 Product features

- Double system integration,single power supply, reliability greatly improved, especially suitable for telecom outdoor cabinet;
- Remote measuring, remote communication, remote control, which can realize can realize

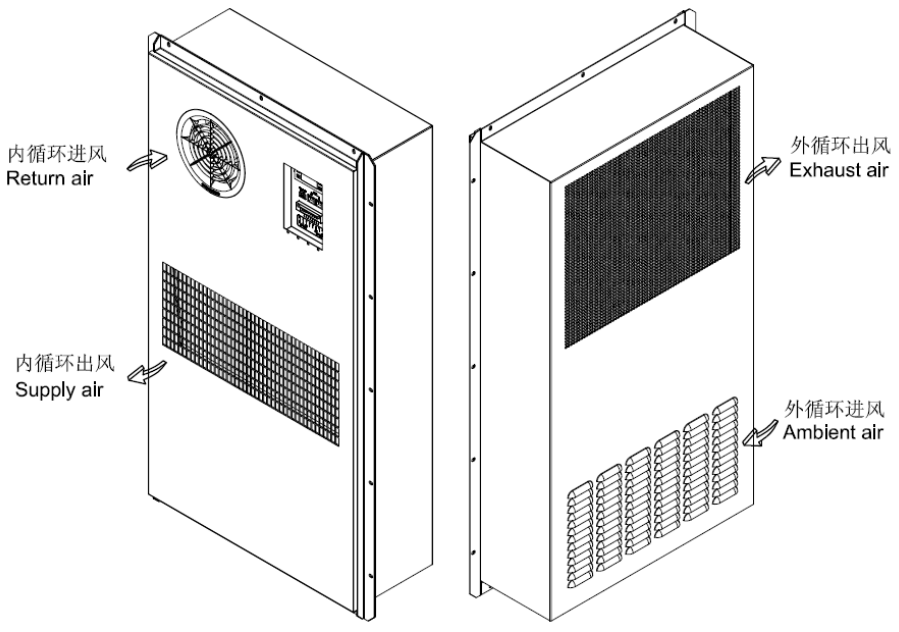
multiple automatic protection and comprehensive self-testing function;

- Two sets of system not only running independently but also can parallel work; heat transfer system can be the best use of natural cold source;
- Fit for T3 high temperature working condition by using of R134a refrigerant gas;
- Multiple self-protection design & visible monitoring interface, RS485 communication port (MODBUS-RTU protocol);
- DC Fan speed PWM control, low acoustic noise during low speed running.

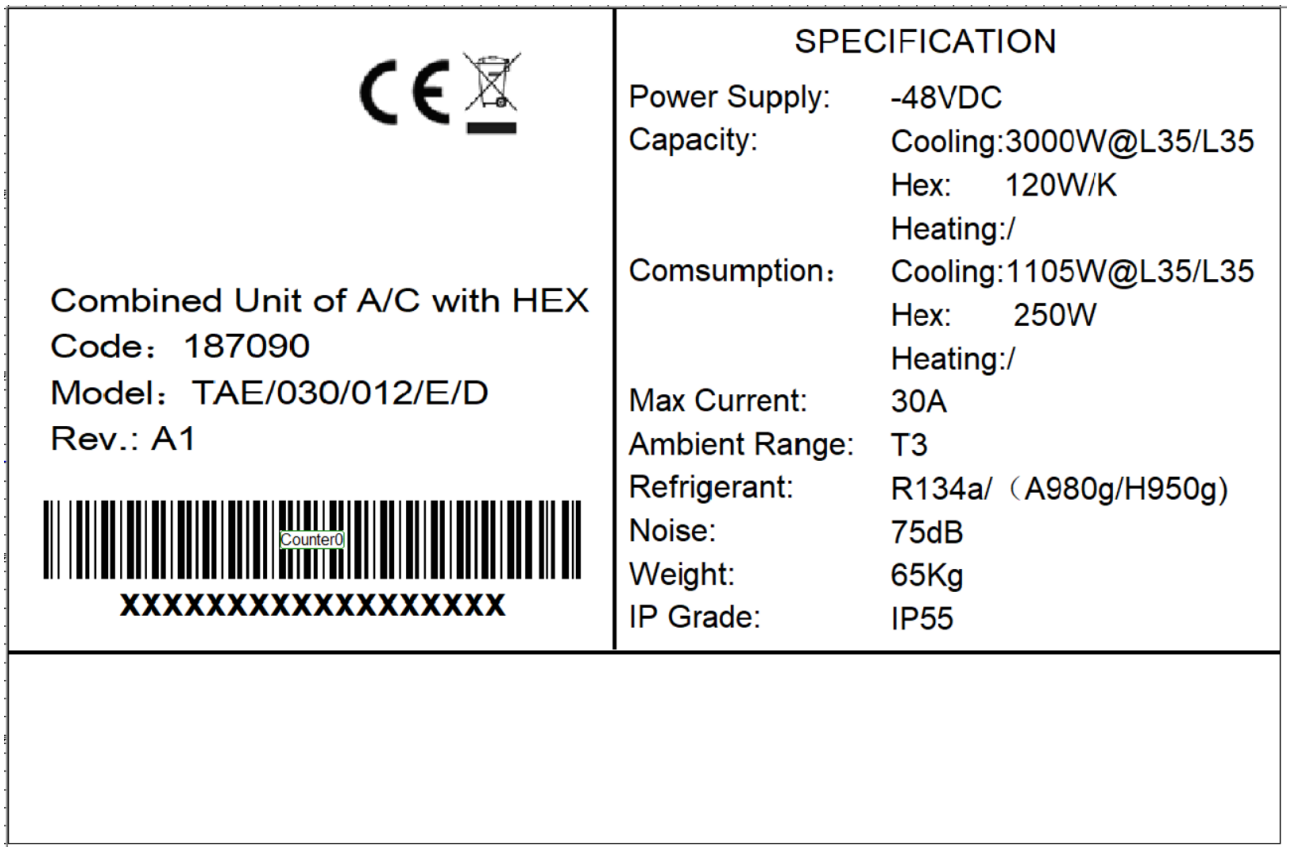
3.3 Working Principle

- The Air-conditioner with heat-exchanger using the compressor refrigeration; in the system of the working medium of phase change realize the heat transfer
- Main parts of the refrigeration: compressor, condenser, Capillary, an evaporator, internal fan, external fan
- Principle of refrigeration: Compressor suck refrigerant gas from evaporator, and compressed, the compressed refrigerant gas pushed into condenser to cooled into refrigerant liquid, then pass the expansive valve, the refrigerant into evaporator and evaporate to cool air.
- Heat transfer principle: when the room temperature higher than outdoor temperature, the refrigerant in the internal heat exchanger evaporating and absorbing heat, indoor temperature reduced. Then the refrigerant gas rose to the external heat exchanger condensed to liquid by ambient air, the condensate liquid returns to the internal heat exchanger, so circulation, to reduce indoor temperature purpose.

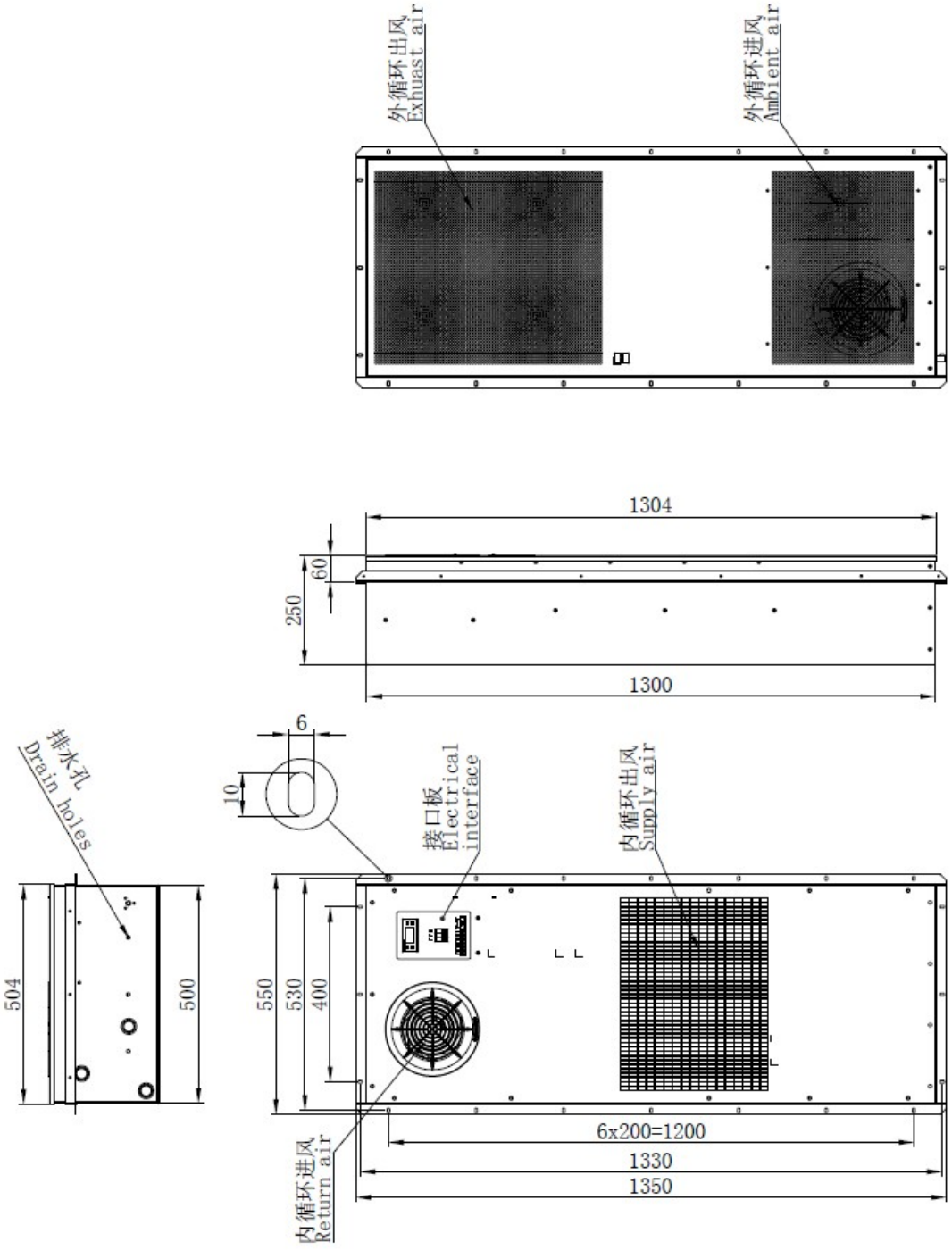
3.4 Air flow design



3.5 Product nameplate



3.6 Product dimensions



3.7 Technical parameters

3.8 Control logic

- Self-test

  The self-test procedure is as follows:

  First: Detection of Internal fan;

  Second: Detection of return air temperature sensor, ambient temperature sensor and condenser temperature sensor;

  The Third: Detection of external fan;

  The Forth: Detection of compressor.

  Note: Power on the switch, the product will not perform a self-test running program , and if setting F31 from 0 into 1 will perform self test.

  The normal work state of the system includes the state of standby, heat transfer, cooling and heating.

- Standby mode

If the return air temperature meets the condition of the Standby mode, the air conditioner runs into the standby operating state, At this point only the low speed fan inside.

- Heat Exchange mode

If the return air temperature meets the condition of the heat exchanger, The air conditioner runs into the heat exchange state, At this point the fan will change speed according to the delta temperature inside and outside cabinet.

- Cooling mode

If the return air temperature meets the cooling condition, the product will run into cooling, with internal fan and external fan full speed, compressor operated (Power is first exception).

3.9 User parameters

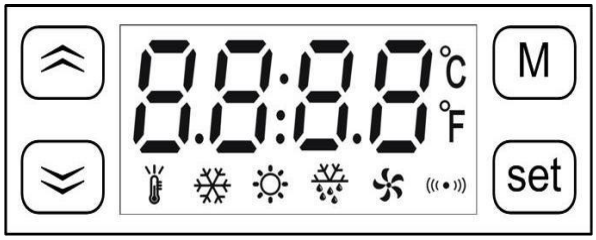
The user parameters are as follows:

Parameter name	Condition	Remark
Standby running temp.	＜35℃	

Heat exchange temp.	≥35℃	In and outer effective delta temp. ≥4℃
Cold start temp.	≥40.5℃	

3.10 Monitor operation

The interface of the monitor is as follows:



The definitions of the symbols from left to right are as follows:

Indicator	Definition	Light	Flicker
	Point setting	Setting mode	Self test
	Cooling	Cooling mode	Compressor Alarm
	External fan	External fan running mode	External fan Alarm
	Alarm	Alarm mode	NA

- **Show RPM of internal fan**

Under the return air temperature interface, press“▲” will show the RPM of internal fan ， press “M “,will show return air temperature back to main interface.

- **Show RPM of external fan**

Under the return air temperature interface, press“▼” will show the RPM of external fan ， press “M “,will show return air temperature back to main interface.

- **Show the current of compressor**

Under the return air temperature interface, press“▲” and “Set” will show the current of the compressor (A),press “M “,will show return air temperature back to main interface.

- **Show ambient temperature**

Under the return air temperature interface, press “Set” will show ambient temperature，press “M” will show return air temperature back to main interface.

- **Show condenser temperature**

Under the return air temperature interface, press“▼” and “Set” will show condenser temperature, press “M “ will show return air temperature back to main interface.

- **Controls parameter settings**

Long press "M" key for 5 seconds, enter the parameter setting mode, then display the code of parameters, with "▲ ▼" key to select the code of parameters, press "Set" button will display corresponding parameter values of the code, then re-use "▲ ▼" button can set the parameters, after finished the setting, press "Set "button, back to display states. During the setting mode, Press "M" key to exit the parameter setting mode, in the process of the parameter values setting by pressing "M" button that give up, but does not change the parameter value.

- **Code：**

Code	Meaning	Range	Default	Unit
*F28	/Communication address	1~255	1	
*F29	/High temperature alarm	35~100	55	℃
*F30	/Low temperature alarm	-45~25	-42	℃
*F42	/Cooling start/stop temperature	27-45	32	℃
*F43	/Cooling start/stop delta temp.	3-15	4	℃
*F45	/Heat exchange start temp.	20~35	25	℃
*F46	/Heat exchange stop delta temp.	1.5-15	3	℃

*F47	/heat exchange effective temp.	2~10	4	℃

3.11 Alarm and fault management

The monitor displays return air temperature at normally, If the alarms, temperature and alarm codes are displayed alternately, the alarm code as follows:

/Code	/Definition	
E01	Internal fan alarm	
E03	External fan alarm	
E05	Compressor alarm	
E07	Internal temperature sensor alarm	
E08	Condenser temperature sensor alarm	
E10	Low voltage alarm	
E11	High voltage alarm	
E13	System high pressure alarm	
E14	Low temperature alarm	
E15	High temperature alarm	
E22	External temperature sensor alarm	

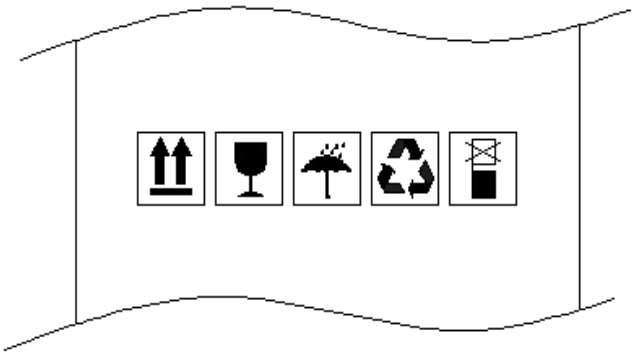
4 Packing and shipping

Air-conditioner with heat-exchanger packed in wooden cases (1pcs/box or 4pcs/box) with EPE protection pad. The package includes Annex（please see the packing list for detail accessory.

Warning

Air-conditioner with heat-exchanger during the transportation, please pay attention to the following matters

Figure4-1 Packing mark



- During Handling or transport, Air-condition with heat-exchanger must be upward placed as. No inverted, flat, excessive tilt and collision.
- Air-conditioner with heat-exchanger is precision instrument, in handling or transport process, should be handled with care, package boxes do not step, prohibit standing or placing other heavy objects.
- During Handling or transport, pay attention to moisture, water, rain.
- After opening the package, please check the products according to the packing list.

5 Installation

5.1 Structure installation

Please follow the below diagram of installation

Figure5-1 Installation diagram

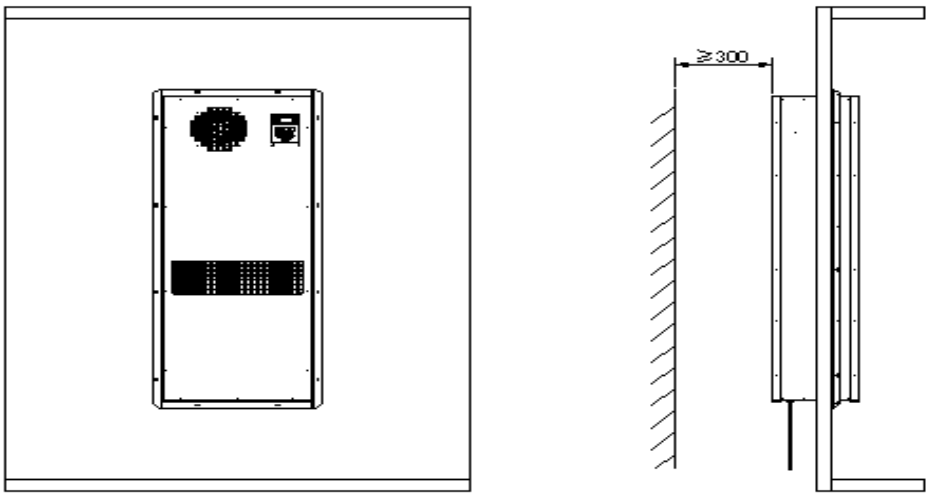
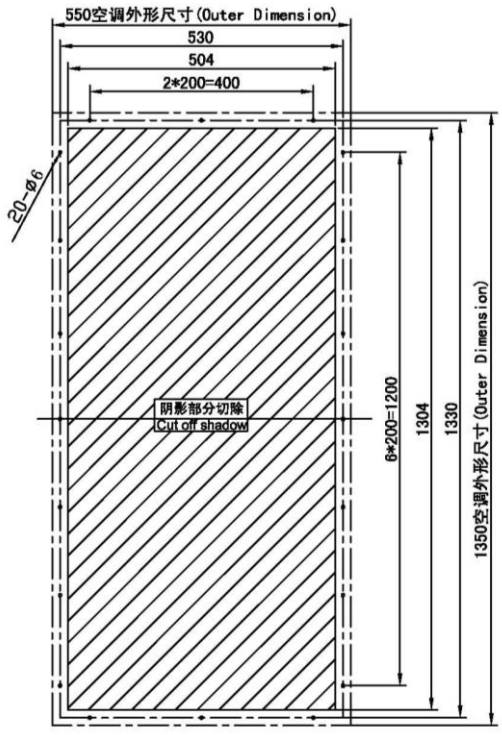


图 5-2 Figure5-2 Cutting diagram



- Installation steps:

1) Draw on the cabinet mounting cut-out map according to Figure 5-2;
2) Cut off the shadow part;
3) Removal of packaging box
4) Installed the Air-conditioner with heat-exchanger on the cabinet use screw, flat pad, spring pad, as Figure5-1
5) Connect drain pipe in the bottom of the unit to drainage system (to outside of shelter) ， the drainage pipe and pipe clip provided as accessories
6) Mount the out cover to the shelter---only side and half embedded needed. (The purpose of the out cover is prevent rain penetrate into the product also protection the product access from external side).

!! Note: the out cover is not a standard part of product, normally it is provided by an engineering company who install the product.

7) The mechanical part of installation is finished till now. please double check.

Important

- Double check lists

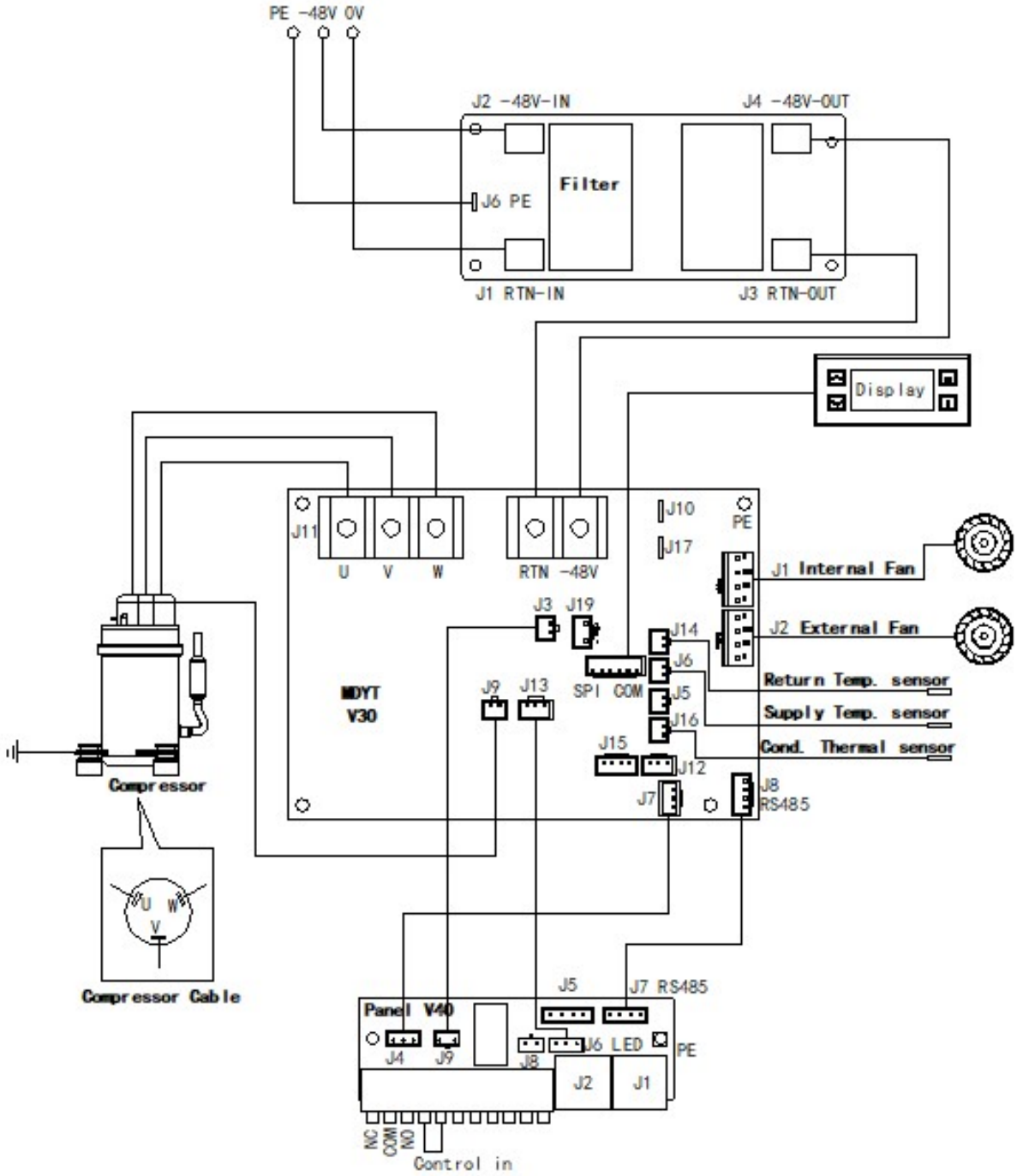
1） Don’t apply this unit in high oli, burning gas, explosive gas, strong corrosivity condition, the ambient air must be under 55℃, and the humidity not higher than 95%.

2）Make sure that the lean of the product less than 3°.

3）Make sure that the cabinet should be sealed well to avoid the cooling losing and avoid ambient moisture penetrate into cabinet, this will avoid produce more condensate water.

4）Doesn’t power on the unit immediately after finish the installation until the unit keep up stand for more than 30 min.

5.2 PCB wiring diagram



6 Pre-operational checks

After Air-conditioner with heat-exchanger installation and the electrical connection is completed, please check the following checklist:

Serial number	Check items
1	Ensure the screw is fastening
2	Ensure that there is enough space near the internal and external of the air condition
3	Power line to connect the right polarity Alarm signal cables are connected correctly
4	Using a multimeter to check the supply voltage, power supply voltage is normal, consistent with the requirements on the nameplate

Warning

When the air conditioner is running, if there is abnormal noise, vibration, please cut off power immediately and notify the professionals to inspect.

7 Maintenance and Warranty

7.1 Product maintenance

7.1.1 Prepare tools

Table7-1 Maintenance Tools

Number	Tools
1	Multimeter
2	Phillips screwdriver
3	Slotted screwdriver

7.1.2 Routine maintenance

Table7-2 Routine maintenance

NUM.	Check items	Check methods	Solution
1	Power line firm	1、Turn off the supply power 2、Pulled the power line，watch whether the line is loosening 3、Screw the screws on the power cable terminals with a screwdriver, watch whether the screw is loosening	If there is a power line looses, You should tie tightly power cable; with a screwdriver to the loose screw

NUM.	Check items	Check methods	Solution
2	Voltage Stability	Use the multimeter to measure Air-conditioner with heat-exchanger input voltage to watch whether the voltage is within normal range.	If the voltage is not within the normal range, Please turn off the power supply immediately. Power on the Air-conditioner with heat-exchanger until the supply voltage within normal range.
3	Screw firmly	Use scrowdriver to screw the screws and watch whether the screw is loosening	If the screw is loosening, please tighten it.
4	Cooling	Observation Air-conditioner with heat-exchanger cooling, when running one machine to see the display shows the current value of the compressor is normal.	1、If there is abnormal noise vibration. Please cut off power immediately and notify the professionals to inspect. 2、If it is alarm while self-test, please process As table7-3

7.1.3 Alarm handling method

Table 7-3 Alarm information

故障名称 Code Name	Principle	Process Method
Return air temperature sensor alarm	Return air temperature sensor is short circuit or open circuit	Check whether the return air temperature sensor is short circuit or open circuit.

Compressor current is too low	Compressor current is not within normal range	1、Check whether the compressor line is loosening 2、Compressor fault, please contact professional maintenance.
Compressor over-current	Compressor current is not within normal range	1、Check whether the condenser is dirty block. 2、Compressor fault, please contact professional maintenance.
Internal fan alarm	Internal fan current is not within normal range.	Check Whether the internal fan line is loosening.
External fan alarm	External fan current is not within normal range.	Check Whether the external fan line is loosening.
High temperature alarm	The cabinet temperature is higher than the set point.	Open the cabinet dorr until the alarm stop.

Supply voltage overload	Compressor current is not within normal range.	Turn off the power supply immediately. Use multimeter measure the voltage, power on the switch until the power supply within the normal range

7.1.4 Other fault analysis and treatment

Table7-4 other fault analysis and processing

Fault state	Analysis of the reasons	Solutions
Power on the switch ,the cabinet temperature is too high but the Air-conditioner with heat-exchanger is not working	1、Power failure or no power 2、The cooling set temperature is higher than the cabinet temperature 3、系统故障。 System fault	1、Check the power supply and the electric circuit 2、Setting cooling temperature according to the needs 3、Please contact professional maintenance.

The Air-conditioner with heat-exchanger is running but the cooling effect is not good	1、The cooling capacity of the Air-conditioner with heat-exchanger is not match with the load. 2、The ambience temperature is too high 3、Other system fault	1.To add or choose another Air-conditioner with heat-exchanger according to the load. 2.Ensure the machine is used in the correct range. 3.Please contact professional maintenance.
The machine is stopping suddenly ,and the electric system is normal	1.The cabinet temperature greater than or equal to the cooling set temperature. 2.Other system fault	1.Setting cooling temperature according to the needs 2.Please contact professional maintenance.

7.1.5 Spare parts list for AC and Hex

Serial NUM.	Name	Mode	Num.
1	internal fan	225 DC FAN	1
2	external fan	225 DC FAN	1
3	main control board	MDYT V30	1
4	compressor	BSG133SDFB7AT	1

7.2 Service and repair

- Warranty period

  The product guarantee period is 12 months from product up-running time or Max. 18 month from product delivery date.

- Warranty coverage

During the warranty period, all belong to the product itself quality problems caused by fault, the company will be free for you to repair; Household repair is required to provide the product label. But by any of the following causes the failure does not belong to our warranty.

1) Out of the Warranty period
2) Cannot provide the product label(the product label is on the nameplate);
3) Because of the abnormal condition or environment ,or the instructions specified in the inappropriate installation, maintenance or operation causes the fault;
4) Not caused by equipment failure, caused by user's other equipment or software.
5) User changed or disassembles by theirself, or maintained by the person without authorization.
6) Caused by force major such as fires, earthquakes, floods and other damage to the fault.

- Disclaim

The warranty is for the delivered products.

Irresponsible is for any loss that may be caused by equipment failure.

7.3 Environment Declarations

If service life ends or the product will never be used, do not dispose of it irresponsibly. Instead, submit it to a locally authorized waste collection cente