MP RT II 1-3K

Service manual

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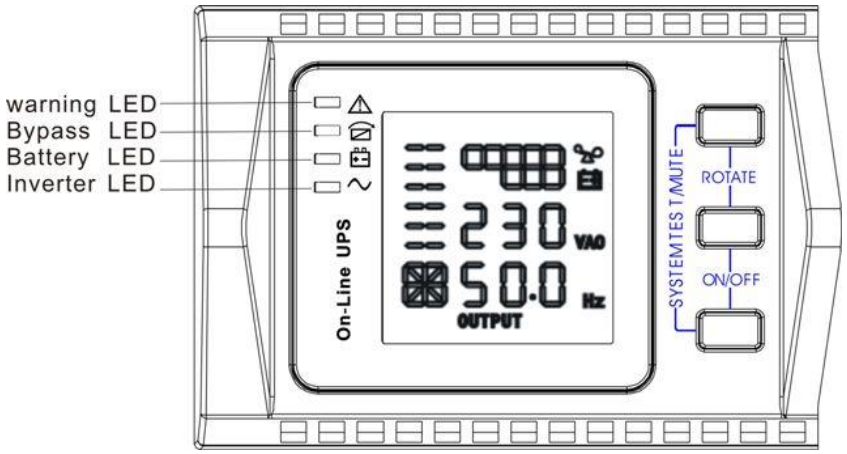
1 Product Introduction 产品介绍

1.1 Front Panel Explanation 前面板说明

1.1.1 LCD Explanation 显示屏说明



UPS Control Panel UPS 控制面板

Indicator 指示灯	Description 描述
Red 红	On 开 The UPS has an active alarm or fault. UPS 实时警报或故障显示。
Yellow 黄	On 开 The UPS is in Bypass mode. UPS 处于旁路模式 The UPS is operating normally on bypass during High efficiency operation. UPS 在高效率运行时处旁路正常工作模式。
Yellow 黄	On 开 The UPS is in Battery mode. UPS 处于电池模式。
Green 绿	On 开 The UPS is operating normally. UPS 正常工作。
NOTE When power on or startup , these indicators will turn on and off sequentially. NOTE On different operation modes , these indicators will indicate differently. Refer to Table 7. 注意：当上电或重启时,这些指示灯将循环点亮和熄灭。 注意：不同的操作模式下,这些指标灯显示也会有所不同。参阅表 7。	

1.1.2 Button function 按钮功能

Button 按钮	Function description 功能描述

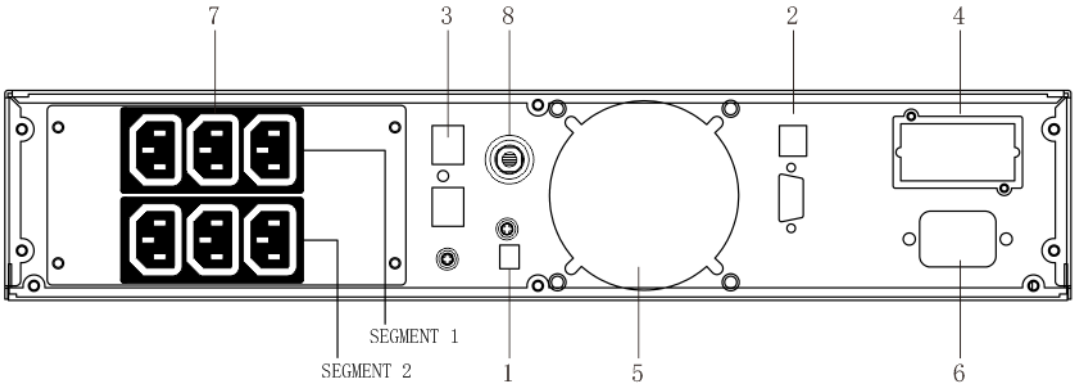
Start up combination(+) 开启组合键	Press and hold this key for more than half a second to turn on the UPS or to turn off the UPS. 持续按键半秒以上，UPS 启动或关闭.
combination (+) 转换组合键	Press and hold this key for more than 2 seconds to rotate LCD in any mode. 在任意模式下长按 2 秒以上则执行 LCD 旋转动作。
Battery test/Mute combination (+) 电池 自检/静音组合键	Press and hold the key for more than 1 second in Line mode or economic(ECO) mode: UPS runs self-test function. Press and hold the key for more than 1 second in battery mode: UPS runs mute function. 市电模式或 ECO 模式下持续按键 1 秒以上：UPS 启动自检功能. 电池模式下持续按键 1 秒以上：UPS 启动静音功能
Scroll (or)	Non-function setting mode: 非功能设置模式 Press and hold the key for more than half a second (less than 2 seconds): Indicate the items of the LCD item section orderly. Press and hold this key for more than 2 seconds: Circularly and orderly display the items every 2 seconds, when press and hold the key for some time again, it will turn to output status. Function setting mode: Press and hold the key for more than half a second (less than 2 seconds): Select the set option. 持续按键半秒以上（2 秒内）:有序显示 LCD 各项内容。持续按键 2 秒以上 :每 2 秒循环有序显示内容。当再持续按键一段时间，将转向输出状态。 功能设置模式: 持续按键半秒以上（2 秒内）:选择设置选项。
Setting entry ( ) 设置进入	Non-function setting mode:非功能设置模式 Press and hold the key for more than 2 seconds: Function setting interface. Function setting mode: Press and hold the key for more than half a second (less than 2 seconds): Affirm the set option. Press and hold the key for more than 2 seconds, exit from this function setting interface. 持续按键 2 秒以上:功能设置界面 功能设置模式： 持续按键半秒以上（2 秒内）：确认设置选项 持续按键 2 秒以上:退出此功能设置界面

1.1.3 Error code Explanation 故障代码解析

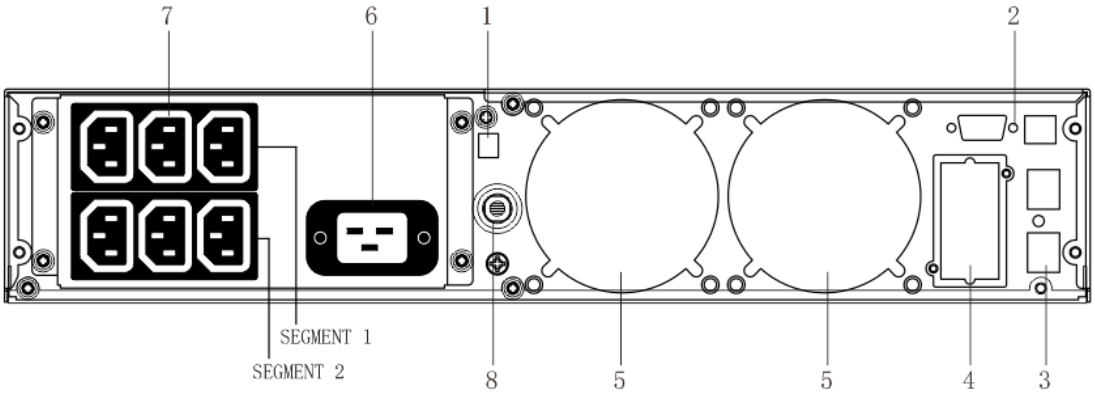
Fault Kind	Fault type	Operating Mode before fault				
		Byp	Line	Bat	BatTest	Eco

		Mode	Mode	Mode	Mode	Mode
Bus Fault	P Bus High		05	01	40	80
	N Bug High		25	21	41	81
	P Bus Low		35	31	70	90
	N Bus Low		55	51	71	91
	Bus unbalance		82	83	84	85
	Soft fail	62				
Inv Fault	High		04	24	42	86
	Low		14	34	52	96
	Soft fail	63				
	Bus discharge fail	61				
Over Heat		33	06	08	43	53
INV short			16	02	44	73
OverLoad			03	09	45	65
Fan Fault		36	28	38	46	66
Charger Fault		07	17			27
Bat Over		11	12			13

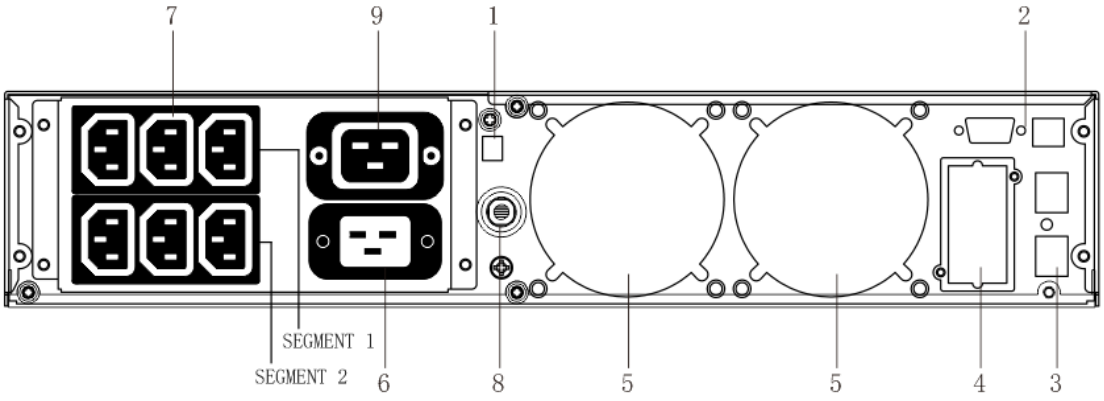
1.2 Rear Panel Explanation 后面板说明



1/1.5KVA



2KVA



3KVA

1.Emergency Power Off (EPO) 紧急切断电源
2.RS232 and USB Port RS232 and USB 接口
3.RJ45 Port RJ45 网络浪涌保护接口
4.Communication Card Options Slot 通讯卡可选插槽
5.External Battery Connector 风扇
6.AC power connection socket AC 电源插座
7.Two programmable outlets 两个可编程接口
8.Breaker 断路器
9.High current Outlets 大电流输出座

1.3 Customer Options Slot 用户可选插槽

The UPS is equipped with EPO dry contacts input, true RS232 and USB Communication port as standard to provide communication with bundled UPS monitoring software for remote monitoring of UPS status via PC.
There are 4 other optional interface cards available to meet various communication needs, i.e. dry contact relay card and SNRT/WEB card
UPS 配有 EPO 干接点输入,标准的 RS232 和 USB
标准通讯接口提供信息给 UPS 绑定的监控软件，通过计算机远程监控 UPS 状态。
其它四种选择界面卡可用来满足不同的通讯需求,即干接点卡和 SNRT /网络卡
All the communication ports (including optional cards) can be active & use simultaneously to monitor the UPS status. However only 1 communication interface at any one time with the highest priority has the ability to command & control the UPS. The priority of these communication interfaces are as follow:
Highest Priority (in descending order),
所有的通信端口(包括选项卡)都可用于监控UPS状态。然而只有一个通信界面可在任何一时间有最高优先命令和控制UPS。这些通信接口的优先级别如下:
最高优先(降序排列),
1) EPO input port EPO输入槽
2) Optional Interface card 选项接口卡
3) USB
4) RS232

1.3.1 RS232 and USB Communication Ports RS232 and USB 通讯端口

The UPS has serial communication capabilities through the USB and RS232 communication ports or through a connectivity card in the

available communication bay. The UPS supports two serial communication devices according to the following table:

通过USB和RS232通信端口或者通过一个能有效通信的连接卡，UPS具备串行通信的能力。UPS据下表支持两种串行通讯设备:

Independent	Multiplexed	
Communication Bay	**USB**	**RS-232**
Any connectivity card	Available	Not in use
Any connectivity card	Not in use	Available

NOTE : *The communication speed of the RS232 port is fixed at 2400 bps.*

注：RS232 的通讯速度固定在 2400bps.

To establish communication between the UPS and a computer, connect your computer to one of the UPS communication ports using an appropriate communication cable (not supplied). See Figure 18 for the communication port locations.

为了让UPS和电脑之间建立通讯,需使用合适的通讯电缆(不提供)将你的计算机与UPS的一个通讯端口连接。通信端口所在位置请见图18。

When the communication cable is installed, power management software can exchange data with the UPS. The software polls the UPS for detailed information on the status of the power environment. If a power emergency occurs, the software initiates the saving of all data and an orderly shutdown of the equipment. The cable pins for the RS-232 communication port are identified in Figure 19, and the pin functions are described in Table 9.

当通信电缆安装好后,电源管理软件可与 UPS 交换数据。系统软件为 UPS 提供电力环境状态的详细信息。如果遇到电力应急的发生,软件开启，保存所有的数据，并有序关闭设备。RS - 232 通讯接口如图 19 所示,引线功能表详见表 9。

RS-232 Communication Port (DB-9 Connector)

RS-232 通讯端口 (DB-9 连接器)

Table 1 . RS-232 Communication Port Pin Assignment

表 1 RS-232 通讯端口引线分配

Pin Number 引线号	Function Definition 功能解析	Direction from the UPS 从 UPS 指向
1、4、6、7、8、9	No use 无用	- -
2	R×D(Transmit to external device) R×D(从外部设备传送)	Out 出
3	TxD(Receive from external device) TxD(从外部设备接收)	In 入
5	GND(Signal common) GND(信号公共)	- -

1.3.2 Emergency Power-off 紧急切断电源

EPO is used to shut down the UPS from a distance. This feature can be used for shutting down the load and the UPS by thermal relay, for instance in the event of room over teRTerature. When EPO is activated, the UPS shuts down the output and all its power converters immediately. The UPS remains on to alarm the fault.
EPO 用于远程关闭 UPS。如发生房间过热 ,这个功能可用于通过热继电器关闭负载和 UPS。当 EPO 被激活,UPS 立即关闭输出和其所有电源转换器。UPS 仍显示故障警报。

WARNING 警告

The EPO circuit is an IEC 60950 safety extra low voltage (SELV) circuit. This circuit must be separated from any hazardous voltage circuits by reinforced insulation.
EPO断路器是一个符合IEC60950安全标准的额外低电压（SELV）断路器。。该断路器与其它电路(含危险电压)需采用加强绝缘隔离。

CAUTION 小心

● The EPO must not be connected to any utility connected circuits. Reinforced insulation to the utility is required. The EPO switch must have a minimum rating of 24 Vdc and 20 mA and be a dedicated latching-type switch not tied into another circuit. The EPO signal must remain active for at least 250 ms for proper operation.

EPO禁止与其它任何功能电路直接连接 ,电气上彼此必须采用加强绝缘隔离。EPO开关是一个最小额定值为24Vdc和20mA等级的专用锁式开关，不与其它电路连接或相关。为可靠运行 ,EPO信号必须有效保持250ms。

● To ensure the UPS stops supplying power to the load during any mode of operation, the input power must be disconnected from the UPS when the emergency power-off function is activated.

当紧急断电功能被激活时，为确保UPS在任何运行模式下停止供电给负载。，输入电源必须脱离UPS。

NOTE For Europe, the emergency switch requirements are detailed in Harmonized document HD-384-48 S1, "Electrical Installation of the Buildings, Part 4: Protection for Safety Chapter 46: Isolation and Switching."

*注：*对欧洲而言，紧急开关的要求在统一文件HD-384 - 48 S1里有详细描述，"建筑电气安装,第4部分:安全防护，第46章，隔离和开关。"

EPO Connections EPO连接			
Wire Function 线功能		Terminal Wire Size Rating 端子线大小等级	Suggested Wire Size 建议线尺寸
EPO	L1 L2	4–0.32 mm2 (12–22 AWG)	0.82 mm2 (18 AWG)

NOTE Leave the EPO connector installed onto the EPO port of the UPS even if the EPO function is not needed.

注 即使 EPO 功能用不到 ,也要让 EPO 连接器安装在 UPS 的 EPO 端口上。

EPO Connections EPO 连接器连接件原理图。

You can set the EPO polarity..
您可设置EPO正负极。

NOTE Depending on user configuration, the pins must be shorted or opened to keep the UPS running. To restart the UPS, reconnect (re-open) the EPO connector pins and turn on the UPS manually. Maximum resistance in the shorted loop is 10 ohm.

NOTE Always test the EPO function before applying your critical load to avoid accidental load loss.

注： 根据用户需求,连接脚必须短路或开路，以保持 UPS 正常运行。重启 UPS,重新连接（断开）EPO 连接脚，手动打开 UPS。短路中最大电阻为 10 欧姆。

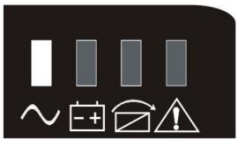
注：在你临界负荷启用之前，要一直测试 EPO 功能，以避免受到意外负载损耗。

2 Installation and Operation 安装和操作

2.1 Operation Mode 操作模式

2.1.1 AC mode 市电模式

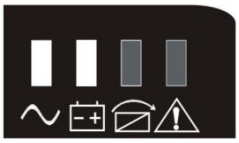
LED indications in line mode are as follows: the inverter green LED is on.
市电模式下运行时 LED 的指示如下图所示：逆变灯 LED 绿灯长亮



When input AC mains is in line with the working conditions, UPS will work in line mode. UPS will monitor and charge batteries and protect your equipment
当输入市电符合 UPS 的工作条件时，UPS 工作在市电模式下。UPS 监控并对电池充电，并保护您的设备。

2.2 Battery mode 电池模式

LED indications in battery mode are as follows: both the inverter green LED and battery yellow LED are on, the buzzer beeps once every 4 seconds. The warning red LED is on when beeping.
电池模式下运行时 LED 的指示如下图所示：逆变灯 LED 绿灯长亮和电池灯 LED 黄灯长亮，蜂鸣器报警四秒一鸣，报警的同时报警灯 LED 红灯亮



When the mains power down or instable, The UPS will turn to battery mode at once.
When recovering the mains power, UPS will turn to line mode and charge batteries.
If low battery volume in battery mode, indications flash. Audible alarm beeps every 1 second and LCD flash.
市电断电或市电不稳时，UPS 立即转到电池模式。
当市电恢复时，UPS 转移到市电模式运行，同时对电池充电。
如果电池容量变低，而在电池模式下，指示灯闪烁，声音警报声每秒一次，同时 LCD 上图标闪烁。

If battery voltage is approaching to power-off point, UPS will be turned off . OFF points are varied with the loads.
如果电池电压低到关机点，UPS 关闭机器。关机点会根据负载点不同而不同。

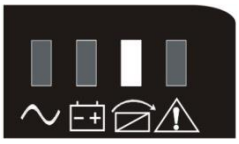
Note: UPS power time depends on the EBP numbers and load. The estimated time displaying on the LCD is similar with the actual stop time, but may have obvious difference.
注意： UPS 供电时间随负载和 EBP 的数量而定，LCD 显示上的放电时间是近似的，与实

际停机时间可能会有明显的不同。
When mains power resumes for low battery voltage, UPS will auto-restart.
电池电压低关机后当市电恢复，UPS 将自动重新启动。

2.2.1 Bypass mode 旁路模式

LED indications in bypass mode are as follows:

旁路模式下运行的 LED 指示如下图所示：



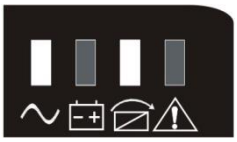
By-pass yellow LED is on, the buzzer beeps once every 2 minutes. The warning red LED is on when beeping. LCD displays are according to the exact load and battery capacity.
旁路灯 LED 黄灯亮,蜂鸣器报警两分一鸣，报警的同时报警灯 LED 红灯亮，LCD 屏幕显示根据负载大小及电池容量而定。

By-pass input range can be set on the front panel. Please refer to manual.
旁路输入范围可由前面板设置，参考用户手册。
UPS can transfer to bypass mode in below conditions:
以下情况，UPS 转换到旁路模式：
●Users can active bypass mode by front panel. 用户可通过前面板激活旁路模式。
●UPS is off when the line power is on and bypass output is active. 当 UPS 在上市电未开机同时旁路输出启用的情况下。
●Overload in line mode or ECO mode. 市电模式或 ECO 模式过载时。

Note: When UPS is working in by-pass mode, it has no backup function.
注意：旁路模式不具备后备的功能。

2.2.2 ECO mode ECO 模式

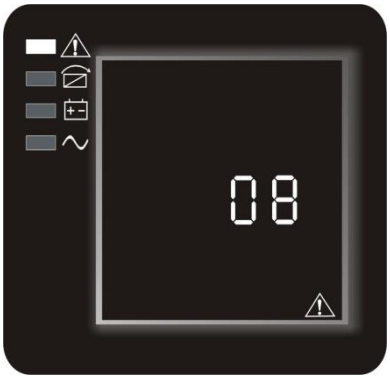
LED indications in ECO mode are as follows: both the inverter green LED and bypass yellow LED are on.
ECO 模式下运行时 LED 的指示如下图所示：逆变灯 LED 绿灯长亮和旁路灯 LED 黄灯长亮



When the input mains meets the input range of the ECO mode and start the ECO function, the UPS will works in ECO mode. If input AC mains exceeds the range of ECO several times in a row in a minute but stays in inverting input range, UPS will work on inverting mode automatically.
当输入市电满足 ECO 输入范围且 ECO 功能启用时，UPS 运行于 ECO 模式。如果输入市电在 1 分钟内连续多次超出 ECO 范围，而在逆变输入范围内，机器会自动运行于市电逆变模式。
ECO range can be set on the front panel. Refer to manual.
ECO 输入范围可由前面板设置，参考用户手册。

2.2.3 故障模式 fault mode

LED indications in fault mode are as follows: warning red LED is on.
故障模式下运行时 LED 的指示如下图所示：报警灯 LED 红灯长亮



Fault mode(LCD interface displaying fault code)
故障运行模式(将故障码显示出来时的 LCD 界面)
When UPS is fault , the LED light is on and the buzzer beeps. UPS will turn to fault mode when overload, inverting fault, Over-temperature fault etc., UPS cuts off the output and LCD displays fault codes. At this moment, you can press the mute key to make the buzzer stop beeping temporarily to wait for maintenance. You can also press the ON/OFF key to shut down the UPS when confirm that there is no serious fault.
当 UPS 发生故障时，报警灯长亮，蜂鸣器长鸣。如过载故障，逆变故障，过温故障等 UPS 进入故障模式，UPS 切断输出，LCD 显示故障代码。此时，可以按静音键暂时停止蜂鸣器长鸣等待维修，也可以在确认没有大的故障条件下按关机组合键关机。

2.3 UPS on and off UPS 开机和关机

2.3.1 start up operation 开机操作

Turn on the UPS in AC mode .接市电 UPS 开机

①. Once mains power is plugged in, the UPS will charge the batteries. LCD shows output voltage is 0, which means UPS has no output voltage at that moment. If it is expected to have output of bypass, you can set bPS "ON" by LCD setting menu.
①.UPS 只要接通市电，就会对电池充电，此时 LCD 显示输出电压为 0，表示 UPS 此时并无输出电压，如需上市电就有旁路输出电压，可在设定界面将 bPS 设为 ON。

②.Press and hold the ON/OFF combination key for more than half a second to start the UPS, then it will start the inverter.
②.持续按开机组合键半秒以上进行开机，即开启逆变器。

③.Once started, the UPS will perform a self-test function.The LED will turn on and off sequentially. After finishing self-test, it will come to line mode. The corresponding LED lights and UPS will work in AC mode.
③.开机时 UPS 会先进行自检，LED 灯循环依次点亮,依次熄灭，待自检等操作完成，进入市电模式，相应的 LED 点亮，UPS 处于市电模式下运行。
未接市电 UPS 直流开机 Turn on the UPS by DC without mains power
.When main power is disconnected, press and hold the ON/OFF key for more than half a second to start UPS.

在无市电输入时，长按开机组合键半秒以上 UPS 启动。
.The operation of UPS in the process of start is almost the same as when mains power is in. After finishing the self-test, the corresponding LED lights and UPS is working in battery mode.
启动过程中的 UPS 动作与接市电时相同，待自检等操作完成后，相应的 LED 点亮，UPS 进入电池模式。

2.3.2 Turn off operation 关机操作

Turn off the UPS in line mode. 有市电时 UPS 关机
①Press and hold the ON/OFF key for more than half a second to turn off the UPS and inverter.
①持续按关机组合键半秒以上，进行关机，即关闭逆变器。
②After UPS shutting down, LED go out and there is no output. If out put is needed, you can set bPS "ON" by LCD setting menu.
②关机后，LED 全熄灭，此时无输出，如需有输出，可在设定界面将 bPS 设为 ON。
Turn off the UPS by DC without mains power. 无市电时 UPS 直流关机
①Press and hold the ON/OFF key for more than half a second to turn off the UPS.
①持续按关机组合键半秒以上，进行关机。
②When turning off the UPS, it will do self-testing firstly. LED will turn on and off sequentially until there is no display on the panel.
②关机时，UPS 会先进行自检，LED 灯循环依次点亮,依次熄灭，直至面板无显示。

2.3.3 Manual self-test, mute test operation 手动自检、静音测试

① When UPS is in line mode, press and hold the self- test/ mute key for more than 1 second, LED light will turn on and off sequentially. UPS comes to self-test mode and tests its status. It will exit automatically after finishing testing, LED resume.
①当 UPS 处于在线工作模式时 ,持续按系统自检/静音组合键 1 秒后 ,LED 灯循环依次点亮,依次熄灭，UPS 进入自检模式，测试 UPS 相关状态，完成自检后自动退出，LED 恢复。
② When UPS is in battery mode, press and hold the self- test/ mute key for more than 1 second, the buzzer stops beeping. If you press and hold the self- test/ mute key for more than 1 second, it will restart to beep again.
②当 UPS 处于电池模式时，持续按系统自检/静音组合键 1 秒后，蜂鸣器静音，再持续按系统自检/静音组合键 1 秒后，蜂鸣器又开始鸣叫。

2.4 Configuration battery 配置电池

2.4.1 Battery Runtimes(in Minutes) at 100% load 在 100%负载电池运行时间(分钟)

Model	Battery type	Internal Battery Q'ty	Internal Batteries Run time	+ 1 EBP	+ 2 EBPs	+ 3 EBPs	+ 4 EBPs
1K	12V/9AH	2	3	15	25	40	53
1.5K		3	3	15	25	40	53
2K		4	3	15	25	40	53
3K		6	3	17	31	52	69
NOTE Battery times are approximate and vary depending on the load configuration and battery charge.							

2.4.2 Set EBPS number and battery capacity of UPS. 设置 UPS 安装的 EBPS 数量及电池容量。

To ensure the max. work time of the battery and correct EBPS number and battery capacity of UPS, the parameters must be set as follow listed in manual. .

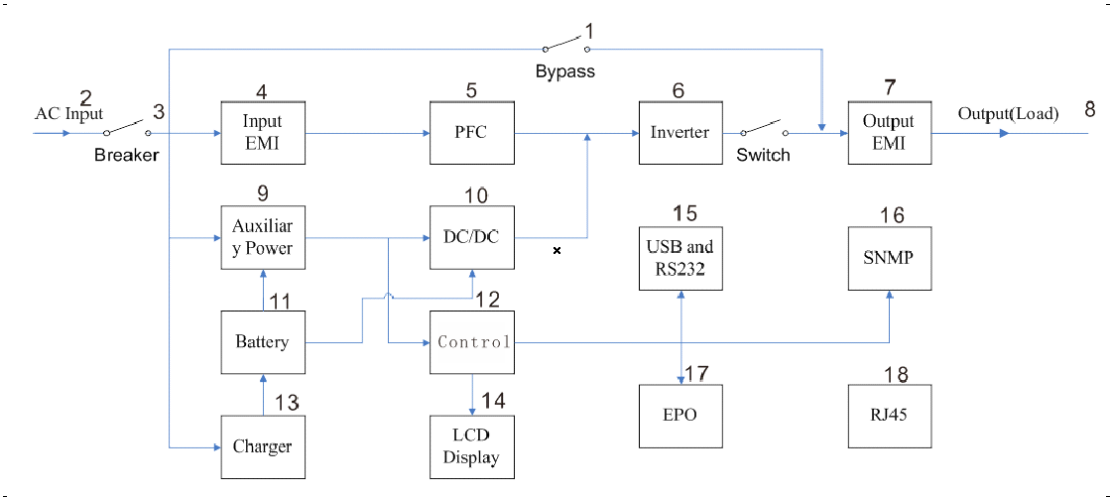
确保最长的电池运行时间，配置 UPS 正确的 EBP 数量及电池容量设定，设定方法参照用户手册.电池组及电池容量设定，电池组能够设定的参数见下表：

All UPS and EBP 所有 UPS 和 EBP	Battery grout numbers 电池组数量
Only UPS (internal battery) 只有 UPS（内部电池）	1(default) 1（默认）
UPS+1EBP	3
UPS+2EBPs	5
UPS+3EBPs	7
UPS+4EBPs	9
Note: UPS contains a battery group, and every EBP has two battery groups. Because of difference of battery internal resistance will result in uneven charge flow, the largest number of external battery box is four. 注意：UPS 包含一个电池组；每一个 EBP 包含两个电池组。 因电池内阻的差异会导致充电不均流，最大外接电池箱的个数是四个。	

3 System Block Diagram and Wiring Diagram

系统方框图和布线图

3.1 System Block Diagram 系统方框图



1.Bypass 旁路

2. AC Input：To provide the AC source to the PFC and charger circuits of the UPS.
市电输入：为不间断电源 PFC 和充电器提供市电

3.Breaker: Input Breaker
断路器:输入断路器

4. Input EMI Filter: To eliminate magnetic interference from AC source or UPS Rectifier.
输入 EMI 过滤器：消除来自市电或不间断电源整流器带来的磁干扰

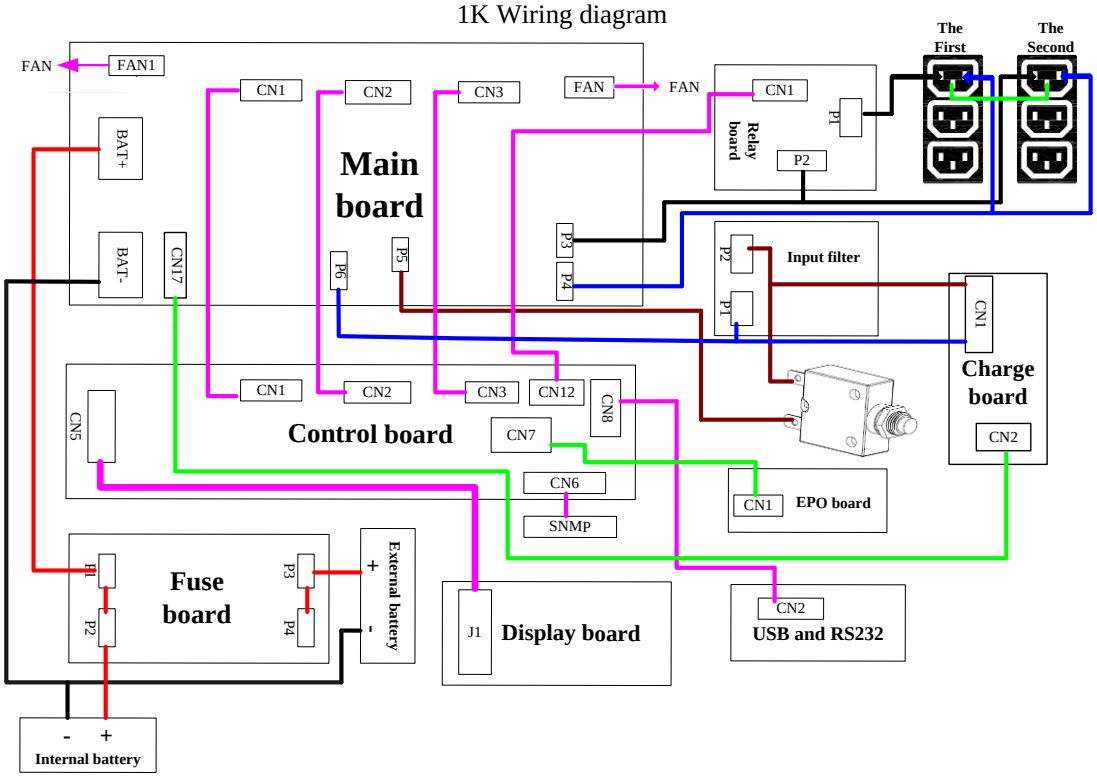
5.PFC: 对输入的市电进行功率因素校正.
6.Inverter: 逆变器
7.Output EMI Filter: 对 UPS 的输出进行电磁消除.
8.Output (Load) UPS 输出，连接负载
9.Auxiliary Power: 输助电源板
10.DC/DC: DC 到 DC 的推挽升压电路
11.Battery: 电池
12. Control: 控制板
13.Charger: 从市电取电对电池进行充电的电路
14.LCD Display: LCD 显示屏
15.USB and RS232 USB 和 RS232 通信接口电路
16.SNRT: SNRT 卡
17.EPO: 紧急断电接口
18.RJ45: RJ45 网络接口

3.2 Wiring Diagram 接线图

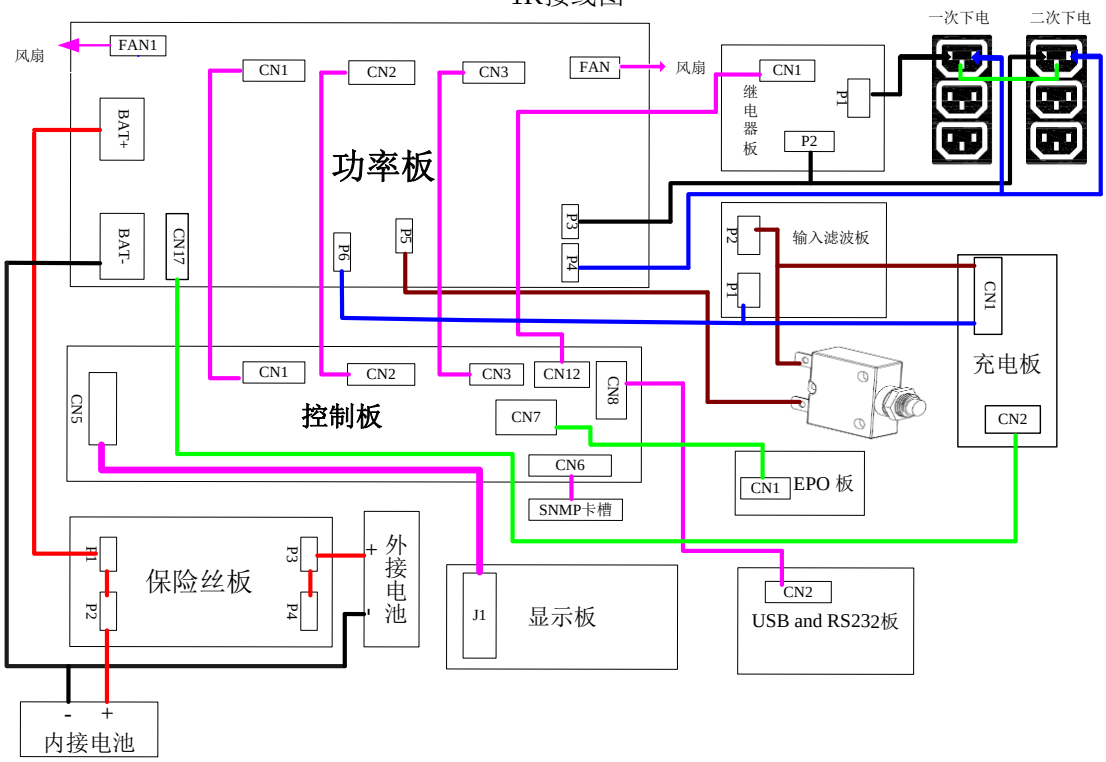
3.2.1 1KVA/1.5KVA UPS is mainly coRTosed of the following PCBs:

1KVA/1.5KVA UPS 主要有以下 PCB 组件组成:

1K Wiring diagram



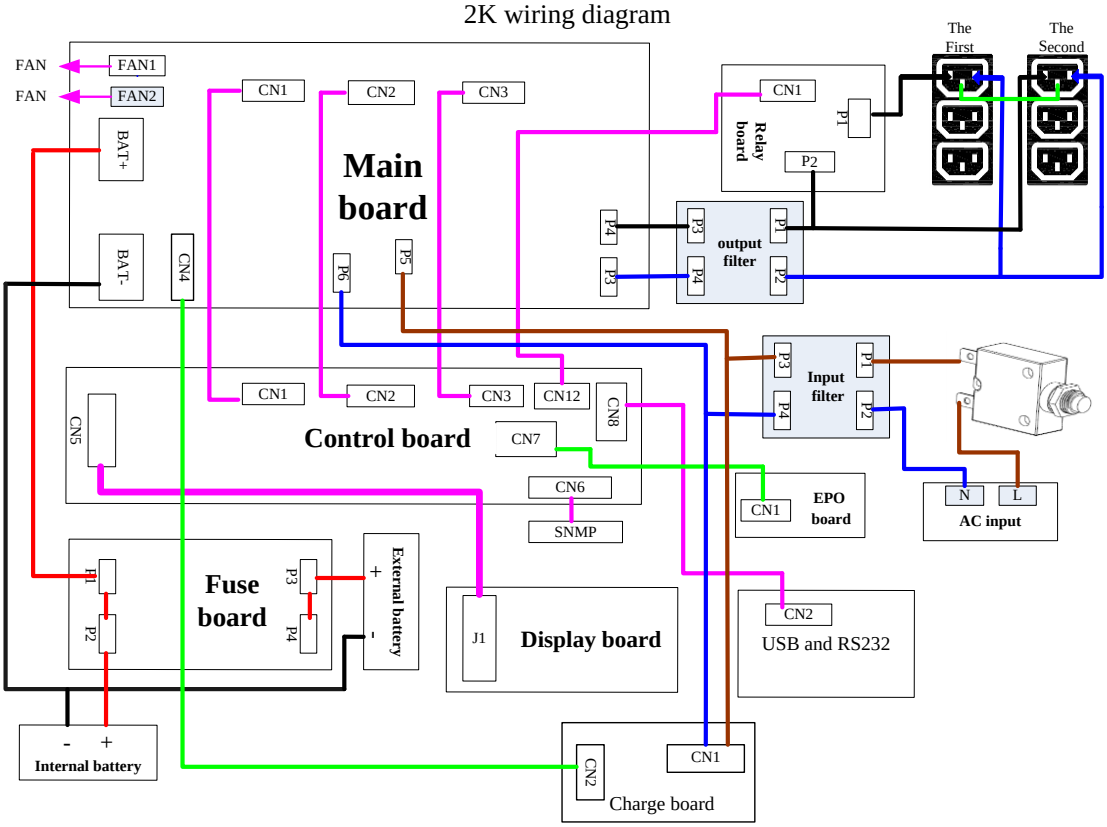
1K接线图



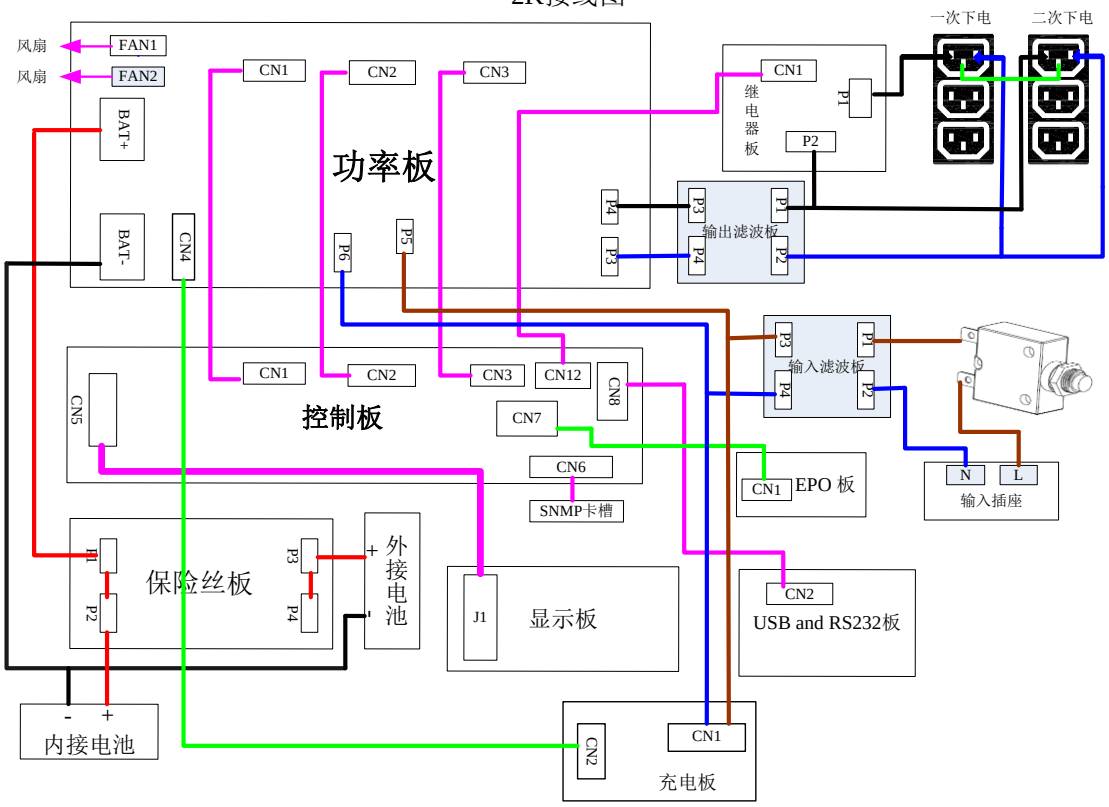
3.2.2 2KVA UPS is mainly composed of the following PCBs:

2KVA UPS 主要有以下 PCB 组件组成:

2K wiring diagram



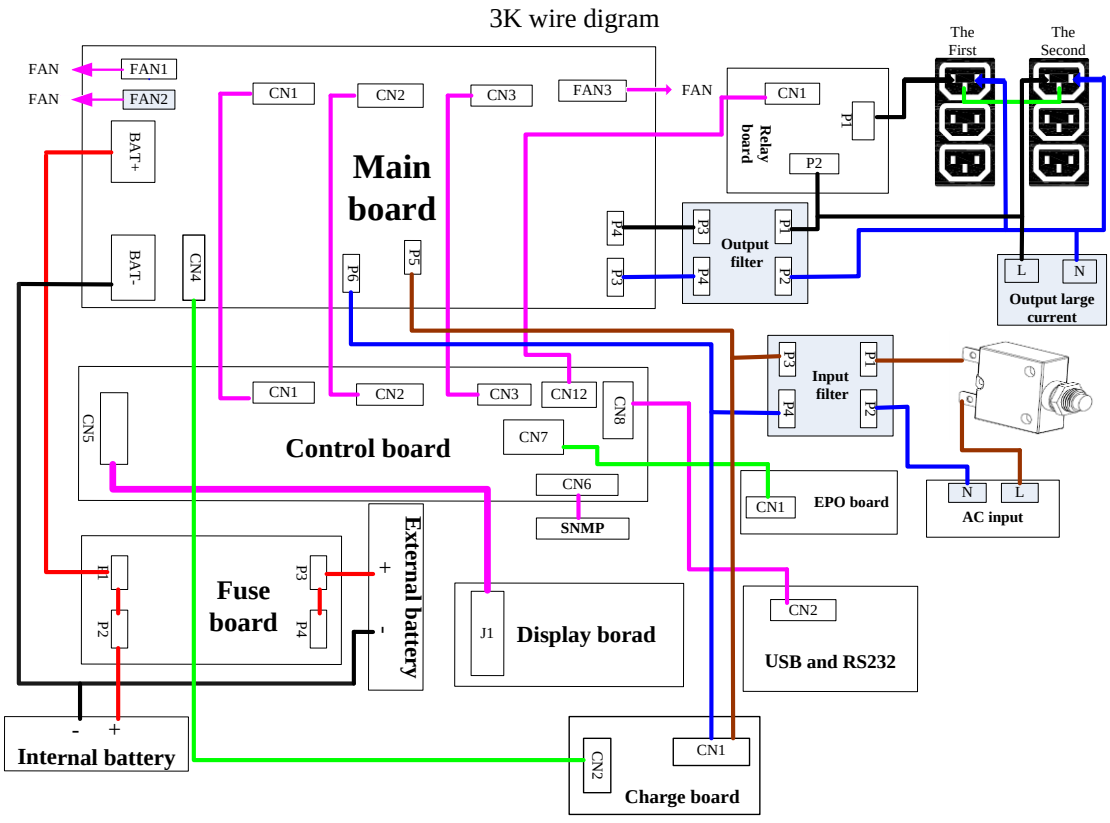
2K接线图



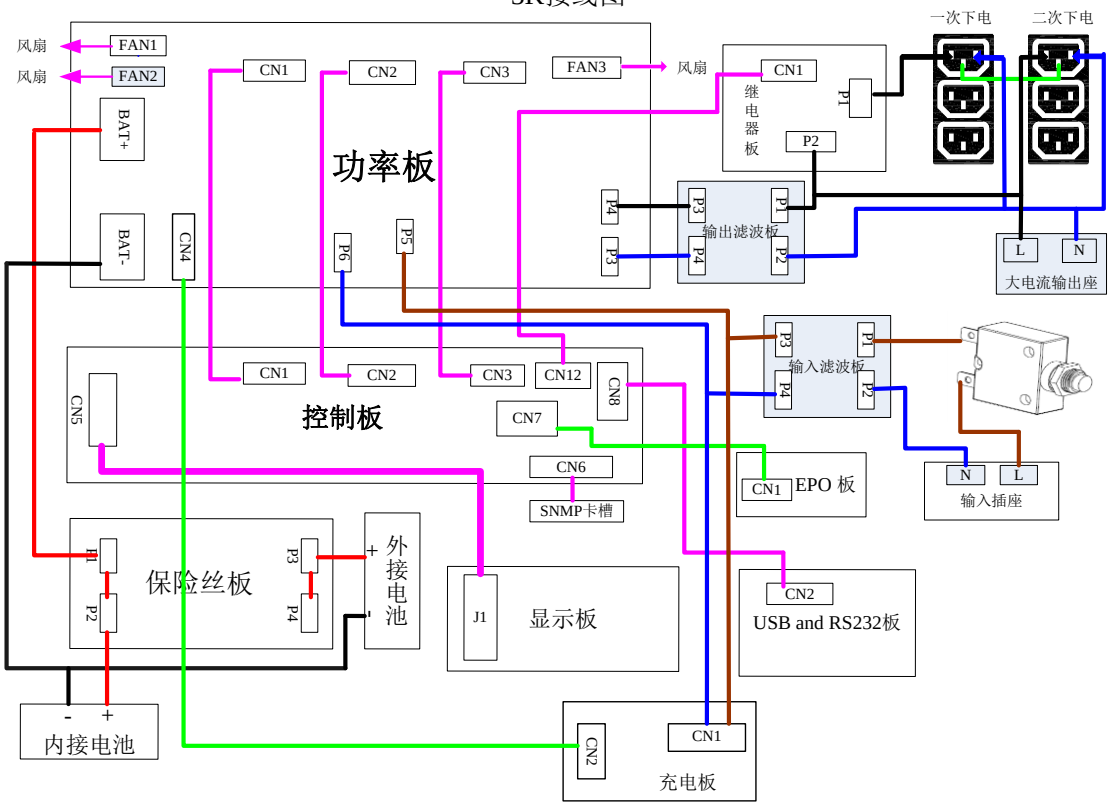
3.2.3 3KVA UPS is mainly composed of the following PCBs:

3KVA UPS 主要有以下 PCB 组件组成:

3K wire digram



3K接线图



4 Unit Test and Calibration Setting 单元测试和校准设置

4.1 Electrical Characteristics 电气特性

4.1.1 Battery Charging Voltage (25℃) 电池充电电压 (25℃)

Setting 设置 / Point Model 指明型号	Battery Charging Voltage 电池充电电压
1KVA	27.5Vdc
1.5KVA	41.25Vdc
2KVA	55Vdc
3KVA	82.5Vdc

4.1.2 Test points and standards 测试点和标准

PCB	TEST	TEST POINT	EXPECTED RESULT
PSDR	DC(+)BUS	C13 or BATTERY-,R104 for	360V±20V for 220V output

		1KVA/1.5KVA C139/C138/C136 or BATTERY-,R304 for 2KVA/3KVA	
	DC(-)BUS	C12 or BATTERY-,R101 for 1KVA/1.5KVA C137/C140/C141 or BATTERY-,R318 for 2KVA/3KVA	-360V±20V for 220V output
CHGR	CHARGER	CN2 PIN1-2 for 1KVA/1.5KVA/2KVA/3KVA	27.5±0.5V for 1KVA 41.25±0.6V for 1.5KVA 55±0.6V for 2KVA 82.5±0.6V for 3KVA

4.2 COMPONENT VERIFICATION 元件确认

For the reason of safety, you must disconnect UPS to the mains and disconnect battery connector. Check the components listed below to confirm which block is out of order and follow the procedures listed on the following pages to repair them.

为了安全的原因,你必须断开 UPS 电源和断开电池连接器。检查下面列出的组件来确认哪些块秩序和遵循以下页面上列出修理程序。

CAUTION:

DO NOT supply UPS with the mains unless you are sure that you have replaced all defective components.

警告:在你确信你已经取代了所有缺陷的组件之前，不能给 UPS 提供电源。

Circuit Block	Components to be checked	Fail condition
FUSE	F1,F2,F3 for 1KVA/1.5KVA F1,F2,F3 for 2KVA/3KVA	open

PFC	Q1/Q1A for 1KVA/1.5KVA Q9 for 2kVA/3KVA	C-E short or open
	D11,D10,CD1 for 1KVA/1.5KVA D116,D117,REC02 for 2KKVA/3KVA	short or open
DC/DC MOS	Q2,Q3,Q4,Q10 for 1KVA/1.5KVA Q4,Q5,Q6,Q7 for 2KKVA/3KVA	D-S short or open
Inverter IGBT	Q12,Q13 for 1KVA/1.5KVA Q13,Q14,Q15,Q16 for 2kVA/3KVA	C-E short or open

4.2.1 POWER FACTOR CORRECTION:

功率因率效正

Step	Checked components	*Instrument function	Reference Value	Failed condition
1	F3 for 1KVA/1.5KVA F3 for 2KVA/3KVA	Ω	short	open
2	Q1/Q1A for 1KVA/1.5KVA Q9 for 2kVA/3KVA	(C,E)：DIODE (G,E)：Ω	0.5V 47KΩ	short or open short or open or value change
3	D11,D10 for 1KVA/1.5KVA D116,D117 for 2KKVA/3KVA	DIODE	0.5V	short or open
4	R168,R169 for 1KVA/1.5KVA	Ω	36Ω,10Ωfor	open or value

	R408,R266,R267 for 2KKVA/3KVA		1KVA/1.5KVA 36Ω,47Ω,22Ω for2KVA/3KVA	change
5	CD1 for 1KVA/1.5KVA REC02 for 2KKVA/3KVA	DIODE	0.5V	short or open

4.2.2 DC-DC CONVERTER: 直流-直流 转换

Step	Checked components	*Instrument function	Reference Value	Failed condition
1	F1,F2 for 1KVA/1.5KVA F1,F2for 2KVA/3KVA	Ω	short	open
2	Q2,Q3,Q4,Q10 for 1KVA/1.5KVA Q4,Q5,Q6,Q7 for 2KKVA/3KVA	(D,S) : DIODE (G,S) : Ω	0.5V 23.5KΩ	short or open short or open or value change

4.2.3 DC/AC INVERTER: 直流/交流逆变

Step	Checked components	Instrument function	Reference Value	Failed condition
1	Q12,Q13 for 1KVA/1.5KVA Q13,Q14,Q15,Q16 for 2kVA/3KVA	(C,E): DIODE (G,E): Ω	0.5V 20KΩ for 1KVA/1.5KVA, 23.5KΩ for 2KVA/3KVA	short or open short or open or value change
2	R138,R140,R154,R155for1 KVA/1.5KVA R303,R307,R314,R308,R31	Ω	36Ω,10Ωfor 1KVA/1.5KVA 10Ω,27Ω for 2KVA/3KVA	value change or open

	1,R316,R322,R320 for 2KVA/3KVA			

4.2.4 CHARGER: 充电：

Step	Checked components	*Instrument function	Reference Value	Failed condition
1	D1,D2,D3,D4 for 1KVA/1.5KVA/2KVA/3KVA	DIODE	0.5V	Short or open
2	Q1 for 1KVA/1.5KVA/2KVA/3KVA	(S,D) (D,S) (G,S)	0.5V ∞ 50KΩ	Short or open Short short or open or value change
3	D6 for 1KVA/1.5KVA/2KVA/3KVA	DIODE	0.5V	Short or open

5 Customer Options Slots 用户选项槽

5.1 DCE (Dry Contact) card DCE 卡（干触点）

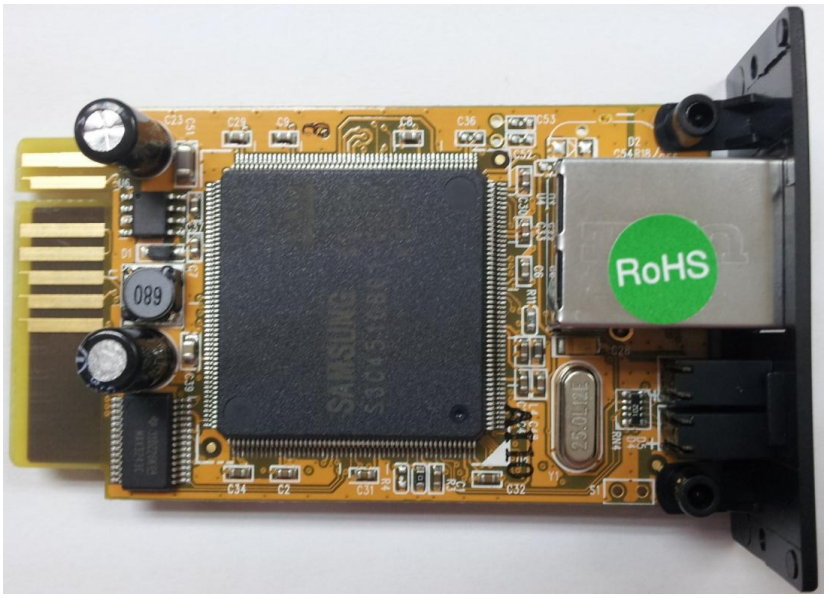
For installation, please refer to the user’ s manual attached with the card.

安装时，请参考用户附卡手册。

Installation Position: Optional Slot

安装位置：选项槽

5.2 SNMP card　SNMP 卡



For installation, please refer to the user’ s manual attached with the card.

安装时，请参考用户附卡手册。

Installation Position: Optional Slot

安装位置：选项槽

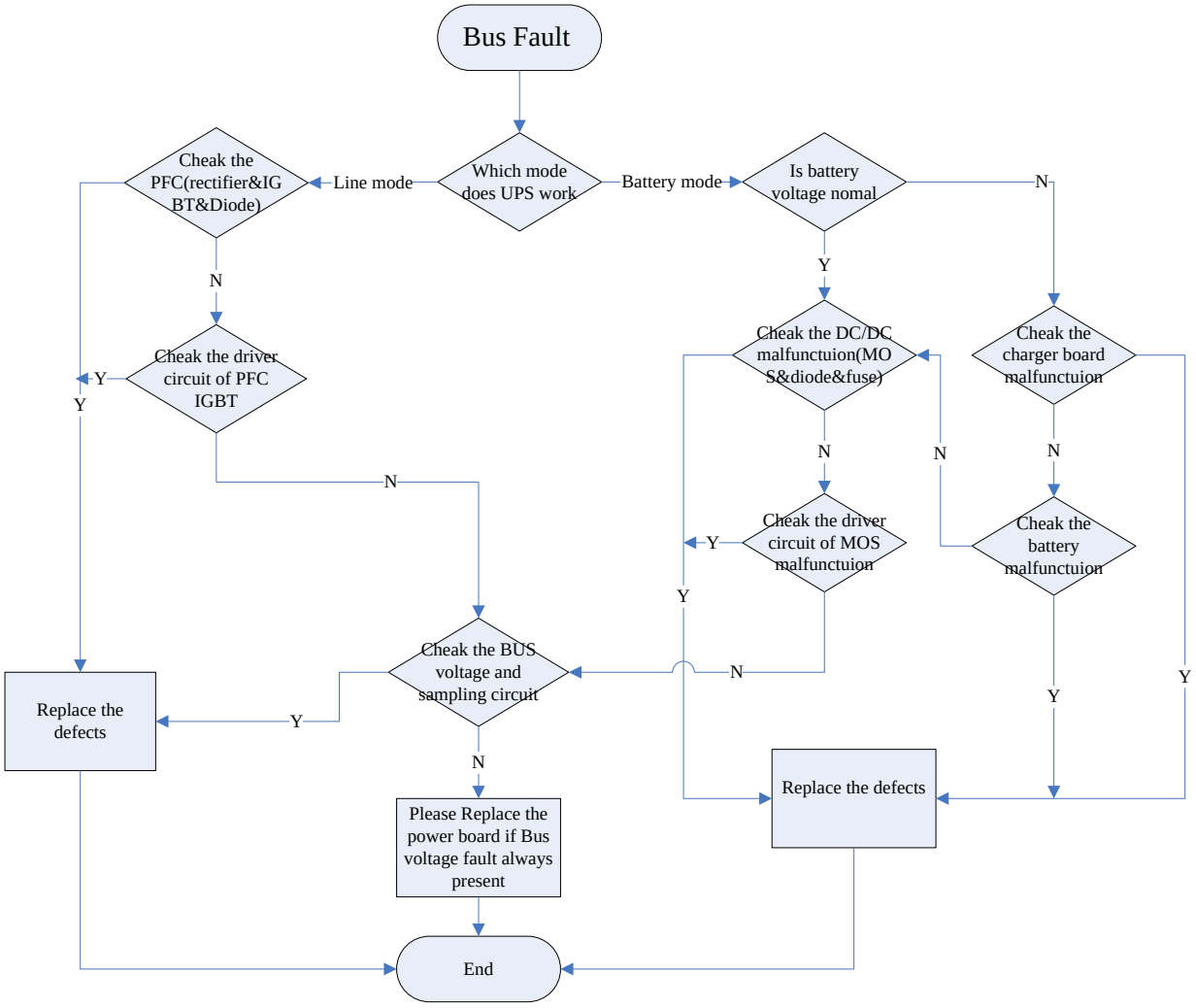
6　Troubleshooting Guide　故障排除指南

6.1 Error Code BUS Fault

Symptom :It means Bus voltage fault. The LED light is on and the buzzer beeps. UPS will turn to fault mode, cuts off the output and LCD displays fault codes.

Note: Fault code in detail see 1.1.3 (Error code Explanation)

Troubleshooting Chart：

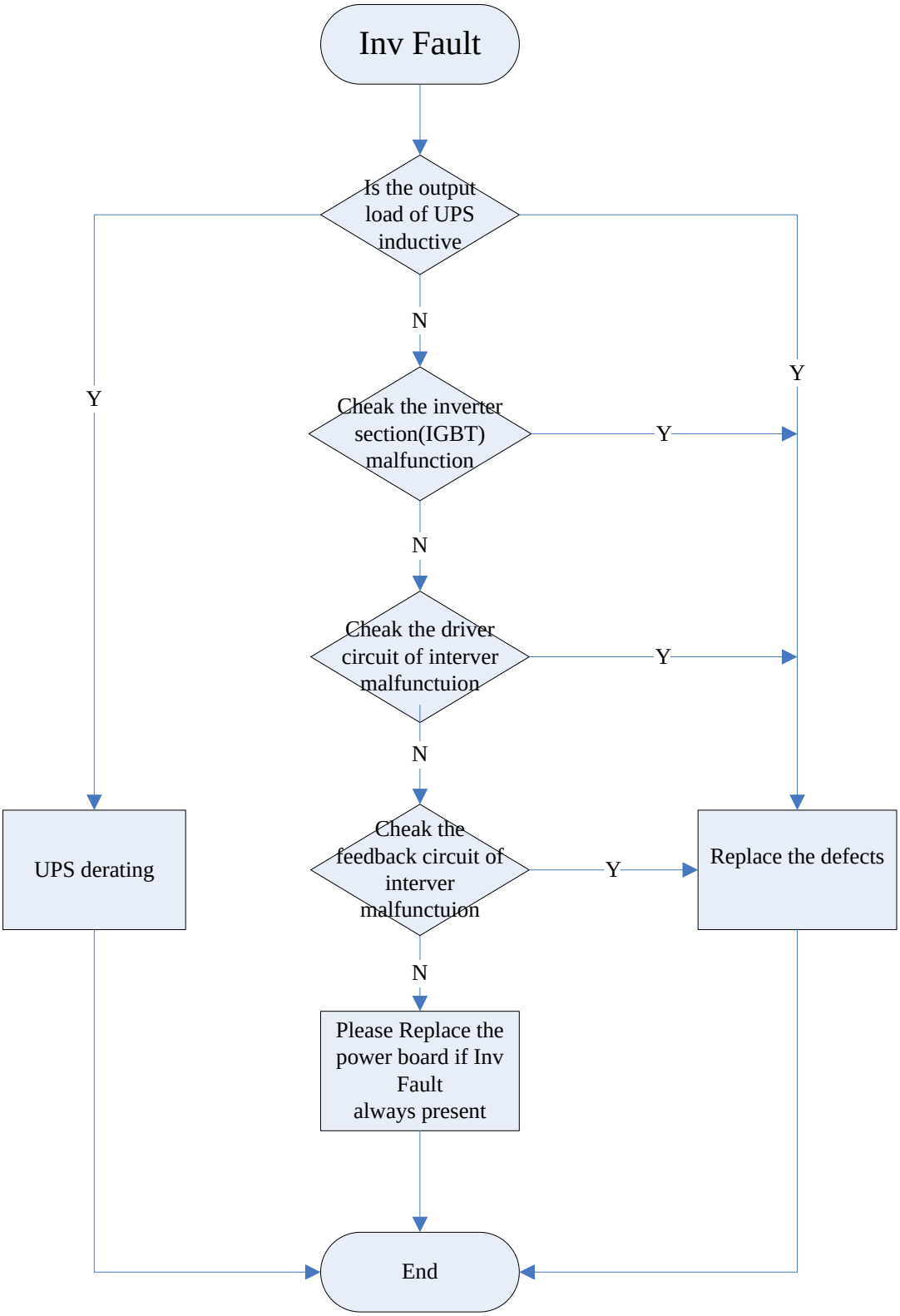


6.2 Error Code　inv Fault

Symptom :It means the UPS inverter is abnormal. The LED light is on and the buzzer beeps. UPS will turn to fault mode, cuts off the output and LCD displays fault codes.

Note: Fault code in detail see 1.1.3 (Error code Explanation)

Troubleshooting Chart :



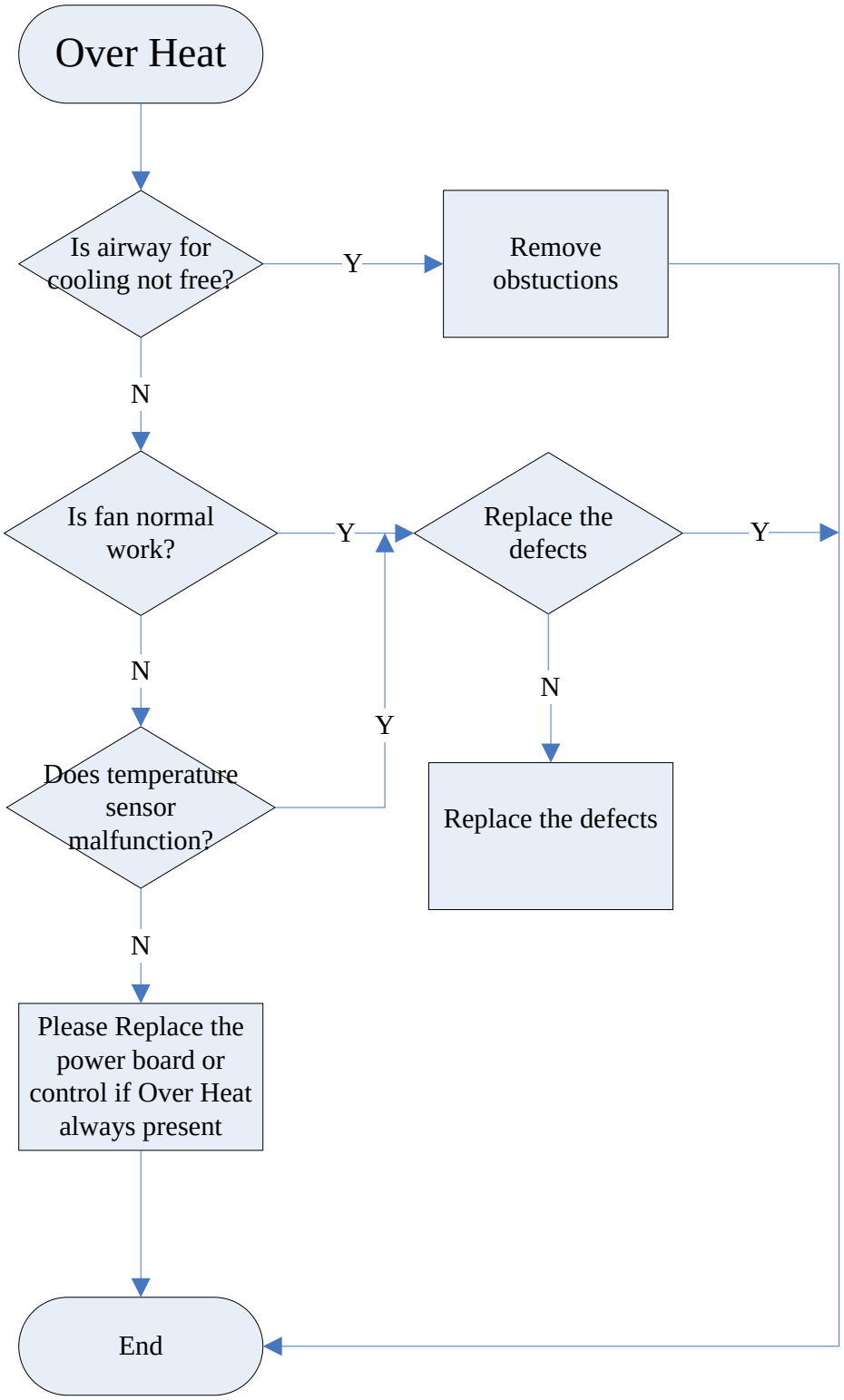
6.3 Error Code Over Heat

Symptom：It means there is overheat protection occurred in the UPS. The LED light is on and the buzzer beeps. UPS will turn to fault mode, cuts off the

output and LCD displays fault codes.

Note: Fault code in detail see 1.1.3 (Error code Explanation)

Troubleshooting Chart :

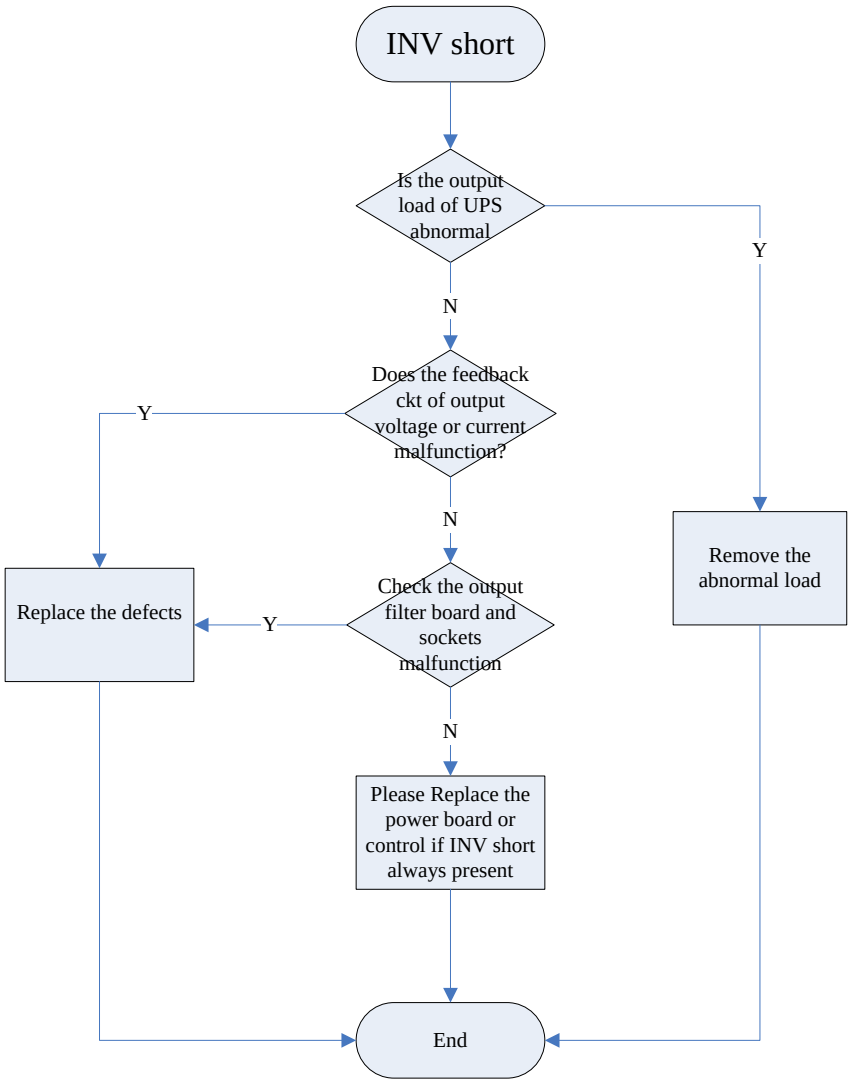


6.4 Error Code INV Short

Symptom : It means UPS is short circuit. The LED light is on and the buzzer beeps. UPS will turn to fault mode, cuts off the output and LCD displays fault codes.

Note: Fault code in detail see 1.1.3 (Error code Explanation)

Troubleshooting Chart :

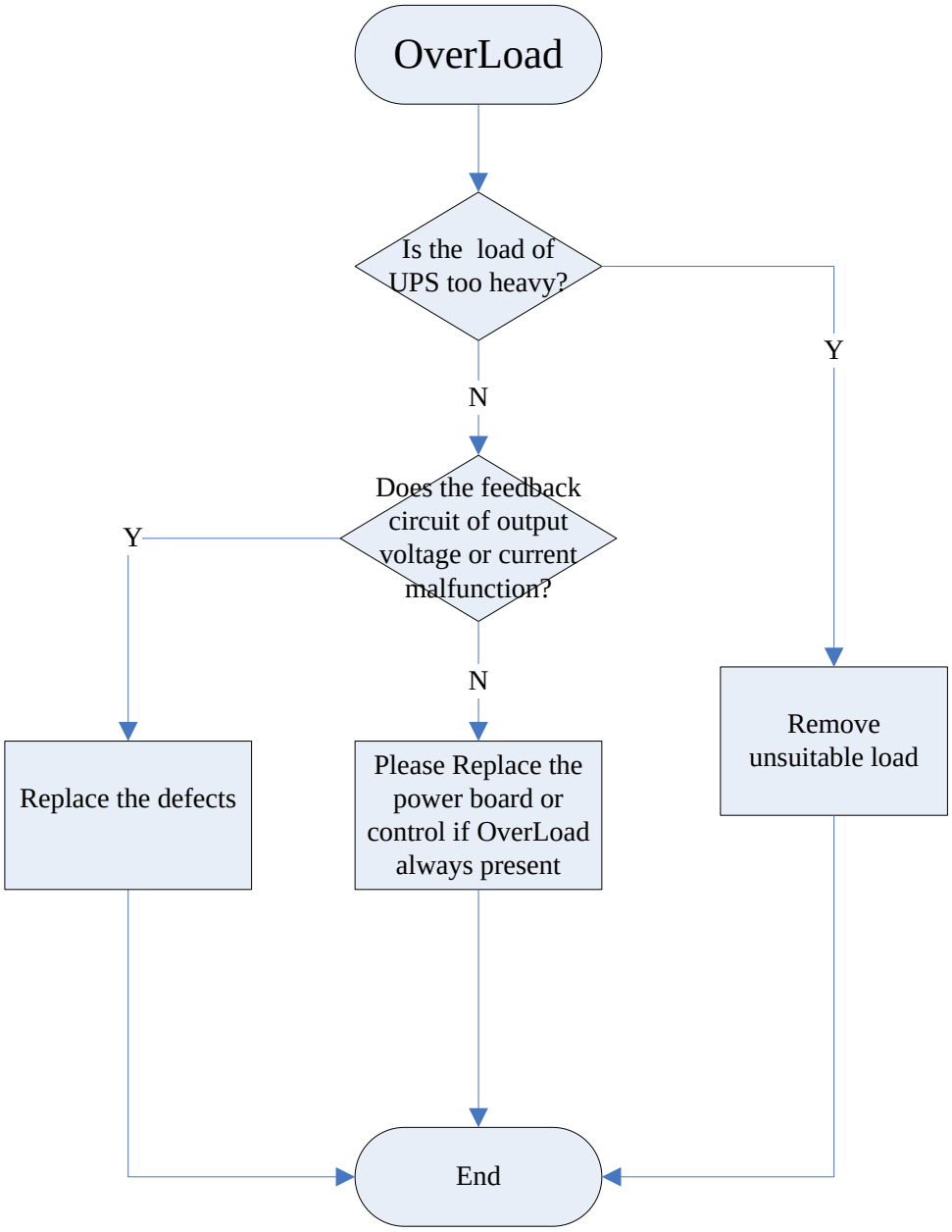


6.5 Error Code Over load

Symptom : It means there is overload protection occurred in the output of the Inverter of the UPS. The LED light is on and the buzzer beeps. UPS will turn to fault mode, cuts off the output and LCD displays fault codes.

Note: Fault code in detail see 1.1.3 (Error code Explanation)

Troubleshooting Chart :



7 Technical Specifications 技术规格参数表

MODEL 型号	MP S RT II Series MP S RT II 系列	1KVA	1.5KVA	2KVA	3KVA
CAPACITY 容量	VA/W	1000VA/900W	1500VA/1350W	2000VA/1800W	3000VA/2700W
INPUT 输入	Voltage Range 电压范围	160-290VAC @ full load 160-290VAC @ 满载			
	Frequency Range 频率范围	45-55Hz@50Hz/55-65Hz@60Hz(auto-detect) 45-55Hz@50Hz/55-65Hz@60Hz(自动追踪)			

	Phase 相位		Single phase with ground 单相接地			
	Current THDI 电流总谐波畸变率		<10%(100% nonlinear load) <10%(非线性满载)			
	Power Factor 功率因素		>=0.98 ≥0.98			
	Generator Input 发电机输入		Support 支持			
	Breaker 断路器		7A	10A	16A	25A
	Input Socket 输入接口		IEC320 C13-10A	IEC320 C13-10A	IEC320 C20-16A	IEC320 C20-16A
	AC power cord 市电源线		IEC320 C14-10A	IEC320 C14-10A	IEC320 C19-16A	IEC320 C19-16A
OUTPUT 输出	Voltage 电压		200/208/220/230/240VAC			
	Power Factor 功率因素		0.9			
	Voltage Regulation 电压变动率		±2%			
	Frequency (Line Mode) 频率（市电模式）		46-54Hz@50Hz/56-64Hz@60Hz			
	Frequency(Battery Mode) 频率（电池模式）		50/60Hz±0.02Hz			
	Current Crest Ratio 电流波峰率		3:1			
	Harmonic Distortion 谐波畸变率		<=3% THD(Linear Load) ≤3% 总谐波畸变率(线性负载)			
			<=5% THD(Non-Linear Load) ≤总谐波畸变率(非线性负载)			
	Output Waveform 输出波形		Pure Sine wave 纯正弦波			
	Outlet 接口		(IEC C13-10A)*6	(IEC C13-10A)*6	(IEC C13-10A)*6	(IEC C13-10A)*6 (IEC C19-16A)*1
	Overload Capacity 过载量	Line Mode 市电模式	30S@ 100%-150% ;300ms @ >150%			
		Battery	30S@ 100%-150% ;300ms @ >150%			

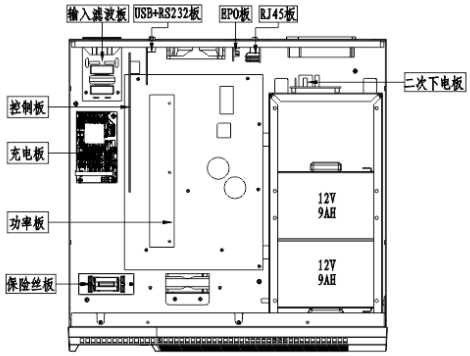
		Mode 电池模式				
EFFICIENCY 效率	AC Mode 市电模式		Full load>=90% 满载≥90%			
	Battery Mode 电池模式		Full load>=85% 满载≥85%			
	ECO Mode ECO 模式		Full load>=94% 满载≥94%			
BATTERY 电池	Number of Batteries Per Set 每台电池数		2	3	4	6
	Battery Type 电池种类		12V/9Ah	12V/9Ah	12V/9Ah	12V/9Ah
	Backup Time 后备时间		Estimated remaining time displayed on the LCD 预计剩余时间显示在 LCD 上			
	Recharge Time(to 90%) 充电时间(到达90%)		5 Hours 5 小时			
	Charging Current(Max) 充电电流（最大值）		1.2A			
	Rated Battery Voltage 额定电池电压		24Vdc	36Vdc	48Vdc	72Vdc
	charge mode 充电模式		CC+CV mode			
	Protect 保护		Over-voltage /Over-current /Low-voltage 过压/过流/低压			
	Battery Socket 电池接口		Anderson like Power Pole Modular Connectors 类似安德森功率模块连接器			
TRANSFER TIME 转换时间	Mains ←→Battery 主路←→电池		0ms			
	Mains ←→ Bypass 主路←→旁路		<4ms			
OPTIONAL FEATURES 可选特性	Economic Mode(ECO Mode) 经济模式（ECO 模式）		Support 支持			

INDICATOR 指示灯	LCD Version(with LED) LCD(带 LED)	Load/Battery/Input/Output/Operating Mode Information 负载/电池/输入/输出/工作模式信息			
AUDIBLE ALARM 声音报警	Battery Mode 电池模式	Sounding every 4 seconds 每四秒响			
	Low Battery 低电量	Sounding every second 每秒响			
	Overload 过载	Sounding twice every second 每秒响两次			
	Fault 故障	Continuously Sounding 连续响			
PHYSICAL 机械特性	Dimension(W*D*H)mm 尺寸（宽*深*高）mm	440X430X86.5		440X572X86.5	440*690*86.5
	Net Weight(kg) 净重（千克）	15.1	18.1	22.2	25.5
ENVIRONMENT 环境参数	Safety 安全等级	CE			
	Operating Environment 操作环境	0-40ºC			
	Relative Humidity 相对湿度	0-90%(non-condensing) 0-90%(非冷凝)			
	Altitude 海拔高度	＜1500m. when ＞1500m, derating 小于 1500 米； 当大于 1500 米时, 需降额			
	Noise Level 噪音分贝	<50dB@ 1Meter 小于 50 分贝@ 1 米			
INTERFACE 接口	Smart RS-232/USB(Preferential) 智 能 RS-232/USB(优先)	Software supports Windows Family, Linus, FreeBSD 软件支持 Windows Family, Linus, FreeBSD			
	Intelligent Slot 智能插槽	SNMP(independent to RS232) SNMP(与 RS232 独立使用)			

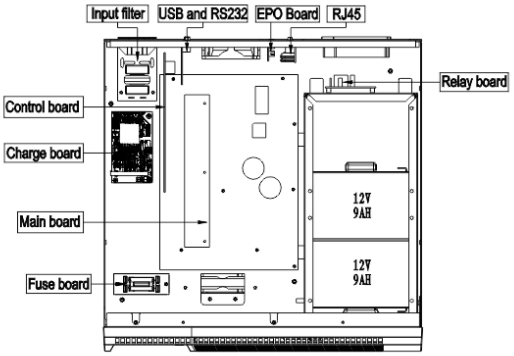
8 Appendix 附录

8.1 PCB Layout PCB 布局图

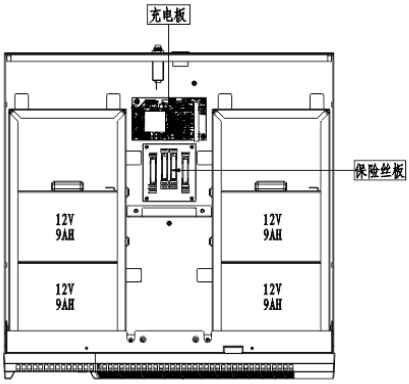
1K II UPS(0.9功因) 布局图



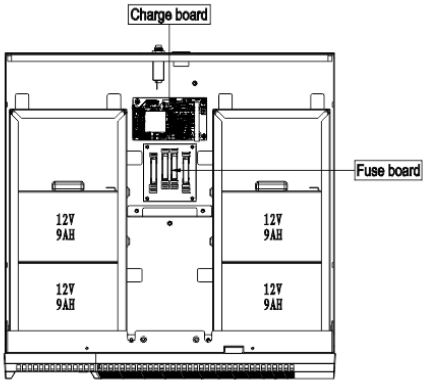
1K II UPS(0.9PF) layout



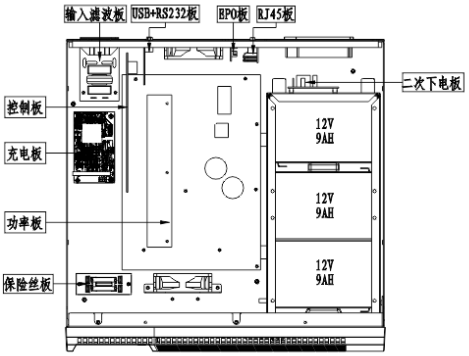
1K II 电池箱(0.9功因) 布局图



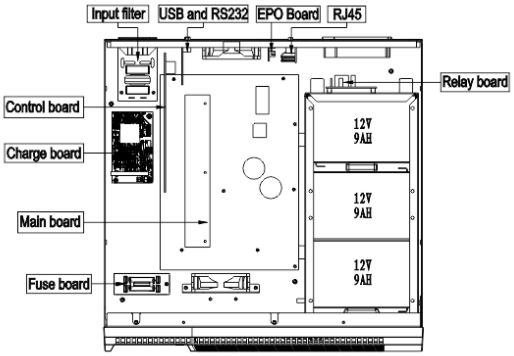
1K II battery box(0.9PF) layout



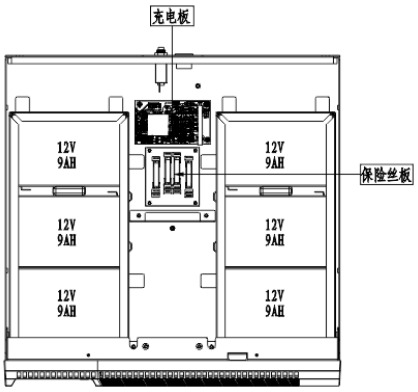
1.5K II UPS(0.9功因) 布局图



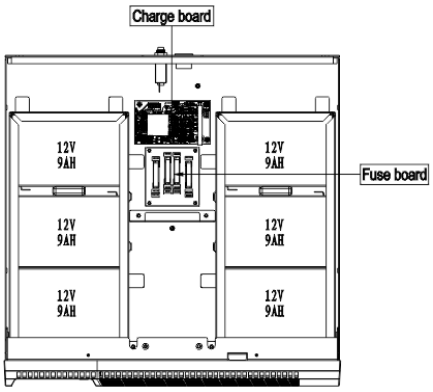
1.5K II UPS(0.9PF) layout



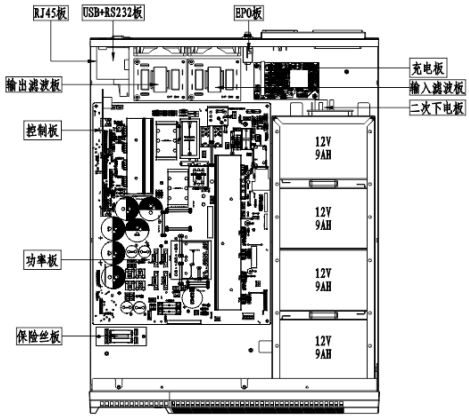
1.5K II 电池箱(0.9功因) 布局图



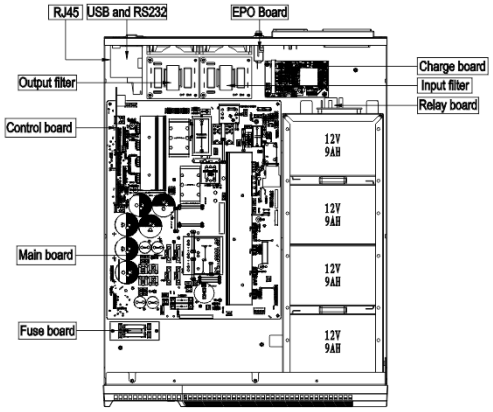
1.5K II battery box(0.9PF) layout



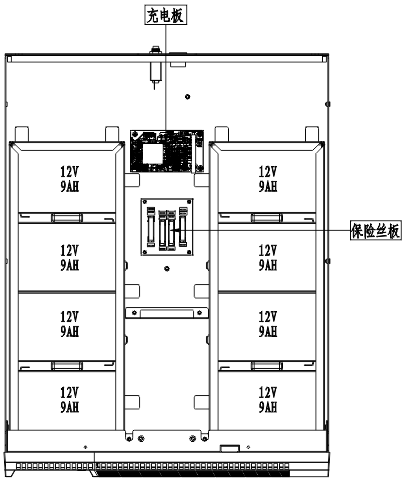
2K II UPS(0.9功因) 布局图



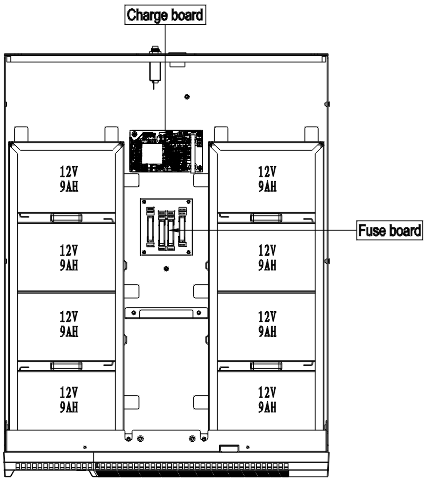
2K II UPS(0.9PF) layout



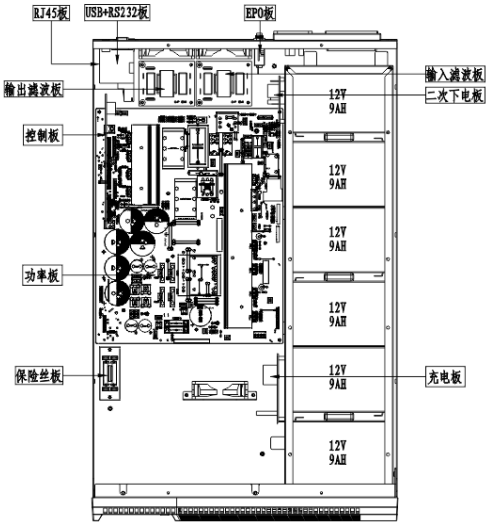
2K II 电池箱(0.9功因) 布局图



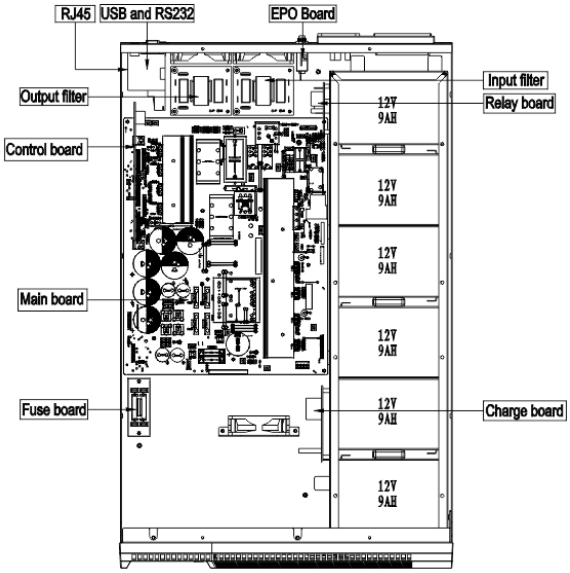
2K II battery box(0.9PF) layout



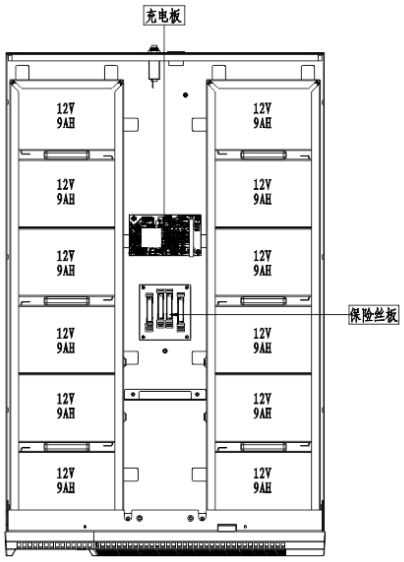
3K II UPS(0.9功因) 布局图



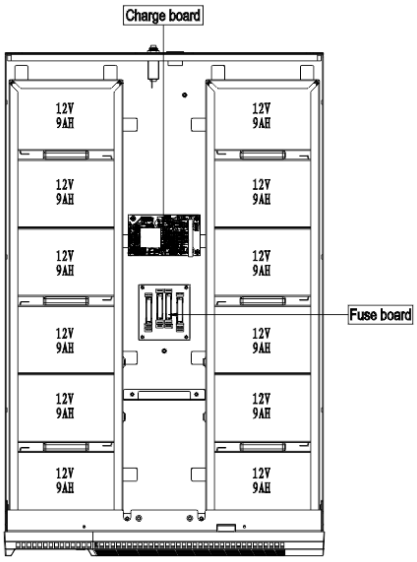
3K II UPS(0.9PF) layout



RT9103 电池箱(0.9功因) 布局图

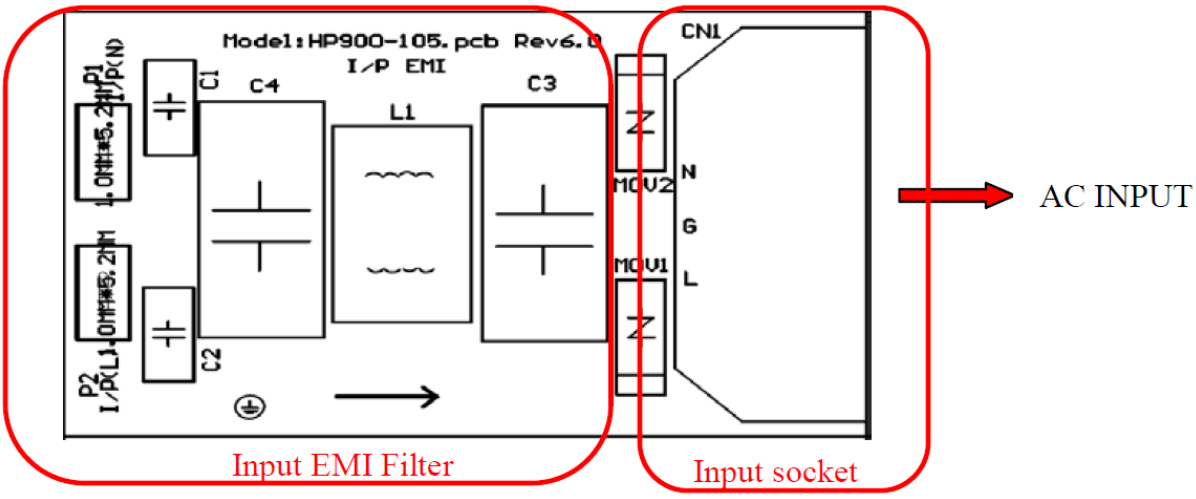


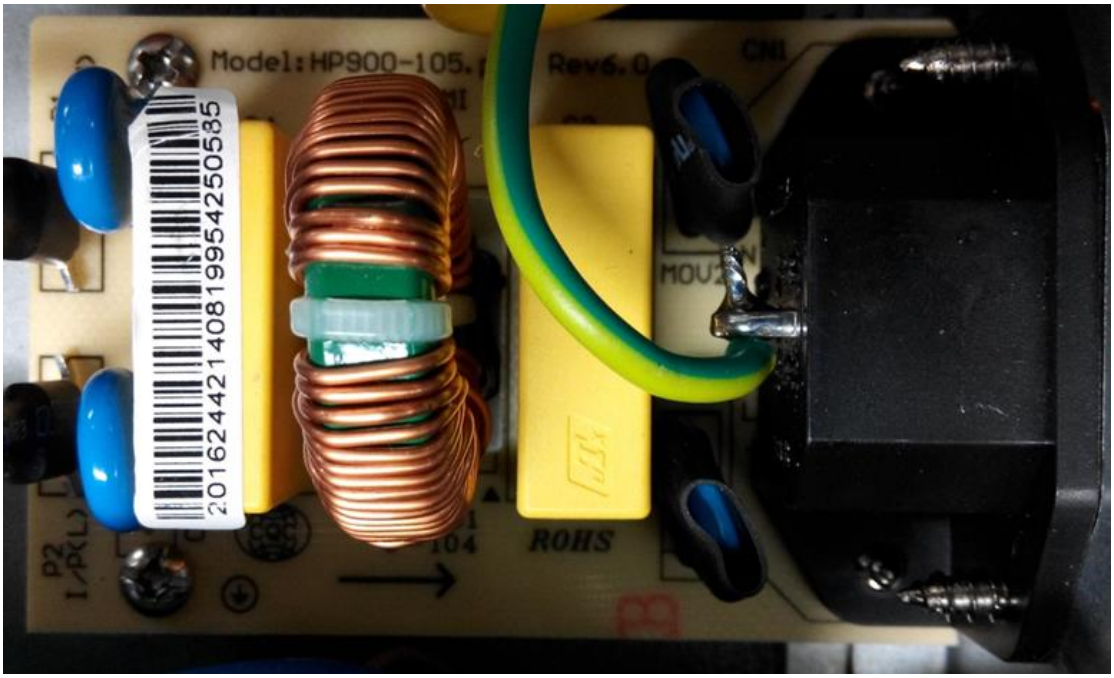
3K II battery box(0.9PF) layout



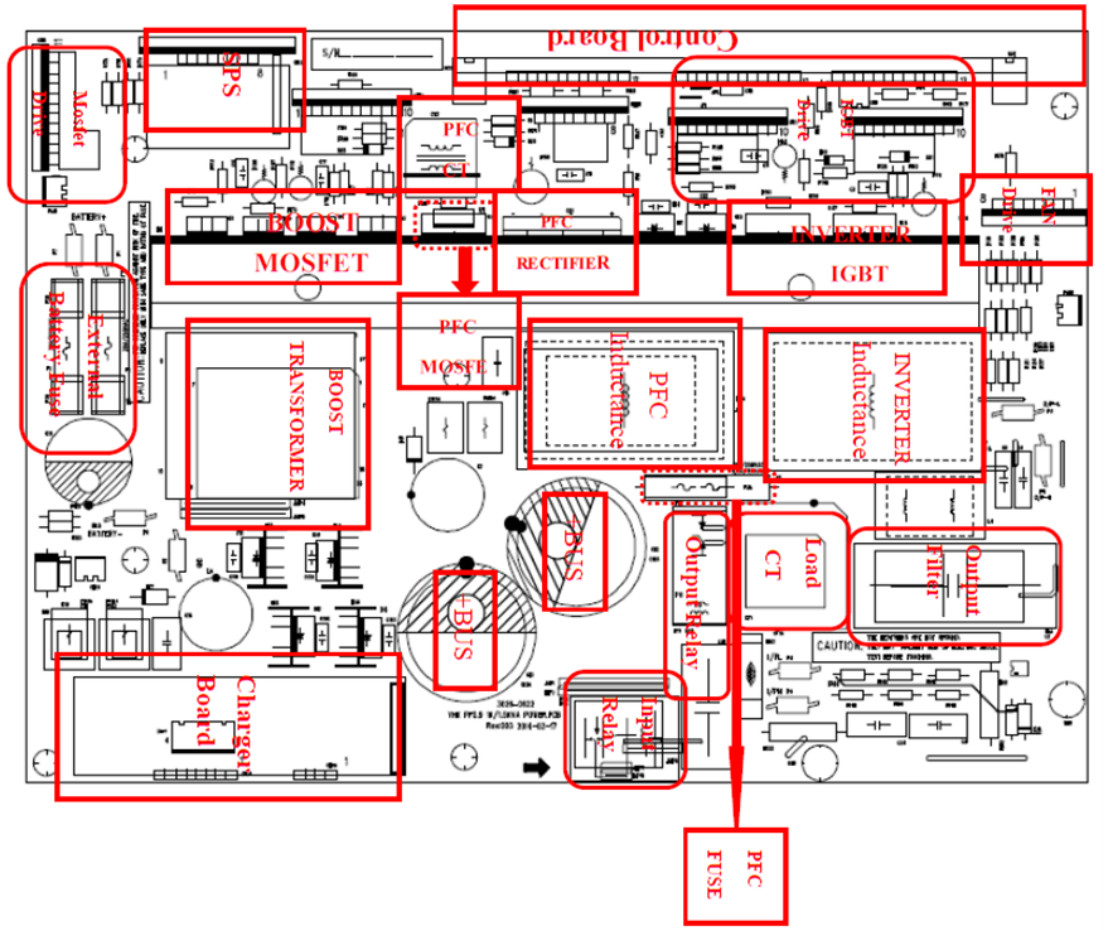
8.2 PCB Placement　PCB 布线图

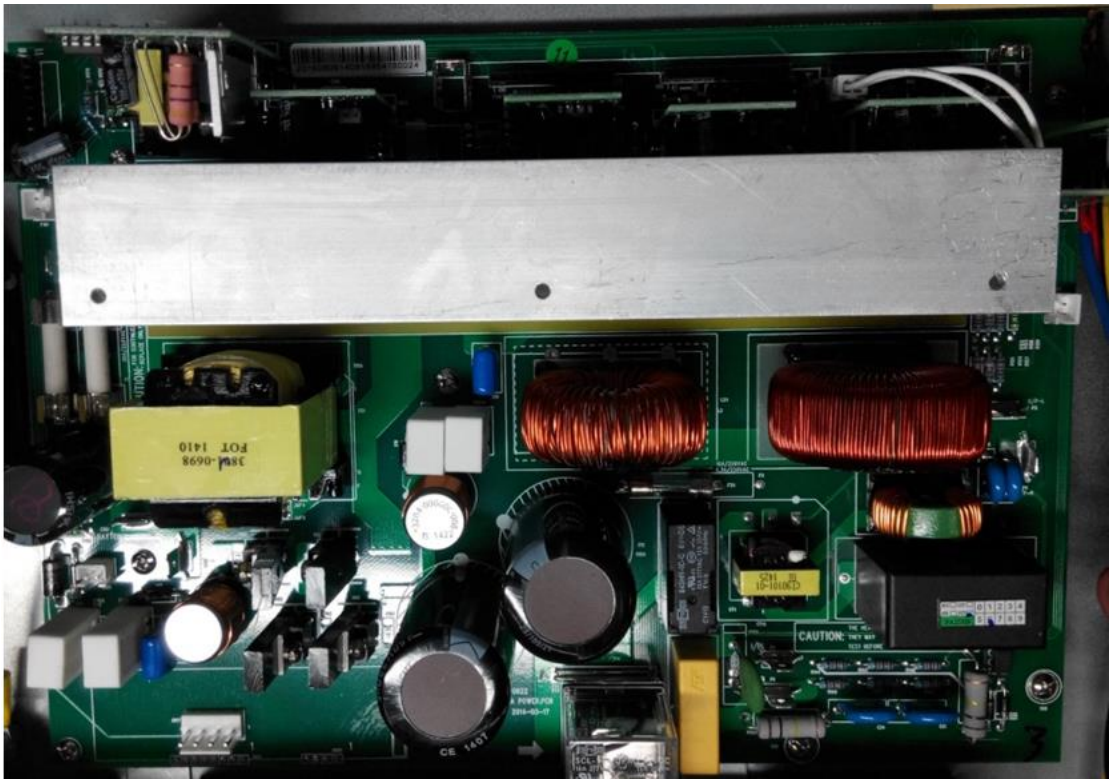
8.2.1　1KVA/1.5KVA Input filter plate　1KVA/1.5KVA 输入滤波板



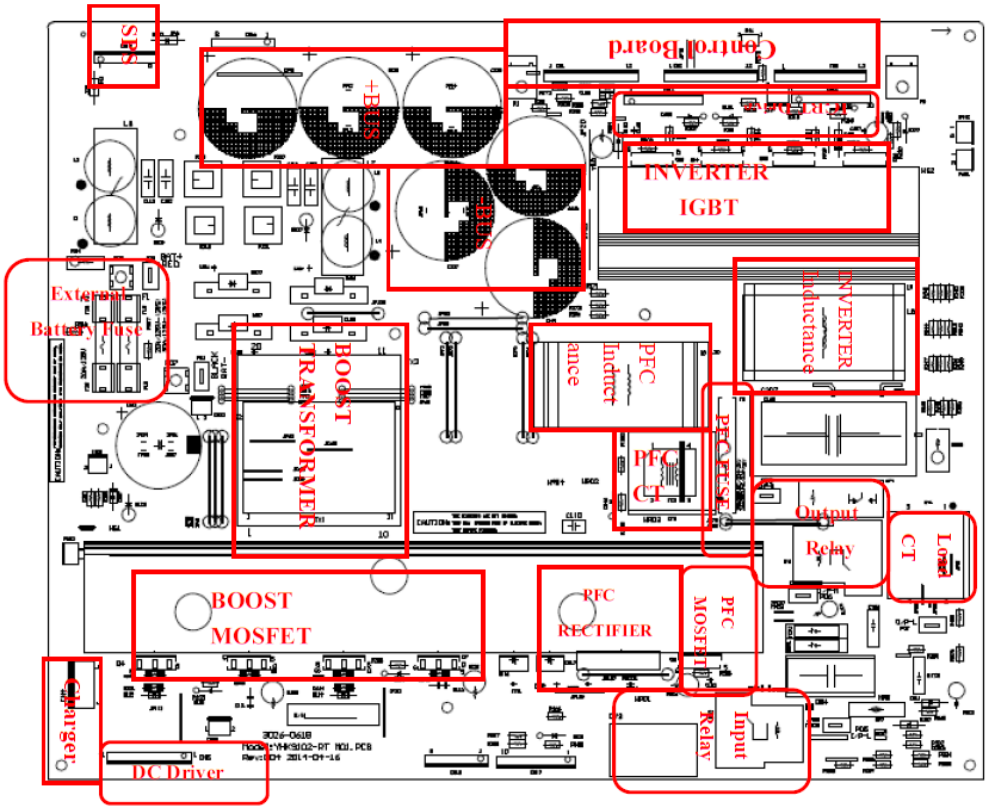


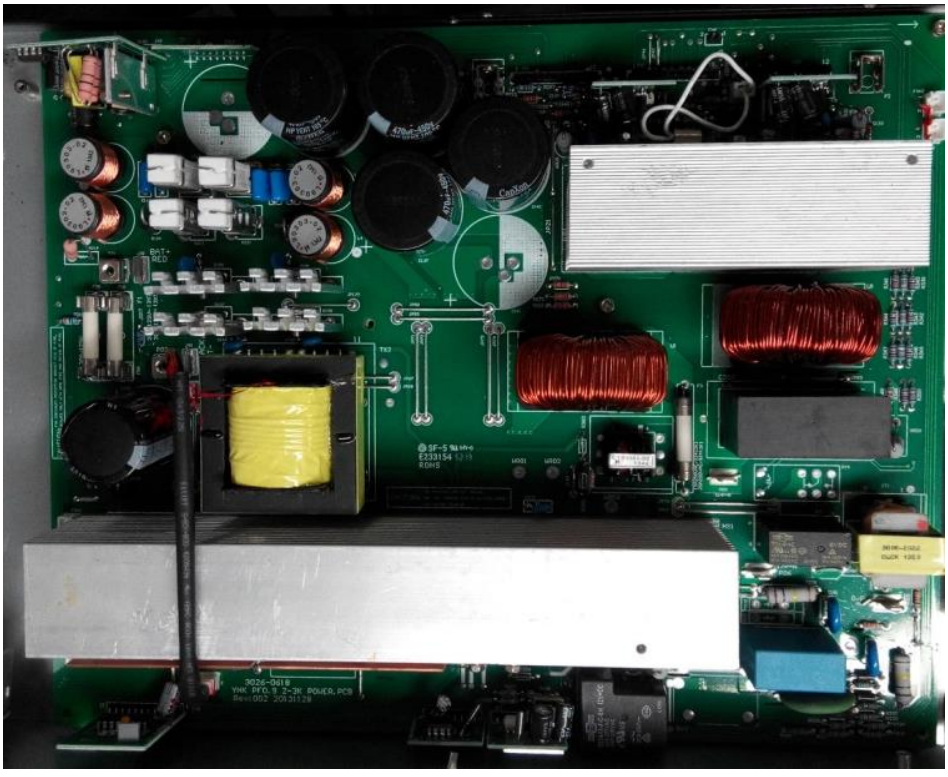
8.2.2 1KVA/1.5KVA power board 1K/1.5K 功率板



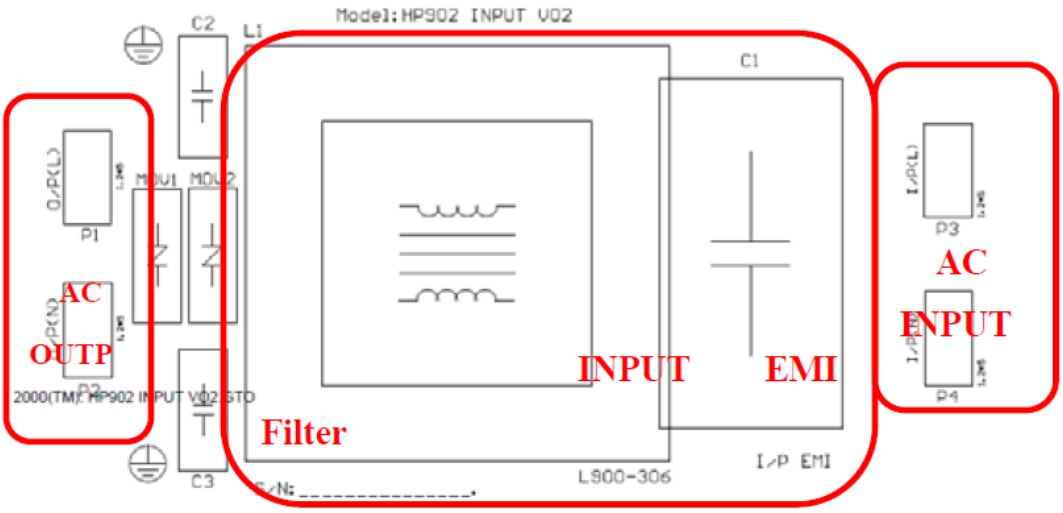


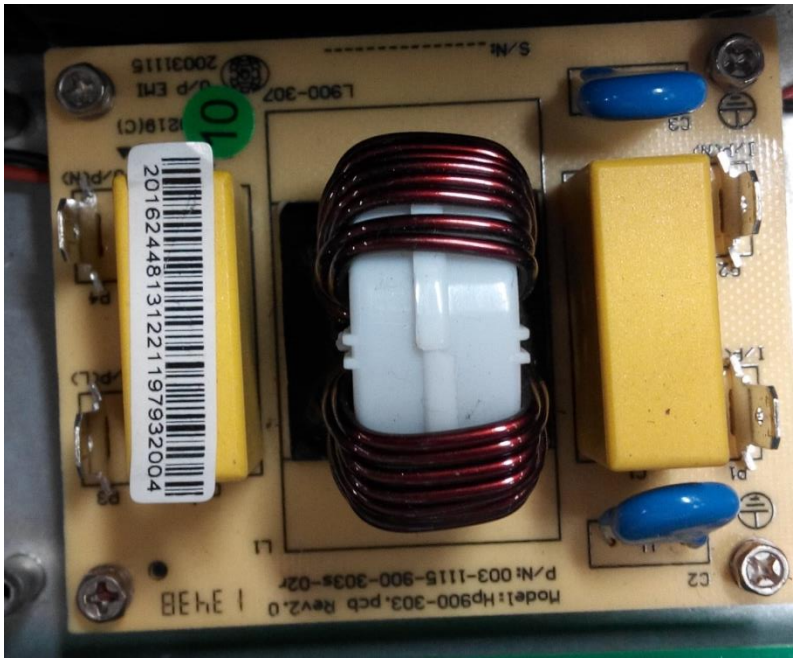
8.2.3 2KVA/3KVA power board 2KVA/3KVA 功率板



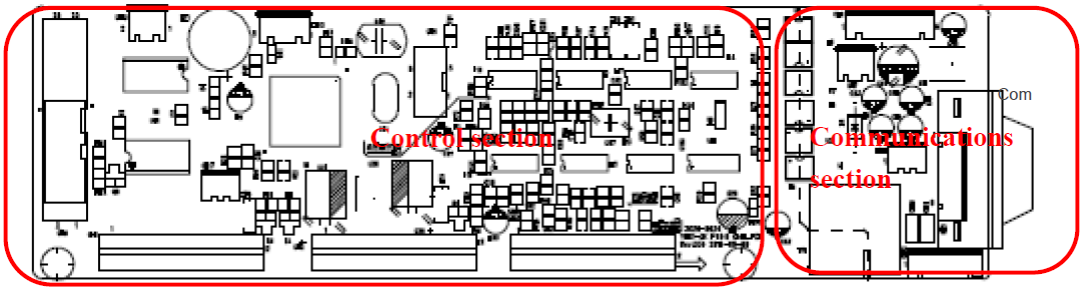


8.2.4 2KVA/3KVA Input filter Board 2KVA/3KVA 输入滤波板

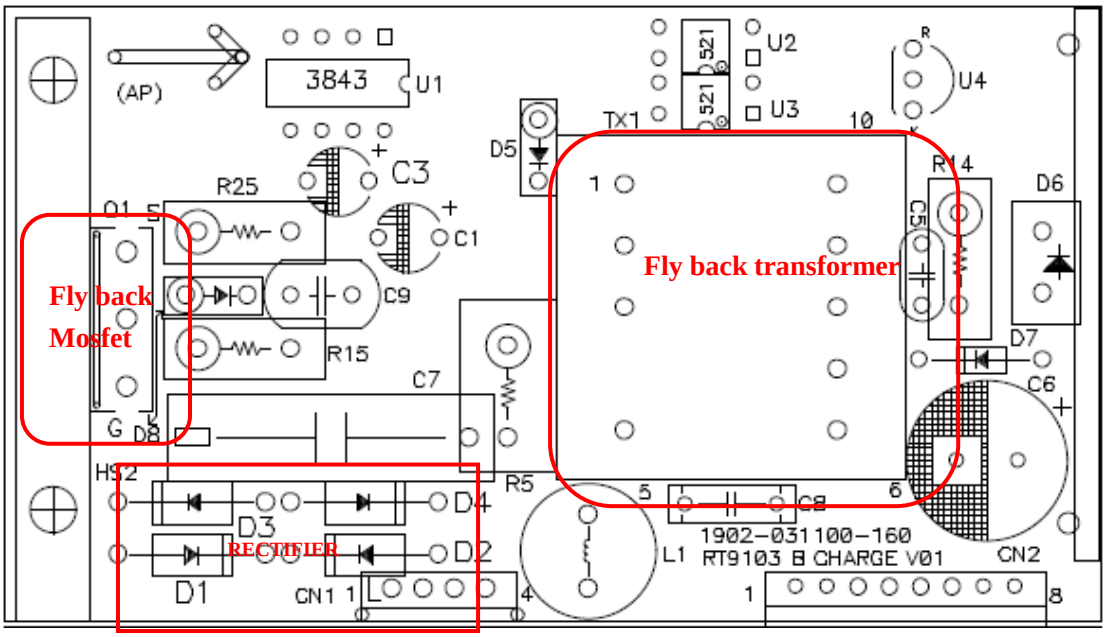


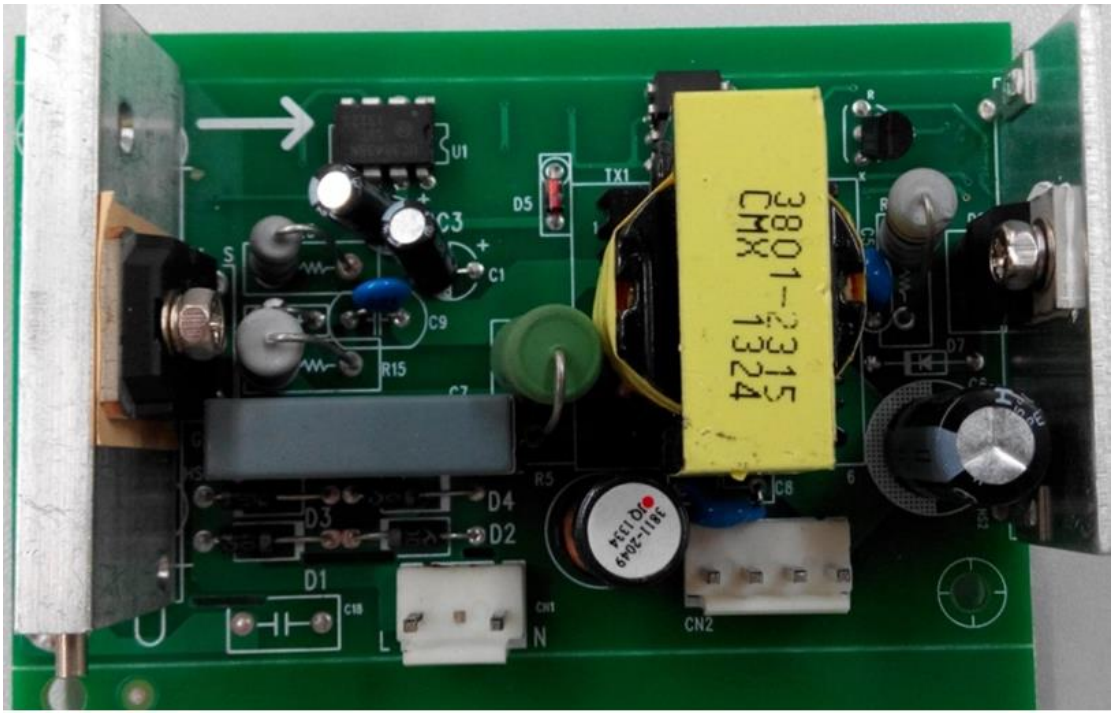


8.2.5 control board 控制板

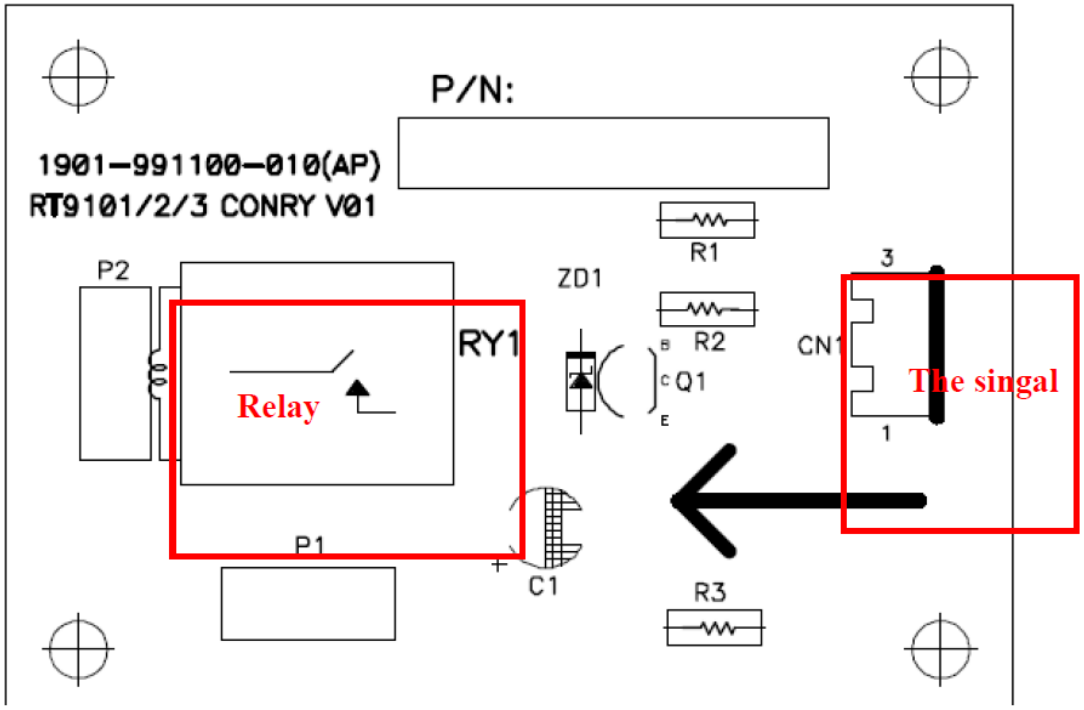


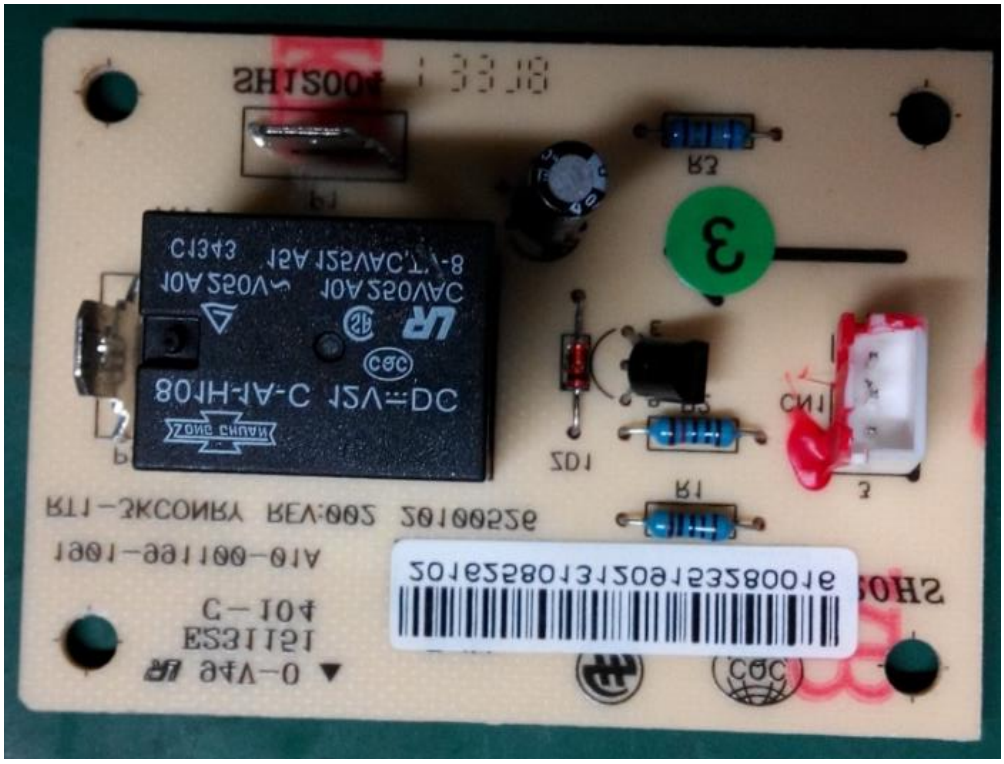
8.2.6 charging board 充电板



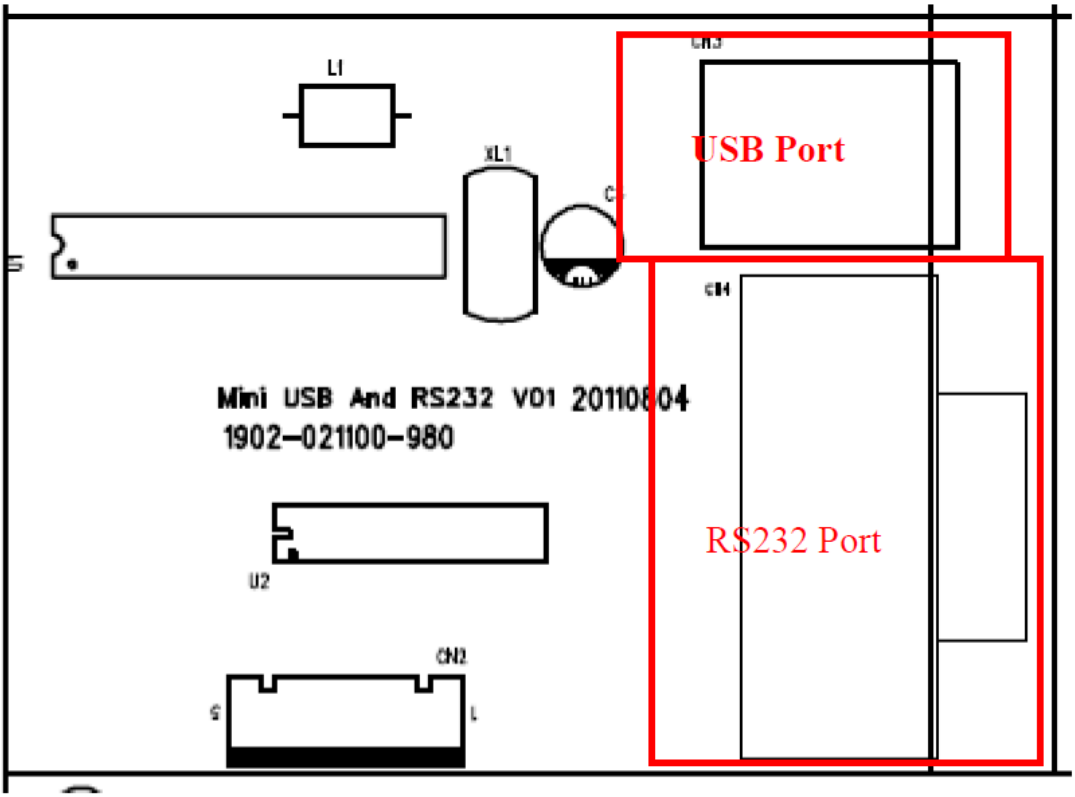


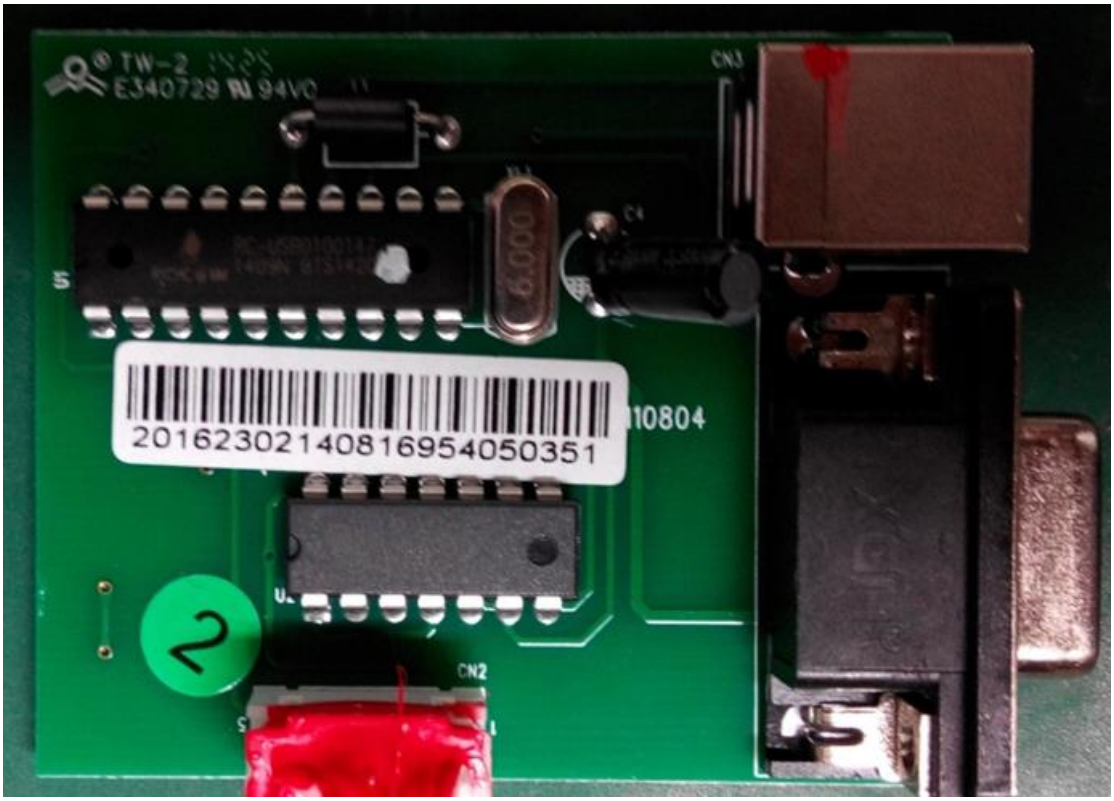
8.2.7 Second electrical relay board 二次下电继电器板





8.2.8 USB and RS232 board USB 和 RS232 板





8.2.9 SPS board SPS 板