热交换器用户服务手册

Product No.: 12020

Table of Contents 目 录

1 CE declaration CE 声明

Declaration of Conformity

We herewith declare the following products:

Product No.: 12020

is in conformity with the following directives:

98 / 37 / EEC	Machine Directive	EN 292, Machine Safety
73 / 23 / EEC	Low Voltage Directive	EN 60 335-1, Low Voltage
89 / 336 / EEC	EMC-Directive	EN 60 335-2-40, Low Voltage
87 / 404 / EEC	Simple Pressure Vessels	EN 61000-6-1, 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:

2002/95/EC	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

2 Technical Data 技术参数

Model No.（型号）:	12020
Rated voltage AC // 交流额定电压	NA
Frequency AC // 交流频率	NA
Rated current AC // 交流额定电流	NA
Start-up current AC // 交流启动电流	NA
Rated voltage DC // 直流额定电压	- 48 V DC Nominal (- 38.4VDC ~ - 57.6 VDC)
Rated current DC // 直流额定电流	2.0A
Start-up current DC // 直流启动电流	2.4A
Dimensions(include flange) // 尺寸（包含法兰） Long mm // 长度 mm Width mm // 宽度 mm Depth mm // 深度 mm	 893.5 312 153
Installation type // 安装方式	Door inside mounted // 门装全内置式
Casing Material // 材料	AL5052+RAL 7035 powder painting//喷粉
Cooling capacity // 换热性能	40W/K
Heating // 加热能力	NA
Cold start function //冷启动功能	NA
Temperature range // 温度范围	-40°C ~ +65°C
Alarm connector // 告警接口	Photo coupler type ： 9-Pin AMP D-Sub Dry Switch type ： SUPU 475408/010
AC connector // 交流接口	NA
DC connector // 直流接口	SUPU 475408/010
Protection category (Ext. circuit / Int. circuit) // 防护等级(外侧 / 内侧)	IP55
Weight // 重量	15kg

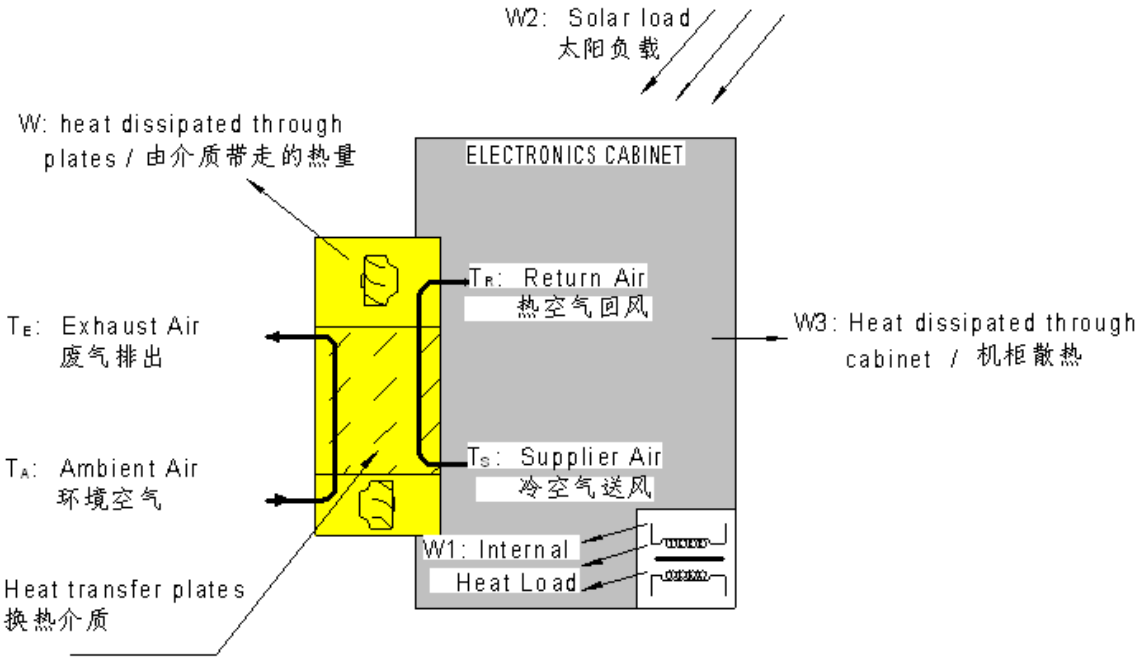
3 Environmental Adaptability 环境适应能力

The product is designed according ETS 300 – 193

产品设计符合 ETS 300 – 193

Items // 项目		Unit // 单位	Range // 范围
Temp. 温度	Long term Running 长时间工作	℃	-10 ～ +55
	Short term Running 短时间工作	℃	-40 ～ +65
Humidity 湿度	Long term Running 长时间工作	%RH	5～85
	Short term Running 短时间工作	%RH	5～95
Sea Level // 海拔高度		m	≤3000
Air Speed // 空气流速		m/s	≤5.0
Solar Radi // 太阳辐射		W/m^2	≤1120
Heat // 热能		W/m^2	≤600
Note: short term means 4 days continuous working or accumulated working time less 15 days within one year. 注：短时间是指连续工作 4 天或是一年累计工作天数少于 15 天。			

4 Working Principle 工作原理图



Heat exchanger is mostly used for enclosed area cooling, HEX is designed especially for mounting in a cabinet. The unit uses ambient air for temperature regulation so it must have access to ambient. The internal temperature of the enclosure is cooled via effective utilization of the ambient air. An air/air counter-current plate heat exchanger is used to transfer the heat. Two centrifugal fans, one for the internal circuit and one for the external circuit provide ventilation.

热交换器通常用在对密封区域的降温，此热交换器是专为机柜而设计的产品。热交换器因需要环境温度进行调节，因此需要有一个通道与外界相通。密闭的内部空气通过环境空气而实现冷却。内、外循环的离心风扇使空气产生对流，通过中间的换热装置实现热量的传递。

The heat exchanger module is designed in such a way that the speed of the external circuit fan is controlled according to temperature, based on the pre-set pattern.

热交换器的内风扇的风速是由温度控制的，是基于一个已调整好的模式而设计的。

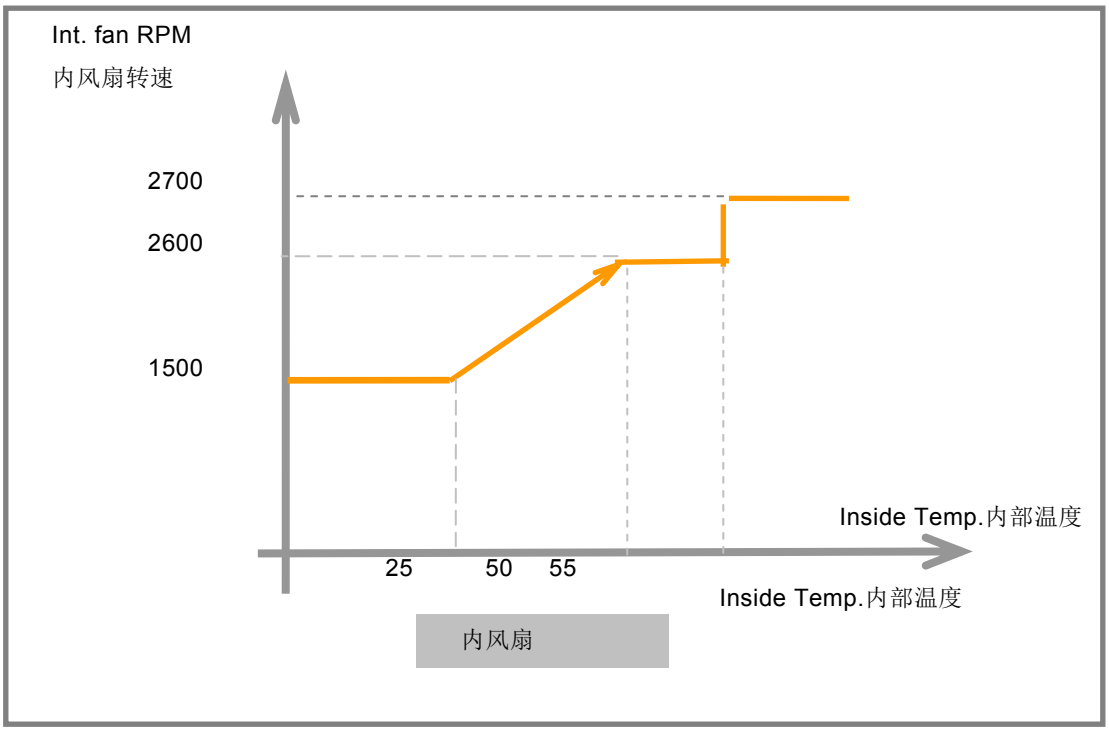
5 Functionality Introduction 功能介绍

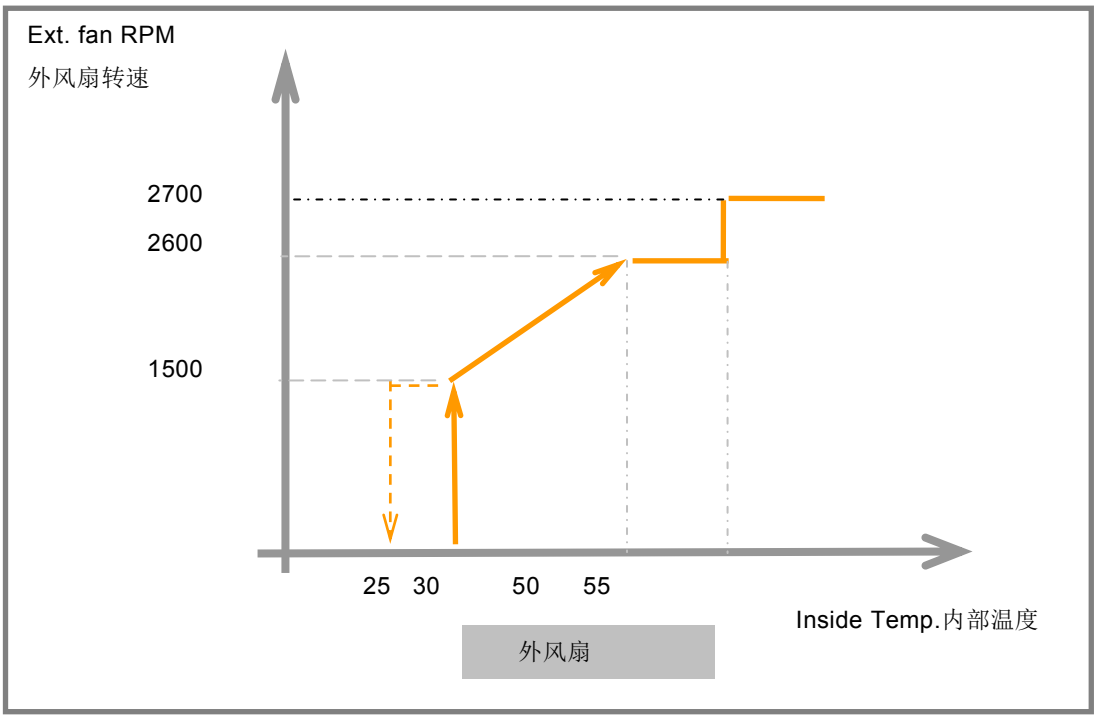
a) Power Supply 电源供电

The unit should be feed with 48V DC power source.

热交换器需48V DC供电。

b) Fan Speed vs. Cabinet inside temperature Curve 风扇转速 Vs. 机柜内部温度曲线





The fan speeds are monitored via the tacho output from the fans. This tacho signal is also used to generate a fan failure signal if deviation is more than -20%. The PWM carrier frequency is 1KHz.
风扇转速是通过风扇的调速装置来调节的，当转速偏差-20%以上时，这个调速装置会产生一个风扇失效信号。调速频率为1K赫兹。

c) HEX Start-up behaviour 热交换器上电自检顺序

After unit switch-on the temperature sensor will self test; then the external fan speed will accelerate continuously up to (R_{low}), then stop running, this will take about 15s; after that, internal fan will accelerate continuously up to (R_{low}), then stop running, this will take about another 15s. The controller will test whether unit get temperature sensor, fan failure. It will initiate alarming once any of them got problem. During testing process, the green LED will light in 3Hz speed, after self-testing finished, it will keep lighting. Red alarming LED will be on if alarming signal generated. Once self testing finished, then the unit will turn to normal operation.

Note: Self testing process will be conducted once “TEST” button been pressed continuously 5s on front control panel.

热交换器一旦上电，传感器将自检；然后是外风机将启动运行自检，然后停止，预计持续 15 秒；之后是内风机启动自检，然后停止，预计持续 15秒。通过自检过程，控制单元判断是否有传感器、风扇故障；自检过程中绿色LED 以3Hz 频闪，自检结束后如有故障，红色LED 灯将长亮，告警；无故障，绿灯常亮，正常运行。

注：自检过程可以通过长按控制面板上的“TEST”键5秒来实现。

d) Alarm 告警

All components failure will be detected through 9 Pin Sub-D ports.
当热交换器中相关零部件失效就会产生告警，告警信号可通过9 针的接口查询。

- NO type Alarm NO型报警

Alarming type: ***normally open***, Photo coupler type.

Unit Alarm will be activated when component failure happen, the red LED light at the same time. For example, the internal fan alarm, the external fan alarm, as well as temperature alarm. The alarm can output through alarming cable that connection customer monitor unit and HEX.

告警方式： 正常断开，光耦隔离输出。

如果任何一个零件故障，如内风扇告警或外风扇告警或温度告警，都会产生系统告警,同时红灯亮。激活的报警信号会通过连接客户监控后台和热交换器之间的告警线输出。

Alarm definition 报警定义:

No.	Pin Number	Name	Alarm definition	Notes
1	Pin 1	T/R＋	RS485 communication port A	
2	Pin 2	T/R－	RS485 communication port B	
3	Pin 3	GND	Signal GND of Control system	
4	Pin 4	ALARM1	Chief Alarm	
5	Pin 5	ALARM2	Internal fan Alarm	
6	Pin 6	ALARM3	External fan Alarm	
7	Pin 7	ALARM4	Heater Alarm	NA
8	Pin 8	ALARM5	Temperature Alarm 80 & 00 degree	
9	Pin 9	ALARM-COM	Alarm signal common port	.

- Relay of no polarity dry switch function 无极性干节点继电器功能

  Function 1: NO type Alarm

  Alarming type: ***normally open***, no polarity dry switch type.

  The alarm type is only for chief alarm, it is can not know which component failure happen when alarm is activated.

  功能1：NO型报警

  告警方式： 正常打开，无极性干结点继电器隔离型输出。

  此报警方式仅用于总告警，报警时不能明确具体的失效零件类别，通过一个继电器输出。

  Function 2: The relay can be feed with loads, but the load should meet the following requests:

  1. Max. Voltage : 250VAC / 220VDC
  2. Max.Power:45VA / 45W
  3. Max. load current:2 A

  功能2：继电器可以带负载，但负载需同时满足下列条件：

  1. 最大电压：250VAC / 220VDC
  2. 最大功率：45VA / 45W
  3. 最大负载电流：2 A

e) Monitoring 监控

The unit can be monitored by software through RS485 port, just get connect with 9 Pin Sub-D. Please consult to the manufacture for more information.

热交换器可通过软件监控，只需连接RS485 接口 和9 Pin Sub-D 的接口。请联系厂商以获取更多的信息。

f) Lighting 指示灯

There are two LEDs on control board, see below definition:

在控制板上有两种颜色的指示灯，请参考以下的定义：

LED	Label 标签	Color 颜色	Status 状态		Definition 定义
Power indicator LED 电源指示灯	Run 运行	Green 绿色	on		Normal operation // 正常运行
			3 Hz lighting		Self testing // 自检
			Off // 关		No power feed // 无电源供给
Alarming Indicator LED 告警指示灯	Alarm 告警	Red 红色	Off // 关		No alarm // 无告警
			On // 开	Lighting times // 闪烁次数	
				1 times	INT.Fan defected // 内风扇故障
				3 times	EXT.Fan defected // 外风扇故障
				5 times	Temperature sensor defected // 温度传感器故障
				9 times	High temperature alarming // 高温报警
				10 times	Low temperature alarming // 低温报警

Note:

The lighting times of alarming indicator describe on the above form is means:

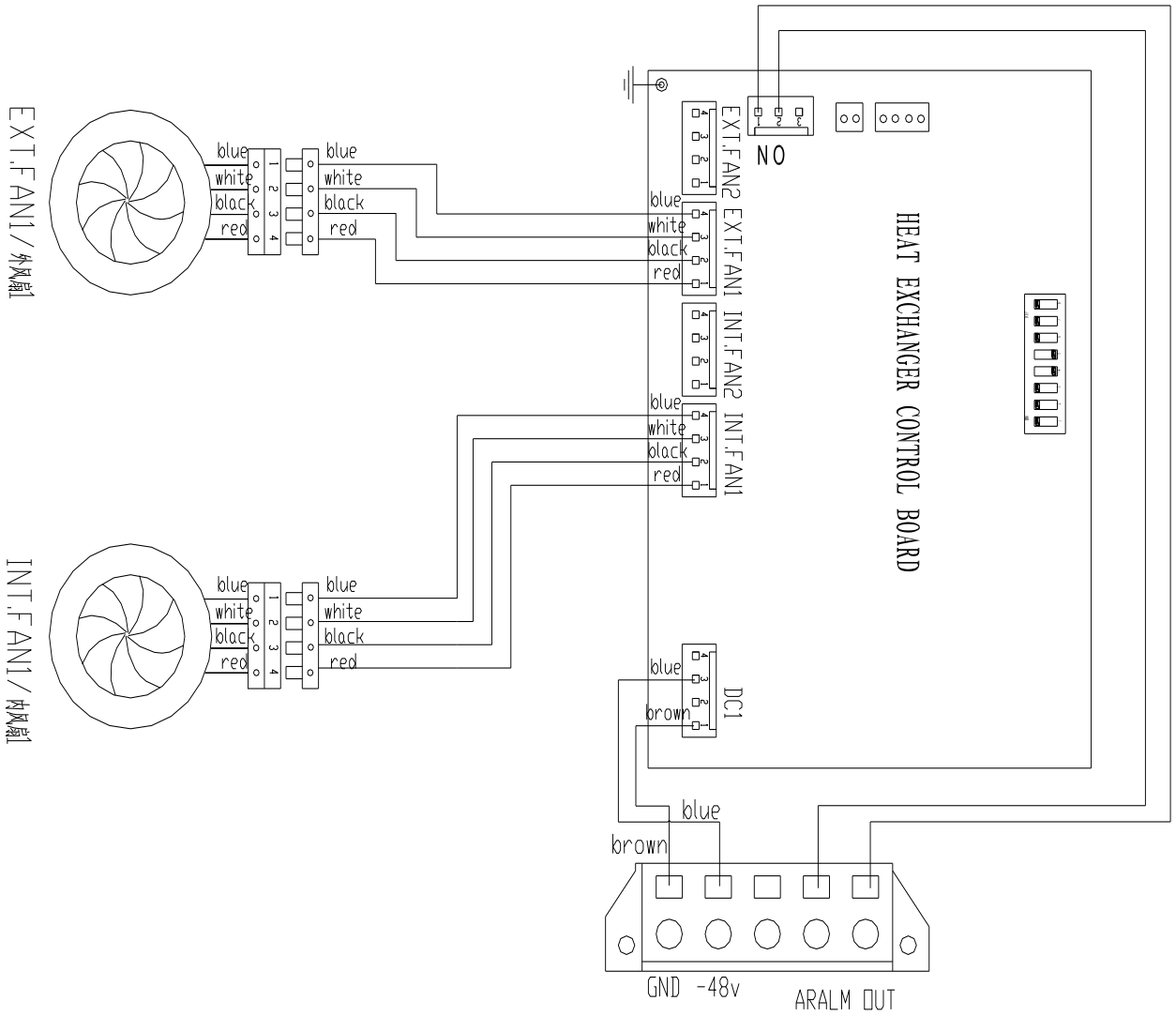
To 3HZ frequency, separated in time 2S consecutive flashes.

备注：

在上述表格中描述的告警指示灯闪烁次数定义为：以 3HZ 的频次，在 2S 的时间间隔后连续闪烁的次数。

6 Interface Introduction 界面说明

a) Electrical Interface – Circuit diagram as below 电路板线路图



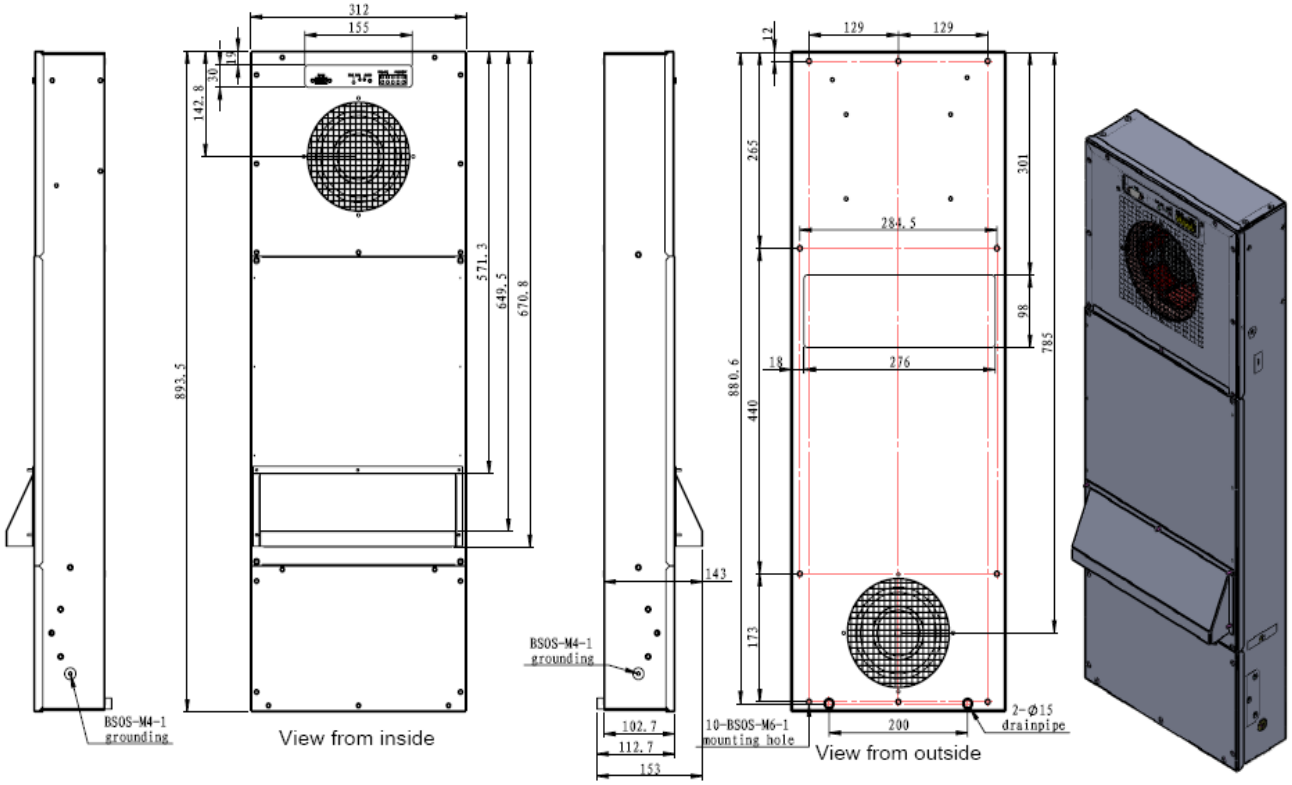
b) Power Input 电源

Below size circuit breakers are suggested to install before unit:

建议在使用热交换器之前安装以下规格的断路器：

Fuse	12020
DC fuse	> = 12 Amps

c) Mechanical Interface 安装界面



7 Preventative Maintenance 预防性维护

It is recommended to perform preventive maintenance on the unit twice a year (depends on the location of the site and the nearby surroundings) and the following should be done:

建议热交换器的预防维护一年两次（取决于当地的地理位置和周围的环境），需完成以下几点：

1. Listen to the fans while in operation. The sound should be constant and with very little fluctuation otherwise the fans are out of balance and should be replaced;
   风扇运行时听风扇的声音。声音应该连续且有轻微的波动，否则风扇就失去平衡需要更换；
2. Switch all the circuit breakers related to the climate unit off;
   关闭与热交换器连接的所有线路；
3. Remove the internal and external fan;
   拆除内、外风扇；
4. Clean the blades of both fans using a brush, compressed air and a vacuum cleaner;
   用毛刷、压缩空气和真空吸尘器清洁风扇的叶片；
5. Clean the heat transfer core using a small brush, compressed air and a vacuum cleaner, the air pressure should less than 0.5bar;
   使用小型毛刷、压缩空气和真空吸尘器清洁换热芯片，压缩空气的压力需小于 0.5bar；
6. Mount the fans back again;

将风扇装好；

7. Switch the unit ON again. Once self testing finished, then the green LED on, the red LED off, the unit turn to normal operation.

将开关闭合。自检完成后，绿灯常亮，红灯不亮，热交换器正常运行。

8. Finish.

结束。

8 Replacing of Components 零部件的替换

Note : Make sure that all circuit breakers related to the climate unit are switched off before you start.

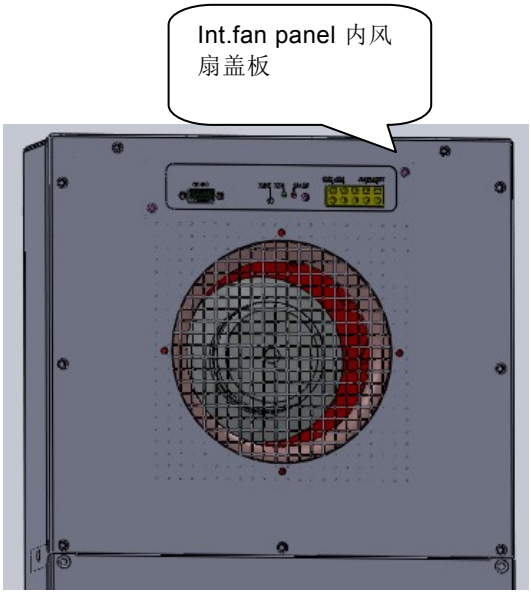
备注：更换之前确保与换热器相连的所有线路断开。

10.1 How to replace the internal fan 如何替换内风扇

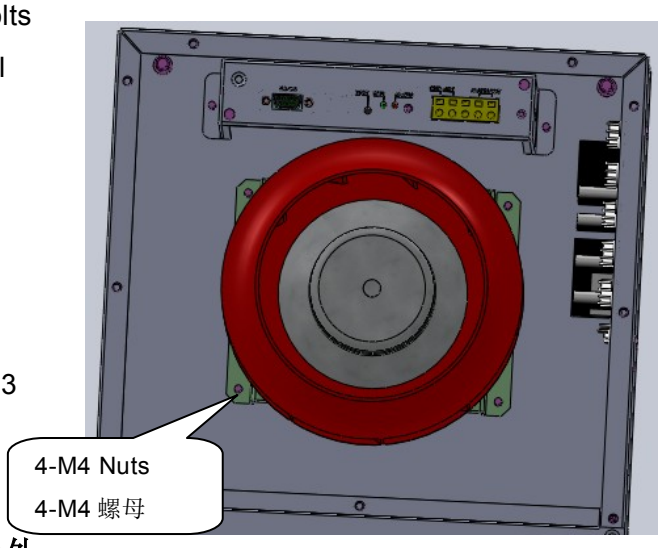
Before you start make sure that you have the following available:

在更换之前请确保您有以下工具和设备：

- ✓ Cross screwdriver of M4，sleeve of M4；
  M4 十字头螺丝起子，M4 套筒；
- ✓ A new fan (insure the same type)
  一个新的风扇（确保相同的型号）



1. Unscrew the M4 bolts placed on the panel, remove the panel;
   去掉盖板上的螺钉，将盖板移除；
2. Unplug the fan connector，unscrew the M6 bolts on the fan fixed board, then remove the panel subassembly;
   拔掉风扇端子，卸掉风扇座上的螺母，然后将组件拆除；
3. Disassemble the fan from the subassembly;
   将风扇从风扇组件上拆除；
4. Mount the new fan by following step 1 、2and 3 in reverse order.
   按照 1-3 的相反步骤安装新的风扇。

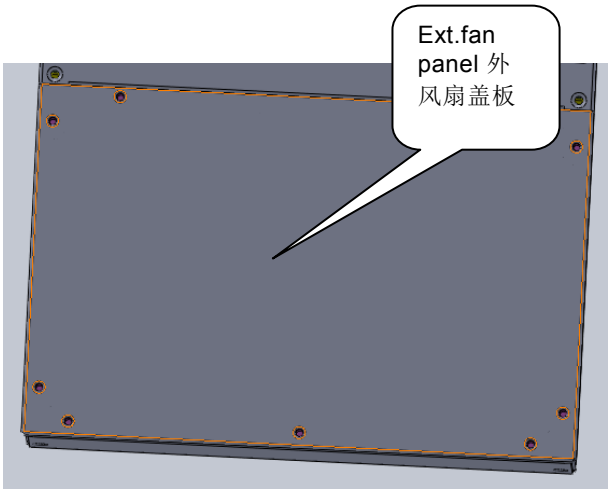


10.2 How to replace the external fan 如何替换外风扇

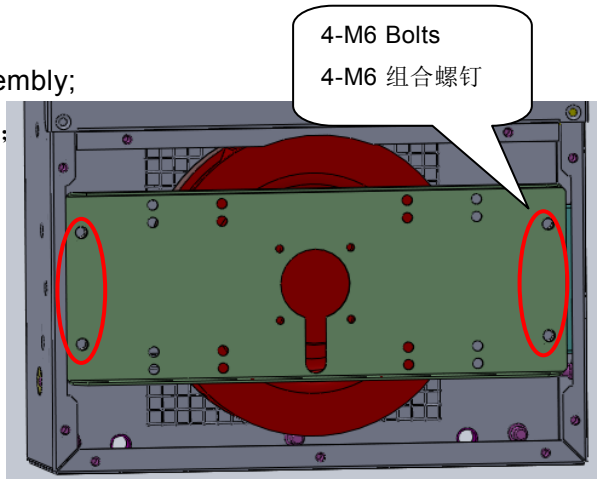
Before you start make sure that you have the following available:

在更换之前请确保您有以下工具和设备：

- ✓ Cross screwdriver of M4&M6 M4&M6 十字头螺丝起子
- ✓ A new fan (insure the same type) 一个新的风扇（确保型号相同）



1. Unscrew the M4 bolts placed on the panel, then remove the panel; (see below pictures)
   去掉盖板上的螺钉，将盖板拆除；
2. Unscrew the M6 bolts on the fan fixed board, unplug the fan connector, then remove the subassembly;
   卸掉风扇座上的螺钉，拔掉风扇端子，然后将组件拆除；
3. Disassemble the fan from the subassembly;
   将风扇从组件上拆除；
4. Mount the new fan by following step 1 、2 and 3 in reverse order.
   按照 1-3 的相反步骤更换新的风扇。

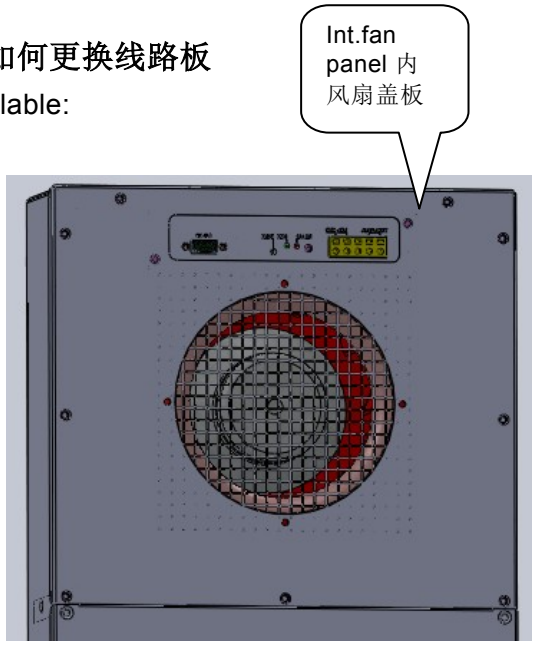


10.3 How to replace the PCB- Printed Circuit Board 如何更换线路板

Before you start make sure that you have the following available:

在更换之前确保您有以下工具和设备：

- ✓ Cross screwdriver of M3&M4, sleeve of M4; M3&M4 十字头螺丝起子 ， M4 套筒；
- ✓ A new circuit board (insure the same type) 一个新的线路板（确保型号相同）



1. Unscrew the M4 bolts placed on the Int.fan panel, then remove the panel; (see below pictures);
   去掉内风扇盖板上的螺钉，将盖板拆除；
2. Unscrew the M6 bolts on the fan fixed board, unplug the internal fan connector, then remove the subassembly;
   卸掉内循环风扇座上的螺母，拔掉风扇端子，然后将组件拆除；

3. Unplug all the connectors on the circuit board and then remove the subassembly from the unit;

断开线路板上所有的端子，将线路板组件拆除；

4. Disassemble the circuit board from the subassembly;

将线路板从组件上拆除；

5. Mount the new circuit board by following step 1、2、3 and 4 in reverse order.

按照 1-4 的相反的步骤更换线路板。