



Power supply simple maintenance manual

File NO.: QS-AMS-DY-001
REV: A/0
Making: Quality department
Date: 2022/03/08



Change list

NO.	REV	Description	Owner	Date
1	A/0	Initial release	Haohongliang	2022-03-08

1. 目的 objective

为帮助、指导场地运维人员有效提升故障电源的维修效率及准确性，结合电源售后维修数据，特制成本维修手册，供参考使用。

In order to help and guide the site operation and maintenance personnel to improve the maintenance efficiency and accuracy of the power supply, combining with the after-sales maintenance data of the power supply, this maintenance manual is formulated for reference.

2. 适用范围 Scope of application

2.1 型号 Model: PSU3300-03

输入 Input: 200-285VAC 50/60Hz 16A Max

输出 Output: 11.5V-14.5V = 3100W

12V = 200W

2.2 型号 Model: PSU3300-03 PLUS

输入 Input: 185-285VAC 50/60Hz 16A Max

输出 Output: 11.5V-14.5V = 3100W

12V = 200W

2.3 型号 Model: PSU3300-01 PLUS1



输入 Input: 200-285Vac 50//60Hz 16A Max.

输出 Output: 11.5-14.5V 3100W


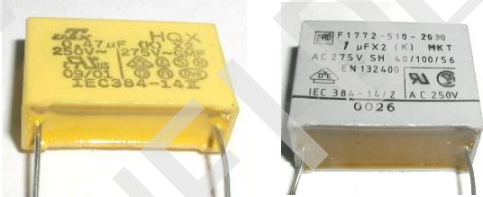


12V 200W

3. 电源基本元器件认知 Knowledge of basic components of power supply

3.1 电子件 Electronic components

电阻 Resistor	图片 The picture	说明 instructions
碳膜电阻 Carbon film resistor		功率 power: 1/16W~2W 电阻值 Resistance value: 1 Ω ~3.3M Ω 容差 tolerance: ±1%(F)~±5%(J)
氧化金属皮膜电阻 Metal oxide skin film resistor		功率 power: 1/8W~5W 电阻值 Resistance value: 5 Ω ~1M Ω 容差 tolerance: ±0.1%~±5%(J)

贴片电阻 SMD resistor		功率: 1/16W~1/2W 电阻值: 0Ω~33MΩ 容差 tolerance: ±5%
压敏电阻 (安规) Varistor(safety gauge)		具有非线性伏安特性, 主要用于在电路承受过压时进行电压钳位, 吸收多余的电流以保护敏感器件。 With nonlinear voltammetry characteristics, mainly used for voltage clamp when the circuit is under overvoltage, absorb excess current to protect sensitive devices.


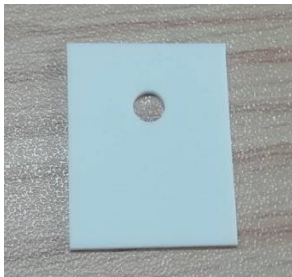
电容 capacitor	图片 The picture	说明 instructions
陶瓷电容 Ceramic capacitor		耐压: 视具体规格 Withstand Voltage: depending on specific specifications 标称电容量: 视具体规格 Nominal capacitance: subject to specific specifications 容差: 视具体规格 tolerance: depending on specific specifications
X 电容 X capacitor		安规电容 Safety capacitance
Y 电容 Y capacitor		
薄膜电容 Thin film capacitor		无极性 nonpolar 绝缘阻抗高 High insulation impedance 频率响应范围广 Wide range of frequency response







电解电容 Electrolytic capacitor		<p>极性要求：引线长脚为正极，短脚为负极。</p> <p>Polarity requirements: the long lead is positive, the short lead is negative.</p>
贴片电容 The patch capacitance		<p>耐压：视具体规格</p> <p>Pressure resistance: depending on specific specifications</p> <p>标称电容量：视具体规格</p> <p>Nominal capacitance: subject to specific specifications</p> <p>容差：视具体规格</p> <p>tolerance: depending on specific specifications</p>

晶体管 The transistor	图片 The picture	说明 instructions
二极管 (整流、开关、稳压等) diode (rectifier,switch,voltage regulator, etc.)		<p>有极性要求：环形标志或短脚为负极</p> <p>Polarity requirements: ring mark or short pin for the negative pole</p>
三极管 triode		<p>主要作用是信号开关及放大。</p> <p>The main function is signal switching and amplification.</p>
IC The integrated circuit		<p>引脚序号识别：将 IC 正面的字母、代号对着自己，使定位标记（封装表面有圆点或缺口）朝左下方，则处于最左下方的管脚是第1脚，其他序号按逆时针依次排列。</p> <p>Pin number identification: the IC front letter, code to their own, so that the positioning mark (packaging surface has dots or gaps) toward the left below, the bottom left pin is the first foot, the other serial number according to the counterclockwise order.</p>

3.2结构件 structure

序号	种类	图片 The picture	序号	种类	图片 The picture
1	保险丝 The fuse		5	开关 switch	
2	PCB Printed circuit board		6	继电器 relay	
3	AC 插座 AC socket		7	线材 wire	
4	风扇 fan		8	连接器 The connector	

序号	种类	图片 The picture	序号	种类	图片 The picture
1	外壳 The shell		5	陶瓷基片 Ceramic substrate	

2	散热片 Heat sinks		6	绝缘粒 Insulation grain	
3	麦拉片 mylar		7	热缩套管 Heat shrinkable casing	
4	绝缘片 (矽胶片) Insulating sheet (silicon film)		8	螺丝 screw	

4. 产品工作原理 The product principle

电源主要组成部分有：EMI 电路、桥式整流、PFC 功率校正电路、反激电路、辅路半桥 LLC 谐振电路、辅路同步整流滤波电路、主路半桥 LLC 谐振电路、主路同步整流滤波电路、MCU 控制电路、保护电路。

The main circuits of the power supply are: EMI circuit, bridge rectifier, power correction circuit, flyback circuit, auxiliary half-bridge LLC resonant circuit, auxiliary synchronous rectifier filter circuit, main half-bridge LLC resonant circuit, main synchronous rectifier filter circuit, MCU control circuit, protection circuit.

①上 AC 电经过 EMI 电路和桥式整流电路，把 AC 电转化为 DC 电；

Power on, the input AC voltage is translated to DC voltage through the EMI circuit and the bridge rectify circuit.

②DC 电通过反激电路生成 18VCC；

DC Voltage generates 18VCC through flyback circuit；

③18VCC 经过转换给继电器，辅助电路 LLC2 小板 IC，主路 LLC1 小板 IC 供电，PFC IC 供电；

18VCC is converted to to supply relay, auxiliary circuit LLC2 IC, main circuit LLC1 IC , PFC IC ;

④PFC 芯片工作后，把 PFC 电压抬高，主输出 LLC1，从输出 LLC2 IC 工作；

After the PFC chip works, the PFC voltage is boosted, the main circuit LLC 1 IC and auxiliary circuit LLC2 IC begin to work.

⑤主输出 LLC1 芯片工作后，经过 LLC 谐振电路有主输出电压，后同步整流工作；

After the main output LLC1 chip works, there is a main output voltage through LLC resonant circuit, and then the synchronous rectification works;

⑥从输出 LLC2 芯片工作后，经过 LLC 谐振电路有从输出电压，后同步整流工作；

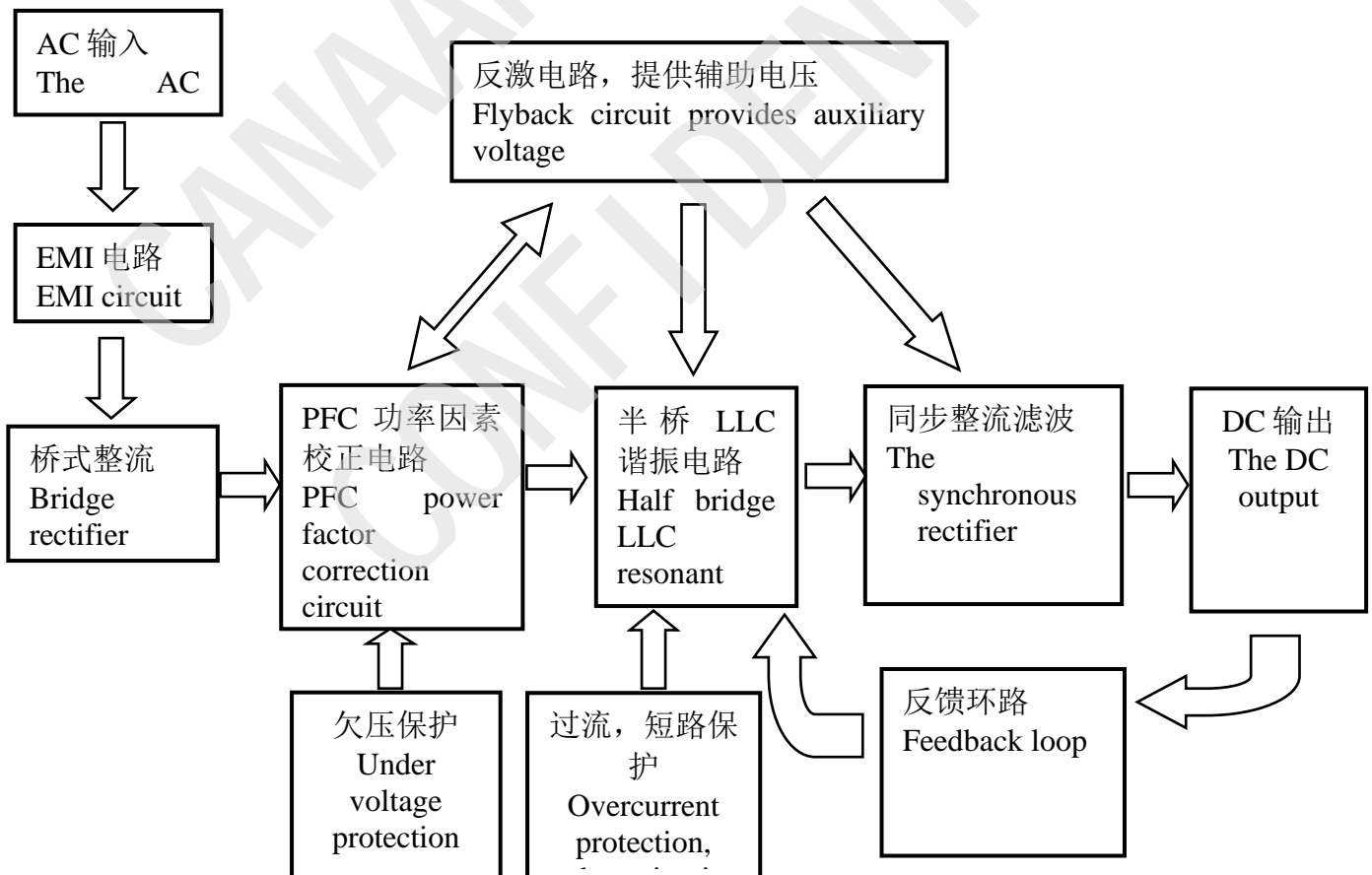
After the auxiliary circuit LLC2 IC works, there is a auxiliary output voltage through LLC resonant circuit, and then the synchronous rectification works;

⑦从输出电压经过转换给 MCU 芯片供电，提供软件通信，控制，保护功能。

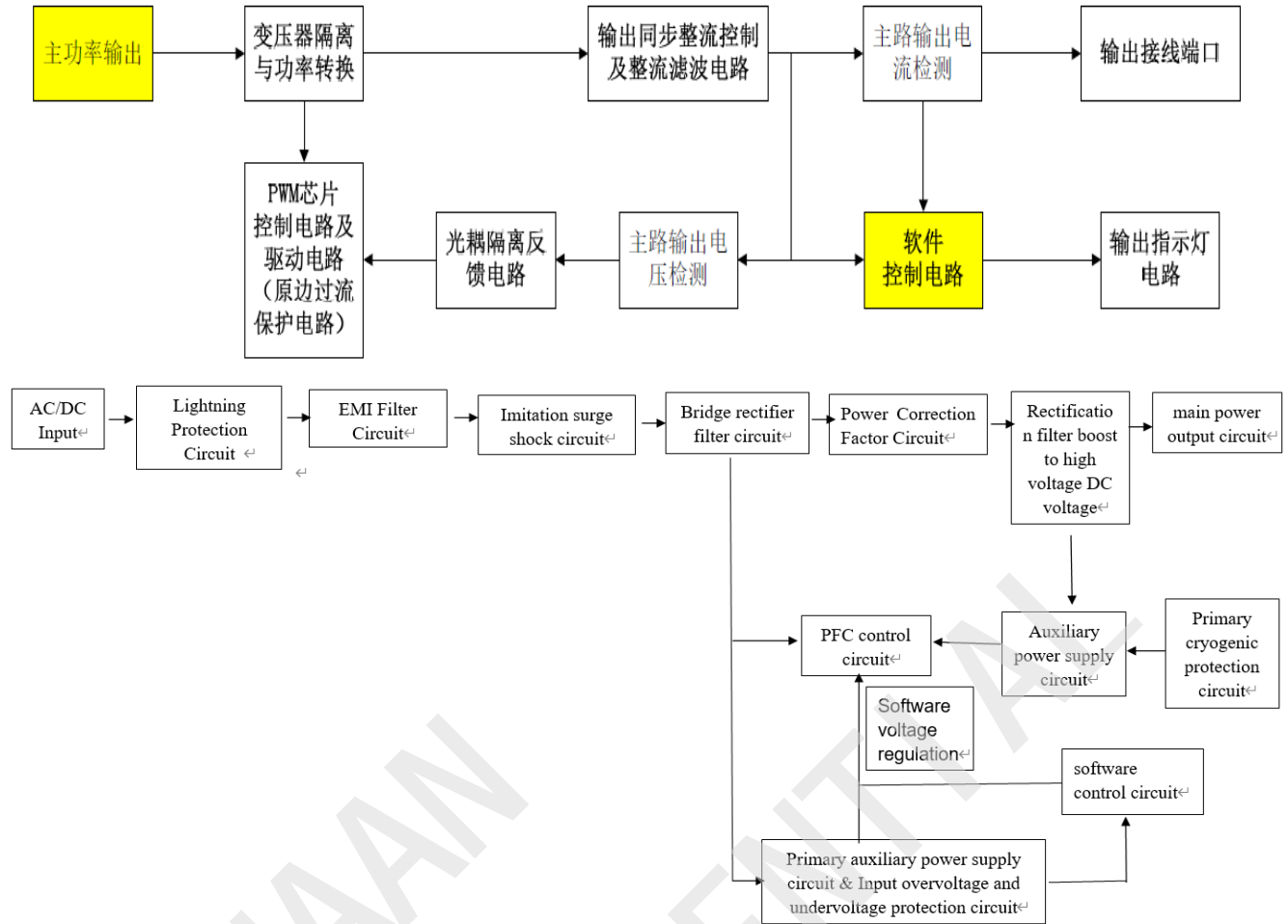
The auxiliary voltage is translated to supply MCU IC, Which provides software communication, control, protection function.

5. 电源线路方框图

5.1 PSU3300-03&PSU3300-03 PLUS



5.2 PSU3300-01 PLUS1



6. 常见故障分析与维修 Common failure analysis and maintenance

6.1 PSU3300-03&PSU3300-03 PLUS

6.1.1 硬件故障 Hardware failure

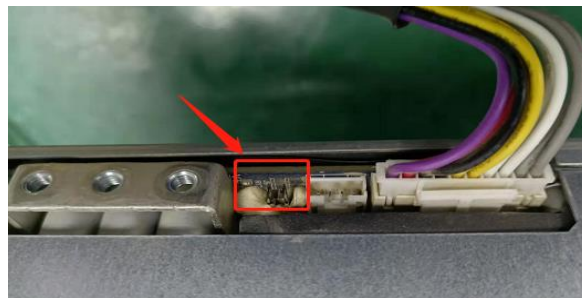
1) 分析流程 Analysis process:

① 故障类型判定, 具体方法为 Fault type determination, the specific method is:

a. 电源断电, 从整机上拆下 If the power supply is cut off, remove it from the miner.

b. 将端子右边 2Pin (靠近 V+ 端子) 短路, 如图:

Short circuit the 2Pin on the right of the terminal (near the V+ terminal), As shown in figure:



c. 电源单体通电开机，不连接矿机 The power monomer is powered on , not connected to the Miner。

d. 万用表设置直流电压档位，测量电源输出电压（万用表正极接电源端子“+”，万用表负极接电源端子“—”）

Multimeter Set the DC voltage range and measure the output voltage of the power supply. (Connect the positive terminal of the multimeter to the power supply terminal + and the negative terminal to the power supply terminal -):

若 $\geq 11.9V$ ，则初步判定电源硬件 OK，待上机老化确认；

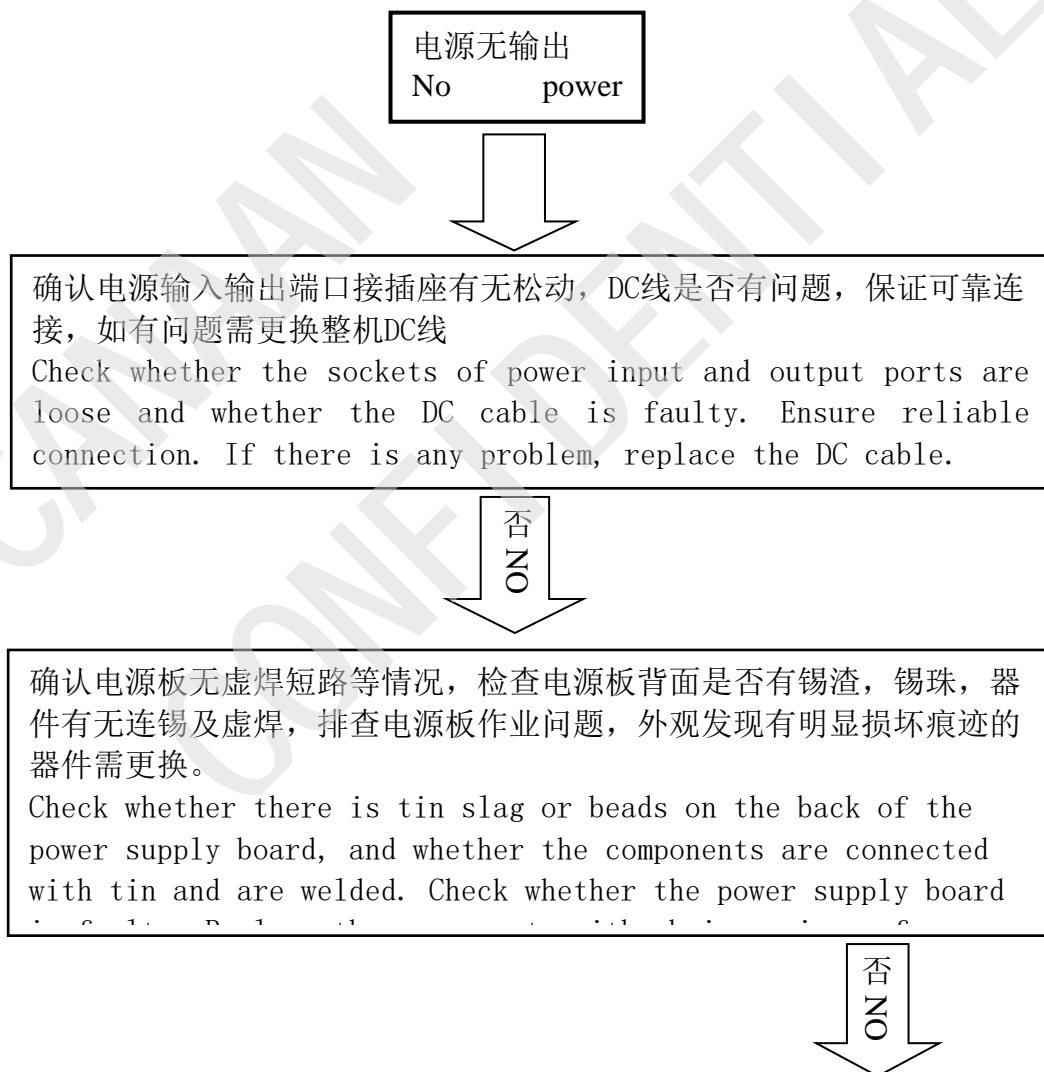
If $\geq 11.9V$, the power supply hardware is preliminarily determined to be OK, to be confirmed by machine aging;

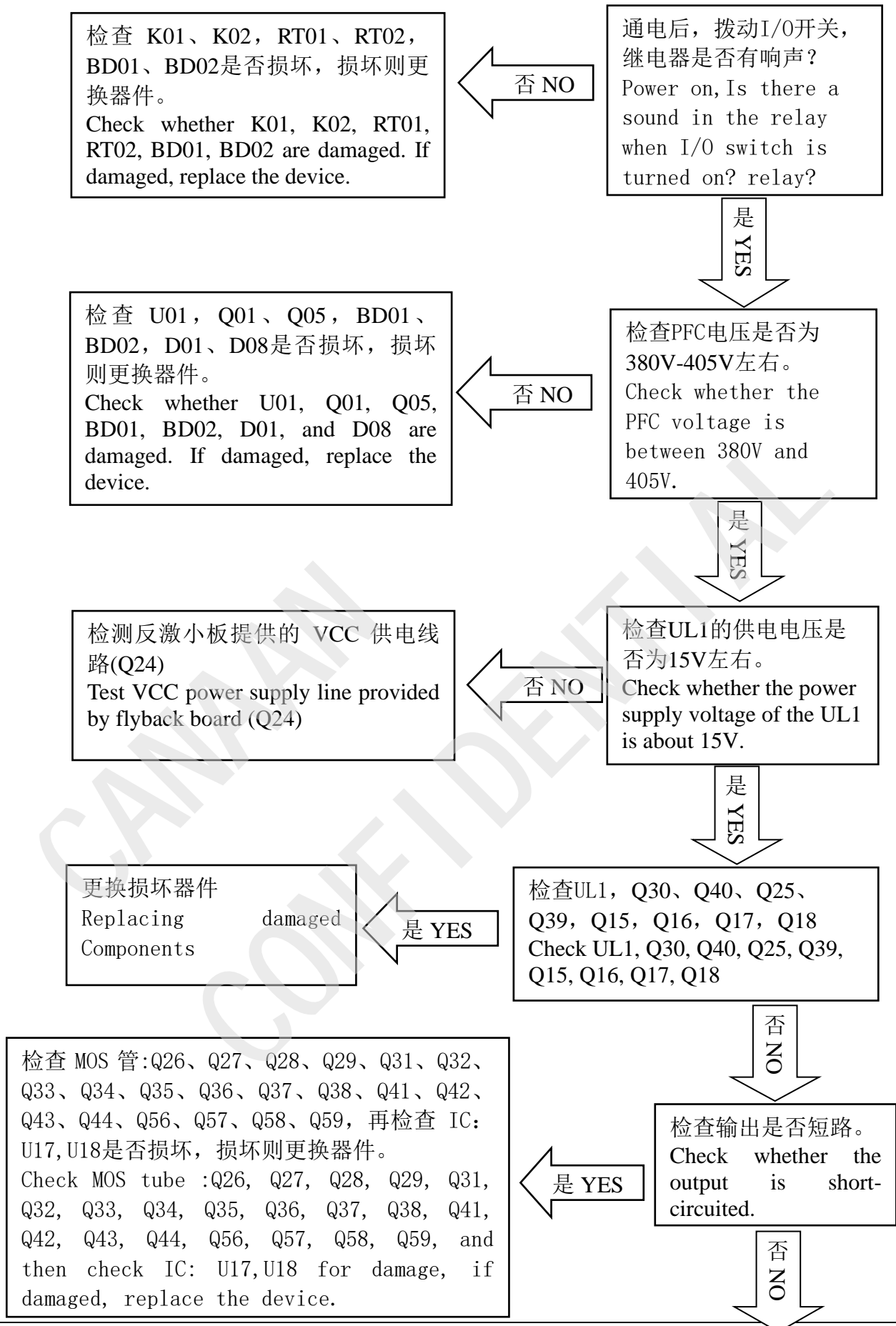
若 $< 11.9V$ ，则初步判定电源硬件故障。

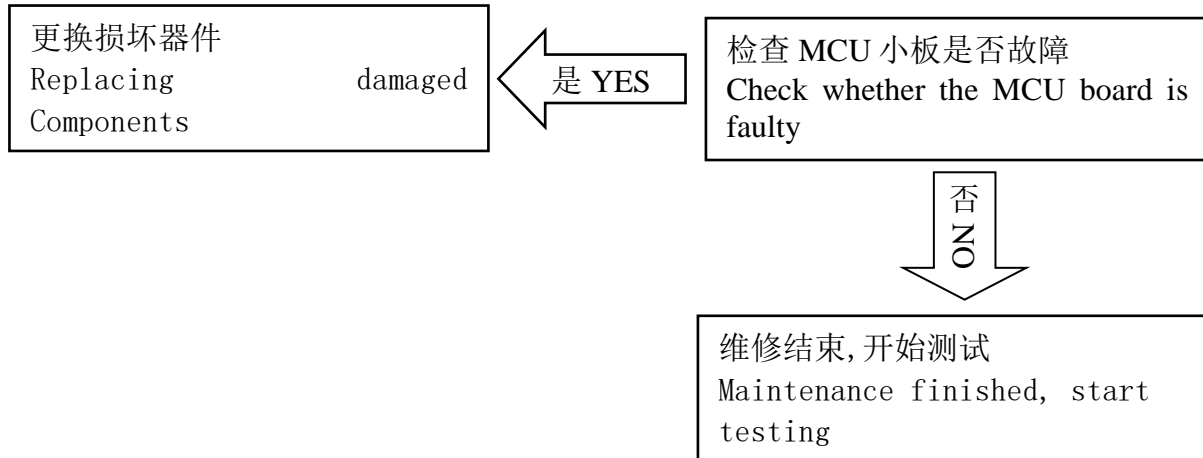
If $< 11.9V$, it is preliminarily determined that the power supply hardware is faulty.

② 硬件故障排查 Hardware troubleshooting:

a. 电源无输出检修流程 The power supply has no output maintenance process:







2) 维修方法 The maintenance method:

不良现象 Bad phenomenon	不良原因 Bad reasons	维修方法 The maintenance method
无输出 no output	F01开路 F01 open	<p>原因详述：过压、过流供电异常，导致交流保险 F01熔断。 Cause details: Overvoltage or overcurrent power supply is abnormal, Cause ac insurance F01 to fuse.</p> <p>维修方法：将万用表设置二极管档位，量测交流插座 L 、N 线，如无数值显示则为 F01已开路，有数值显示则表示交流线路正常。 Set the multimeter to diode gear and measure the L and N lines of the AC socket. If no value is displayed, F01 is open. If there is a value, it indicates that the AC line is normal.</p>
无输出 no output	高压 BUCK 小板损坏 High pressure BUCK small plate damaged	<p>原因详述：因工作环境恶劣而导致高压 BUCK 小板损毁。 Reason details: The high-pressure BUCK small plate is damaged due to the bad working environment.</p> <p>维修方法：检查芯片 UF1、QF1、QF2、RF9、RF10、RF17、RF18、RF19、RF14是否损坏，若有损坏则更换器件。 Maintenance method: Check whether the chips UF1, QF1, QF2, RF9, RF10, RF17, RF18, RF19, RF14 are damaged or not. If there is damage, replace the components.</p>
无输出 no output	BD01、 BD02损坏 BD01 or BD02 is damaged	<p>原因详述：交流桥式整流二极管 BD01、BD02因灰尘过多导致 BD1损坏。 Cause details: AC bridge rectifier diodes BD01 and BD02 are damaged due to excessive dust.</p> <p>维修方法：更换 BD01、BD02与 F01，注意更换器件要套好套管。桥式整流二极管的4个引脚都需套上套管，且与散热器之间要涂好散热膏。 Maintenance method: replace BD01, BD02 and F01, pay attention to replace the device to cover well casing. The four pins of the bridge rectifier diode shall be covered with bushing, and the radiator shall be coated with heat dissipating cream.</p>

无输出 no output	BD03损坏 BD03 is damaged	<p>原因详述：小桥式整流二极管 BD02引脚腐蚀损坏。 Cause details: small bridge rectifier diode BD02 pin corrosion damage.</p> <p>维修方法：更换 BD03。 Maintenance method: replace BD03.</p>
无输出 no output	风扇损坏 Damage of fan	<p>PFC 部分炸机：检查 U01、Q01、Q05、BD01、BD02、D01、D08、Q02、Q07、Q03、Q08、F01、D02、D09，及外围贴片电阻是否损坏，若有损坏则更换器件。 更换 BD01、BD02、Q01、Q05、D01、D08时注意涂散热膏，更换 F01时注意套热缩套管。 其中测量芯片 U01是否损坏时，将万用表设置到测量二极管档位，检测 VCC 对地是否有 0.5V 左右的压差，若没有则更换 U6: (IC: NCP1654)。</p> <p>PFC partial blast machine: check U01, Q01, Q05, BD01, BD02, D01, D08, Q02, Q07, Q03, Q08, F01, D02, D09, and the peripheral patch resistance is damaged, if there is damage, then replace the device. Apply cooling cream when replacing BD01, BD02, Q01, Q05, D01 and D08, and cover the heat shrink tubing when replacing F01. When measuring whether the chip U01 is damaged, set the multimeter to the diode gear to detect whether the VCC has a pressure difference of about 0.5V to the ground. If not, replace U6: (IC: NCP1654).</p> <p>主 LLC 部分炸机：检 Q30、Q40、Q25、Q39、Q15、Q16、Q17、Q18、UL1、R1、R2、R16、R18、D9、D12是否损坏，损坏则更换器件。 更换 Q1、Q8时注意涂散热膏。 其中测量芯片 U2是否损坏时，将万用表设置到测量二极管档位，检测 C94 两端是否有 0.5V 左右的压差，若无，则更换 U2: (IC: NCP1399AM/1399AC)。</p> <p>Main LLC part of the machine: check whether Q30, Q40, Q25, Q39, Q15, Q16, Q17, Q18, UL1, R1, R2, R16, R18, D9, D12 is damaged, if damaged, replace the device. When replacing Q1 and Q8, pay attention to applying heat dissipating cream. When measuring whether the chip U2 is damaged, set the multimeter to the measuring diode gear and detect whether there is a pressure difference of about 0.5V at both ends of C94. If not, replace U2 (IC: NCP1399AM/1399AC).</p>
无输出 no output	同步整流 MOS 损坏 The synchrono us rectifier is damaged	<p>原因详述：元器件/线路腐蚀的导致同步整流低压 MOS 短路。 Cause details: Component/circuit corrosion leads to synchronous rectifier low voltage MOS short circuit.</p> <p>维修方法：检查 Q26、Q27、Q28、Q29、Q31、Q32、Q33、Q34、Q35、Q36、Q37、Q38、Q41、Q42、Q43、Q44、Q56、Q57、Q58、Q59、U17、U18、Q45、Q46、Q47、Q48、Q49、Q50、Q52、Q75及电阻2R2是否损坏，损坏则更换器件，同步整流 MOS5个为1组，一般只坏一个，需仔细检测。 Maintenance method: Check Q26, Q27, Q28, Q29, Q31, Q32, Q33, Q34, Q35, Q36, Q37, Q38, Q41, Q42, Q43, Q44, Q56, Q57, Q58, Q59, U17, U18, Q45, Q46, Q47, Q48, Q49, Q50, Q52, Q7 5 and resistance 2R2 are damaged, if damaged, replace the device, synchronous rectification MOS5 is 1 group,</p>

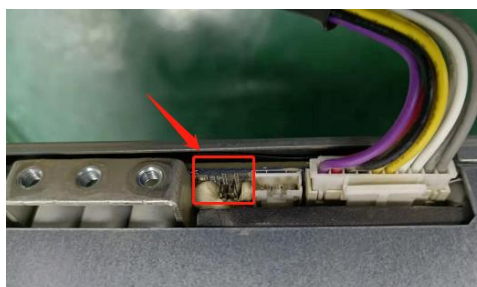
		<p>generally only one is broken, need to be carefully detected.</p> <p>备注：更换完 MOS 管锁散热片前需要重新涂散热膏。 Note: Apply heat sink cream again before replacing the heat sink of MOS tube lock.</p>
<p>不开机 no start up</p>	<p>辅助 LLC2小板 损坏 Auxiliary LLC2 small board damaged</p>	<p>原因详述：强电压击穿辅助小板线路。 Reasons detailed: strong voltage breakdown auxiliary small board.</p> <p>维修方法：检查 Q16、Q11是否短路，若出现上述情况则更换该器件。 检查芯片 UL2的 VCC 对地脚（排针第5脚）的阻抗是否有0.5V 左右的压差，若不是或者已经对地短路，则需更换 UL2（IC 型号：1399AM/1399AC）。</p> <p>Maintenance method: Check Q16, Q11 for short circuit, if the above situation occurs, replace the component. Check whether the VCC of the UL2 chip has a pressure difference of about 0.5V to the grounding pin (pin 5). If not, replace the UL2 (IC model: 1399AM/1399AC).</p> <p>备注：更换完需重新涂三防漆。 Note: After replacement, reapply tri-proof paint.</p>
<p>备注：Remark:</p> <p>① 风扇损坏会导致电源温升过高，从而引发炸机，器件损坏可分为两大部分，PFC 部分炸机、LLC 部分炸机，分析时要每个部分都分别量测。 Fan damage will cause the temperature of the power supply to rise too high, resulting in explosion, device damage can be divided into two parts, PFC part of the explosion, LLC part of the explosion, analysis to each part of the measurement.</p> <p>② 更换物料时一定要对应型号，切忌看外观一样就认为是同种物料。 Replace the material must be corresponding to the model, do not think it is the same material by looking at the same appearance.</p>		

6.1.2 软件故障 Software failure

1) 分析流程及故障类型判定 Analysis process and fault type determination:

- 电源断电，从整机上拆下 If the power supply is cut off, remove it from the miner.
- 将端子右边 2Pin（靠近 V+端子）短路，如图：

Short circuit the 2Pin on the right of the terminal (near the V+ terminal), As shown in figure:



c. 电源单体通电开机，不连接矿机 The power monomer is powered on , not connected to the Miner.

d. 万用表设置直流电压档位，测量电源输出电压（万用表正极接电源端子“+”，万用表负极接电源端子“—”）

Multimeter Set the DC voltage range and measure the output voltage of the power supply. (Connect the positive terminal of the multimeter to the power supply terminal + and the negative terminal to the power supply terminal -):

若 $<11.9V$ ，则初步判定电源硬件故障，分析流程及维修方法如上文所述。

If $< 11.9V$, the power supply hardware failure is preliminarily determined, and the analysis process and maintenance method are as described above.

- 若 $\geq 11.9V$ ，则初步判定电源硬件 OK，接下来，电源连接性能合格矿机（算力、功耗比等指标合格），正常跑老化：

If $\geq 11.9V$, it is preliminarily determined that the power supply hardware is OK. Next, the power supply connection performance is qualified for mining machine (qualified for computing power, power consumption ratio and other indicators), and normal running aging;

如果仍然发生无算力、算力低、PS 数据异常或其他相关错误代码，则初步判断为电源软件电路故障；

If there is still no computing power, low computing power, abnormal PS data or other relevant error codes, it is preliminarily judged as power supply software circuit failure;

如果连接矿机后，老化算力及功耗比等指标均正常，说明电源 OK。

If the aging calculation force and power consumption ratio are normal after connecting the mining machine, it indicates that the power supply is OK.

2) 维修方法 The maintenance method:

依次排除 MCU 小板 STM8S005C6T6 IC 芯片及阻容器件问题，对应更换即可。

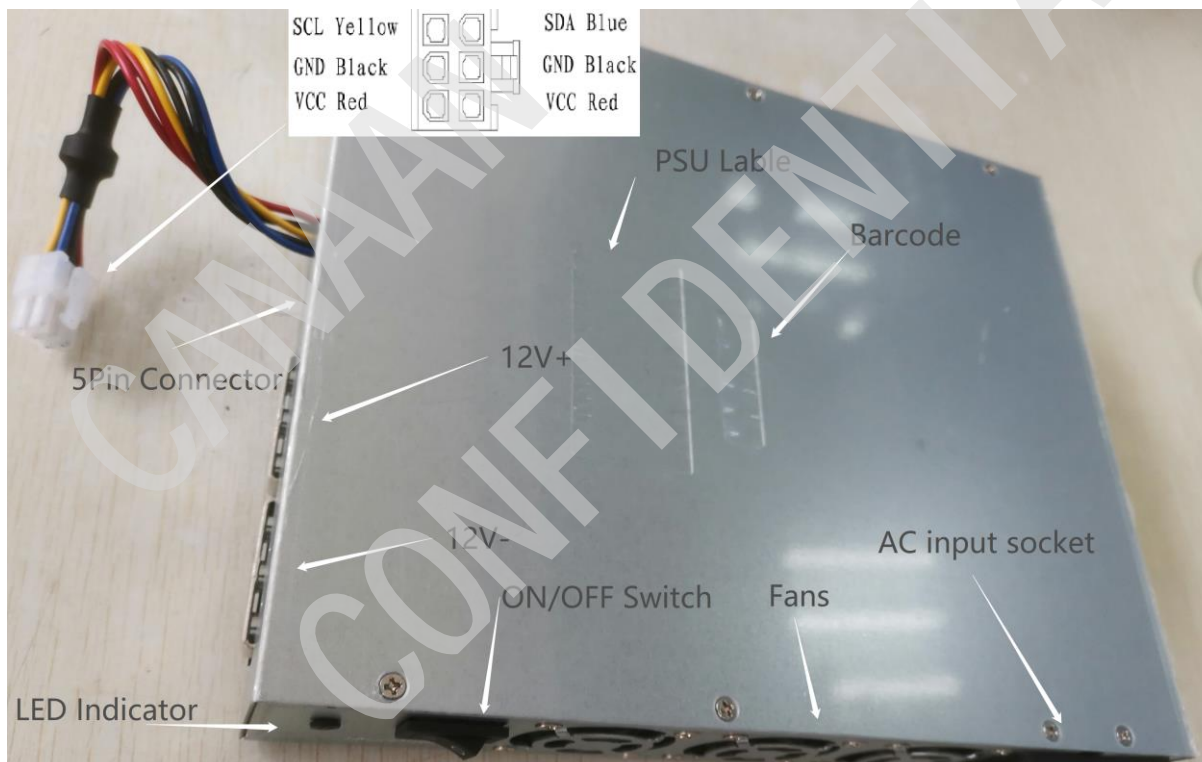
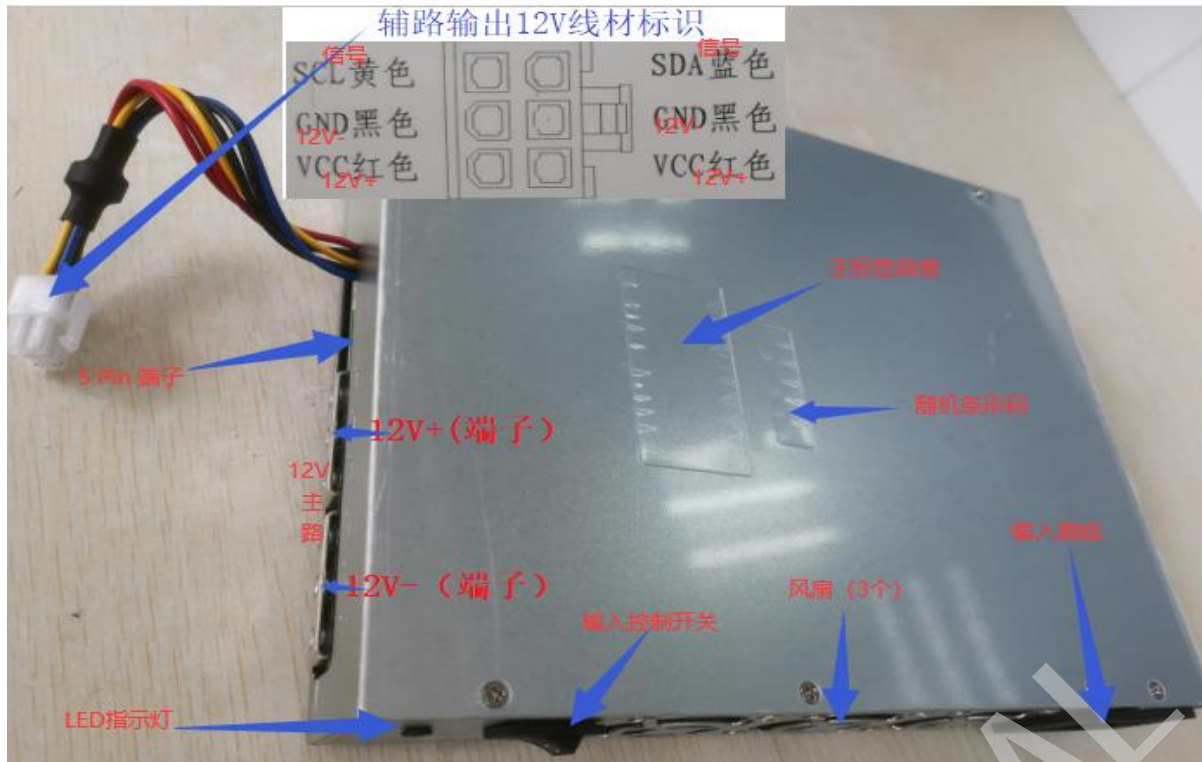
Remove MCU small board STM8S005C6T6 IC chip and resistance container parts in turn, and replace them accordingly.

6.2 PSU3300-01 PLUS1

6.2.1 维修作业指引：Repair and Maintenance

1) 电源整机维修判定 PSU trouble shooting

a. 产品外观说明图： PSU introduction



b. 产品外观检查及检测: Product appearance inspection and testing

①首先观察外观，看是否有明显的破损，有明显外观问题可能受撞击或摔撞。

First, observe the appearance to see if there is obvious damage. If there is obvious appearance problem, it can be impacted or dropped

②其次摇晃下看是否有异音，有异音可能有功率管炸掉；

Secondly, shake to see if there is any abnormal sound. If there is any abnormal sound, the power tube may blow up

③再次用万用表测量输入输出的阻抗看是否有短路:

Measure the input and output impedance with a multimeter again to see if there is a short circuit

输入端子是否松动或拉弧, L/N/G 间是否短路;

Whether the input terminal is loose or arcing, and whether there is a short circuit between L / N / G

12V 主路输出端子变形, 与外壳短路, 正负极间短路测量;

The output terminal of 12V main circuit is deformed, short circuited with the shell, and the short circuit between positive and negative electrodes is measured
12V 辅路输出端子破损, PIN 针间短路, 正负极间短路测量;

12V auxiliary circuit output terminal is damaged, short circuit between pin pins and short circuit between positive and negative electrodes are measured

④查风扇叶是否被异物堵住;

Check whether the fan blade is blocked by foreign matters

⑤电源通电启动, 短路 5Pin 端子的 AGND 与 SETUP 可启动主路输出;

When the power supply is powered on and started, the agnd and setup of short circuit 5pin terminal can start the main circuit output

⑥观察前面板指示灯, 正常工作亮绿灯, 红色表示异常需立即断开输入电压;

Observe the indicator light on the front panel, the green light is on for normal operation, and the red light indicates that it is abnormal, and the input voltage needs to be disconnected immediately

⑦电源通电, 观察电源内部指示灯:

When the power supply is powered on, observe the internal indicator light of the power supply

- 指示灯常亮: 输出风扇故障

The indicator light is always on: the output fan is faulty

- 指示灯闪 1 次 灭 3S: 环境温度过高保护

The indicator light flashes once and goes out for 3S: protection against excessive ambient temperature

- 指示灯闪 2 次 灭 3S: 次级散热温度保护

Indicator light flashes twice and goes out for 3S: secondary heat dissipation temperature protection

- 指示灯闪 3 次 灭 3S: LLC 散热温度保护

The indicator light flashes for 3 times and goes out for 3S: LLC heat dissipation temperature protection

- 指示灯闪 4 次 灭 3S: PFC 散热温度保护

The indicator light flashes for 4 times and goes out for 3S: PFC heat dissipation temperature protection

⑧通电没有任何反应的，开盖，电容放电

Power on without any reaction, open the cover and discharge the capacitor

- 打开输入控制开关（0：关闭，1：导通），测量开关是否正常闭合

Open the input control switch (0: off, 1: on), and measure whether the switch is normally closed

- 观察电源内部是否有炸功率管或烧掉器件

Observe whether there is power tube explosion or device burning inside the power supply

- 测量主要功率管看是否有损坏的

Measure the main power tube to see if there is any damage

⑨裸机通电：测量关键电压

Bare metal power on: measure key voltage

- 大电解电容电压：390V 左右

Voltage of large electrolytic capacitor: about 390v

- 初级辅助供电 VCC 供电 15V 左右

Primary auxiliary power supply VCC power supply is about 15V

- 辅路输出供电 15V

Auxiliary circuit output power supply 15V

- 辅路 12V

Auxiliary road 12V

- 主路默认输出 13V

The default output of main circuit is 13V

2) 整机拆外壳流程图 Flow chart of shell removal of the whole machine



1: 首先拆掉外壳 7 颗螺丝,

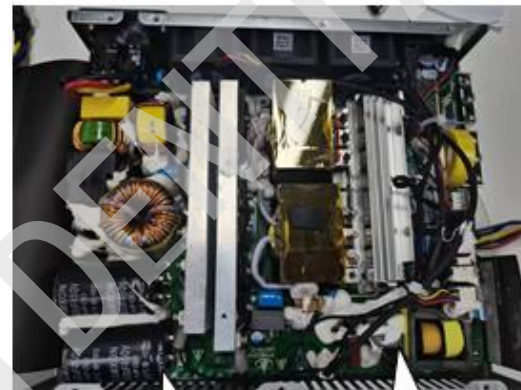


2: 对电容 C4 进行放电再拆掉主板 7 颗螺丝

3: 从箭头指示位置倾斜将主板拿出。



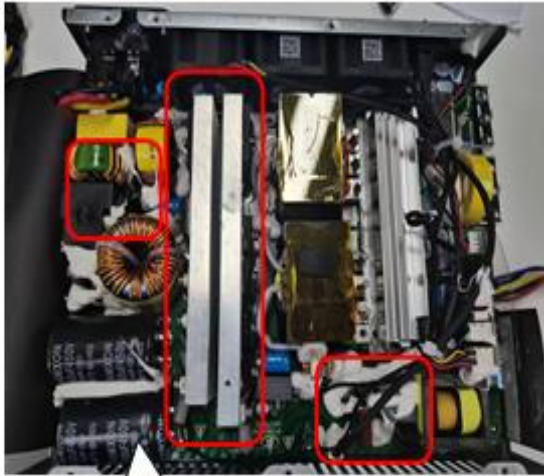
Step 1. unscrew and take apart the cover



Step 2. discharge capacitor C4 and unscrew PCBA.

Step 3. Follow this direction and take PCBA out.

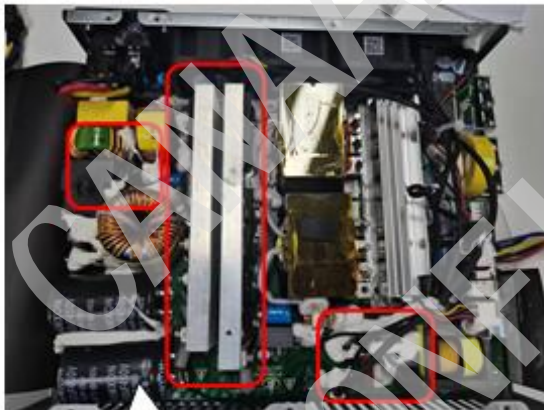
3) PCBA 外观不良品判定 PCBA appearance defect judgment



目测上图红色圈圈内的元器件有无明显的烧黑或其他变化，



目测上图红色圈圈内的元器件有无明显的烧黑或其他变化，

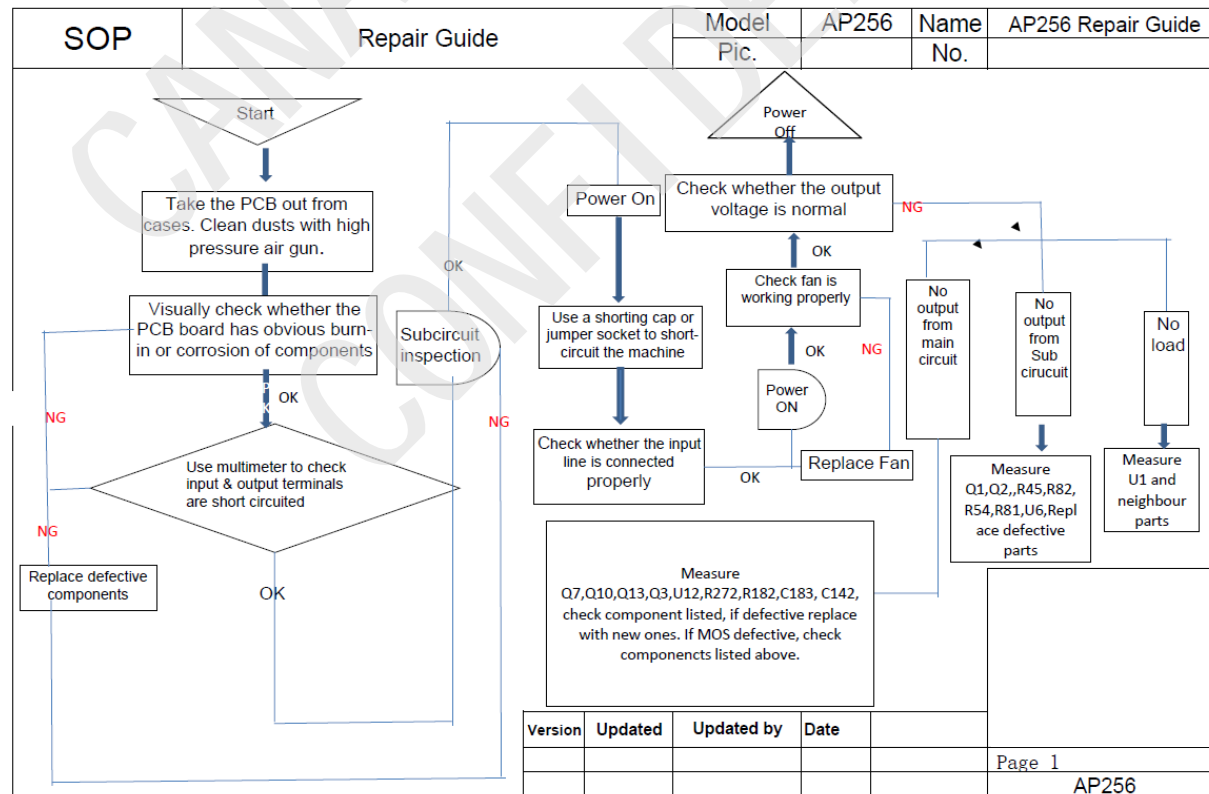
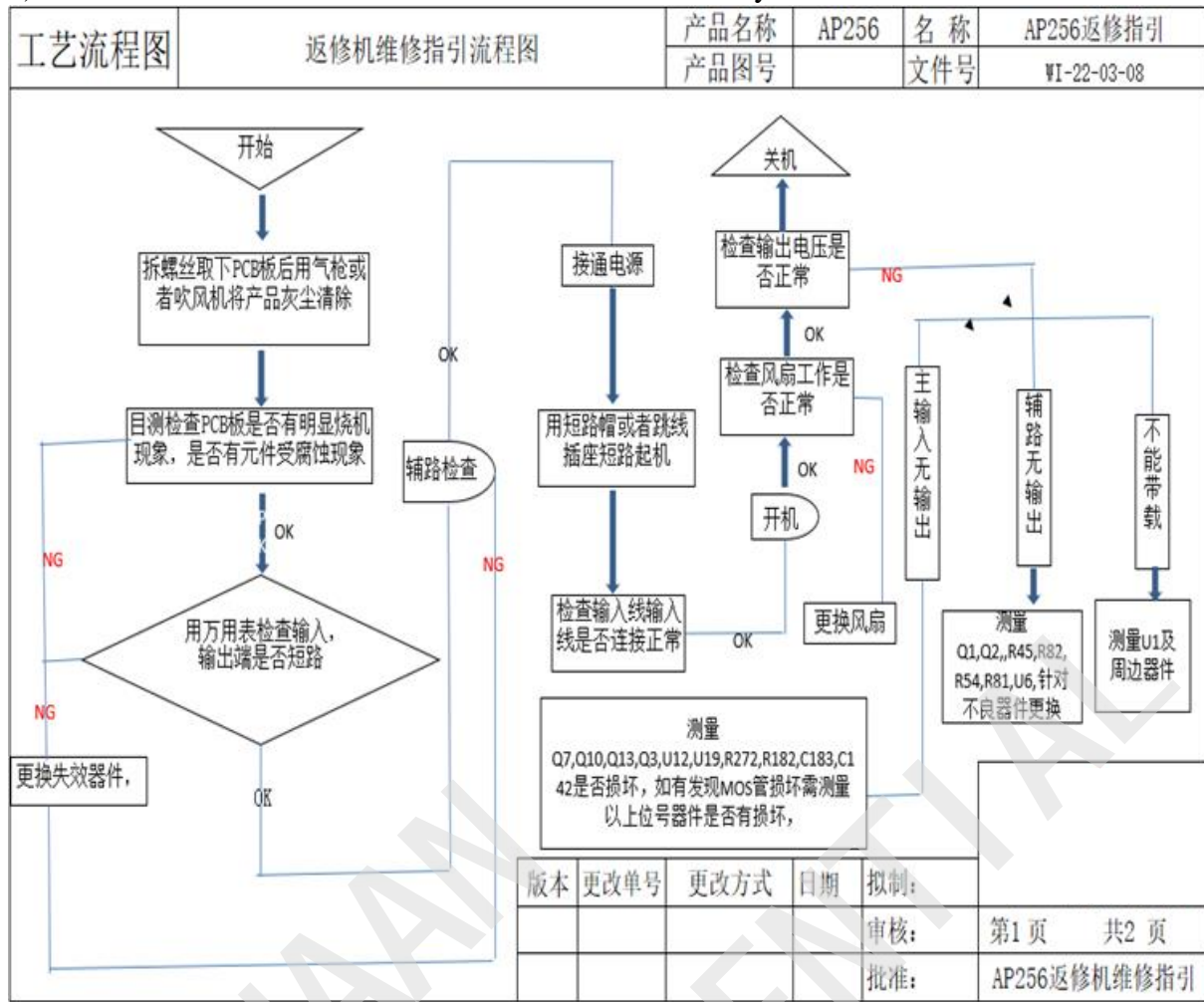


Step 1. Visual inspection whether these parts burned or damaged



Step 2. Visual inspection whether these parts burned or damaged.

4)PCBA 硬件故障分析流程图 PCBA hardware fault analysis flow chart



5) 万用表检测不良品方法 Method for detecting defective products with Multimeter



如图测量整流桥的输入输出端之间是否有短路击穿,用电阻档10K 测量阻值少于100欧为损坏



如图测量输出端 MOS 管, 首先把散热器拆下, 用万能表电阻档测试 MOS 管的输出和控制脚是否短路击穿, 如是则损坏。



Follow Picture multimeter with resistance 10k, if resistance tested <100K between input and output terminals of the rectifier bridge. Means there was a short circuit breakdown.

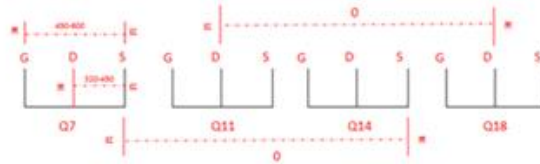


Follow picture measure MOS. First remove the radiator, and use the resistance gear of a multimeter to test whether the output of the MOS tube and the control pin are short-circuited and broken down. If yes, MOS is damaged.



如图测量前置 MOS 管，用万能表电阻档测量 MOS 管的 G,D,S 脚之间是否有电流击穿现象。

AP256 背面带散热器元件位置示意图



Follow picture measure front MOS with multimeter check if any breakdown between G, D, S

Back side locations on heatsink



6.2.2 常见故障分析与维修 Frequent failures



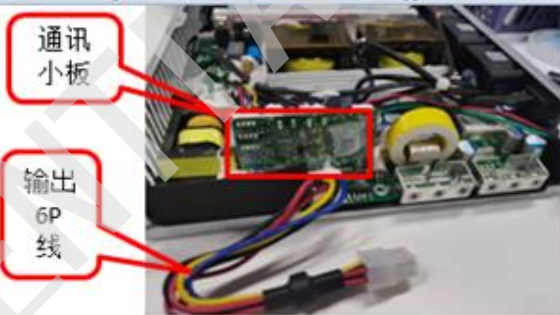
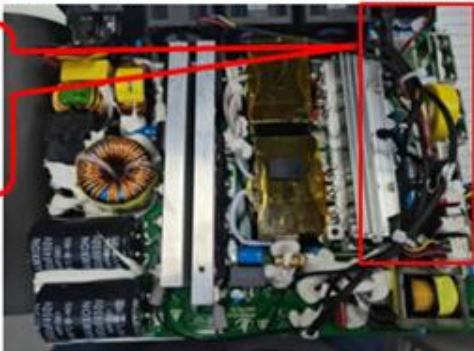
1) 常见故障失效器件清单 BOM of frequently failed

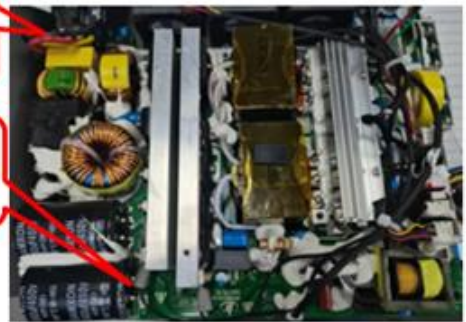
序号	故障现象	电路位置	主故障失效器件	需检查器件
1	PFC 无390V 电压	PFC 电路	TR1短路	F2、RB1、RB2、RT1、D5、D9、D13、Q32、Q33、Q34、R311、R309、R314、R329、R330其中部分元件失效
2	PFC 无390V 电压	PFC 电路	C4、C24失效	/
3	无输出	13V 主路 MOS 管驱动电路	Q10、Q13、Q3、Q7短路	U7、U19、U12、RT1、D5、D9、D13、R329、R330其中部分元件失效
4	无输出	12V 辅路 MOS 管驱动电路	Q1、Q2短路	U6、Q21、Q23、R53、R56、R87、R110其中部分元件失效



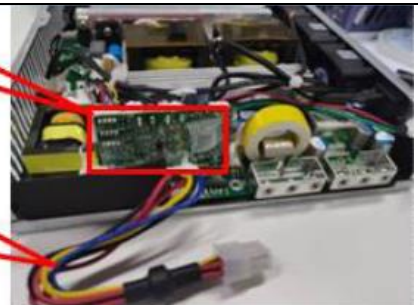
5	无输出	13V 主路输出电路	Q6、Q8、Q9、Q11、Q12、Q14、Q15、Q16、Q17、Q18、Q19、Q20失效	其中任意一个失效，G/D/S 间短路
6	主路输出纹波大	13V 主路输出电路	C31、C32、C40、C41、C46、C47、C48、C49、C51、C52、C55、C56、C57、C59、C60、C62、C63、C64、C65、C66、C70、C71、C72、C73	其中任意一个失效，容值衰减
7	无输出	12V 辅路输出电路	Q22、Q24失效	其中任意一个失效，G/D/S 间短路
8	无输出	风扇	风扇叶堵塞，或风扇线腐蚀开路	/
9	无输出	输入电路	开关压坏	/
10	无输出	12V 输出排线	12V 输出排线破损或脱落	/

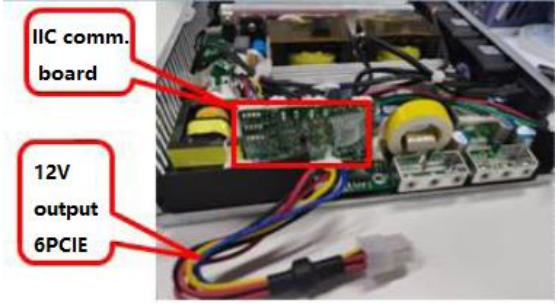
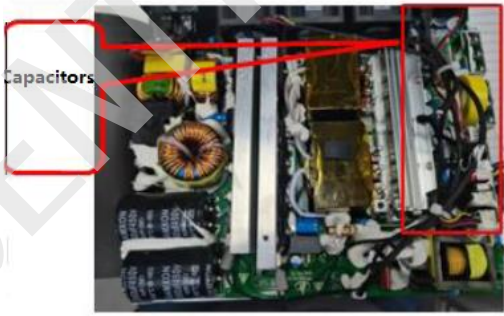

Item	Failure	Location	Main defective Parts	Parts to Diagnosed
1	PFC voltage no 390V	PFC circuit	TR1 short circuit	F2、RB1、RB2、RT1、D5、D9、D13、Q32、Q33、Q34、R311、R309、R314、R329、R330 some of these parts fail
2	PFC voltage no 390V	PFC circuit	C4、C24 fail	/
3	No output	13V main MOS drive circuit	Q10、Q13、Q3、Q7 shortcircuit	U7、U19、U12、RT1、D5、D9、D13、R329、R330 some of these parts fail
4	No output	12V output MOS drive circuit	Q1、Q2 shortcircuit	U6、Q21、Q23、R53、R56、R87、R110 some of these parts fail
5	No output	13V main output circuit	Q6、Q8、Q9、Q11、Q12、Q14、Q15、Q16、Q17、Q18、Q19、Q20 fail	some of these parts fail, G/D/S short-circuit
6	Main output high ripple	13V main output circuit	C31、C32、C40、C41、C46、C47、C48、C49、C51、C52、C55、C56、C57、C59、C60、C62、C63、C64、C65、C66、C70、C71、C72、C73	some of these parts fail, Capacitance value decay
7	No output	12V output circuit	Q22、Q24 fail	some of these parts fail, G/D/S short-circuit
8	No output	Fan	Fan blade is blocked, or the fan wire is corroded and opened	/
9	No output	Input circuit	ON/OFF Switch fail	/
10	No output	12V output cable	12V output cable damaged or fall off	/

2) 常见故障及维修方法 Failed device PCBA maintenance and detection method

序号	故障现象	应急处理处理步骤	图文
1	无输出	首先检查C4电容电压是否有388伏到420伏，如果没有则检查U15，附近电路，是否有14伏电压，14伏电压是U10, U7, U6供电的，如正常检查输出MOS是否短路，如没有检查前级MOS管及附近电路是否正常，	<p>图中所示为U15 PFC电路</p> 
2	主路无输出	检查通讯小板第7脚是否有1.5伏，如有就说明通讯信号正常，检查输入输出MOS管是否有短路，和U12和U19附近元器件是否正常，PFC电压是否正常，	<p>图中为U12,U19位置</p> 
3	无通讯	1:首先确保机器辅路有12伏输出，并且用短路帽短路AGND与SETUP能启动主路，且输出电压正常，说明机器电源部分是正常的，首先需检查输出6P线是否受损线序是否正确，如正确需检查U14芯片周围元器件是否损坏，用万用表连DAT和CLK对地阻值是否正确。如不正确可以判断是U14和附近电路问题。如阻值正确还需检查U17和附近电路和供电电压是否正常。程序丢失也会不通讯，	<p>通讯小板</p> <p>输出6P线</p> 
4	电源失效	检查C12, C17, C31, C32, C40, C41, C46, C47, C48, C49, C51, C52, C55, C56, C57, C59, C60, C62, C63, C64, C65, C66, C70, C71, C72, C73	<p>圈内所指电容位置</p> 

5	整机不通电	1: 检查开关是否失效, 2: F1保险丝是否熔断 3: C4电容是否有电压388~420伏 4: 再用万用表检查输出输入端MOS管是否失效	 <p>F1保险丝</p> <p>C4电容</p>
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Item	Failure	SOP	Picture
1	No output	<p>Step 1. check whether the C4 capacitor voltage is 388 volts to 420 volts. if no, check the circuit near U15 to see if there is 14 volts.</p> <p>Step 2 . 14 volts are powered by U10, U7, U6.</p> <p>If normal, check whether the output MOS is short-circuited.</p> <p>If not, check whether the front-stage MOS tube and nearby circuits are normal.</p>	 <p>U15 PFC Circuit</p>
2	No main output	<p>Auxiliary circuit is normal and the main circuit has no output. Check whether the 7th pin of the communication board has 1.5 volts.</p> <p>If so, it means communication signal is normal. Check whether input and output MOS tubes are short-circuited, and whether the components near U12 and U19 are normal, and whether the PFC voltage is normal.</p>	 <p>U12 U19</p>
3	IIC communication out	<p>First make sure that the auxiliary circuit of the machine has 12V output, and short-circuit AGND and SETUP with a short-circuit cap to start the main circuit, and the output voltage is normal, indicating that the</p>	 <p>IIC comm. board</p> <p>12V output 6PCIE</p>

		<p>power supply of the machine is normal.</p> <p>It is necessary to check whether the output 6P line is damaged and the line sequence is correct.</p> <p>If it is correct, check whether the components around the U14 chip are damaged, and use a multimeter to connect DAT and CLK to the ground resistance value is correct.</p> <p>If it is not correct, it can be judged that it is a problem with U14 and nearby circuits. If the resistance value is correct, it is necessary to check whether U17 and the nearby circuit and power supply voltage are normal. If the program is lost, it will not communicate</p>	 <p>IIC comm. board</p> <p>12V output 6PCIE</p>
4	PSU Fail	<p>Measure C12, C17, C31, C32, C40, C41, C46, C47, C48, C49, C51, C52, C55, C56, C57, C59, C60, C62, C63, C64, C65, C66, C70, C71, C72, C73</p>	 <p>Capacitors</p>
5	PSU no output	<p>Step 1. Check ON/OFF switch fail or not.</p> <p>Step 2. F1 fuse broken or not.</p> <p>Step 3. C4 capacitors voltage within 388-420V</p> <p>Step 4. Measure with multimeter to check input MOS fail or not.</p>	 <p>F1 fuse</p> <p>C4 Capacitor</p>

7. 维修工具及材料 Maintenance tools and materials

维修工具 Maintenance tools	规格型号 specifications	功率 power
烙铁 Soldering iron	QUICK/205	150W

热风枪 Hot air gun	QUICK/801DW	1000W
吸锡枪 Absorb gun	/	/
镊子 tweezers	/	/
毛刷 brush	/	/
尖嘴钳 Long nose pliers	/	/
剪钳 pliers	/	/
万用表 multimeter	/	/
剥线钳 Wire stripping pliers	/	/
电批 Electric screwdriver	/	/
锡丝 Tin wire	Diameter of 0.8 mm	/
螺丝刀 screwdriver	/	/
放电器(灯泡) discharger(light bulbs)	150W	
制作保护开关材料 Make protective switch materials		
材料 material	规格型号 specifications	数量 The number of
空气开关 Air switch	6A	1
AC 开关 AC switch	30A	1
220v 灯泡 220v light bulb	150W	1

8. 维修注意事项 Maintenance Precautions

8.1 不良电源通电确认时，务必使用保护开关，避免炸机伤害。

When bad power supply is confirmed, be sure to use the protective switch to avoid explosion injury.

8.2 维修过程中要注意静电防护，需佩戴防静电手环。

Pay attention to electrostatic protection during maintenance, and wear an anti-static bracelet.

8.3 电烙铁温度管理，建议控制在 380℃~420℃。

Electric soldering iron temperature management, it is recommended to control in 380℃~420℃.

8.4 维修物料更换需使用同型号、同规格产品，不得私自使用替代物料。

When replacing materials, use products of the same model and specifications. Do



not use substitute materials without permission.

8.5 维修更换下的不良物料，需做不良标识，优化现场定位管理，避免与合格品混料。

The defective materials that are repaired and replaced shall be marked as defective, and the on-site positioning management shall be optimized to avoid mixing with qualified products.

8.6 记录电源 S/N 序列号、不良现象、不良原因、维修办法等信息，定期提供维修记录表。

Record the power supply S/N serial number, bad phenomenon, bad reason, maintenance method and other information, regularly provide maintenance record form.

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