X9 1～3K 控制板使用及维修手册

X9 1~3K control board use and maintain service manual

Prepared by： Gruby Date： 2015.12.2

Checked by： Date：

Approved by： Date：

变　　更　　记　　录

00 版之前的版次以 0A,0B,0C…表示，00 版后之版次以 00A,00B,00C…表示　回首页

项次	版次	变更内容	制定	制定日期	审核	生效日期
1	00A	首次发文 first version	Gruby	2015.12.2		

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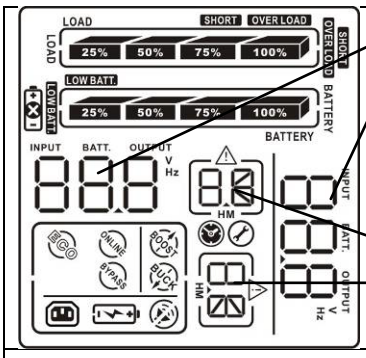
1-1. LCD Panel



Parameters 2

Parameters 1

There are two parameters to set up the UPS.
Parameter 1: It's for program alternatives.
There are 9 programs to set up:
Parameter 2: It's for setting information display。

Display	Function
Backup time information	
	Indicates the backup time in pie chart.
	Indicates the backup time in numbers. H: hours, M: minute
Warning & Fault information	
	Indicates that the warning and fault occurs.
	Indicates the warning and fault codes, and the codes are listed in details in 3-5 section.
Setting Operation	
	Indicates the setting operation.
Input/Output & Battery information	
	Indicates the output/input voltage, output/input frequency, battery voltage. V: voltage, Hz: frequency
Load information	
	Indicates the load level by 0-25%, 26-50%, 51-75%, and 76-100%.
OVER LOAD	Indicates overload.
SHORT	Indicates the load or the UPS output is short circuited.
UPS status	
	Indicates that programmable management outlets are working.
	Indicates the UPS working in line mode.
	Indicates the UPS is working in converter mode.
	Indicates the UPS is working in bypass mode.
	Indicates the UPS powers the output directly from the mains
	Indicates that the UPS alarm is disabled.

	Indicates the battery charger is working.
Battery information	
	Indicates the Battery level by 0-25%, 26-50%, 51-75%, and 76-100%.
	Indicates low battery.
	Indicates there is something wrong with battery.

1-2. LCD display wordings index

Abbreviation	Display content	Meaning
ENA		Enable
DIS		Disable
ESC		Escape
RAC		Rack display
TOE		Tower display
B.L		Low Battery
O.L		Over Load
N.C		Battery is not connected
O.C		Over Charger
SF		Site Fault
E.P		EPO
T.P		Over Temperature
C.H		Charger Failure
B.B		Battery Fault
F.U		Bypass Frequency Unstable
B.V		Bypass Out Range

1-3. Audible Alarm

Battery Mode	Sounding every 4 seconds
Low Battery	Sounding every second
Overload	Sounding twice every second
Fault	Continuously sounding

1-4. Faults Reference Code

Fault event	Fault code	Icon	Fault event	Fault code	Icon
Bus start fail	01	x	Inverter voltage Low	13	x
Bus over	02	x	Inverter output short	14	
Bus under	03	x	Battery voltage too high	27	

Bus unbalance	04	x	Battery voltage too low	28	BATT. FAULT
Inverter soft start fail	11	x	Over temperature	41	x
Inverter voltage high	12	x	Over load	43	OVER LOAD

1-5. Warning indicator

Warning	Icon (flashing)	Code	Alarm
Low Battery		bL	Sounding every second
Overload		OL	Sounding twice every second
Battery is not connected		nC	Sounding every second
Overcharge		OC	Sounding every second
Site wiring fault		SF	Sounding every second
EPO enable		EP	Sounding every second
Over temperature		tP	Sounding every second
Charger failure		CH	Sounding every second
Battery Fault		bb	Sounding every second
Bypass Out Range		bU	Sounding every second
Bypass Frequency Unstable		bU	Sounding every second

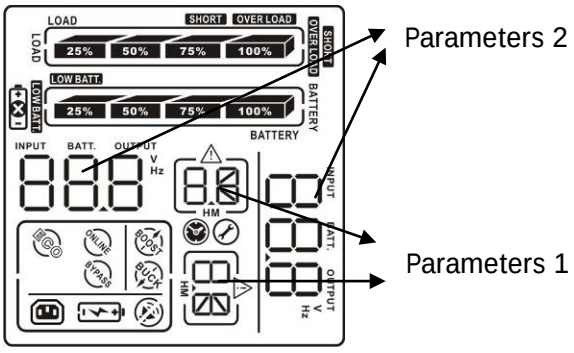
NOTE: “Site Wiring Fault” function can be enabled/disabled via software. Please check software manual for the details.

2. 设置说明 Setup instructions

2-1. Button operation

Button	Function
ON/Mute Button	➢ Turn on the UPS: Press and hold ON/Mute button for at least 2 seconds to turn on the UPS. ➢ Mute the alarm: When the UPS is on battery mode, press and hold this button for at least 5 seconds to disable or enable the alarm system. But it's not applied to the situations when warnings or errors occur. ➢ Up key: Press this button to display previous selection in UPS setting mode. ➢ Switch to UPS self-test mode: Press and hold ON/Mute button for 5 seconds to enter UPS self-testing while in AC mode, ECO mode, or converter mode.
OFF/Enter Button	➢ Turn off the UPS: Press and hold this button at least 2 seconds to turn off the UPS in battery mode. UPS will be in standby mode under power normal or transfer to Bypass mode if the Bypass enable setting by pressing this button. ➢ Confirm selection key: Press this button to confirm selection in UPS setting mode.
Select Button	➢ Switch LCD message: Press this button to change the LCD message for input voltage, input frequency, battery voltage, output voltage and output frequency. It will return back to default display when pausing for 10 seconds. ➢ Setting mode: Press and hold this button for 5 seconds to enter UPS setting mode when UPS is in standby mode or bypass mode. ➢ Down key: Press this button to display next selection in UPS setting mode.
ON/Mute + Select Button	➢ Switch to bypass mode: When the main power is normal, press ON/Mute and Select buttons simultaneously for 5 seconds. Then UPS will enter to bypass mode. This action will be ineffective when the input voltage is out of acceptable range.

2-2. UPS Setting

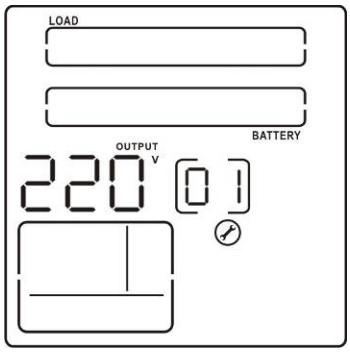


Two parameters need to be configured in order to set up
the UPS. Refer to following diagram.

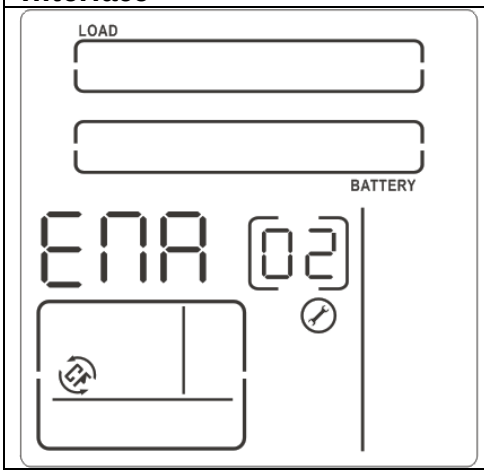
Parameter 1: it is used for the different configuration
options. There are 9 programs to set up. Refer to the table
below.

Parameter 2: it represents the setting information or
values of each program.

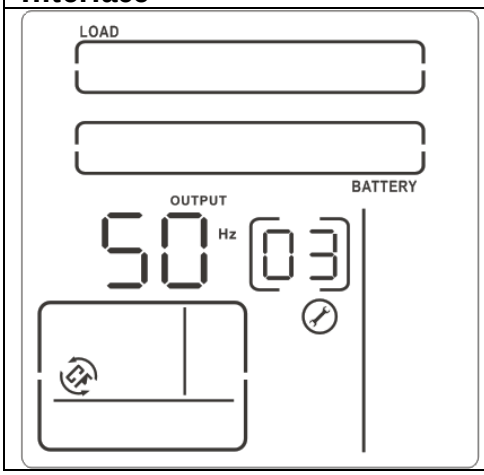
- **01: Output voltage setting**

Interface	Setting
	**Parameter 3: Output voltage** For 200/208/220/230/240 VAC models, you may choose the following output voltage: **200:** presents output voltage is 200Vac **208:** presents output voltage is 208Vac **220:** presents output voltage is 220Vac **230:** presents output voltage is 230Vac **240:** presents output voltage is 240Vac For 100/110/150/120/127 VAC models, you may choose the following output voltage: **100:** presents output voltage is 100Vac **110:** presents output voltage is 110Vac **115:** presents output voltage is 115Vac **120:** presents output voltage is 120Vac **127:** presents output voltage is 127Vac

- **02: Frequency Converter enable/disable**

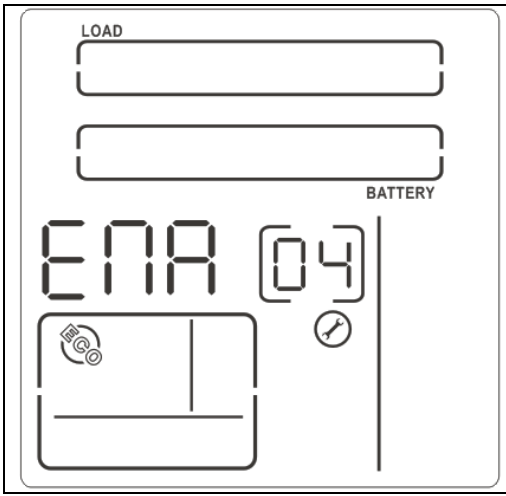
Interface	Setting
	**Parameter 2 & 3:** Enable or disable converter mode. You may choose the following two options: **CF ENA:** converter mode enable **CF DIS:** converter mode disable

- **03: Output frequency setting**

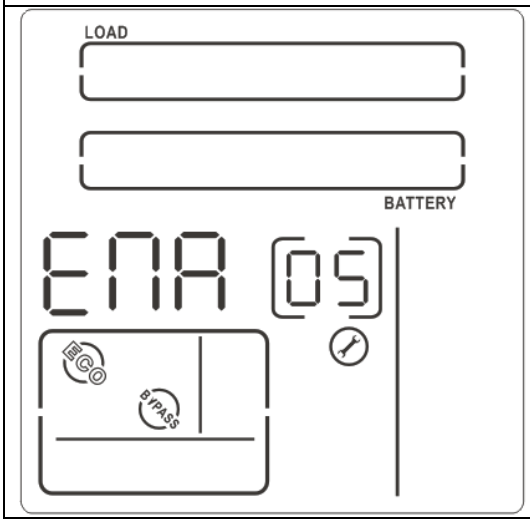
Interface	Setting
	**Parameter 2 & 3: Output frequency setting.** You may set the initial frequency on battery mode: **BAT 50:** presents output frequency is 50Hz **BAT 60:** presents output frequency is 60Hz If converter mode is enabled, you may choose the following output frequency: **CF 50:** presents output frequency is 50Hz **CF 60:** presents output frequency is 60Hz

- **04: ECO enable/disable**

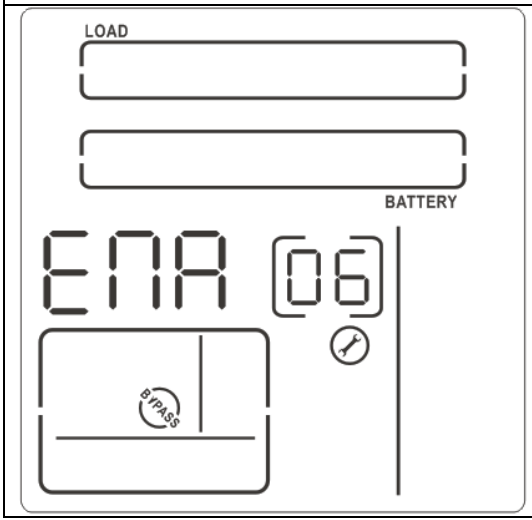
Interface	Setting

	**Parameter 3:** Enable or disable ECO function. You may choose the following two options: **ENA:** ECO mode enable **DIS:** ECO mode disable

- 05: AECO enable/disable

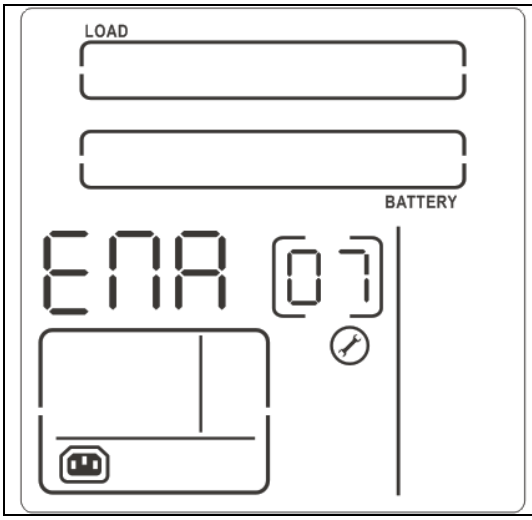
Interface	Setting
	ENA: Advanced ECO mode enable DIS: Advanced ECO mode disable

- **06: Bypass enable/disable when UPS is off**

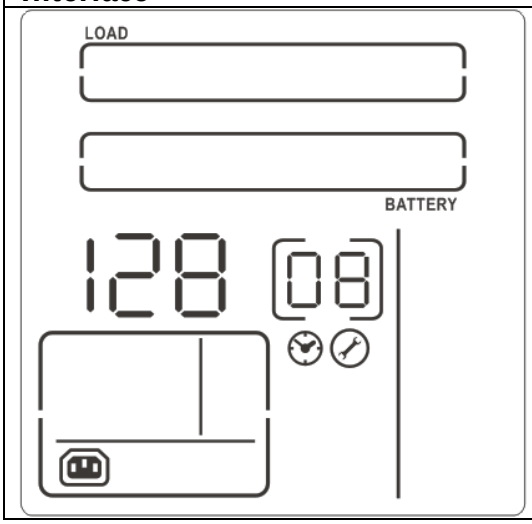
Interface	**Setting**
	**Parameter 3:** Enable or disable Bypass function. You may choose the following two options: **ENA:** Bypass enable **DIS:** Bypass disable

- **07: Programmable outlets enable/disable**

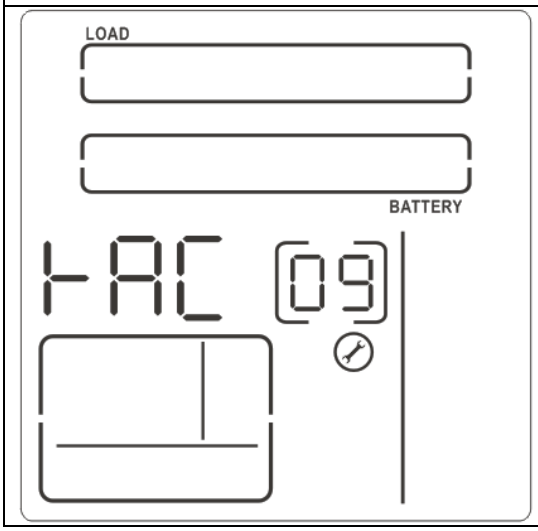
Interface	**Setting**

	**Parameter 3:** Enable or disable programmable outlets. **ENA:** Programmable outlets enable **DIS:** Programmable outlets disable

- **08: Programmable outlets setting**

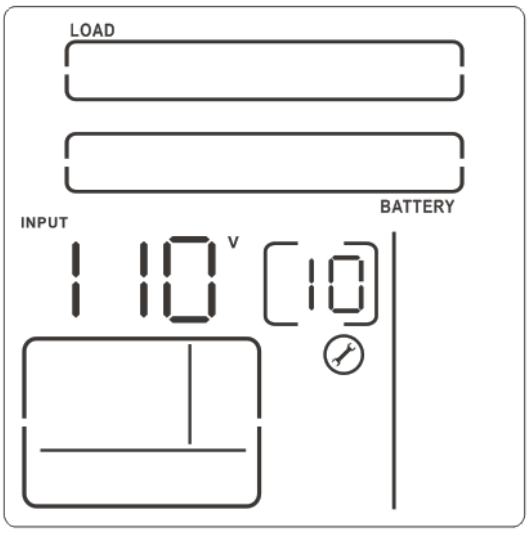
Interface	Setting
	**Parameter 3:** Set up backup time limits for programmable outlets. **0-999:** setting the backup time limits in minutes from 0-999 for programmable outlets which connect to non-critical devices on battery mode.

- 09: LCD display direction setting

Interface	Setting
	RAC: the LCD display is horizontal. TOE: the LCD display is vertical.

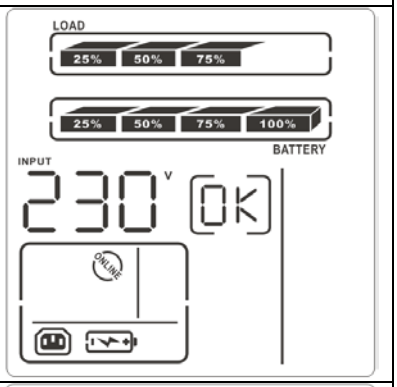
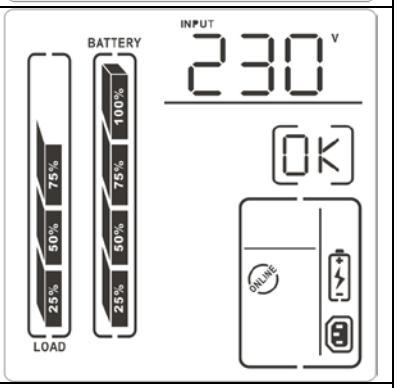
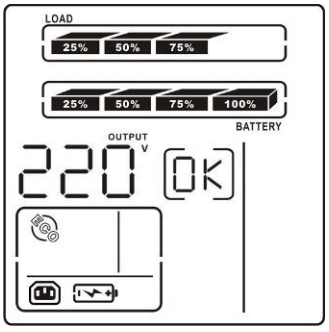
- **10: input voltage range setting**

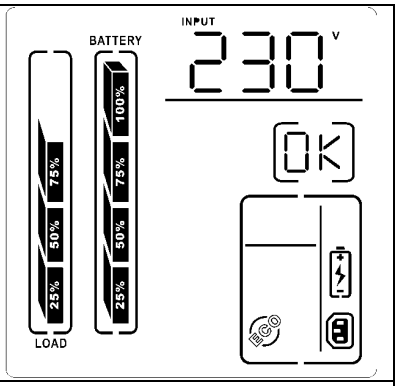
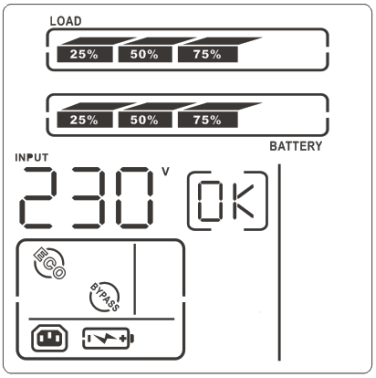
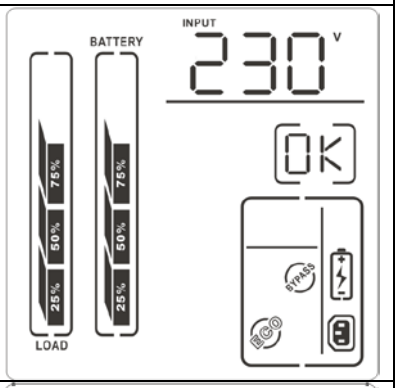
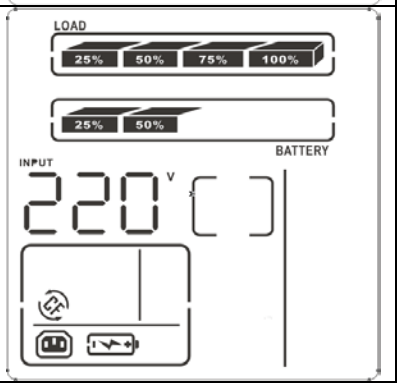
Interface	Setting

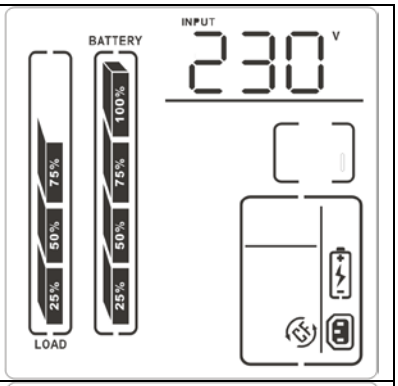
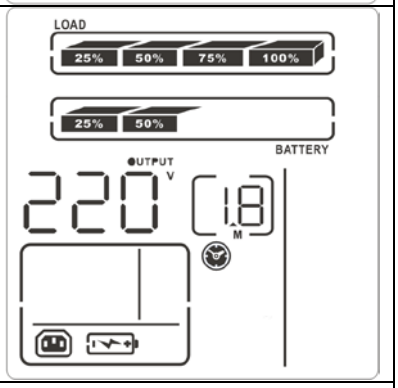
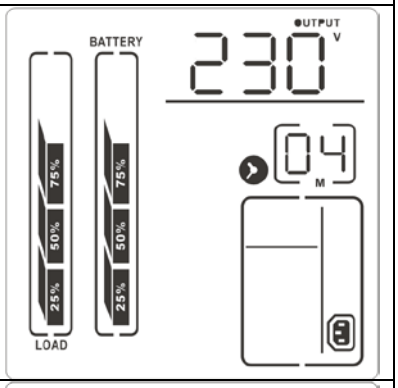
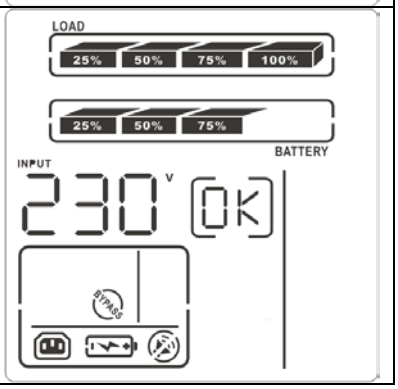
	For high voltage models: 110/300 alternating shine: input voltage range 110V to 300V; 160/260 alternating shine: input voltage range 160V to 260V; 170/270 alternating shine: input voltage range 170V to 270V; For low voltage models： 55/150 alternating shine: input voltage range 55V to 150V; 80/130 alternating shine: input voltage range 80V to 130V; 85/135 alternating shine: input voltage range 85V to 135V;

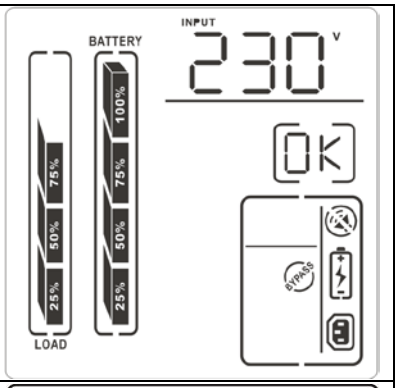
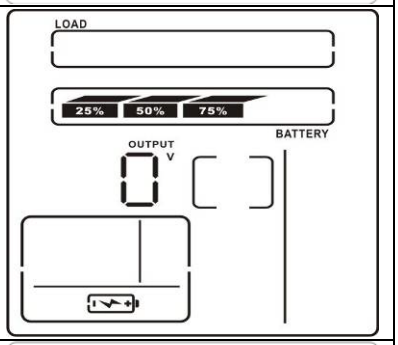
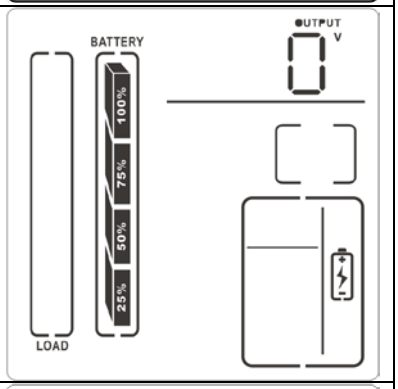
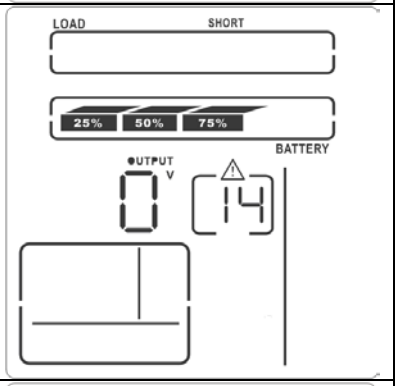
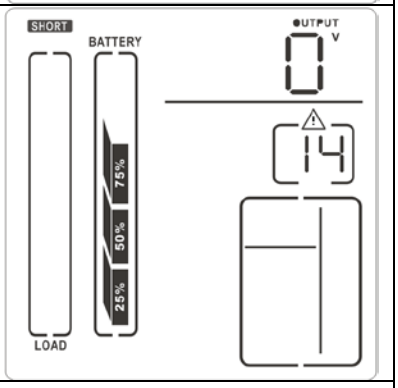
- **00: Exit setting**

2-3. Operating Mode Description

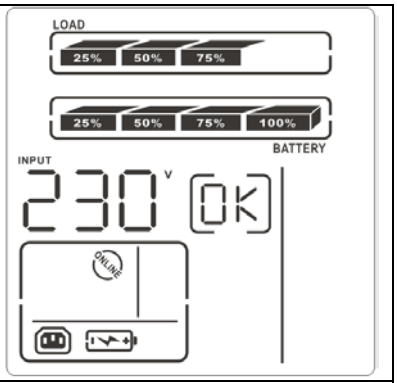
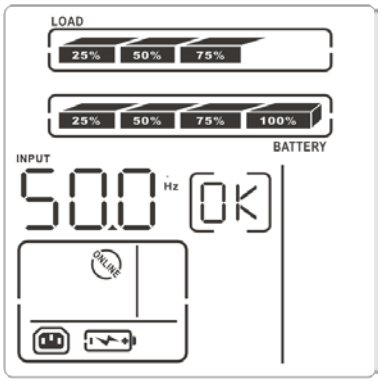
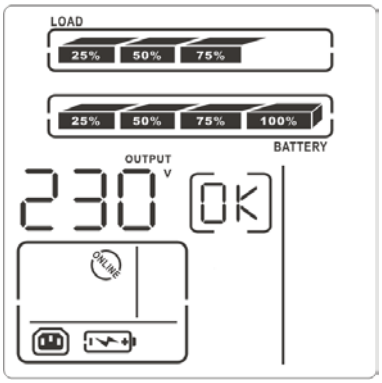
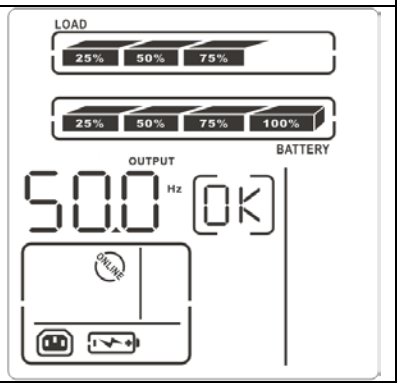
Operating mode	Description	LCD display
Online mode （Rack）	When the input voltage is within acceptable range, UPS will provide pure and stable AC power to output. The UPS will also charge the battery at online mode.	
Online mode （Tower）	When the input voltage is within acceptable range, UPS will provide pure and stable AC power to output. The UPS will also charge the battery at online mode.	
ECO mode （Rack）	Efficiency Corrective Optimizer mode: When the input voltage is within setting range(±3%Vo max）, UPS will bypass voltage to output for energy saving. (PFC and INVERTER are ready.)	

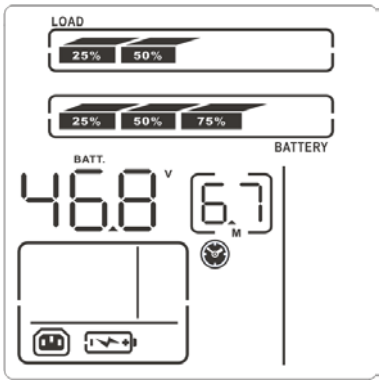
ECO mode （Tower）	Efficiency Corrective Optimizer mode: When the input voltage is within setting range (±3%Vo max), UPS will bypass voltage to output for energy saving. (PFC and INVERTER are ready.)	
AECO mode (Rack)	Advanced Efficiency Corrective Optimizer mode: When the input voltage is within setting range (±3%Vo max), UPS will bypass voltage to output for energy saving. (PFC and INVERTER are off.)	
AECO mode (Tower)	Advanced Efficiency Corrective Optimizer mode: When the input voltage is within setting range (±3%Vo max), UPS will bypass voltage to output for energy saving. (PFC and INVERTER are off.)	
Frequency Converter mode （Rack）	When input frequency is within 40 Hz to 70 Hz, the UPS can be set at a constant output frequency, 50 Hz or 60 Hz.　The UPS will still charge battery under this mode.	

Frequency Converter mode （Tower）	When input frequency is within 40 Hz to 70 Hz, the UPS can be set at a constant output frequency, 50 Hz or 60 Hz. The UPS will still charge battery under this mode.	
Battery mode （Rack）	When the input voltage is beyond the acceptable range or power failure and alarm is sounding every 4 second, UPS will backup power from battery.	
Battery mode （Tower）	When the input voltage is beyond the acceptable range or power failure and alarm is sounding every 4 second, UPS will backup power from battery.	
Bypass mode （Rack）	When input voltage is within acceptable range but UPS is overload, UPS will enter bypass mode or bypass mode can be set by front panel. Alarm is sounding every 10 second.	

Bypass mode （Tower）	When input voltage is within acceptable range but UPS is overload, UPS will enter bypass mode or bypass mode can be set by front panel. Alarm is sounding every 10 second.	
Standby mode （Rack）	UPS is powered off without output power, but the battery still can be charged.	
Standby mode （Tower）	UPS is powered off without output power, but the battery still can be charged.	
Fault mode （Rack）	The UPS is in fault mode when no output power is supplied from the UPS and the fault icon flashes on the LCD display, although the information of UPS can be displayed in the screen.	
Fault mode （Tower）	The UPS is in fault mode when no output power is supplied from the UPS and the fault icon flashes on the LCD display, although the information of UPS can be displayed in the screen.	

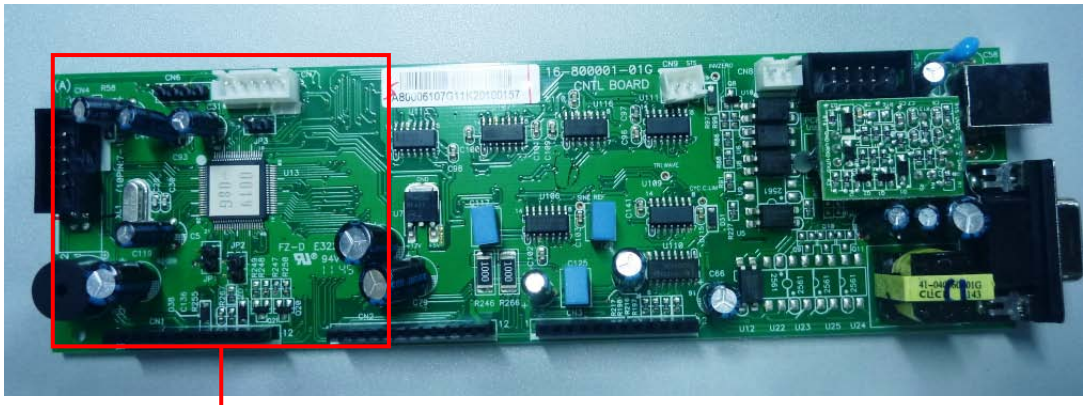
2-4 Select description

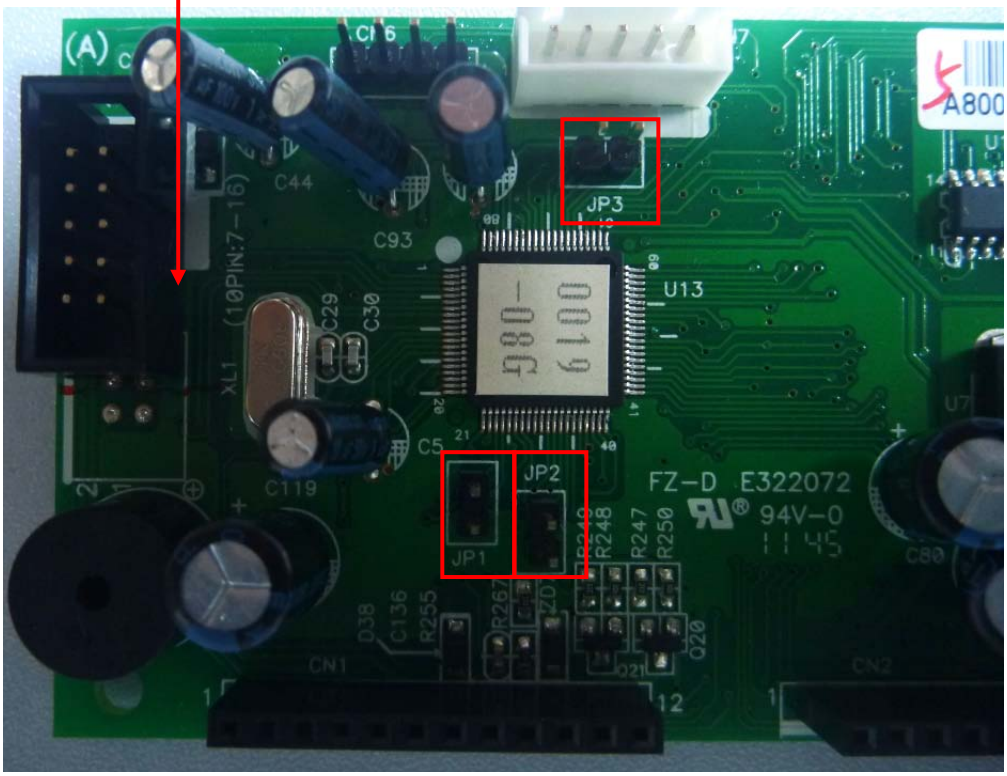
input information display (e.g. rack)	illustration at right we see: Input voltage is 230V.	
input information display (e.g. rack)	illustration at right we see: Input frequency is 50Hz.	
Output information display (e.g. rack)	illustration at right we see: output voltage is 230V.	
Output information display (e.g. rack)	illustration at right we see: output frequency is 50Hz.	

Battery Information display (e.g. rack)	illustration at right we see: Battery voltage is 46.8V; Back time is 6.7 minutes.	

2-5. Definition of the UPS model on control board (JP1/JP2/JP3)

There are three mode detection Jumpers on the control board: JP1/JP2/JP3:





	SHORT	OPEN
JP1	LV model (100V/110V/115V/120V/127V)	HV model (200V/208V/220V/230V/240V)
JP2	Long-run model	Standard model
JP3	Battery voltage detection 1K / 2K 24V / 48V	Battery voltage detection 1K / 2K 36V / 72V

3. 维修指导 Maintenance work guidance

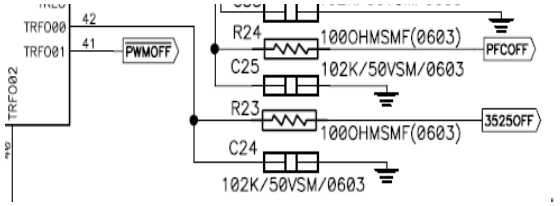
Application:

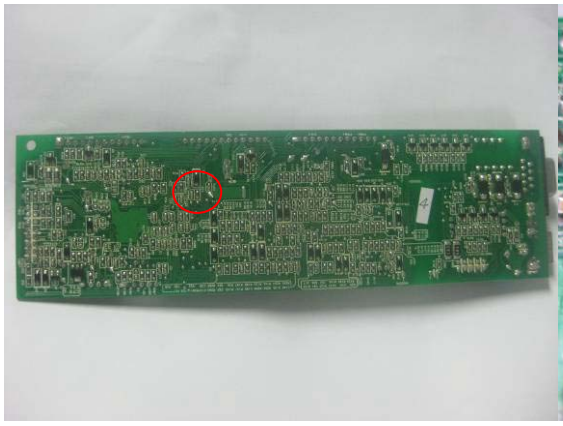
Guidance for the maintenance of the following UPS fault：

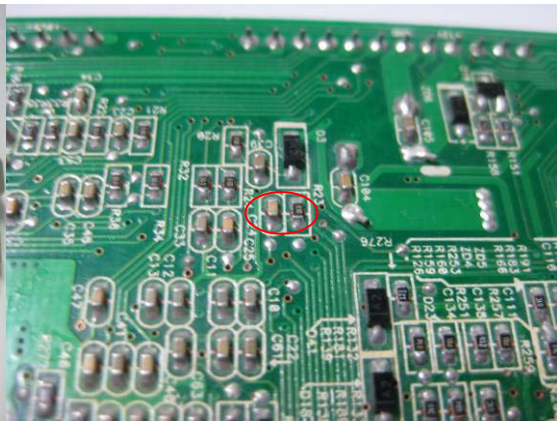
After the UPS failure，First, confirm whether the CNTL failure caused（change the normal CNTL to confirm），if confirmed the failure caused by the CNTL，record the phenomenon of UPS failure，observed the error code on the LCD，find the appropriate error code service guide in this document.

01 FAULT (BUS soft start failure)

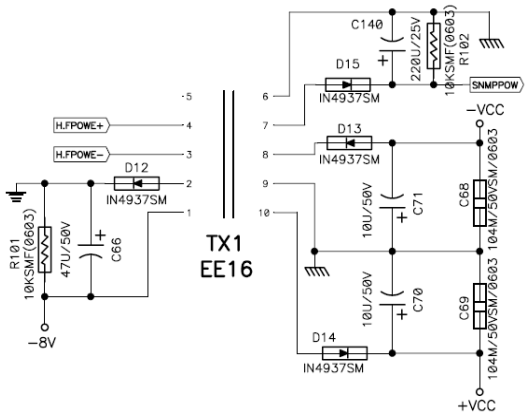
1. Check the R23，C24 whether damaged

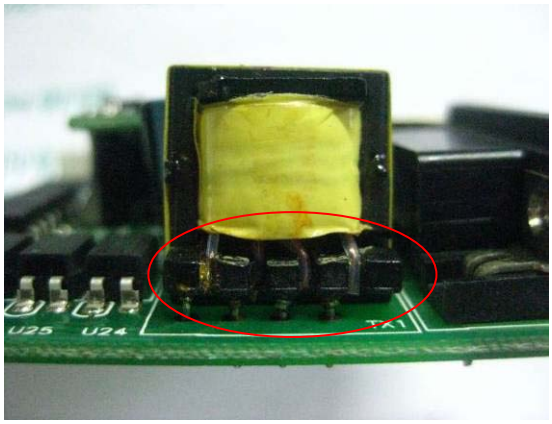


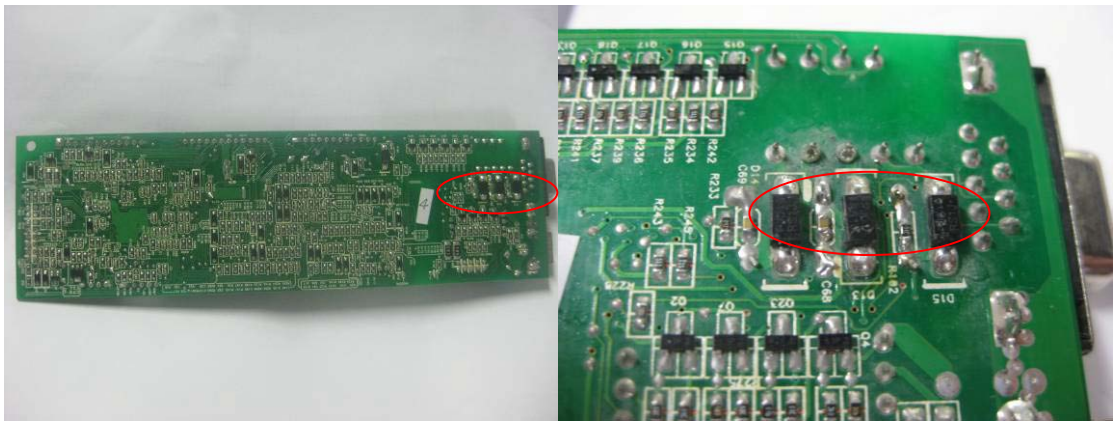




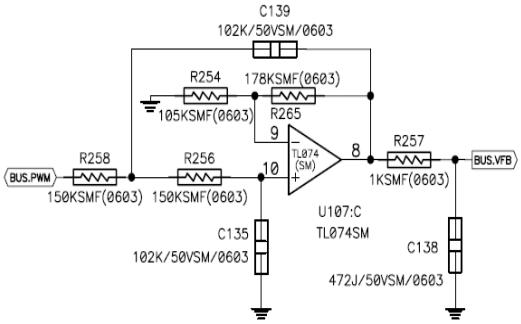
2. Check the components D13,D14,D15 connected TX1 not damaged, be sure the TX is not broken

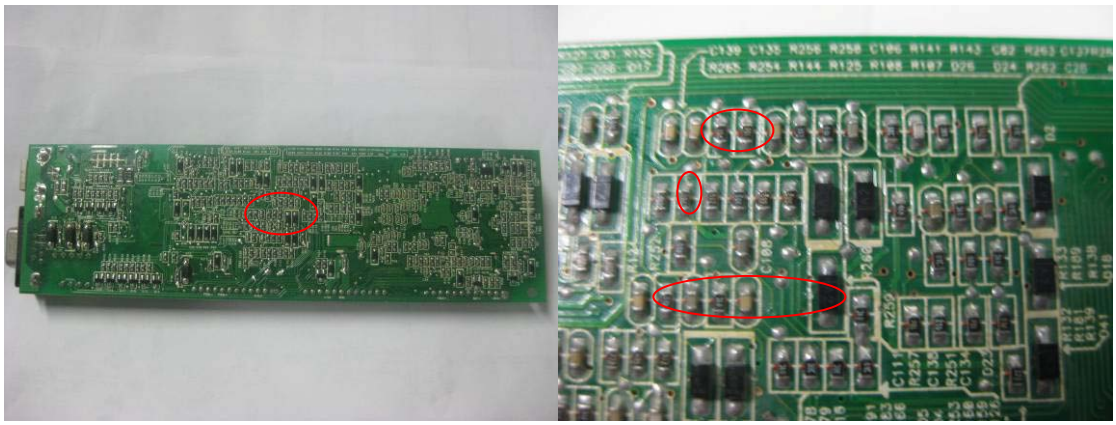


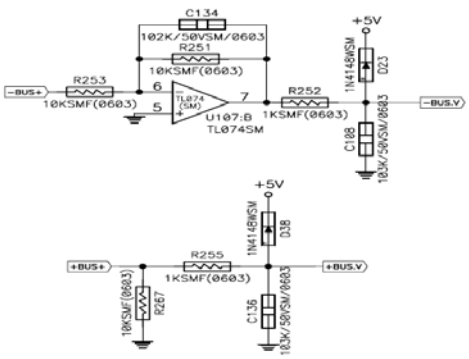


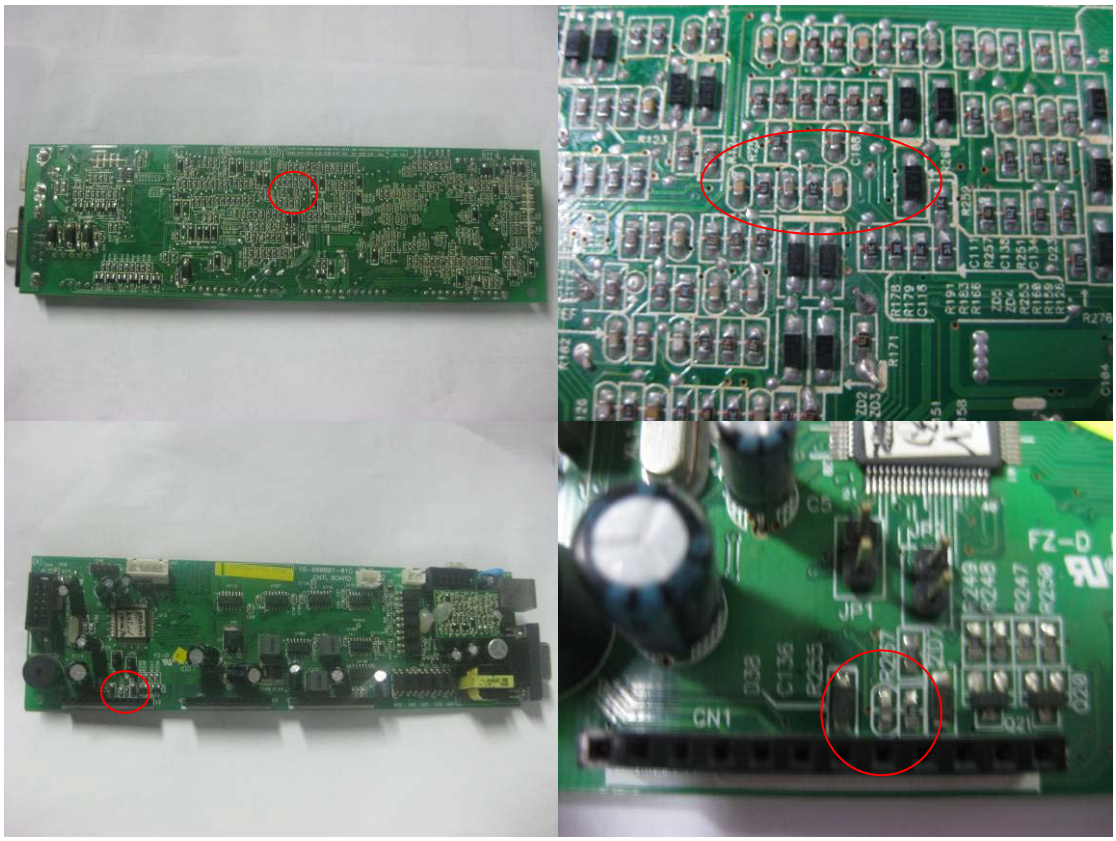


3. Check the U107 surrounding components, R257, C138 ,D23,C108,D38,C136,if these all ok，maybe you need to replace the U107: TL074，at last，maybe the MCU is broken.



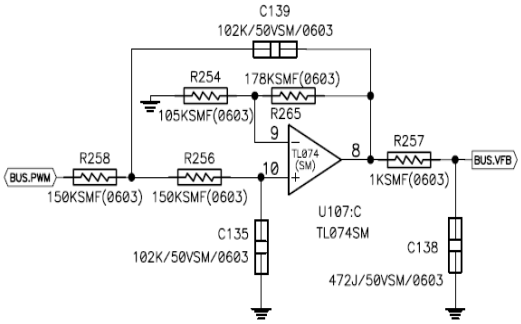


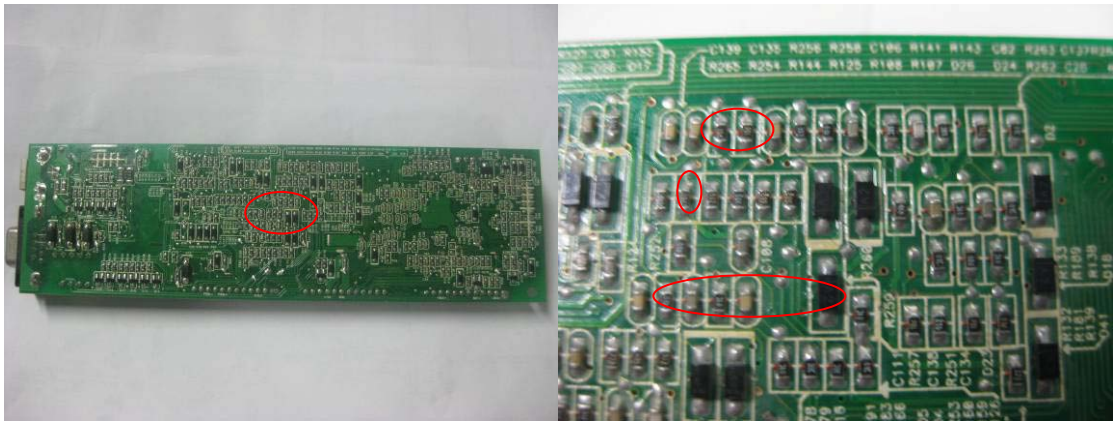


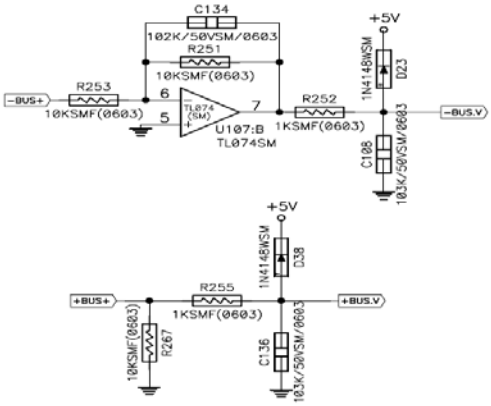


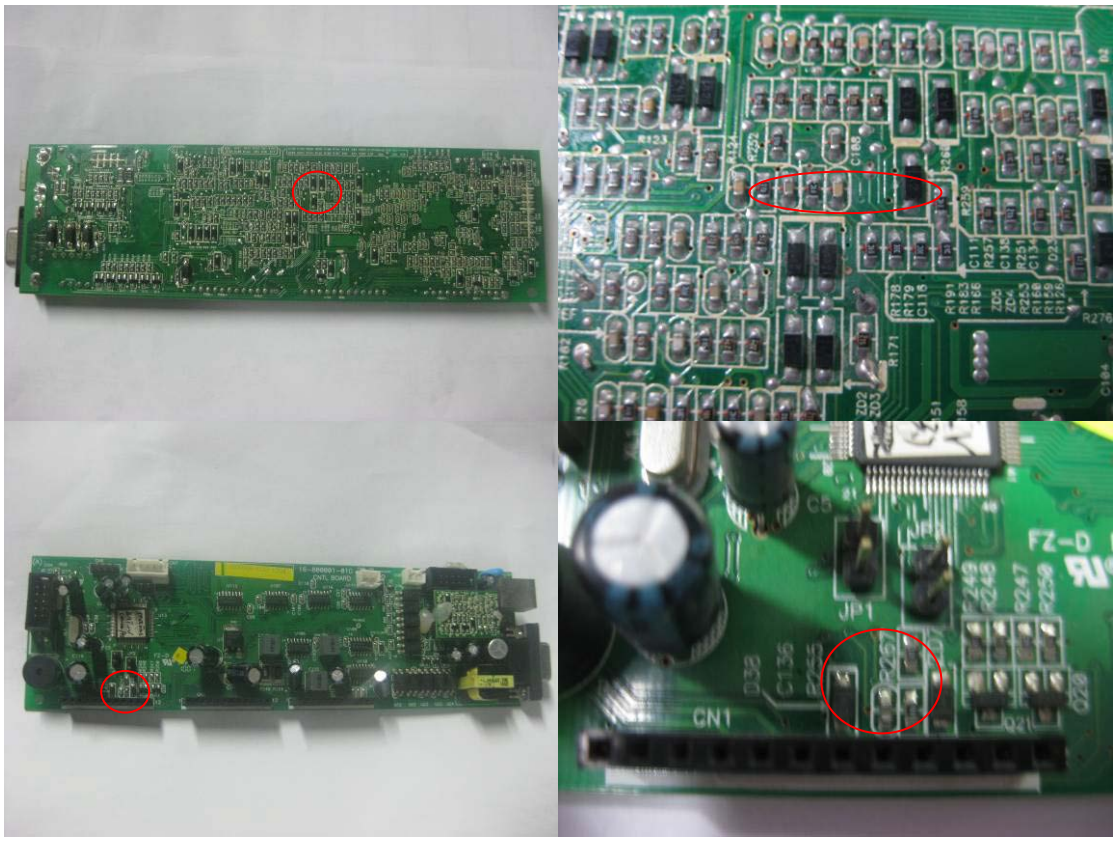
02 FAULT(Bus over)，03 FAULT（Bus under），04FAULT（Bus unbalance）

1. Check the U107 surrounding components no damage，may be U107: TL074 bad





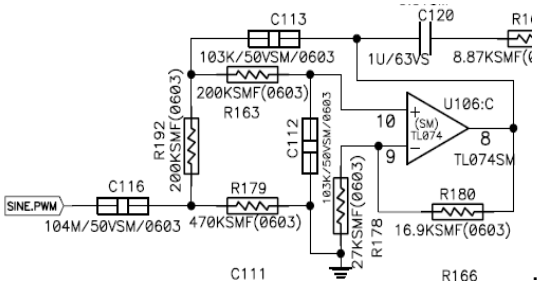


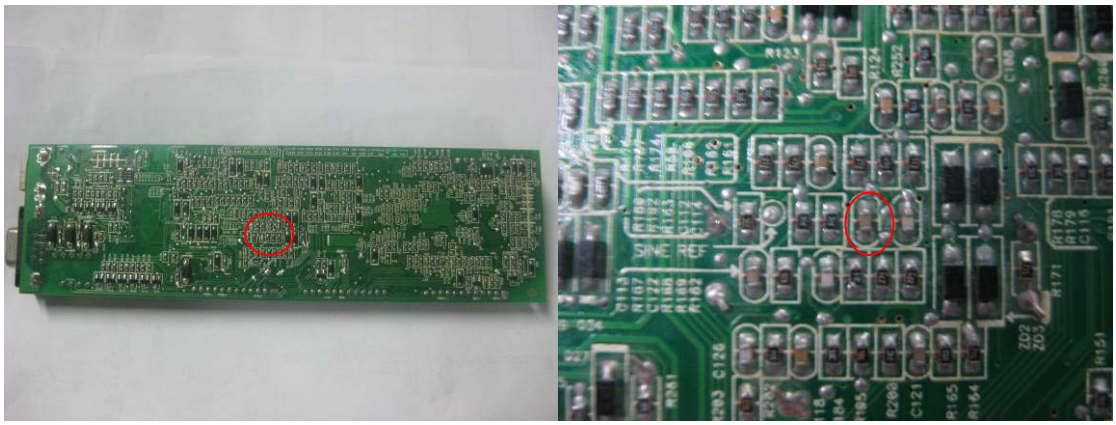


2. All these is ok，it could be the MCU broken

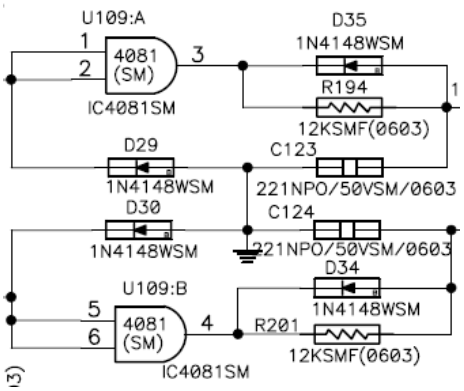
11 FAULT（inverter soft start failure）

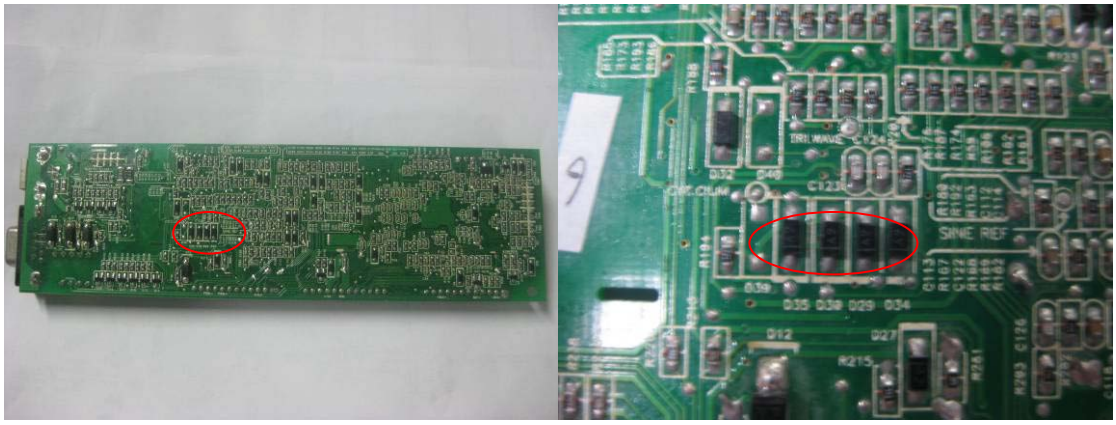
1. Check the C112, it also could be U106: TL074 bad





2. Check the diodes D29, D30 whether short, if short may be U109: 4081 Bad



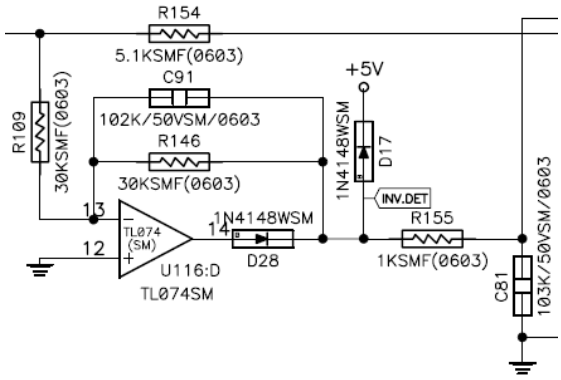


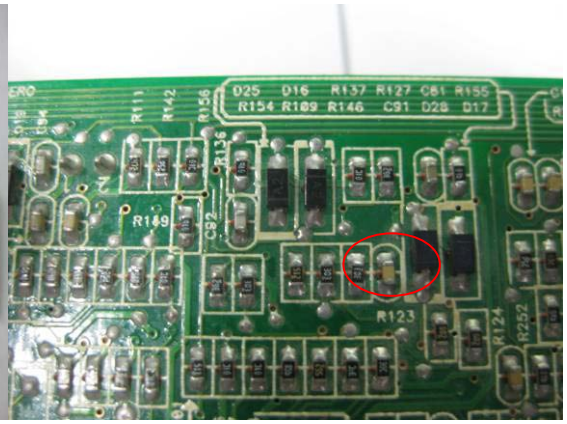
3. Check the U110 pin 5 whether shorted to ground, if shorted replace U110: IC2003

4. All these is ok，also it could be the MCU broken

12 FAULT（Inverter voltage high）,13FAULT（Inverter voltage low）

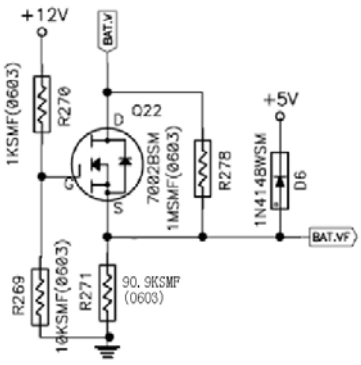
1. Check the following U116: TL074 surrounding components for any damage, R146,D28 may be bad

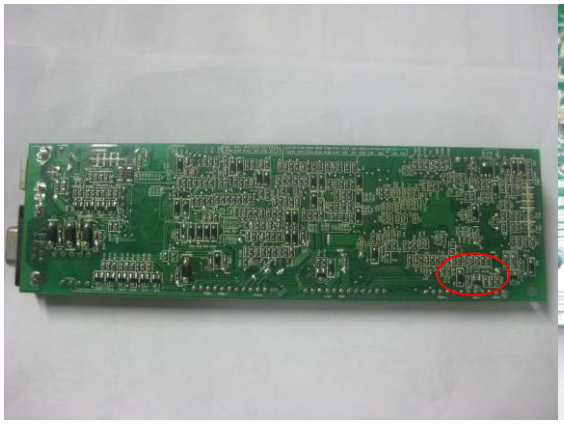


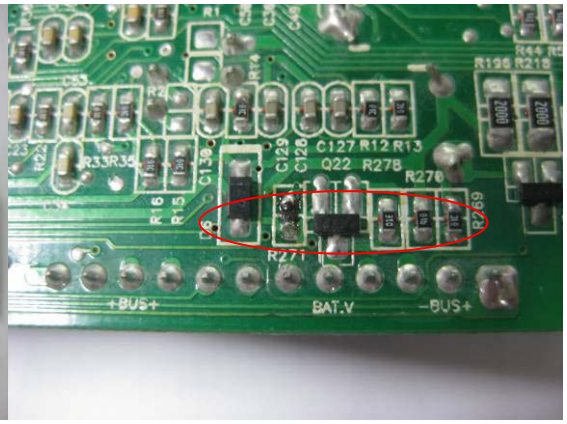


27 FAULT （Battery voltage too high）; 28 FAULT （Battery voltage too low）; low battery warning; Battery is not connected warning

Check the following circuit components, Q22, R269, R270, R271, D6 may be bad

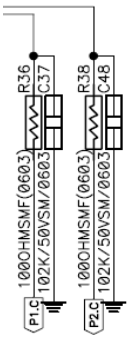


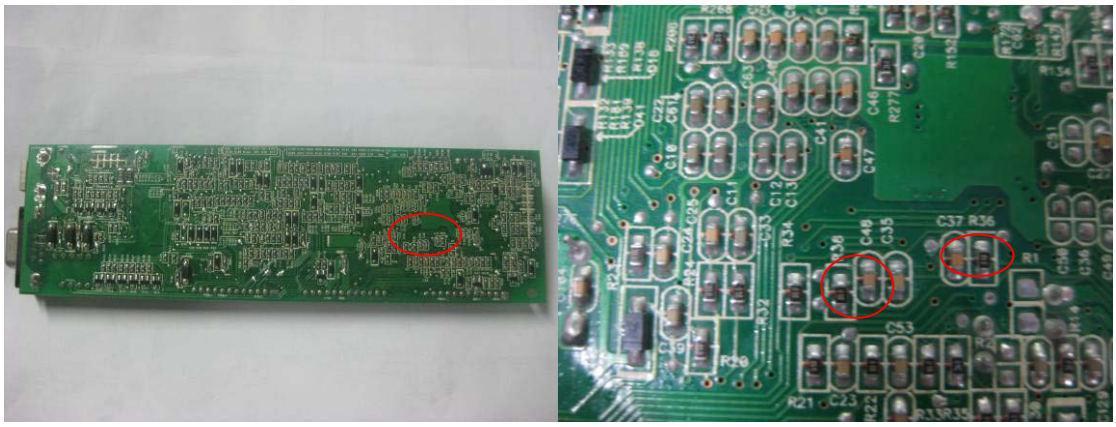




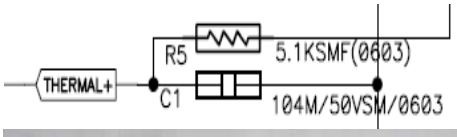
41FAULT（Over temperature）; TP warning: Over temperature

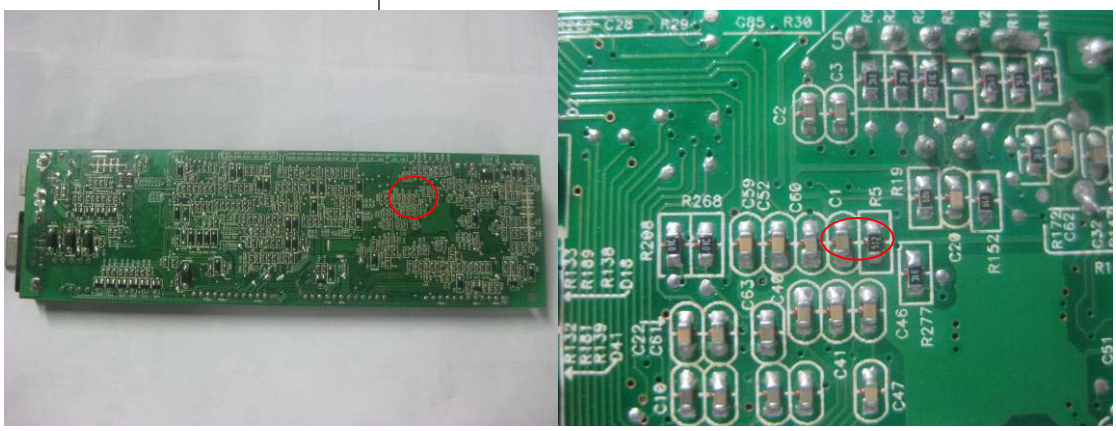
1. Check the following circuit components R36, R38, C37, and C48





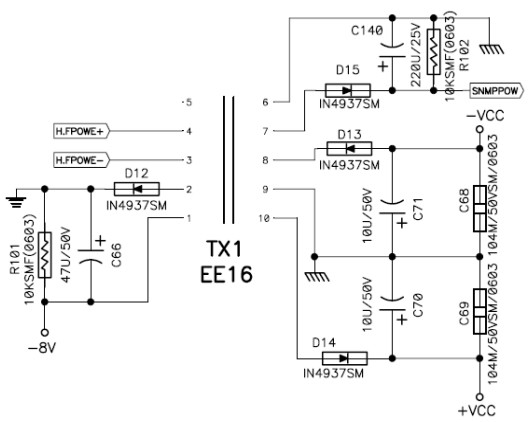
2. Check the following circuit components R5,C1

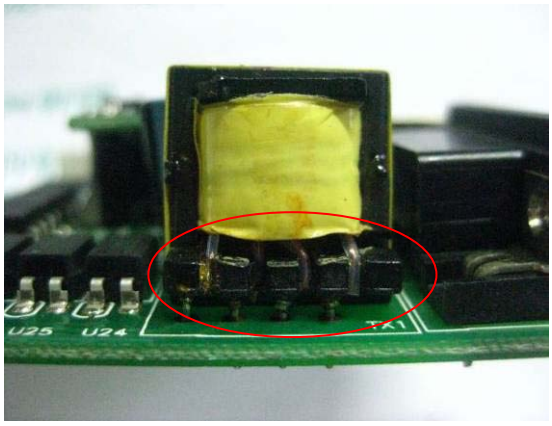


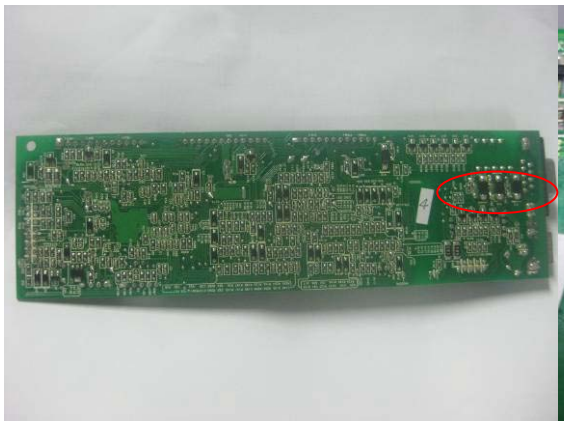


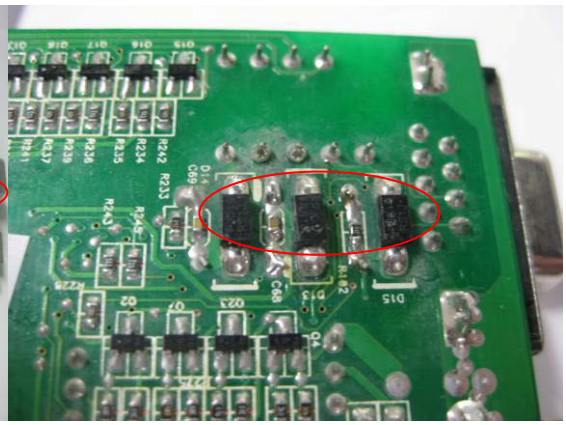
EP FAULT (EPO ENABLE)

Test the TX1 coil，D14 whether opened



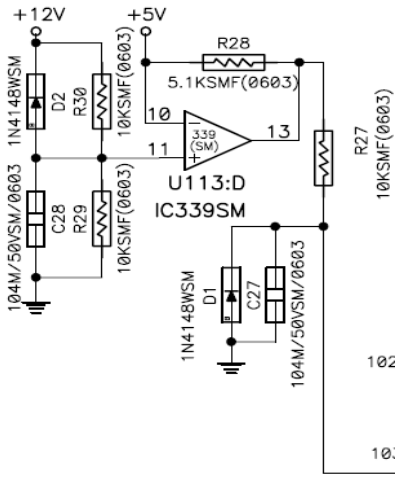


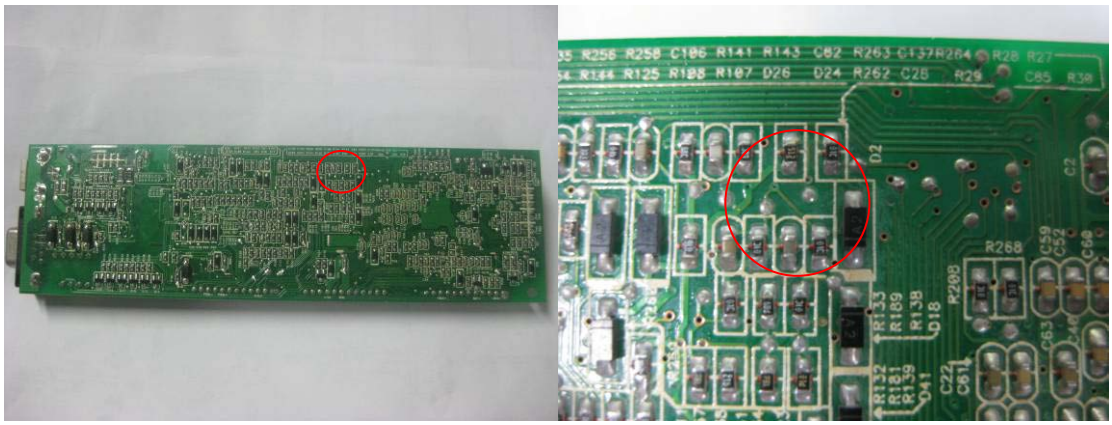




Blinking on LCD display or no LCD display

1. Panel suddenly lights suddenly off, check the following circuit of components R30,R29,R28,D2,if the resistance error，it may be U113: IC339 bad

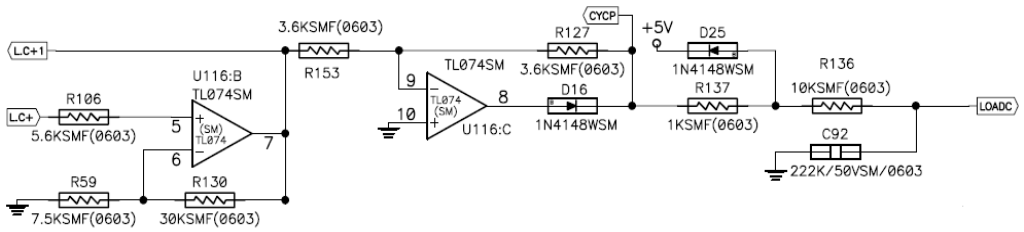


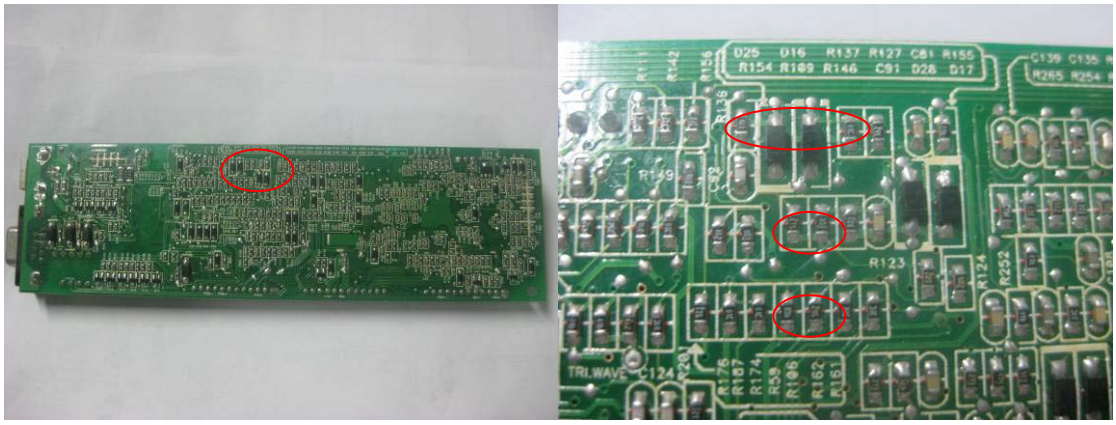


2. no LCD display，but DC fans operate，maybe the MCU broken

Overload warning

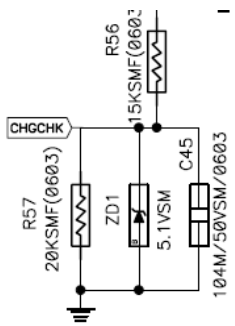
Check following circuit，maybe some components damaged

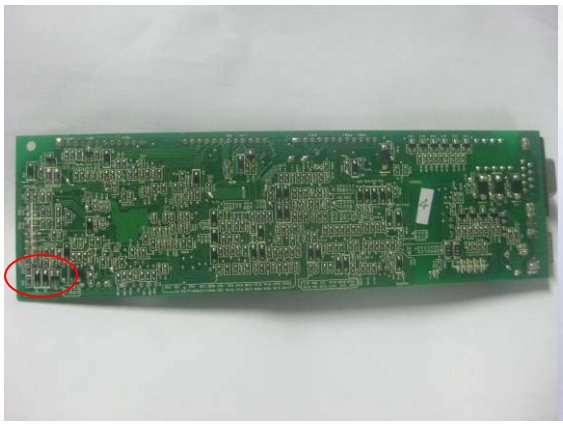


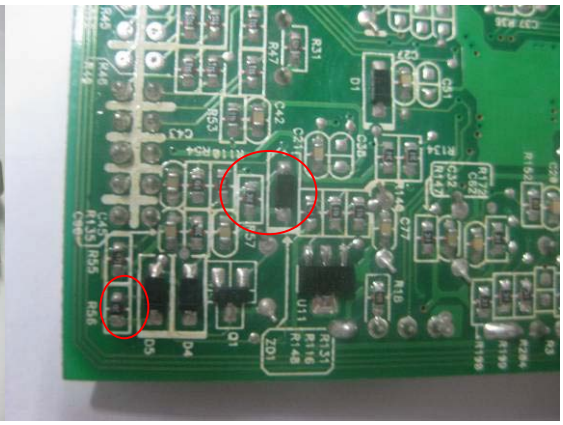


CH warning: Charger failure

Check the following components may be R57, R56, ZD1 bad

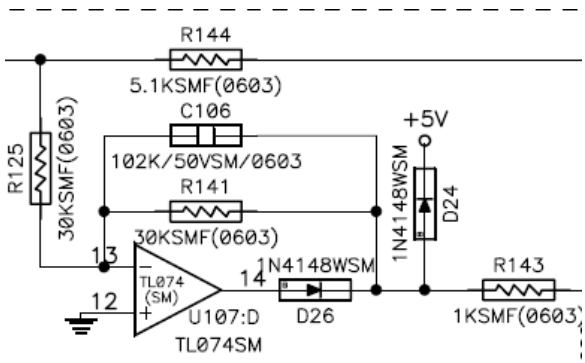


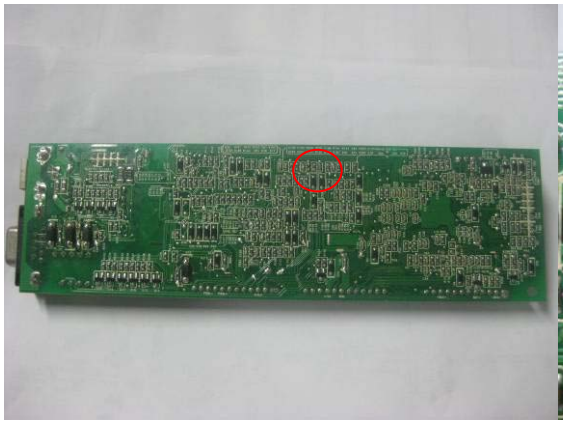


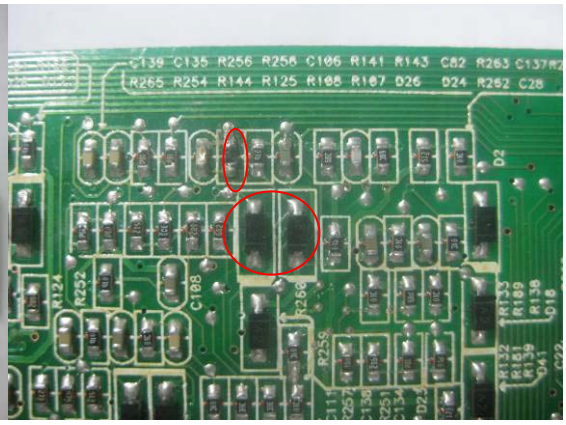


Not transfer to mains

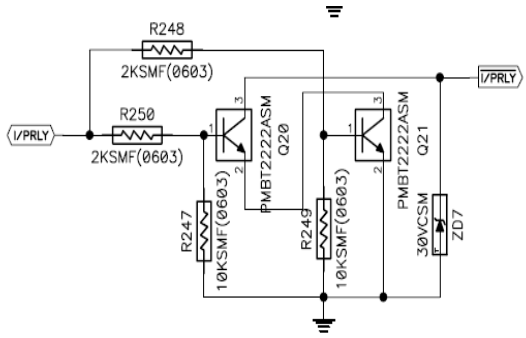
1. Check the following U116: TL074 surrounding components for any damage, R141,D24,D26 may be bad

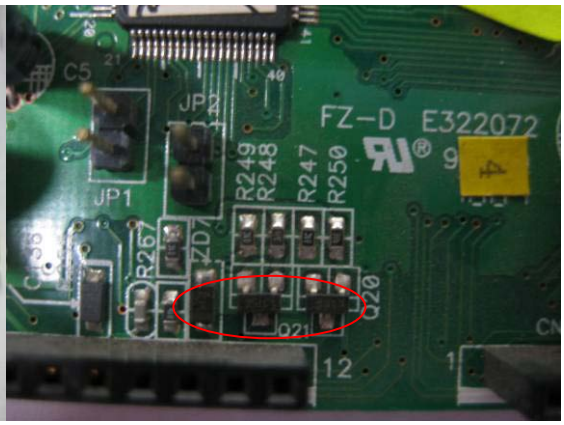






2. check the following components may be Q20, Q21, and ZD7 bad





SPS start fail

For example, when check control board use DC power supply, the LCD not lit when press ON button, fan not work and no beeping, this phenomenon is likely caused by the short circuit of +5V by MCU. You can check the 5V-to-ground impedance; it’s likely to be very small or shorted. This Fault can be resolved only by replace the control board.