

Please kindly notice before use it in suitable application:

- It is Online double conversion UPS with full set of functions and capabilities.
- This model includes special functions like:
Frequency conversion, ECO mode, EPO (Emergency Power OFF), ROO (Remote ON/OFF) , Programmable Outlets.
- Design Technology on Inverter: Half- Bridge Common Neutral
- Mainly Features of Half-Bridge Common Neutral UPS:
 1. Input Neutral is connected to Output Neutral in normal operation as On-line mode. It makes error voltage between Input Neutral with Ground is similar to Output Neutral to Ground.
 2. The Online UPS designs for PC & IT related applications: PCs, Workstations, Servers, etc.
 3. Not suitable for managing high inductive loads. This kind of loads generates unbalance in DC bus of UPS (Error 08).
 4. Not compatible with loads based on half-wave rectified power supplies. They generate unbalance in UPS bus (Error 08).
 5. Not suitable for specific loads requires 0Vac on Neutral – Ground.

Intelligent True On-Line MSIII series UPS

Service Manual

4.5K/6KVA, 8K/10KVA

- Technical information on this manual is property of AblereX.
- AblereX can introduce modifications in their products or manuals without further notice.
- AblereX is not responsible of mistakes or missing information in this manual.
- AblereX is not responsible for wrong use a third part can do of this information.
- All rights reserved. Reproduction without permission is prohibited.
- Any additional information you will supported under AblereX Service team at www.ablerex.com.tw

Table of Contents

Product Introduction	6
1.1 Symbols on the LCD Display Panel	6
1.2 Panel explanation	6
1.3 Communication Port Explanation.....	12
Installation and Operation.....	13
2.1 Unpacking.....	13
2.2 Selecting Installation Position	14
2.3 Terminal Block Explanation.....	16
2.4 Operation Test and Installation Instruction	20
System Block Diagram and PCB Wiring Diagram.....	32
3.1 System Block Diagram	32
3.2 Unit Wiring Diagram	34
Unit Test, Calibration Setting Explanation	37
4.1 VR Function Explanation	37
4.2 Electrical Characteristics	37
4.3 Startup Procedure for Debug UPS	40
4.4 UPS Inverter Output Balance Check	42
4.5 Unit Calibration and Setting Procedure	43
4.6 Frequency Converter(CVCF Mode)Setting Notice.....	45
Customer Options Slots	46
5.1 R2E(RS-232) card.....	46
5.2 RSE(RS-485) card	46
5.3 USE(USB) card	47
5.4 DCE(Dry Contact) card	47
5.5 SNMP Cards	48
5.6 Please follow the step as below for installation	49
Trouble Shooting	50
Appendex A PCB Placement	90

S

1. Safety Instructions and Storage/ Battery Care

1.1 Safety Instructions

1.2

SAVE THESE INSTRUCTIONS.

This manual contains important instructions that should be followed during installation and maintenance of the UPS and batteries.

NEVER connect output NEUTRAL with system GROUND. This will damage UPS. If load requires 0V between NEUTRAL and GROUND, an isolation transformer must be installed at UPS output. Then you can connect NEUTRAL and GROUND in the secondary of the transformer.

Laser Printers, Scanners and Copiers are high peak power devices. Make sure your UPS output capacity in watts can manage peak consumption of connected loads.

Do not open the case as there are no serviceable parts inside. Opening the case will void your warranty and introduces the risk of electric shock.

Do not try to repair the unit yourself. Doing so will void your warranty. Contact your local supplier for repairs.

If liquids are spilled on the UPS or foreign objects dropped on the unit, the UPS could be damaged. Users may at risk to electric shock. The warranty will become null and void.

Do not install the UPS in an environment with sparks, smoke, or hazardous gases. This UPS is equipped with an EMI filter. To prevent potential leakage current or hazards, ensure that the AC mains supply is properly grounded.

This UPS is designed to be installed and commissioned in a sheltered, controlled environment as follows:

- Operating temperature 0-40°C and 5-90% relative humidity. High ambient temperature reduces battery life.
- Avoid direct sunlight.
- Do not install the UPS in an inflammable or otherwise hazardous environment.
- Avoid areas that are subject to high vibration.
- Avoid any area with sparks.
- Dusty, corrosive, and salty environments can damage any UPS.
- Install the UPS indoors as it is not designed for installation outdoors.

4. To prevent overheating of the UPS, keep all ventilation openings free from obstruction and do not place anything on top of the UPS. Keep the UPS rear panel 20 cm away from the wall or other obstructions.

Install the UPS in a well ventilated area. During battery charging and or battery failure, there is a potential to be a small trace of odours.

If the product emits any noise or smell, shut down the UPS, disconnect all loads and contact your dealer for maintenance.

Always switch off the UPS and disconnect the batteries when relocating the UPS. Be aware that, even when disconnected, charged batteries present a possible electric shock hazard.

The UPS should be recharged every 2-3 months if unused. If this is not done then the warranty will be null and void. When installed with the AC connected the batteries will be automatically recharged and kept in top condition.

Make sure that the AC utility outlet is correctly grounded.

Ensure that the input voltage rating of the UPS matches the utility supply voltage. Use a certified input power cable with the correct plugs and sockets for the system voltage.

To ensure safety in all applications where a UPS is hard wired to the electrical supply, ensure that the system is installed by a qualified electrical contractor. The UPS has its own internal energy source (battery). Should the battery be switched on when no AC power is available there could be voltage at the output terminals.

This UPS supports electronic equipment in office, telecommunication, process-control and security applications. Non-authorized technicians are not allowed to install the UPS in the following areas.

- a. Medical equipment directly related to human life
- b. Elevators, subway systems, or any other equipment related to human safety.
- c. Public systems or critical computer systems.

Do not try to replacement of the battery yourself. Doing so will void your warranty. Contact your local supplier for repairs.

CAUTION - RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

CAUTION - Do not dispose of batteries in a fire. The batteries may explode.

CAUTION – Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

CAUTION– A battery can present a risk of electrical shock and high short circuit current. The following precautions should be observed when working on batteries:

- 1) Remove watches, rings, or other metal objects.
- 2) Use tools with insulated handles.
- 3) Wear rubber gloves and boots.
- 4) Do not lay tools or metal parts on top of batteries.
- 5) Disconnect charging source prior to connecting or disconnecting battery terminals.

- 6) Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

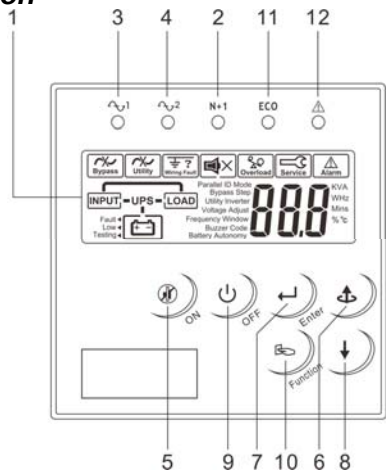
External battery cabinet installation instructions, please refer to " Battery Bank Installation User's MANUAL".

1.3 Storage / Battery Care

If the UPS is unused for an extended period of time it must be stored in a moderate climate. The batteries should be charged for 12 hours every three months by connecting the UPS to the utility supply the switching on the UPS using the front control panel. Some models use a rear mounted circuit breaker that must be switched to the on position. Repeat this procedure every two months if the storage ambient temperature is above 25°C.

1.4 Product Introduction

1.1. Panel explanation



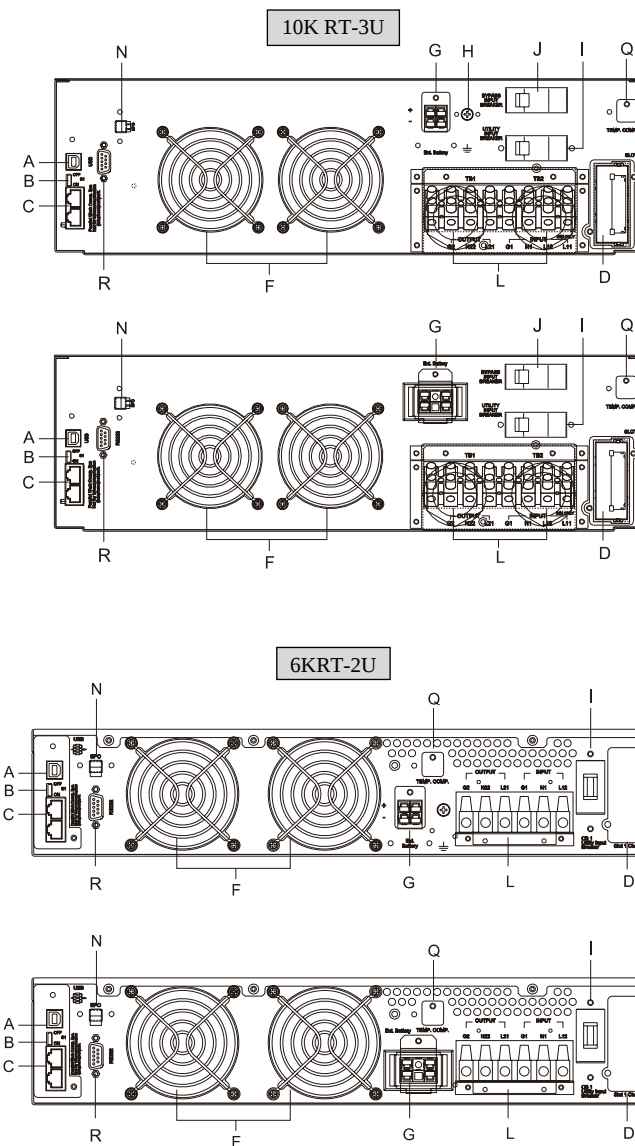
- ① LCD Display
- ② Green LED lights up to indicate the UPS has the capability to run under redundancy mode.
- ③ Green LED steadily lights up to indicate that the utility input voltage is within the window; the LED flashes flickeringly to indicate that the utility input voltage is within the acceptable window.
- ④ Green LED lights up to indicate Bypass Input is normal.
- ⑤ UPS ON/Alarm Silence
- ⑥ Go to previous page or change the setting of the UPS.
- ⑦ To re-confirm the change of UPS Setting
- ⑧ Go to next page
- ⑨ UPS OFF Switch
- ⑩ Special functions log in/out
- ⑪ UPS is working under ECO(Economic, Line-interactive) mode.
- ⑫ UPS Fault or Abnormal

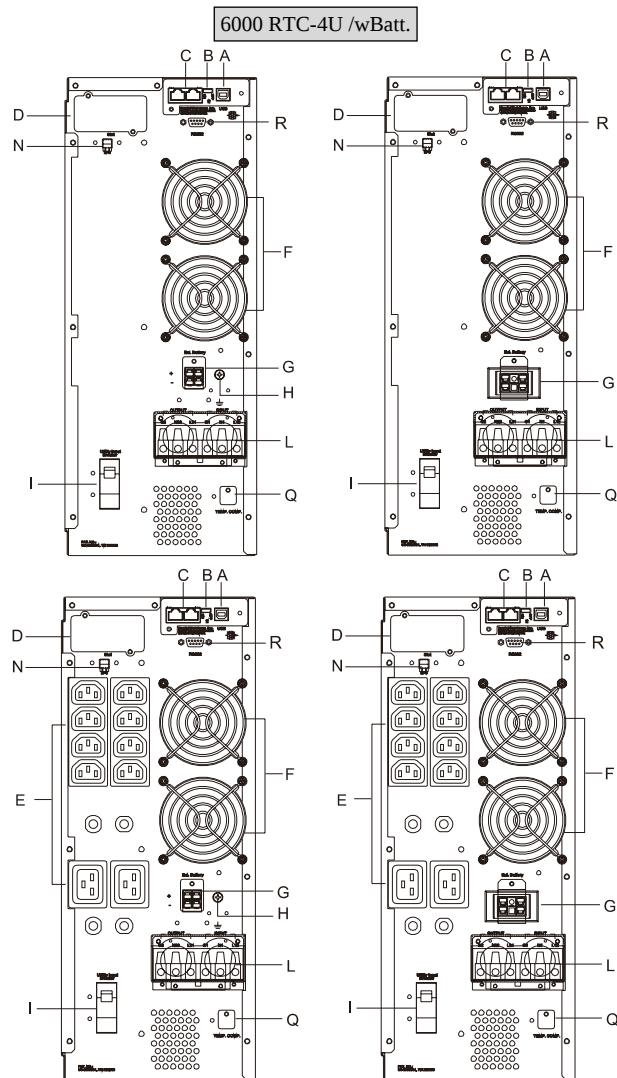
1.5 Symbols on the LCD Display Panel

Item	Symbol	Description
1	INPUT	Utility or Bypass Source
2	Low ◀	Battery Low
3	Fault ◀	Battery Abnormal
4	Overload	UPS Overloading
5	Service	UPS Working in specified mode*
6	Bypass	Bypass Input Abnormal, UPS fails to transfer to bypass, Bypass Abnormal at ECO mode
7	Utility	Utility Input Abnormal
8	OFF	UPS Shutoff
9	INPUT OFF	UPS Abnormal Lock
10	INPUT-UPS-LOAD	UPS Flow Chart
11	888 KVA WHz Mins % °C	3-Digit Measurement Display
12	□ □ □	Indicates the item to be measured
13	⏻	UPS ON Switch or Alarm Silence
14	⏻	UPS OFF Switch
15	⏮	Previous Page or Setting Change
16	⏭	Next Page

17		Special Function Log In/Out
18		Enter or Reconfirm
19		Utility Input Normal LED
20		Bypass Input Normal LED
21		UPS under Redundancy Mode
22		UPS under ECO Mode
23		UPS Fault or Abnormal Warning LED
24		Emergency Power Off
The below items from 25 to 30 show the UPS is on Service Mode		
25	Sr01	The UPS is on Service Mode now
26	Sr02	Inverter's & PFC's PWM Output On(It shall be -6Vdc ~ +15Vdc/20KHz square wave)
27	Sr03	1 st Soft Start(Charger or battery pre-charges +/-BUS now)
28	Sr04	2 nd Soft Start(It means AC SCR Driver on or Battery SCR Driver On)
29	Sr05	3 rd Soft Start(Boosts +/-BUS up to desired voltage as indicated in 0)
30	Sr06	Inverter Soft Start(to reach to the desired output voltage of Inverter)

1.1.2 Rear Panel Explanation





- A USB Port
- B Terminal Resistor for Parallel function
- C CAN Bus Connection Port for Parallel System
(Do not for telecommunication network)
- D Customer Options Slot 1
- E Outlet- IEC C19/C13 with Breaker
- F Cooling Fan
- G External Battery Connector
- H External Battery Ground
- I Utility Input Breaker CB1
- J Bypass Input Breaker CB2
- L Input/output Terminal Block
- N EPO (Emergency Power Off) : 2 types switch state, Normal Close and Normal Open
EPO can be converted to ROO(Remote ON/OFF)
ROO with 2 types switch state -Normal Close and Normal Open
ROO and EPO need to use the software switching
- Q Temp. Comp.
- R RS232 port

1.6 Communication Port Explanation

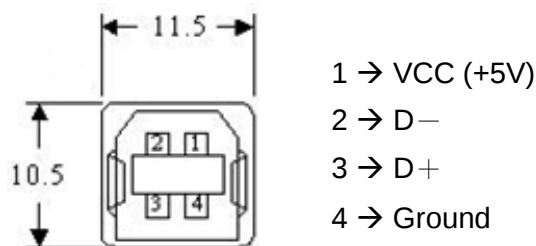
The communication port on the UPS provides for USB and RS-232 communication with the UPS software to remotely monitor the power and UPS status.

You may use optional interfaces cards for R2E (RS-232), RSE (RS-485), DCE (Dry Contact), and SNMP. However, the R2E card and RSE card must not be used simultaneously.

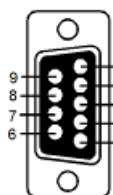
The software bundled with the UPS is compatible with many operating systems such as Windows 2000, XP, Server 2003, VISTA, Server 2008, Win7 and Win8. For other applications such as Novell NetWare, Unix, or Linux please contact your local distributor for a proper solution.

When the optional interface cards are used together with the onboard USB port the EPO signals will get highest priority, then the SNMP/WEB card, then the shutdown command at the DCE, R2E and RSE, and then finally the onboard USB port gets the lowest priority.

USB complies with USB version 1.0, 1.5 Mbps and USB HID version 1.0



True RS-232



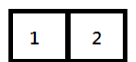
The RS-232 interface must be configured as follows.

Baud Rate	2400 bps
Data Length	8 bits
Stop Bit	1
Parity	None

Pin 3: RS-232 Rx
Pin 2: RS-232 Tx
Pin 5: Ground

EPO/ROO

Pin Assignments:



+ Gnd

Function setting :

1. EPO NC → Shutdown UPS (default)
2. EPO NO → Shutdown UPS
3. ROO NC → Start-up UPS
4. ROO NO → Start-up UPS

(This function setting by **setting tool**)

Installation and Operation

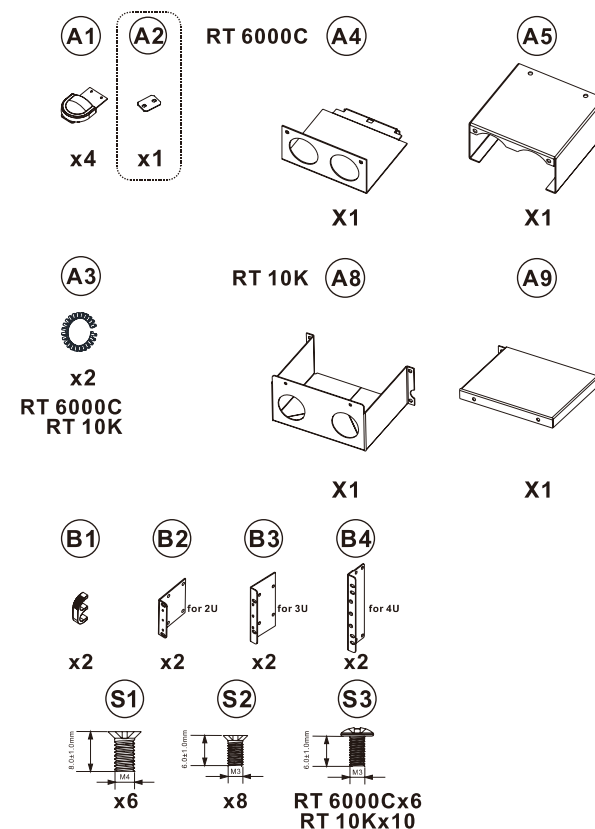
The packing condition and the external outlook of the unit should be inspected carefully before installation. Retain the packing material for future use.

1.7 Unpacking

Take the UPS out of the PE foam.

Check accessories

- * 1 set of Quick Start Manual
- * 1 set of User's Manual
- * 1 set of USB cable for UPS communications with software.
- * 1 set of Metal Accessories Kits as below:

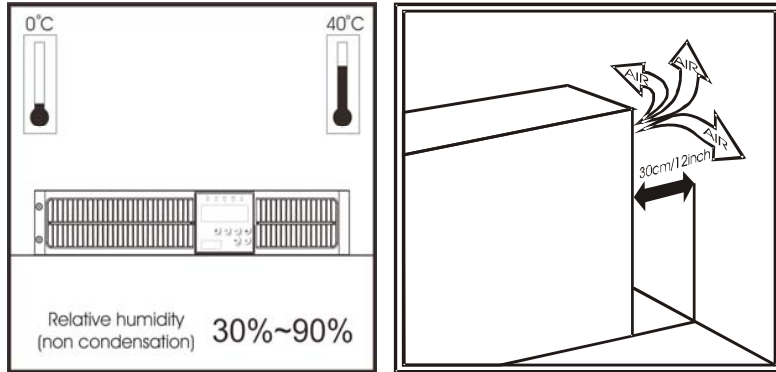


* A1 & A2 for Tower structure , B1 & B2 are for rack of machine, A and B can't be used when UPS being delivery.

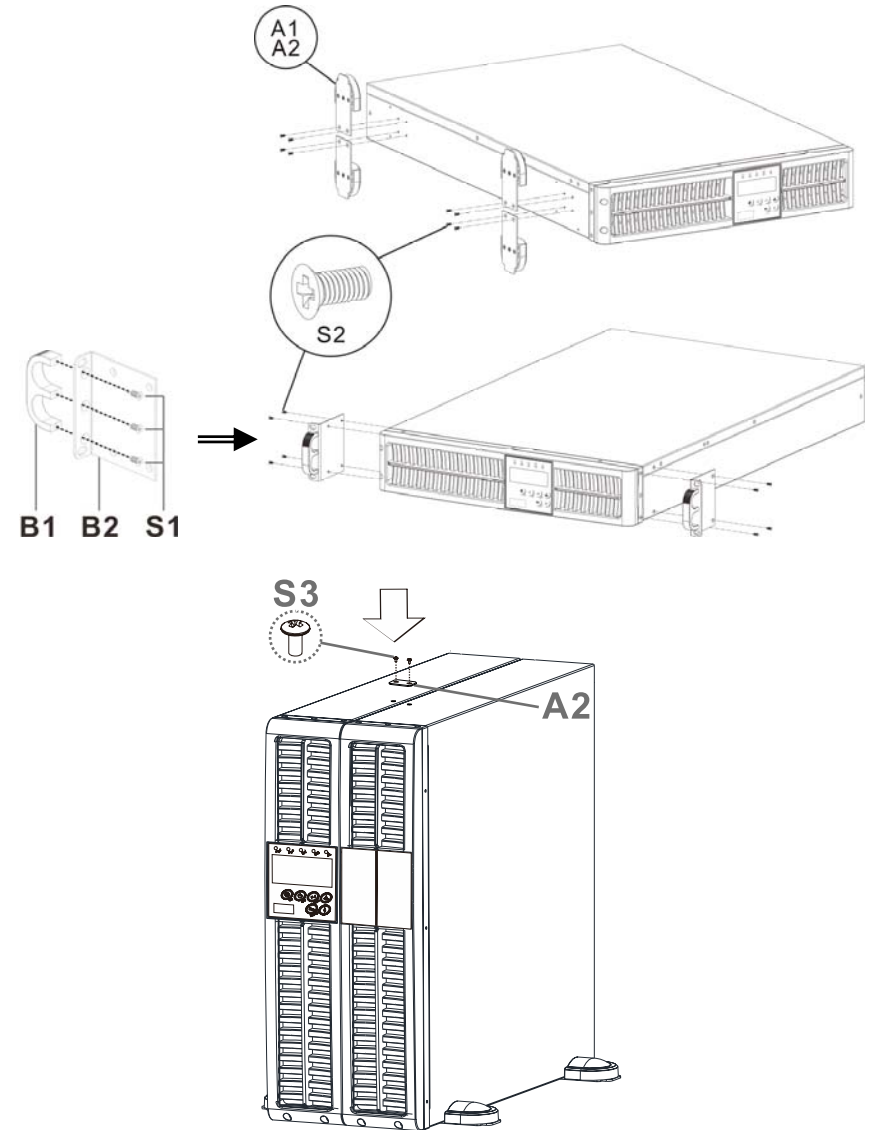
1.8 Selecting Installation Position

It is necessary to select a proper environment to install the unit, in order to minimize the possibility of damage to the UPS and extend the life of the UPS. Please follow the advice below:

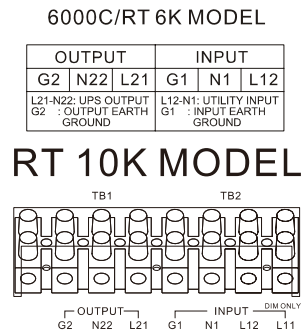
- 1.1.1. Keep at least 30 cm (12 inches) clearance from the rear panel of the UPS to the wall.
- 1.1.2. Do not block the air-flow to the ventilation openings of the unit.
- 1.1.3. Please check the installation site to avoid overheating and excessive moisture.
- 1.1.4. Do not place the UPS in an environment near dust, corrosive or salty material or flammable objects.
- 1.1.5. Do not expose the UPS to outdoors.



1.9 Caster Cover Installation Guide



1.10 Terminal Block Explanation



- **L12-N1:** the terminal for Utility Input to provide the power source when the UPS is working under Utility mode
- **G1:** the terminal for UPS Input Ground
- **L21 、 N22:** the terminals for UPS Output
- **G2:** the terminal for UPS Output Ground

Remarks:

1. The maximum current for each terminal is 36 Arms for 6 kVA.
2. If the UPS is a SIM (Single Input) type, only AC source can be supplied to the UPS from the L12-N1 terminal for the 1-phase.
- Use mounting cable ties to fix cables.

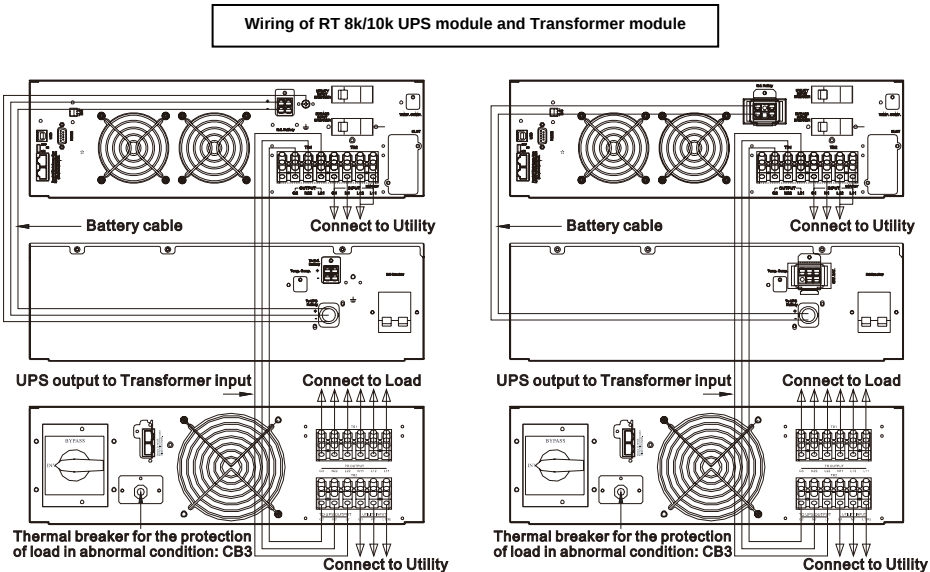
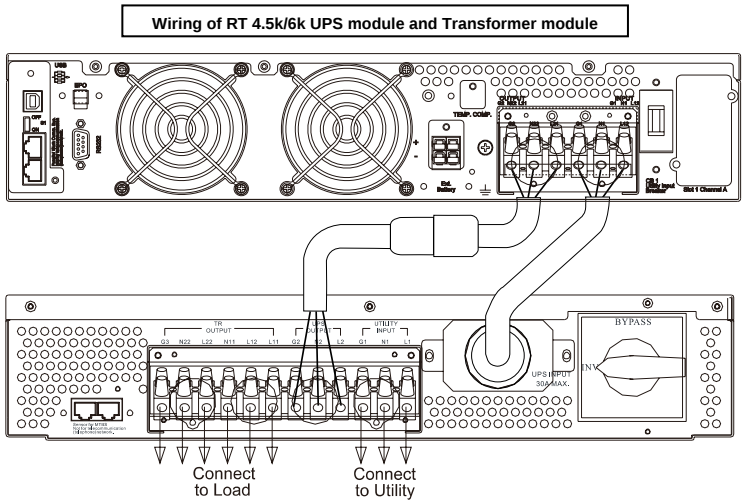
3. Please refer to the specs of input current, output current and recommended conductors listed as below :

a. AC input and output (minimum 75°C copper wire)

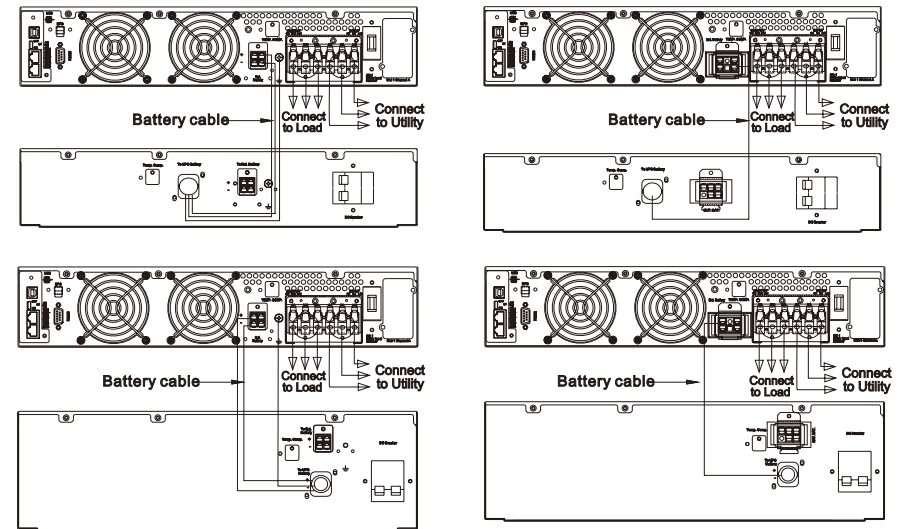
Model	Maximum Current	Conductor Section
4.5KVA(Tower/RT)	25 A	AWG # 10
6KVA(Tower/RT)	36 A	AWG # 10
8KVA	50A/40A	AWG # 8
10KVA	62A/50A	AWG # 8

b. Battery input

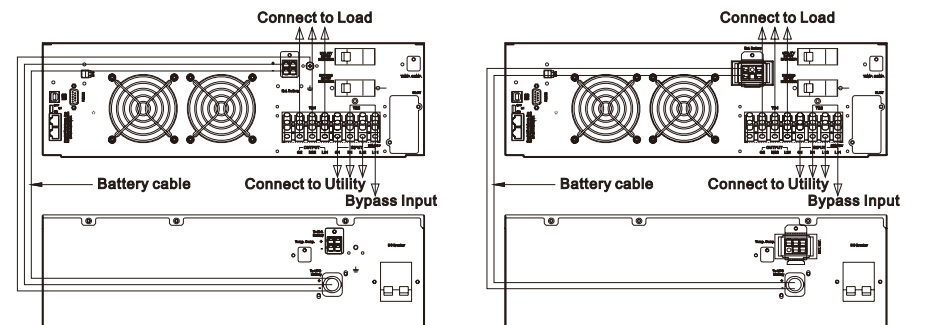
Model	Maximum Current	Conductor Section
4.5KVA	19 A	AWG # 10
6KVA	36 A	AWG # 10
8KVA	42A	AWG # 10
10KVA	53A	AWG # 8



Wiring of RT 4.5k/6k UPS module and Transformer module



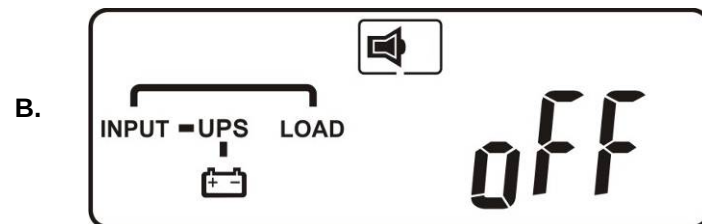
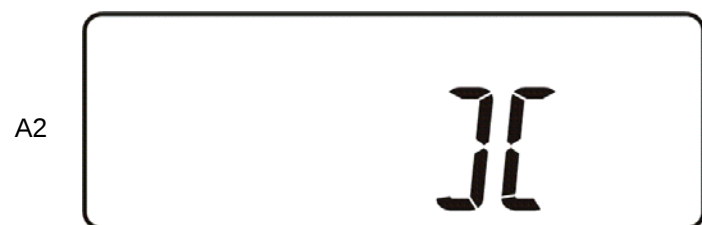
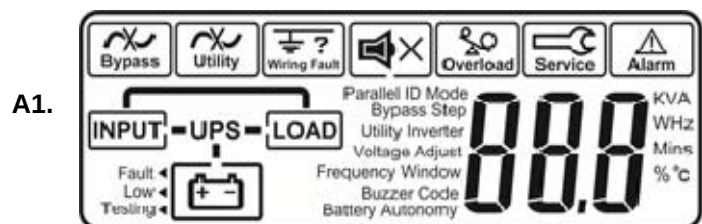
Wiring of RT 8k/10k UPS module and Transformer module



1.11 Operation Test and Installation Instruction

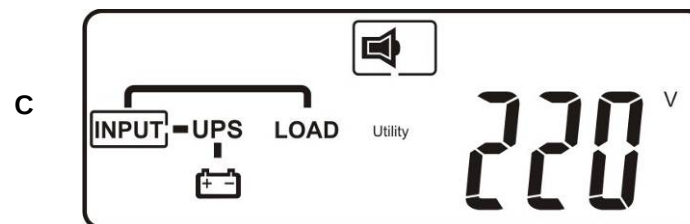
2.1.1 Start Up in Normal Mode

- 2.1.1.1 Open the terminal block cover on the rear panel (refer to 1.1.2) Before proceed the installation, please make sure the grounding is connected properly.
- 2.1.1.2 Make sure Utility breaker, UPS' Utility breaker and Bypass breaker are On "Off" position.
- 2.1.1.3 Make sure the voltage of Utility matches with the input voltage window of the UPS.
- 2.1.1.4 Connect the Utility separately to the terminal blocks of UPS' Utility and Bypass Inputs. Switch on the Power Breaker of the distribution panel and the breakers of the UPS' Utility and Bypass Inputs, and then the UPS starts up. Green LEDs ~ 1 & ~ 2 light up to show the Utility and Bypass Inputs are normal and the LCD display with parallel function will illustrate from drawing A1, drawing A2 to drawing B. Otherwise the LCD display will illustrate from drawing A2 to drawing B.

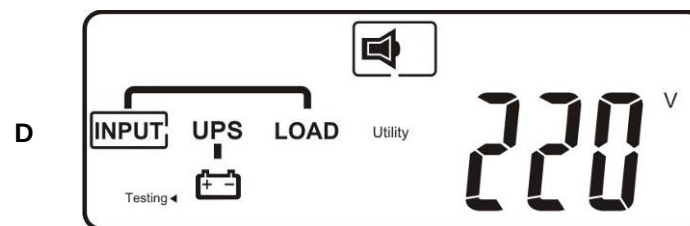


- 2.1.1.5 Then, the UPS is on Bypass Mode now and it will proceed self-test automatically. If there is no abnormal message occurred, it means the pre-startup of the UPS is successful and the charger starts to charge the batteries.

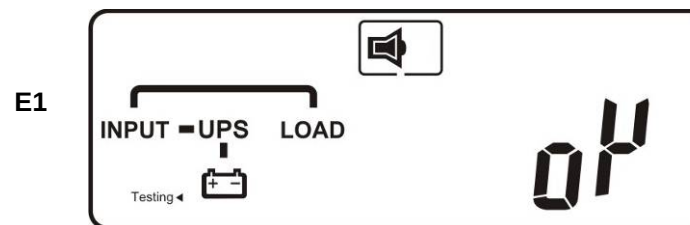
- 2.1.1.6 Press the UPS On Switch  for approx. 3 seconds, then the Buzzer sounds twice and the LCD display changes from drawing B to drawing C.



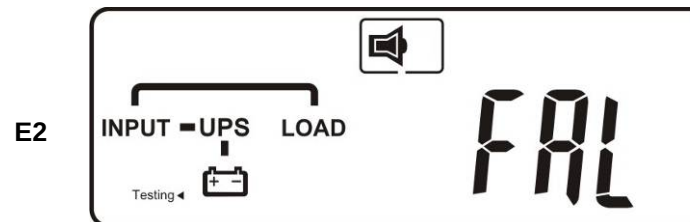
- 2.1.1.7 Then, the UPS is under self-test mode again, the LCD display will illustrate from drawing C to drawing D and remain approx. 4 seconds under battery mode, then illustrate from drawing E1 to drawing F if the self-test is successful.



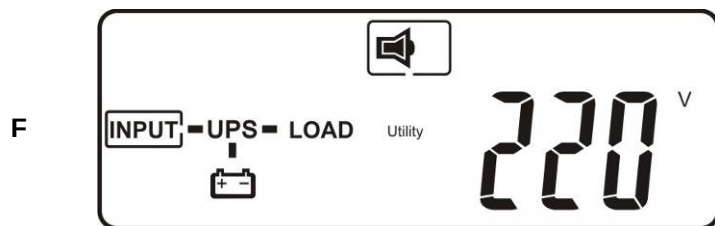
* "testing".



* It shows "OK" in self-test



* It shows "Fail" in self-test



* It shows "220Vac" in Utility Input.

2.1.1.8 In case of failure in self-test, the LCD display will illustrate from Drawing D to drawing E2, then an error code or error status will be shown on the screen.

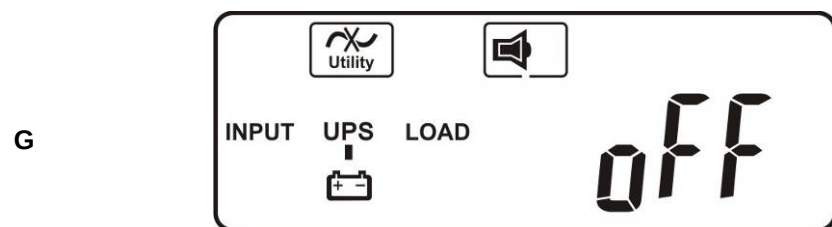
2.1.1.9 Your start-up operation of the UPS is completely now. Make sure the UPS is plugged onto the wall receptacle for charging at least 8 hours and the batteries of the UPS are fully charged.

2.1.2 Start-up in Battery Mode (Cold Start)

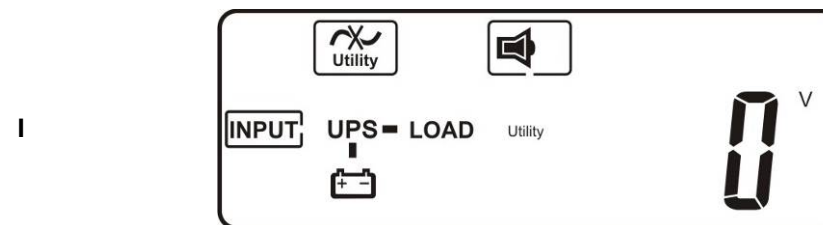
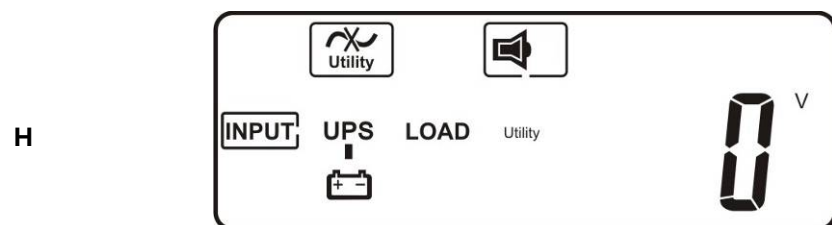
2.1.2.1 Make sure the UPS you have already been installed at least 1 set(20pcs) of 12V/7AH batteries.

2.1.2.2 Push the UPS On Switch  to awake the UPS for approx. 3 seconds, and then the buzzer sounds twice. The LCD display will illustrate from drawing A to drawing G, and keep awake for approx. 15 seconds.

2.1.2.3 Press the UPS On Switch  of the UPS again for about 3 seconds till the LCD display illustrates from drawing G to drawing H, then the UPS will be in self-test Mode. The UPS may offer energy to the output in a minute, and the LCD display illustrates as drawing I. In case of failure in pushing the UPS On Switch in 15 seconds, the UPS will automatically turn off.



* It shows "Off", which means the UPS pre-start is successful.

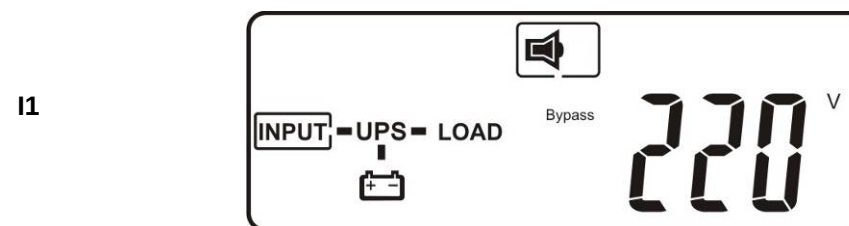


* It shows Utility input is "0" and Utility Abnormal.

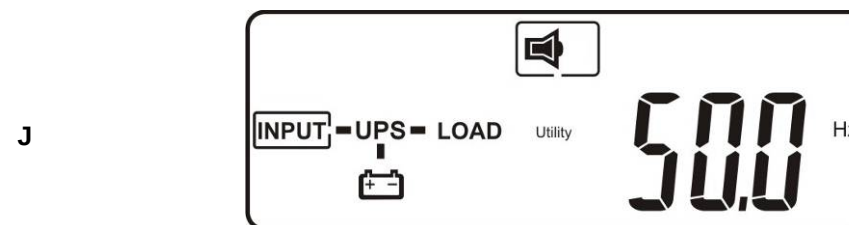
Check Measured Values & Figures detected by UPS

If you would like to check the measured values & figures detected by the UPS, please use scroll up  and scroll down  key pads.

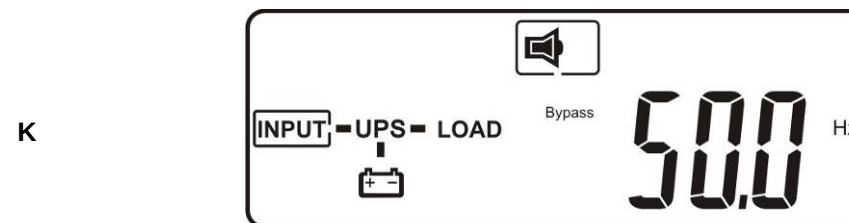
When you use scroll down key pad, the LCD display will illustrate in sequence as Drawing C(Voltage from Utility Input) → Drawing I1(Voltage from Bypass Input) → Drawing J(Frequency from Utility Input) → Drawing K(Frequency from Bypass Input) → Drawing L(UPS Output Voltage) → Drawing M(UPS Output Frequency) → Drawing N(UPS Output Load %) → Drawing O1(UPS Battery Voltage) → Drawing O2(UPS Battery Voltage) → Drawing P(UPS Inner Temperature).



* It shows voltage comes from Bypass Input

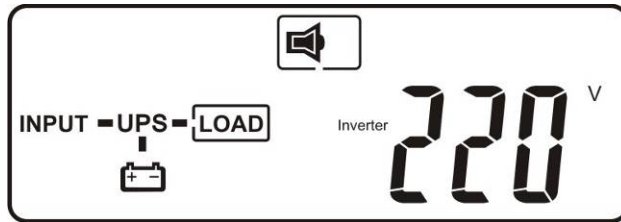


* It shows frequency from Utility Input.



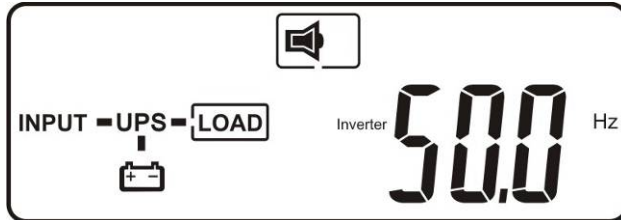
* It shows frequency from Bypass Input.

L



* It shows UPS output Voltage.

M



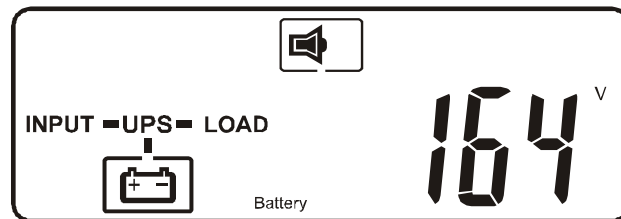
* It shows UPS output frequency.

N



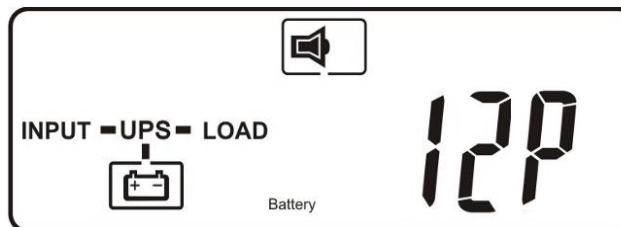
* It shows UPS output load level(%)

O



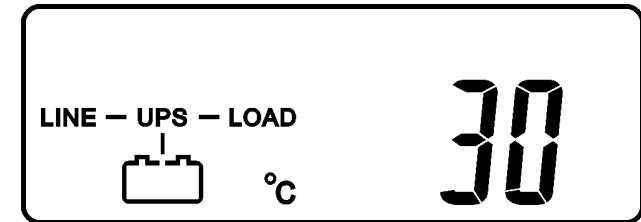
* It shows Battery Voltage.

O2



* It shows Battery Number.

P

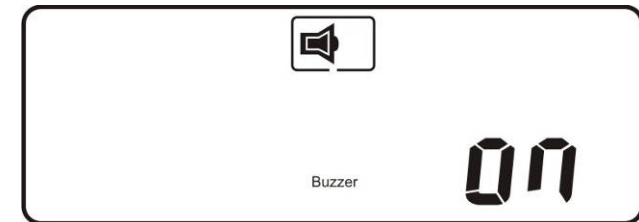


* It shows UPS Inner Temperature

2.1.3 UPS Default Data and Special Function Execution

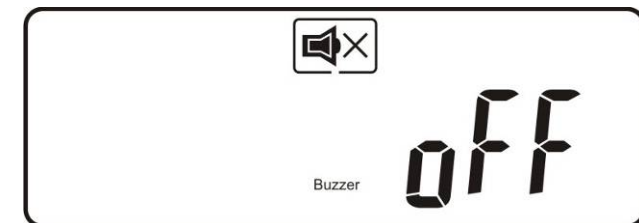
2.1.3.1 After UPS completely starts up, press key pad to change the LCD display screen to drawing Q1.

Q1



* It shows buzzer "On".

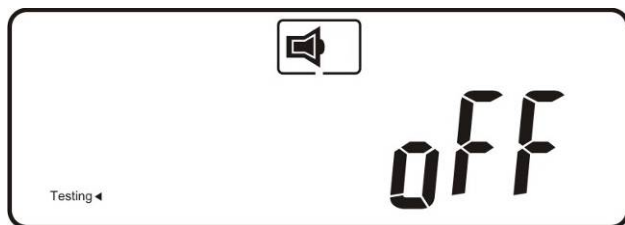
Q2



* It shows buzzer "Off".

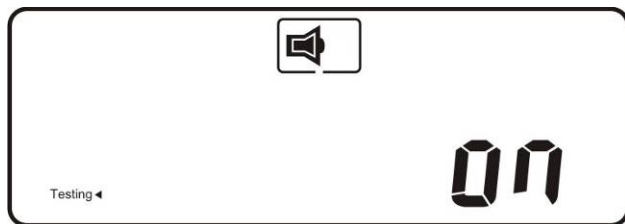
2.1.3.2 Press key pad to scroll down the screen and check the UPS settings. The LCD display will show in sequence between Drawing Q1(buzzer) → Drawing R1(Self-test) → Drawing S1(Bypass Voltage Windows) → Drawing T(Output Frequency Synchronization Window) → Drawing U(Inverter Output Voltage) → Drawing V1(UPS Operation Mode) → Drawing W(Output Voltage Micro Tune Value) → Drawing X(UPS Id) → Drawing Y(Parallel function status).

R1



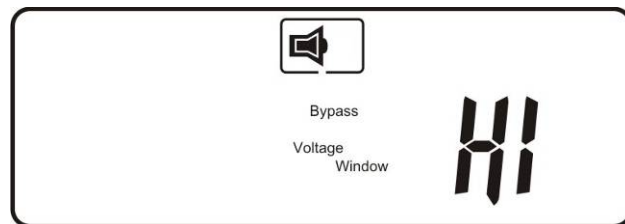
* It shows self-test is "Off".

R2



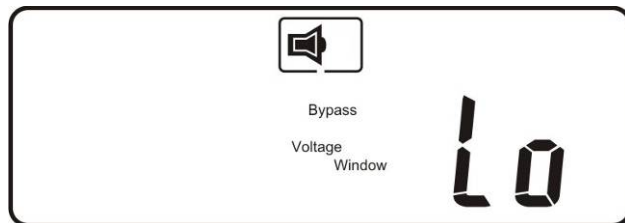
* It shows self-test is "On".

S1



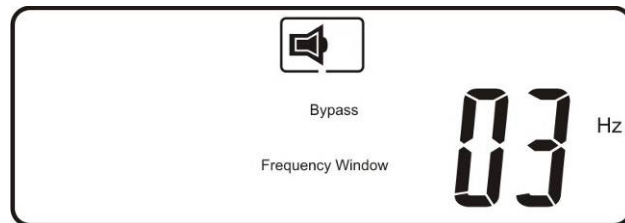
* It shows Bypass Voltage is adjusted to narrow range.

S2



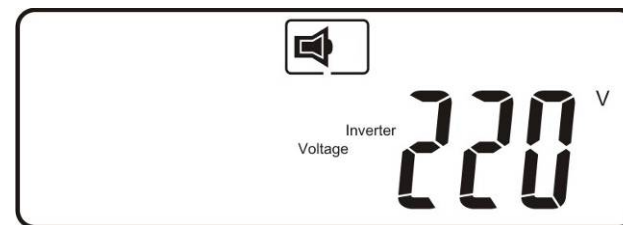
* It shows bypass voltage is adjusted to wider range.

T



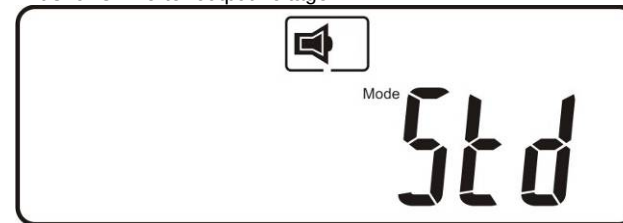
* It shows Frequency Window is +/-3Hz.

U



* It shows inverter output voltage.

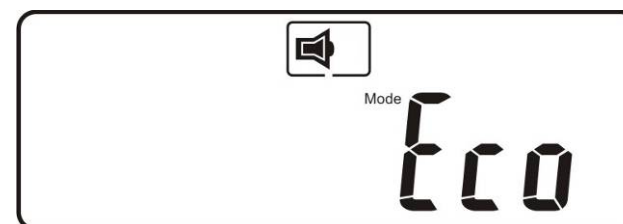
V1



the UPS is operated in "normal mode".

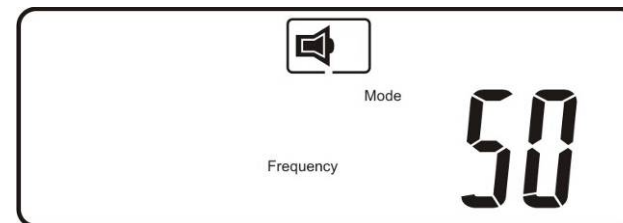
* It shows

V2



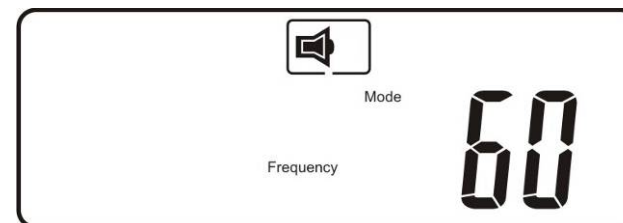
* It shows the UPS is operated in "Eco mode".

V3



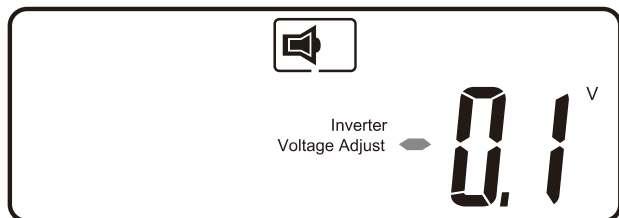
* It shows the UPS is operated in "CVCF 50Hz mode".

V4



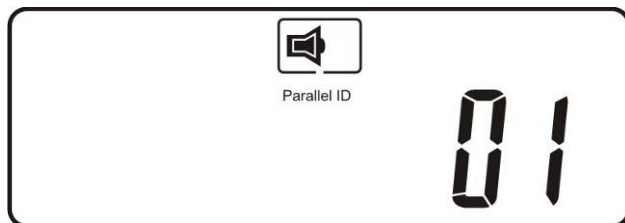
* It shows the UPS is operated in "CVCF 60Hz mode".

W



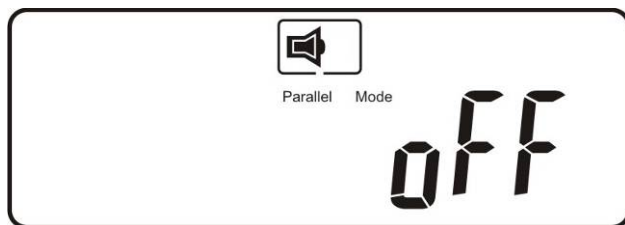
* It shows Output Voltage Adjustment ($\pm 6.0V, 0.1V/\text{Per-scale}$)

X



* It shows UPS Identification Number.

Y



* It shows the UPS is in the No. 1st of parallel systems.

2.1.3.3 Press scroll up  key pad, you may execute special functions. The Functions includes buzzer ON (as drawing Q1), or buzzer OFF (as drawing Q2, Alarm silence for UPS Warning) and self-test OFF (As drawing R1) or self-test ON. (as drawing R2. UPS will execute battery test for 10 seconds. If the self-test is successful, it will show as Drawing E1; otherwise, it will show as drawing E2 & error message in the same time.)

2.1.4 UPS Default Settings and their alternatives

2.1.4.1 Make sure the UPS is not “On” yet. Press On Switch  and scroll down  key pads simultaneously for approx. 3 seconds, the buzzer will sound twice, the LCD display screen shows as drawing Q1, then the UPS is under setting mode now.

2.1.4.2 To scroll down the LCD screen, you may refer to Chapter 2.1.3.2

2.1.4.3 Except Buzzer(as drawing Q1 & Q2) and Self-test(as drawings R1 & R2), all the rest default settings may be changed by pressing scroll up  key pad.

2.1.4.4 Drawings S1 and S2 means the bypass input acceptable window that follow the output setting voltage, please refer to the specification for the details.

2.1.4.5 Drawing T means the bypass frequency window of the Inverter Output, the acceptable setting values are $\pm 3\text{Hz}$ and $\pm 1\text{Hz}$.

2.1.4.6 Drawing U means the acceptable Inverter Output Voltage, of which voltage is 200Vac, 208Vac, 220Vac, 230Vac, or 240Vac.

2.1.4.7 Drawing V1, V2, V3 and V4 mean the operation modes of the UPS, of which alternative is Online, Eco(Economic) mode, fixed 50Hz Output or fixed 60Hz Output.

2.1.4.8 Drawing W means the adjustments of the Inverter Output, which may be calibrated as 0%, +1%, -1%, +2%, -2%, +3%, or -3%.

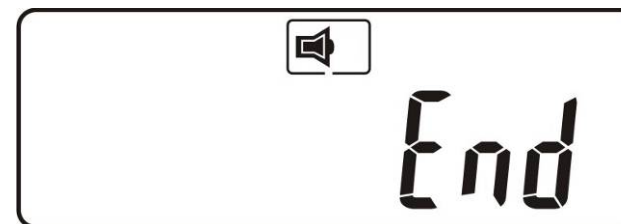
2.1.4.9 Drawing X means a specified address & position of the UPS when the UPS is in Parallel mode. The settable numbers are from 1st to 4th. The number must be 1st if the UPS is not in parallel.

2.1.4.10 Drawing Y means the parallel function status. The “P 01” means parallel function disabled and the “P 02” means parallel function enabled.

2.1.4.11 When all the setting changes are done, you have to press enter  key Pad to save all the changes when the LCD screen shows as drawing Z, then, the LCD screen will show as drawing AA to complete the setting changes. If you don't want to change those settings, you may press “OFF”

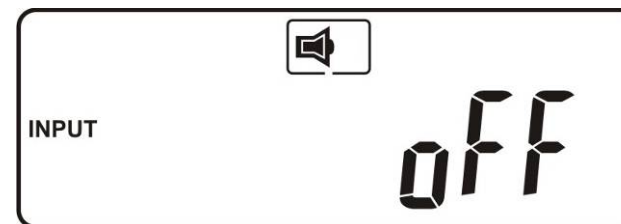
 key pads for 5 seconds, then the LCD screen turns to Drawing AA directly, which means your setting changes are invalid.

Z



* Press the Enter key to save changes.

AA



* It shows the UPS is locked.

2.1.4.12 Turn Off the breaker of Utility Input.

2.1.4.13 Your Setting changes are complete.

2.1.5 UPS Is Off Due to Unknown Reason and Its Trouble Shooting

2.1.5.1 If there is a serious abnormal condition occurred, the UPS will lock it itself in "OFF" position as shown in drawing AA and a abnormal message will show in the LCD screen.

2.1.5.2 To release the UPS lock, please proceed the followings:

Check those error messages recorded.

Check to see 1.4 to trouble shoot the problem of the UPS.

Press Off  key pad for 5 seconds and buzzer will sound twice.

Turn Off the Breaker of Utility Input.

The UPS lock problem is solved now.

2.1.6 Shut Off

2.1.6.1 Press Off  key pad for about 5 seconds, the Inverter output will be turned off, then the output load is supplied by Bypass loop and the LCD screen shows as drawing B.

2.1.6.2 Turn Off the breakers of UPS Utility and Bypass Input.

2.1.6.3 The UPS is turned off completely.

2.1.7 Maintenance Bypass Mode

2.1.7.1 It is for UPS maintenance only. A Non-authorized technician is not allowed to operate the following procedures. If there is any damage under unauthorized condition, your warranty will be void immediately.

2.1.7.2 Press the Off  key pad for approx. 5 seconds, the LCD screen shows as drawing B and the UPS output is on bypass mode.

2.1.7.3 Release the cover of the CAM Switch (Maintenance Bypass Switch) first, then turn on the CAM Switch to "Bypass" mode, and at the right-hand upper Corner of the LCD screen will show  sign.

2.1.7.4 Turn off the UPS Utility breaker as well as Bypass Input Breaker, you then may proceed UPS maintenance now.

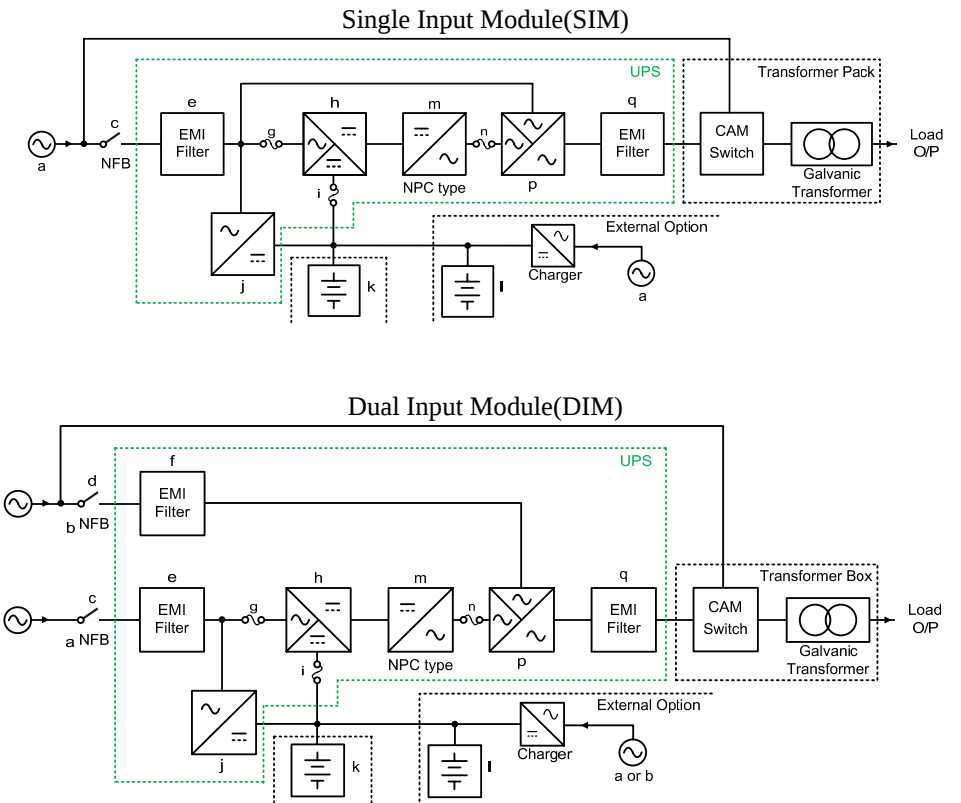
2.1.7.5 To repeat 2.1.1.4, you may put the UPS back to normal working mode, then turn back the CAM switch to "INV" mode, fasten back the cover and repeat 2.1.1.5 to 2.1.1.8 The UPS will switch back to inverter mode.

2.1.7.6 It is required to go through step 1 of 2.1.7.2 first, then go through step 2 of 2.1.7.3 If you skip the step 1., the UPS will alert for 10 seconds to warn that the procedure is abnormal, which may damage the UPS due to uncertain Utility status. The UPS will switch back to Inverter mode immediately if you turn the CAM switch back to "INV".

System Block Diagram and PCB Wiring Diagram

1.12 System Block Diagram

- a. UPS Utility Input: to provide the AC source to the UPS rectifier circuit and charger.
- b. UPS Bypass Input: to provide the AC source to the UPS Bypass Input and Maintenance Bypass loop.
- c. UPS Utility Input Breaker: to protect the UPS Rectifier circuit from over-current.
- d. UPS Bypass Input Breaker: to protect the UPS Bypass circuit from over-current.
- e. EMI Filter on UPS Utility Input : to eliminate the magnetic interference from AC Source or UPS Utility Input.
- f. EMI Filter on UPS Bypass Input: to eliminate the magnetic interference from AC Source or UPS Bypass Input.
- g. Fuse for UPS Utility Input: to provide over-current protection for UPS Rectifier Circuit.
- h. Rectifier and Booster: When Utility is normal, they will convert the AC to DC and correct input power factor. When Utility is abnormal, the batteries will be boosted to provide the DC voltage to the Inverter.
- i. Input fuse for Battery: to protect batteries when DC-Booster is out of order.
- j. Charger: the battery charging device.
- k. Internal Battery(6000C only): When AC abnormal, it provides the backup power from the batteries.
- l. External Battery Bank: To provide longer backup time by adding additional Battery bank.
- m. Inverter Generator: To convert the DC voltage to AC voltage
- n. UPS Inverter Output Fuse: When the UPS is overloaded, the fuse will be opened.
- o. Inverter Output Switch: When the UPS is overloaded or abnormal, or the UPS is working on ECO mode or if EPO (Emergency Power Off) is activated, the Switch will be opened.
- p. Auto Bypass Loop: When the UPS is overloaded or abnormal, the UPS will switch the UPS to bypass output automatically from inverter output.
- q. UPS Output EMI Filter: To eliminate the magnetic interference from the UPS Output and avoid the interference caused by the output load and the UPS.



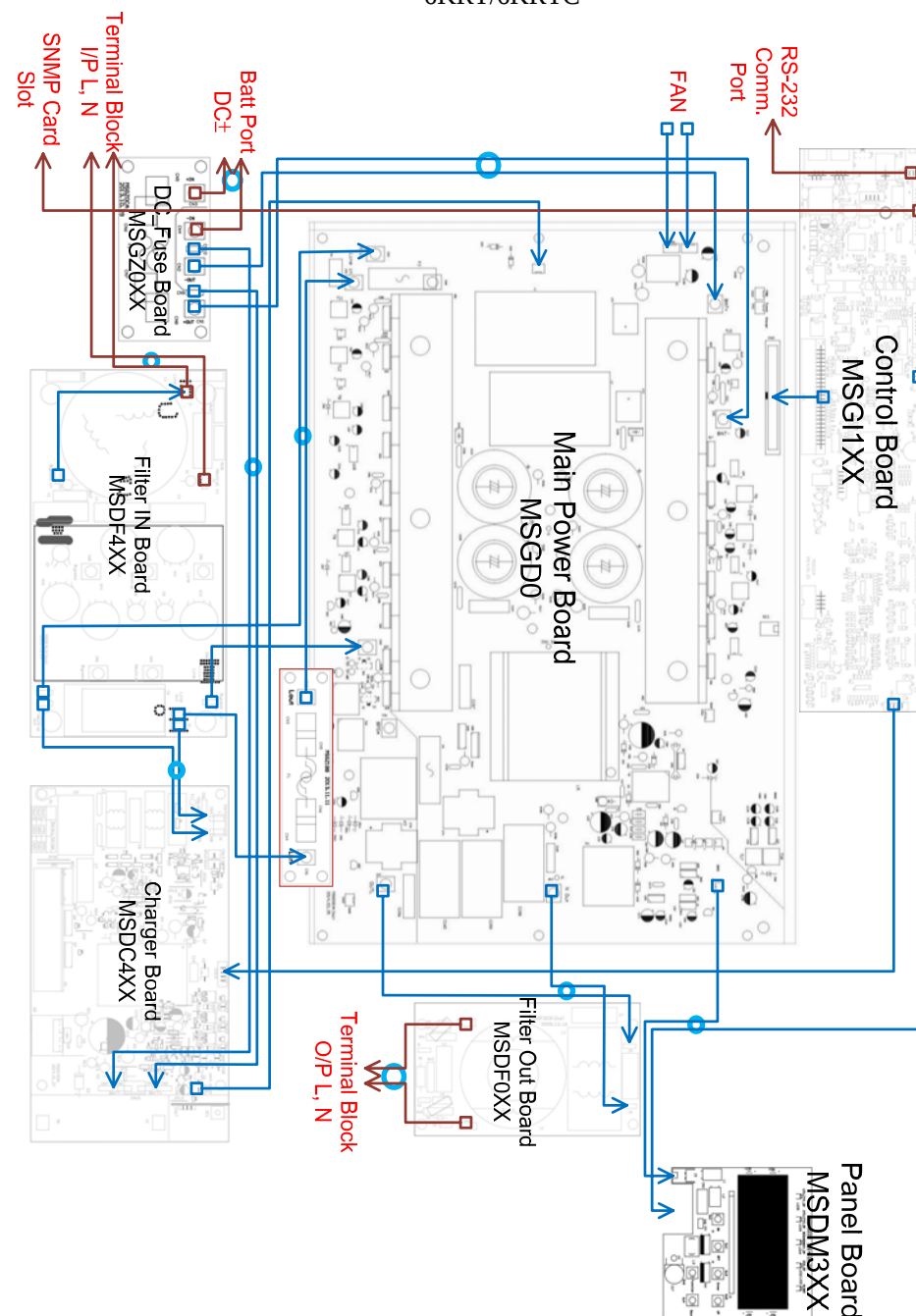
1.13 Unit Wiring Diagram

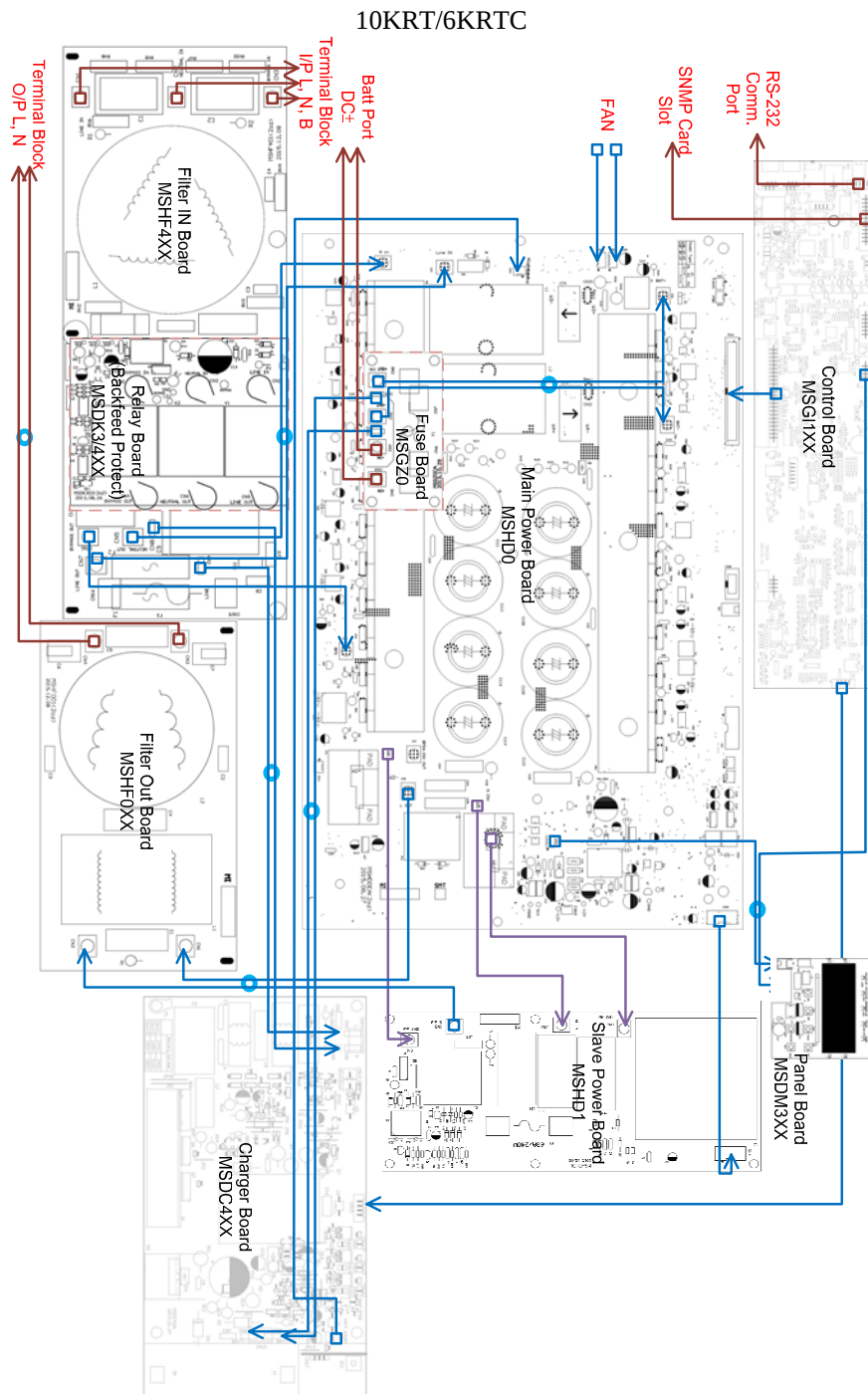
3.3.1 The MSIII6K/6KC/10KVA UPS is composed of six(6) boards. Please find the description as below:

Item	Description	Part No.	Function
1	Control	MSGI1XX(6K/10K)	To generate all control signals and also AC/DC detecting signals.
2	Power(Driver)	MSGD0XX(6K) MSHD0XX(10K) MSHD1XX(10K)	AC/DC 、DC/DC 、AC/AC and circuit working power supply
3	EPO	MSXN0XX(6K/10K)	UPS emergency power shutdown immediately
4	LCD Display	MSDM32XX(6K/10K)	To control and display UPS Status and values
5	Charger	MSDC4XX(6K/10K) MSHC0XX(6K/10K)	Battery Charger
6	I/P EMI filter	MSDF4XX(6K) MSHF4XX(10K)	UPS Input noise filtering and surge protection
7	O/P EMI filter	MSDF0XX(6K) MSHF0XX(10K)	UPS Output noise filtering
8	Relay	MSDK3XX(6K/10K) MSDK4XX(6K/10K)	To narrow the inrush current of output transformer
9	DC FUSE	MSGZ0XX(6K/10K)	Protection of battery current
10	AC FUSE	MSGZ1XX(10K)	Protection of input AC current

3.3.2 Unit Wiring Connection

6KRT/6KRTC





Unit Test, Calibration Setting Explanation

1.14 VR Function Explanation

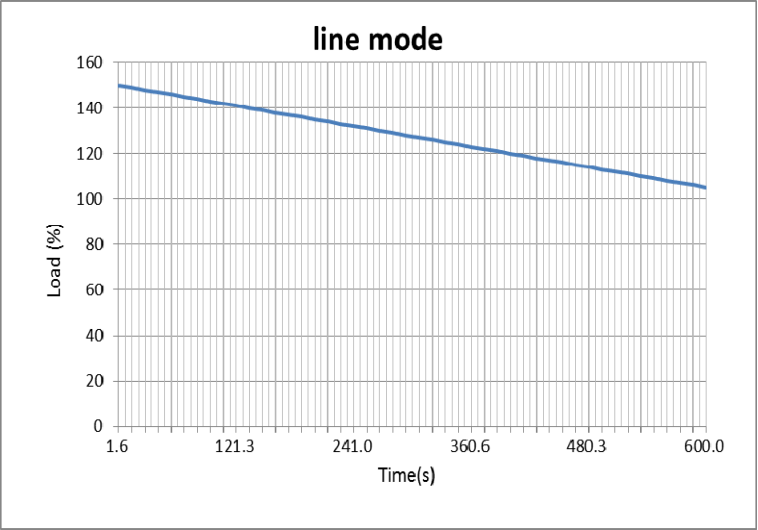
Series Number	PCB Number	Function	Location
12S-16S	MSDC4XX MSHC0XX	Charger for 144V	VR1
	MSDC4XX MSHC0XX	Charger for 168V	VR2
	MSDC4XX MSHC0XX	Charger for 192V	VR3
16S-20S	MSDC4XX MSHC0XX	Charger for 192V	VR3
	MSDC4XX MSHC0XX	Charger for 216V	VR2
	MSDC4XX MSHC0XX	Charger for 240V	VR1

1.15 Electrical Characteristics

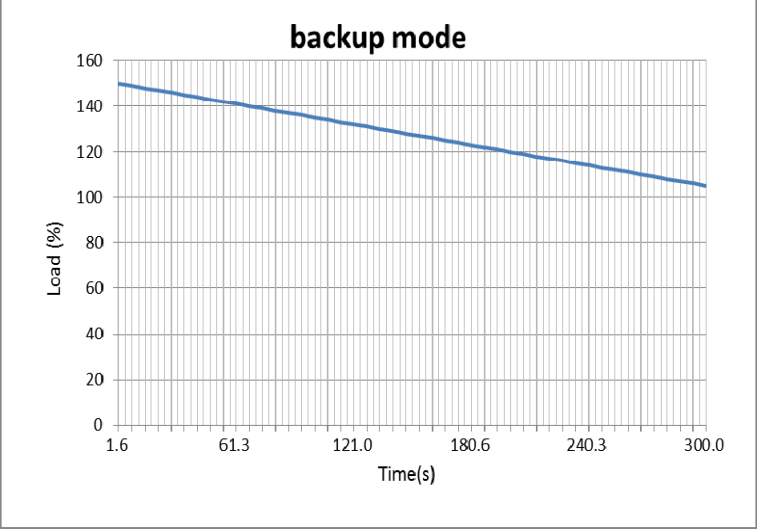
4.2.1 Battery Charging Voltage(25°C)

Setting Point		Battery Charging Voltage
Model		
MSIII 6KVA		163.8Vdc±0.3V for 144VDC
		191.1Vdc±0.3V for 168VDC
		218.4Vdc±0.3V for 192VDC
MSIII 10KVA		218.4Vdc±0.3V for 192VDC
		245.7Vdc±0.3V for 216VDC
		273.0Vdc±0.3V for 240VDC

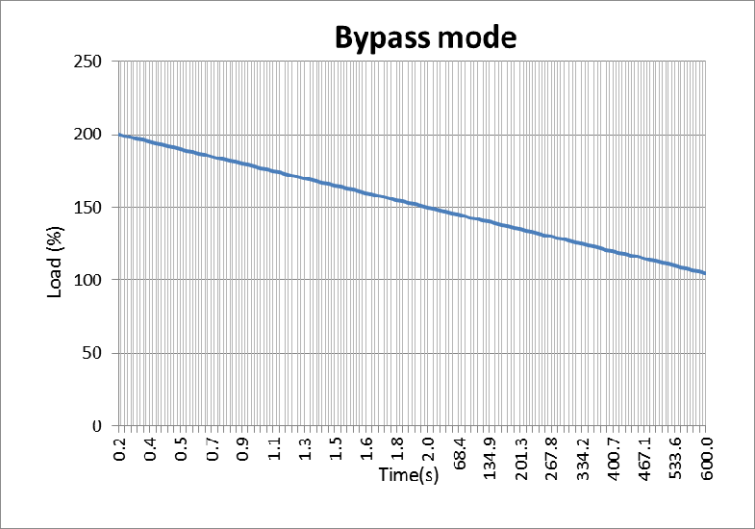
4.2.2 Overload time out versus Inverter mode and Bypass mode
Normal Mode :



Backup Mode :



Bypass Mode :



4.2.3 DC BUS Voltage Regulation

Inverter Voltage	AC Input	DC BUS
200	205	341
220	225	365
230	235	370
240	245	385

1.16 Startup Procedure for Debug UPS

- 4.3.1 Connect an AC 220Vac/50(60)Hz onto L11 & L12.
- 4.3.2 Remove the output loads connected to the UPS and remove the battery connecting wires of the UPS.
- 4.3.3 Remove the control wires CN13 & CN14 of the MSDC4XX PCB and measure the DC Bus voltage by using multi-meter.(Bus + is to measure CN19 to the upper end of C38 and Bus – is to measure CN19 to the upper end of C37.)
- 4.3.4 Turn off CB2 and turn on CB1.
- 4.3.5 Push  key pad and  key pad for approx. 3 seconds till buzzer beeps twice, then the UPS will go to service mode.
- 4.3.6 Push  key pad for a second till the buzzer beeps twice, and LCD displays from Sr01 to Sr02. Measure the waveform of the PFC and Inverter IGBT gate, it shall be a square wave with voltage/frequency at -6Vdc ~ +15Vdc / 20KHz, then buzzer will beep once.
- 4.3.7 Push  key pad for a second till buzzer beeps twice. The LCD displays from Sr02 to Sr03, then the UPS proceeds the 1st stage soft start, which means charger is charging the BUS + & -, then buzzer will beep once.
- 4.3.8 Push  key pad for a second till buzzer beeps twice. The LCD displays from Sr03 to Sr04, then the UPS proceeds the 2nd stage soft start, which means battery SCR is turned on to charge the BUS + & -, then the buzzer will beep once.
- 4.3.9 Push  key pad for a second till buzzer beeps twice. The LCD displays from Sr04 to Sr05, then UPS proceeds the 3rd stage soft start, which means the DC voltage is boosted up to the desired voltage(Please refer to Chapter 0, the DC Bus Voltage Regulation) then buzzer will beep once.
- 4.3.10 Push  key pad for a second till buzzer beeps twice. The LCD displays from Sr05 to Sr06, then the UPS proceeds the voltage setting from Inverter Soft Start to Inverter Output, then the buzzer will beep once.
- 4.3.11 Push  key pad for a second till buzzer beeps twice. The LCD displays from SR06 to OFF, then the UPS proceeds DC Bus discharging. The UPS will shut itself off automatically after discharged.
- 4.3.12 Turn off CB1.
- 4.3.13 Turn On both CB1 and CB2.
- 4.3.14 The LCD displays “oFF”, then measure the output of the UPS is nominal voltage such as 220Vac/50(60Hz) or not.
- 4.3.15 Adjust the voltage of Bypass Input at 170Vac/50(60)Hz and check if the UPS output voltage is near 0Vac?
- 4.3.16 Adjust the voltage of Bypass Input at nominal voltage such as 220Vac/50(60)Hz.
- 4.3.17 Push  key pad for 3 seconds until buzzer beeps twice, then the UPS proceeds AC start procedure. When self-test is executed completely, the

UPS will switch from bypass output to Inverter output. Measure the UPS output waveform to see whether it is stable.

- 4.3.18 Change the frequency of Utility to 56Hz, the UPS will switch to Backup Mode automatically.
- 4.3.19 UPS will go back to Utility mode once the Utility frequency goes back to 50Hz.
- 4.3.20 Connect the control wire of the Charger and push the function key  to execute self-test, then the UPS will detect this abnormal condition and display battery abnormal  on the LCD.
- 4.3.21 Use Scroll up  key pad and Scroll down  key pad to see if any abnormal display content or values on the LCD panel.
- 4.3.22 Push  key pad for 5 seconds until buzzer beeps twice, then UPS will shut off and close the input of Utility.
- 4.3.23 Your UPS Unit test is done completely.

1.17 UPS Inverter Output Balance Check

4.4.1 Connect the UPS as shown below.

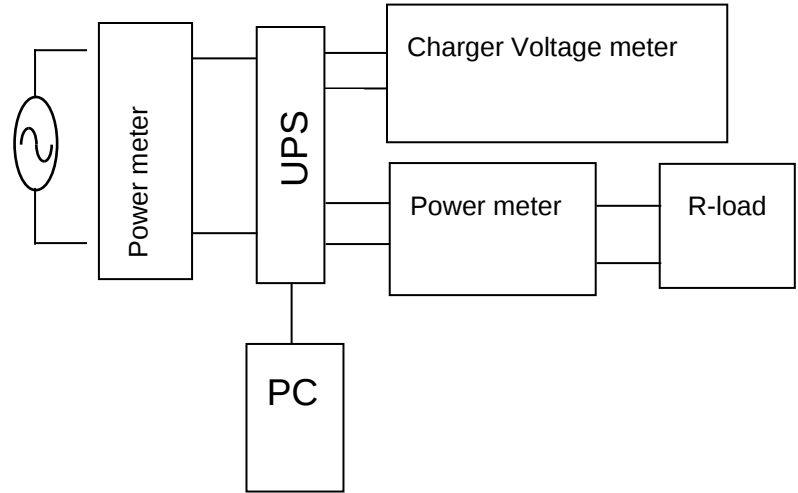


Fig 4.4-1

- 4.4.2 Disconnect the isolation transformer if any; otherwise, it is not possible to measure whether the UPS output waveform is in balance or not.
- 4.4.3 Connect a 220Vac/50(60)Hz to the UPS to start up the UPS and make sure it is on Line Mode.
- 4.4.4 Without output load connected, please connect a fixture in parallel.(The fixture is made with 1M ohms resistors and 1uF/63V capacitor in serial. Then, measure the two ends of 1uF/63V capacitor to see whether the DC voltage is below 100mV.
- 4.4.5 Connected a 6Kva/6000W resistor load to the output and repeat 4.1.29

1.18 Unit Calibration and Setting Procedure

4.5.1 General Parameter Setting Procedure

4.5.1.1 Please connect the UPS as shown in Fig 4.5-1.

4.5.1.2 Connect a 50/60Hz 220Vac source to the UPS, start up the Utility and Bypass breakers on the rear panel as well the Inverter Switch on the front panel.

4.5.1.3 Connect the USB cable to the UPS and computer, then execute MSII Setting tool program. The setting screen of the program shall be as Fig 4.5-1. (MAKE SURE THAT THE PROGRAM IS INSTALLED COMPLETELY, BEFORE THIS SETTING PROGRAM IS IN USE.)

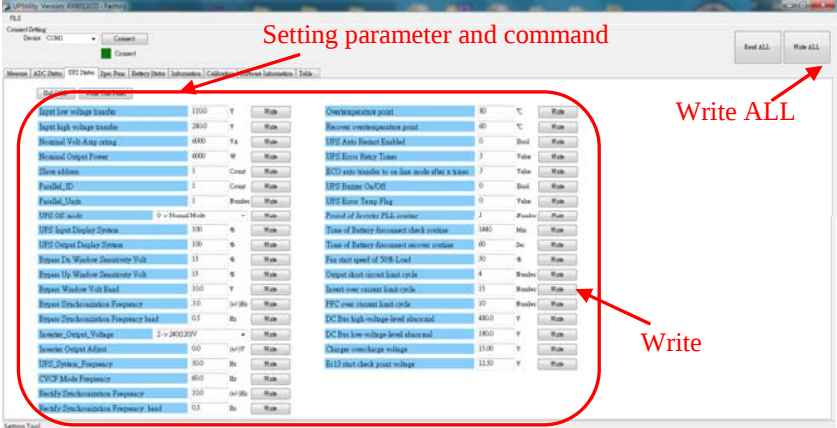


Fig4.5-1

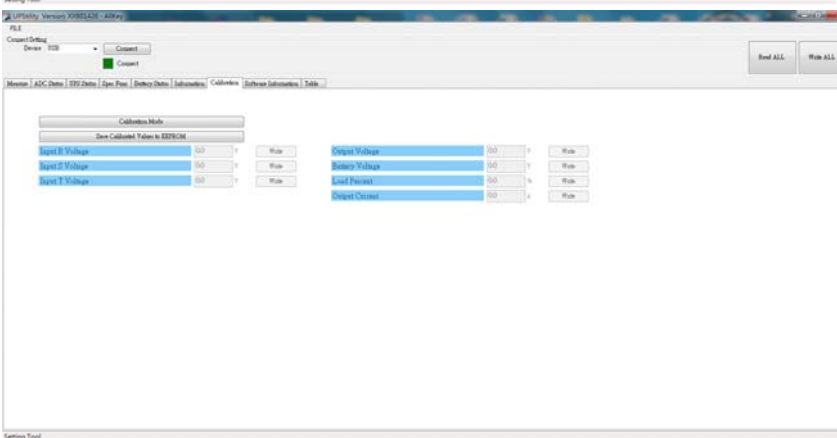


Fig 4.5-2

4.5.1.4 Enter the desired parameter to the “Setting parameter and command”, of Fig 4.5-1. then click “write” icon.

4.5.1.5 If buzzer beeps twice, it means your setting is successful.

4.5.1.6 If the buzzer beeps continuously, it means your setting is in failure. Please repeat 4.5.1.2 to 0. For error message, please refer to 1.4.

4.5.2 UPS Voltages and Load Level Calibrations

The calibration can be done through front panel or PC.

4.5.2.1 Connect the UPS as figure 4.4-1.

4.5.2.2 Connect a 50/60Hz、220Vac source to the UPS and tune the charging voltage till 273.7Vdc.(Make sure the batteries are disconnected.)

4.5.2.3 turn on CB1 & CB2, then push  key pad and  key pad simultaneously to make sure the UPS goes to calibration mode.

4.5.2.4 The calibration setting can be done by using 4 key pads-- on the front panel. If you would like to use PC to proceed setting, you have to key in correct voltage and load percentage, then click “calibration” icon.

4.5.2.5 If the setting is complete, the buzzer will beep twice.

4.5.2.6 If the buzzer beeps continuously, it means your setting is in failure. You have to repeat 4.5.2.2 to 4.5.2.4

4.5.2.7 If the setting can not be complete in 10 minute after UPS enters into the calibration mode, the UPS will automatically go to “Line OFF” mode. The function keys of the front panel are:

 key : +/- Adjustment

 key : Next item

 key : Calibration is complete and new data is written into EEPROM and escape from the Calibration mode. If the UPS beeps twice, it means your setting is successful; on the contrary, it means your setting is in failure. You shall proceed the calibration once again.

 key : Give up from the calibration and shut off the UPS.

4.5.2.8 Adjustable Parameters

Adjustable Item	Standard Specifications	Remarks
AC Input Voltage	220Vac	For both Rectifier and Bypass input
Inverter Voltage	220Vac	
Load %	>30%	
Battery Voltage	273.7Vdc	

4.5.2.9 For AC volt & Inv Voltage, use a voltage meter to adjust the desired voltage by comparing the value shown on the LCD display, make sure that these two values shown on the LCD panel and the meter are the same.

4.5.2.10 Connect a 6Kva/4.2Kw resistance load at the output of the UPS, then calibrate the load percentage to be accurate. Then, the display sequence on the LCD will be as below. Output
Volt↔LOAD%

4.5.2.11 Press the  key pad when those parameters are calibrated to save them into the EEPROM.

4.5.2.12 After the UPS beeps twice, the UPS will switch to “Line Off” mode, then press the “OFF” on the front panel to shut down the UPS. Turn off the Utility breaker to shut off the UPS completely, and then turn on the UPS again to check all values measured are complied with those shown on the LCD display panel.

4.5.2.13 If the UPS beeps continuously, it means your calibration is in failure, then an error message will be shown on the LCD display panel. Please refer to 1.4 for error code explanation.

Notice :

The minimum output load connected should be over 30%; otherwise the UPS's load level will reserve their original parameters. You are recommended to connect at least 80~100%. If less than 50%, the calibration will not be accurate enough.

Make sure all calibration tolerances of voltage and load are within 8% and 15%; otherwise, the calibrations are not successful, and then an error code will be shown on the LCD display.

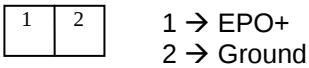
If the calibration is not finished in 10 minutes, the UPS will escape from the calibration mode automatically.

1.19 Frequency Converter(CVCF Mode)Setting Notice

The UPS can be set as Frequency Converter(CVCF mode). If the UPS is Dual Input Model, you have to make sure the Bypass Input Breaker is set at “OFF” position; on the contrary, if the UPS is Single Input Model, you have to remove the power wire of the Bypass Input, Of which location is between the CN16(or CN22) of the power board MSDD0xx and the J4 of the filter board MSDF4xx.

Customer Options Slots

All the below interface cards are with built-in EPO function. The pin assignments of the EPO are:



To enable the EPO function, please short Pin 1 & 2.

1.20 R2E(RS-232) card

CN1 is for RS232 DB9 and CN3 is for EPO. For communication definition, please refer to Chapter 1.3

Installation Position: slot1 or slot 2.

Adapted flat cable: cable A or cable B

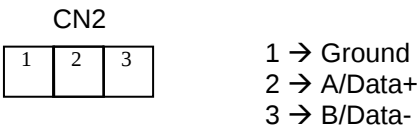
For installation, please refer to Chapter 5.6



1.21 RSE(RS-485) card

CN1 for EPO, CN2 for RS485 and CN3 for remote power.

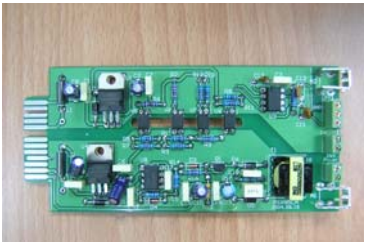
For communication pin assignments, please see the definition below:



Installation Position: slot1 or slot 2.

Adapted flat cable: cable A or cable B

For installation, please refer to Chapter 5.6



1.22 USE(USB) card

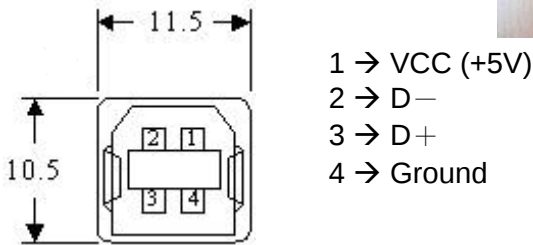
CN1 for USB and CN3 for EPO.

For communication pin assignments, please see the definition below:

comply with USB version 1.0, 1.5Mbps

comply with USB HID Version 1.0.

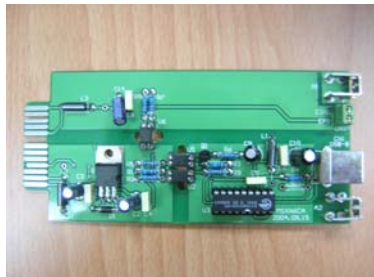
The Pin Assignments of the USE card:



Installation Position: slot1 or slot 2.

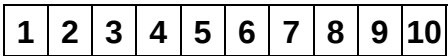
Adapted flat cable: cable A or cable B

For installation, please refer to Chapter 5.6.

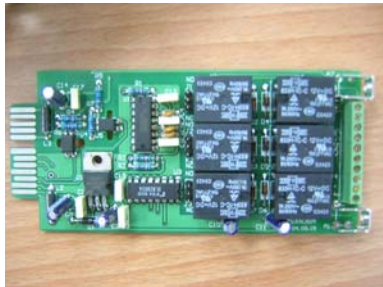


1.23 DCE(Dry Contact) card

The pin assignments of 10-Pin Terminal:



- Pin 1: UPS on Bypass mode.
- Pin 2: Utility Normal
- Pin 3: Inverter On
- Pin 4: Battery Low
- Pin 5: Battery Bad or Abnormal
- Pin 6: UPS Alarm
- Pin 7: Common
- Pin 8: Shutdown+
- Pin 9: EPO+
- Pin 10: Ground



To enable the shutdown function, please short Pin 8 & 10.

The capacity of each relay contact is 40Vdc/25mA.

Installation Position: slot 1 or slot 2

Adapted flat cable: cable A or cable B

For installation, please refer to Chapter 5.6.

1.24 SNMP Cards

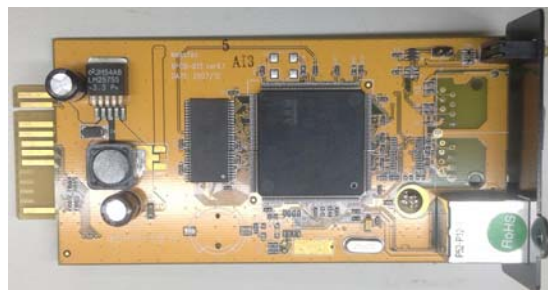
SNMP/WEB card

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

Installation Position: slot1 or slot 2.

Adapted flat cable: cable A or cable B

For installation, please refer to Chapter 5.6.



Net Agent II Internal Card

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

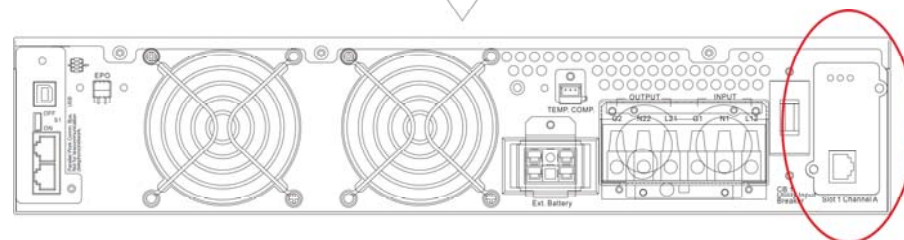
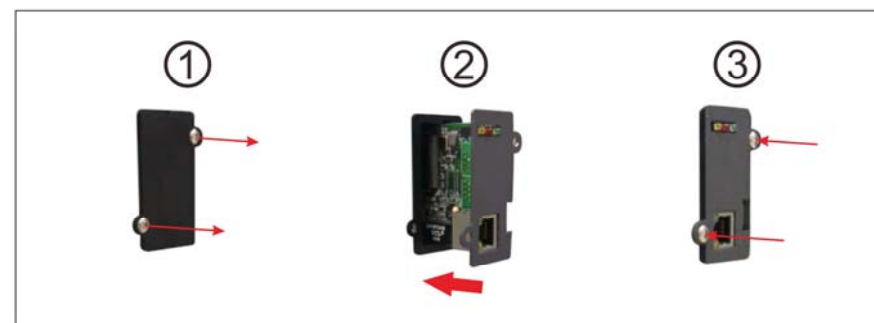
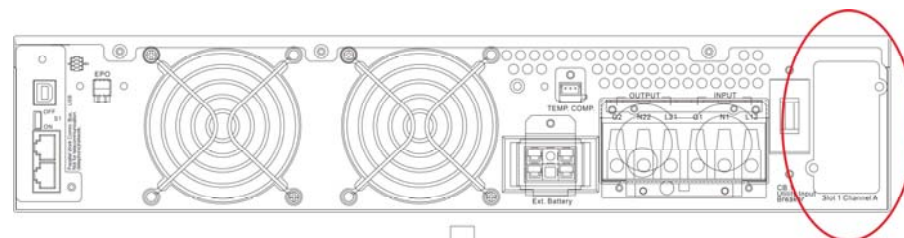
Installation Position: slot 2.

Adapted flat cable: cable C.

For installation, please refer to Chapter 5.6



1.25 Please follow the step as below for installation



Trouble Shooting

If there is a abnormal condition occurred, the LCD display will show an error code as indicated at Chapter 1.4. Please follow the troubleshooting indicated below.

The below Error Codes indicate you the error status of the UPS		
1	Er01	1 st stage DC BUS capacitor pre-charge abnormal or Battery Fuse fails after 50 seconds
2	Er02	2 nd AC SCR or Battery SCR soft Start abnormal after 3 seconds
3	Er03	3 rd PFC(Boost) soft start abnormal after 30 seconds
4	Er04	Inverter out of order(out of range 160~275V) or Inverter voltage - Expect voltage) > 1V
5	Er05	Battery Weak or Dead
6	Er06	Output Short Circuit
7	Er07	EPO Mode
8	Er08	DC Bus high-voltage-level abnormal
9	Er09	DC Bus low-voltage-level abnormal
10	Er10	Inverter Over-current
11	Er11	UPS Overheat
12	Er12	UPS Overload
13	Er13	Charger out of order or abnormal
14	Er14	Fan out of order

15	Er15	Wrong Procedure to Enter Maintenance Mode
16	Er16	Output Parameters Set Error in Parallel System
17	Er17	ID Numbers are in conflict in Parallel System or ID number Error in single unit
18	Er18	EEPROM's data error. Its values are reset to default.(Nomral/220V/adj0%/+/-3Hz/low sensitivity)
19	Er19	Reserved
20	Er20	DC Bus voltage can't be discharged
21	Er21	Parallel communication error (communication wire disconnected or failure to find ID1 UPS) in parallel system
22	Er22	Bypass SCR or Output Fuse Fails
23	Er23	Inverter Relay or SCR or Output Fuse Fails
24	Er24	Bypass Input found when Running on CVCF mode
25	Er25	Reserved
26	Er26	PFC over-current
27	Er27	The UPS must be operated in normal mode in parallel system
28	Er28	Bypass Overload Time out and cut off output.
29	Er29	Charger Overcharges battery(>15V/unit)
30	Er30	Inverter Balance Error
31	Er32	Sync Signal Error
32	Er33	Isolated transformer overheat

33	Er35	UPS Output can't balance load %
34	CEr1	Utility voltage out of range
35	CEr2	Bypass Voltage out of range
36	CEr3	Inverter Voltage out of range
37	CEr4	Load Percentage out of range
38	CEr5	Battery Voltage out of range
39	CEr6	UPS Output Voltage out of range

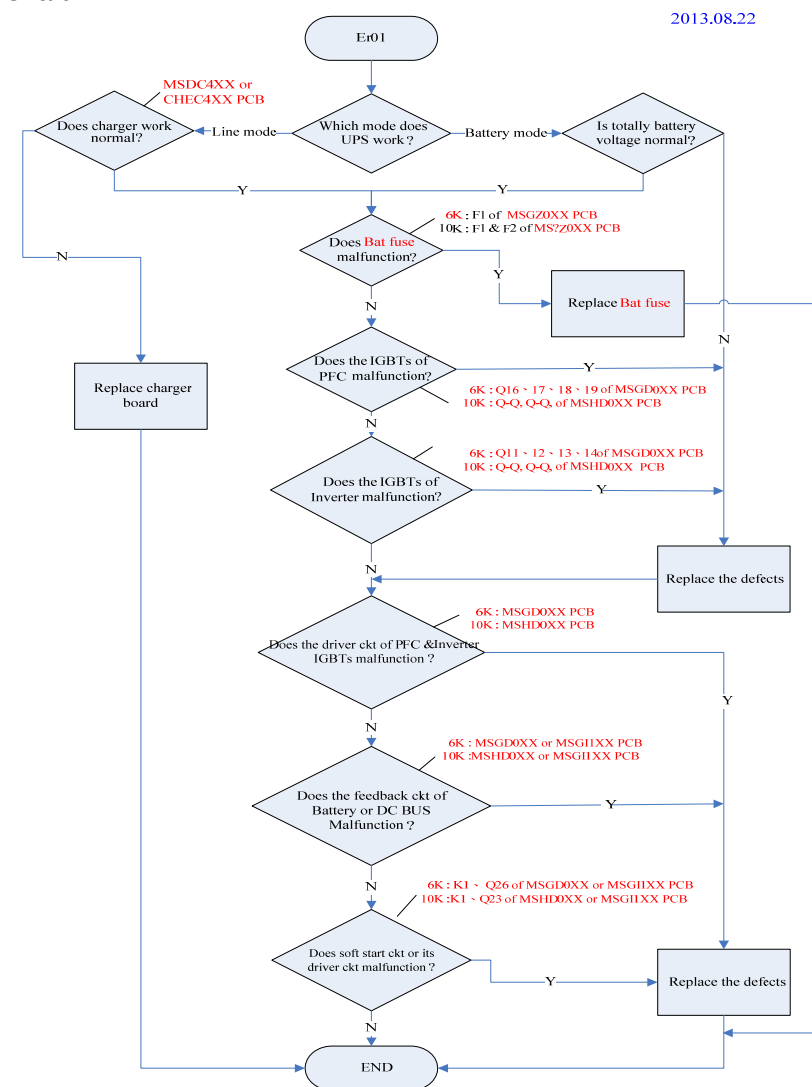
Remarks:

- 1 : When one of the Er06, EPO, Er23, Er24, Er28, Er32, Er33, Er35 error message occurs, the UPS will have no output and lock itself immediately. (please refer to Chapter 2.5.6) .
- 2 : If the bypass voltage is normal(within specs), but one of the Er01, Er02, Er03, Er05, Er13, Er14, Er20, Er22, Er26, Er29 or Er30 error message occur, the UPS will transfer to Bypass loop and lock itself. (please refer to Chapter 2.5.6) .
- 3 : If the bypass voltage is normal(within specs), one of the Er04, Er08, Er09, Er10, Er11 or Er12 error message occurs, the UPS will transfer to Bypass loop, then try to transfer back to Inverter mode automatically. If the symptoms happen 4 times in one hour, the UPS will lock itself; otherwise, the error messages and the times of the error messages will be clear and reset automatically.
- 4 : If the Er16, Er17, Er21, Er27 or Er34 error message occurs, the inverter of the UPS will have no output and the user is prohibited to turn on the UPS from the front panel.

Error Code Er01

Definition : The UPS is in the 1st stage soft start procedure, but the DC bus voltage can not reach at preset charging voltage (about 90% of battery voltage) within 30 seconds.

Flow Chart

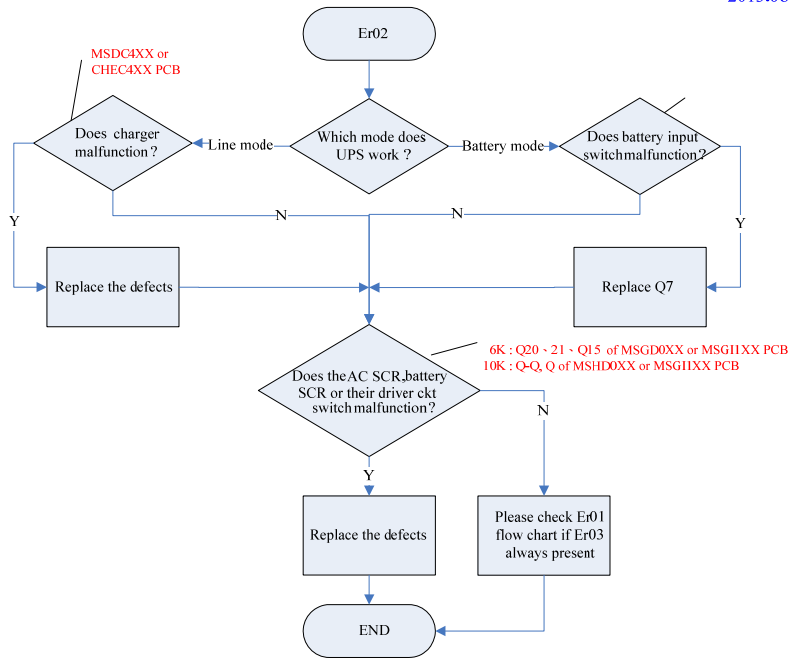


1.26 Error Code Er02

Definition : The UPS is in 2nd stage soft start procedure, but the DC Bus can not reach preset charging voltage in 3 seconds (approx. 90% of battery voltage.)

Flow Chart

2013.08.22



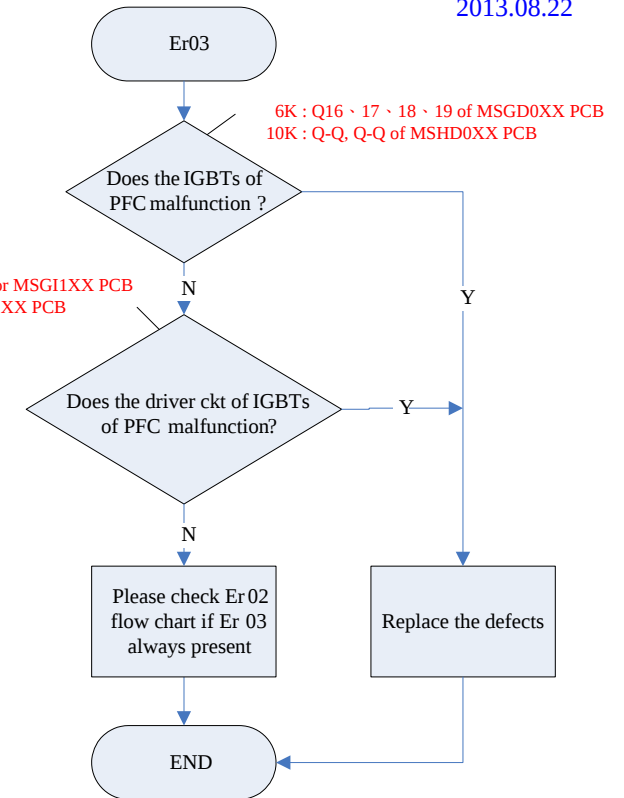
1.27 Error Code Er03

Definition : The UPS is in 3rd stage soft start procedure, but the DC bus voltage can not reach to preset charging voltage in 30 seconds (Please refer to Chapter 0) .

Flow Chart

2013.08.22

6K : Q16 ~ 17 ~ 18 ~ 19 of MSGD0XX or MSG11XX PCB
10K : Q-Q, Q-Q of MSHD0XX or MSG11XX PCB

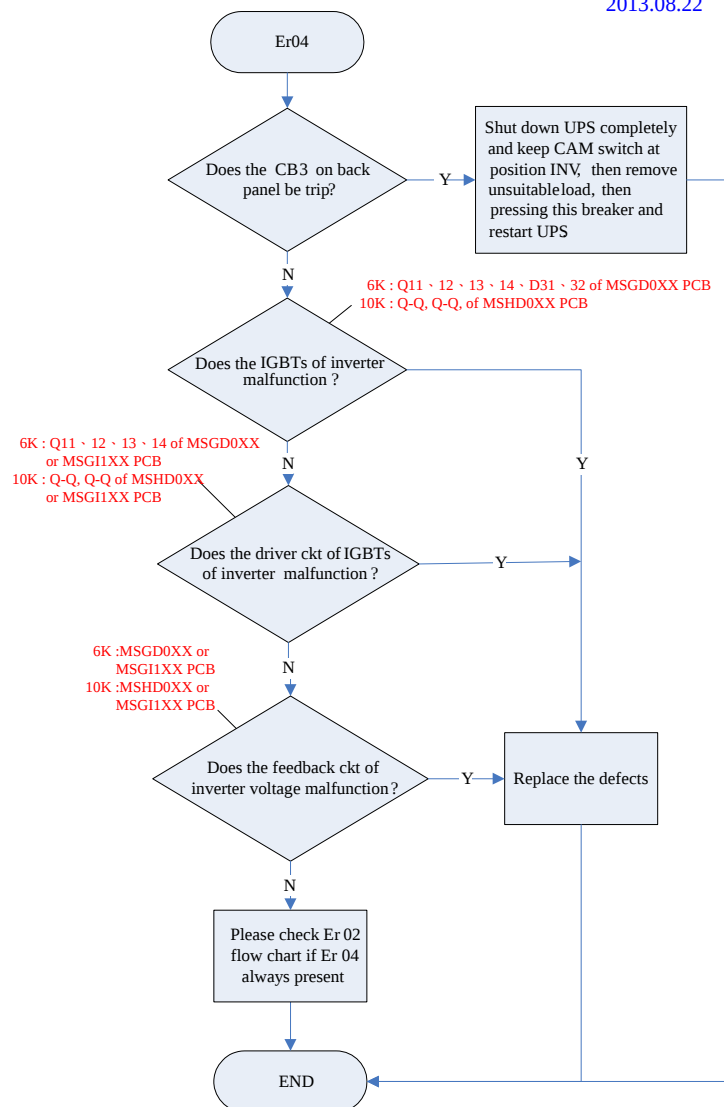


1.28 Error Code Er04

Definition : It means the UPS Inverter Output is Abnormal.

Flow Chart

2013.08.22

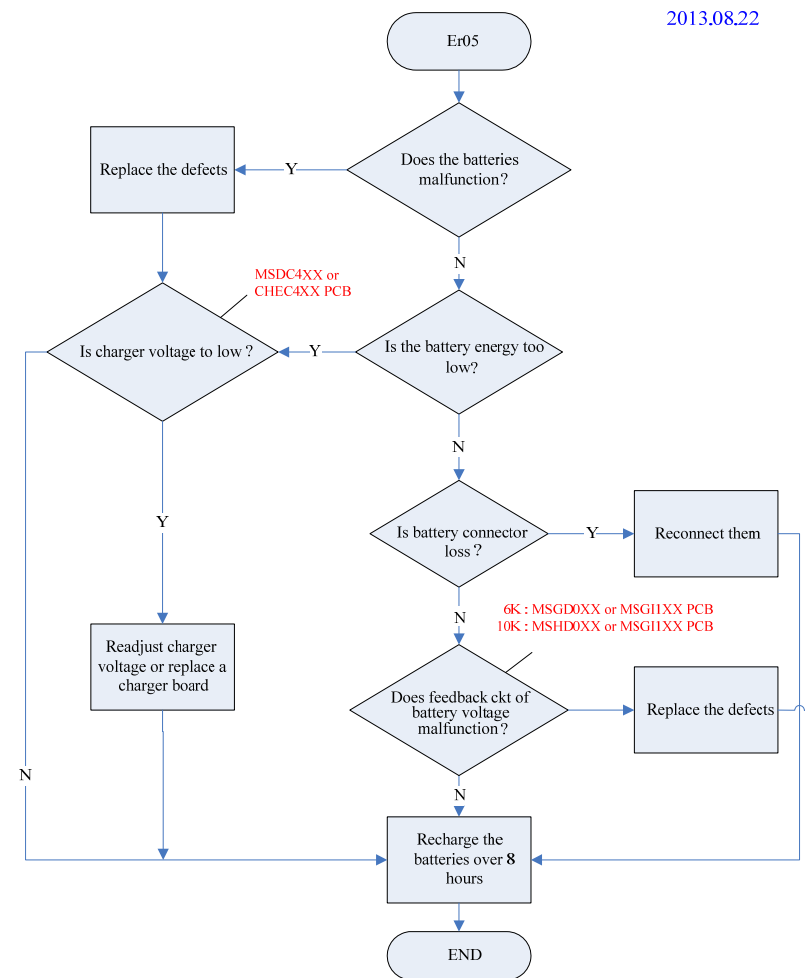


1.29 Error Code Er05

Definition : It means the battery is weak or bad after self test is executed.

Flow Chart

2013.08.22

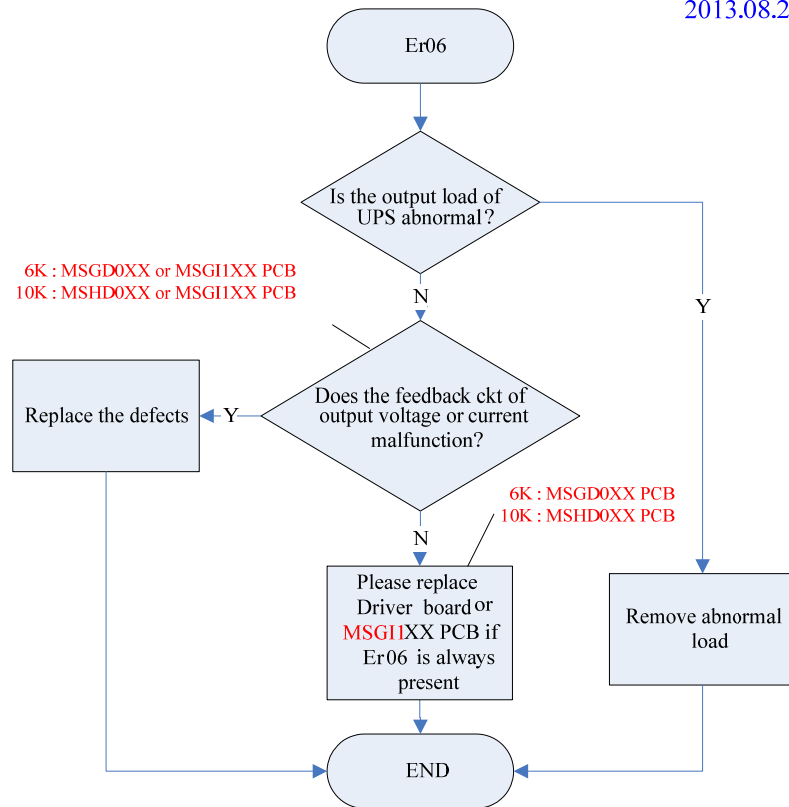


1.30 Error Code Er06

Definition : It means the UPS is in short-circuited.

Flow Chart

2013.08.22

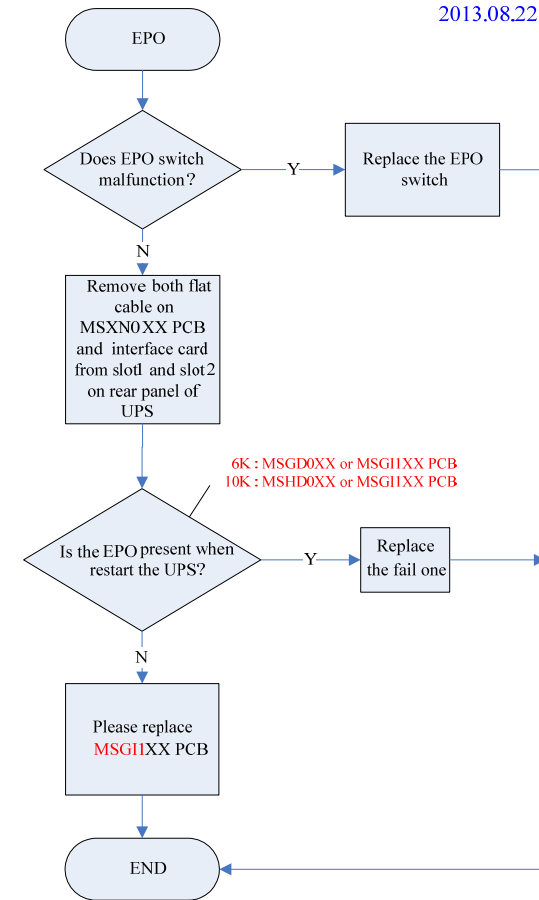


1.31 Error Code Er07

Definition : It means the UPS enters into EPO (Emerg Power Off) mode.

Flow Chart

2013.08.22

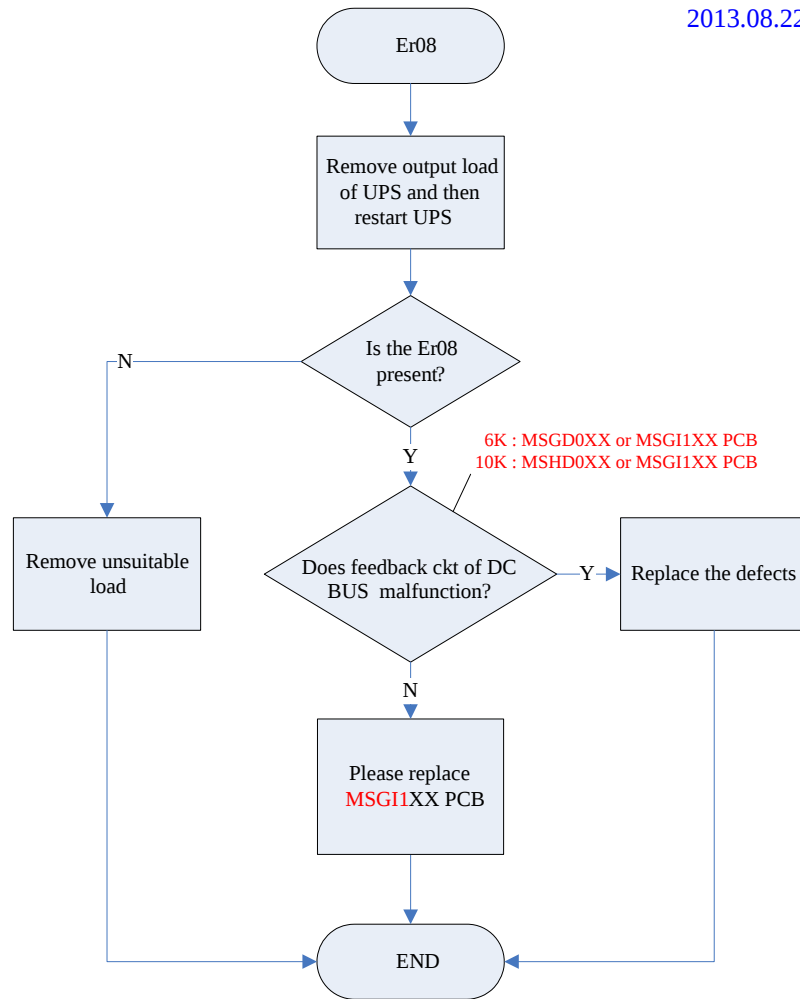


1.32 Error Code Er08

Definition : It means the DC Bus of the UPS is over-voltage.

Flow Chart

2013.08.22

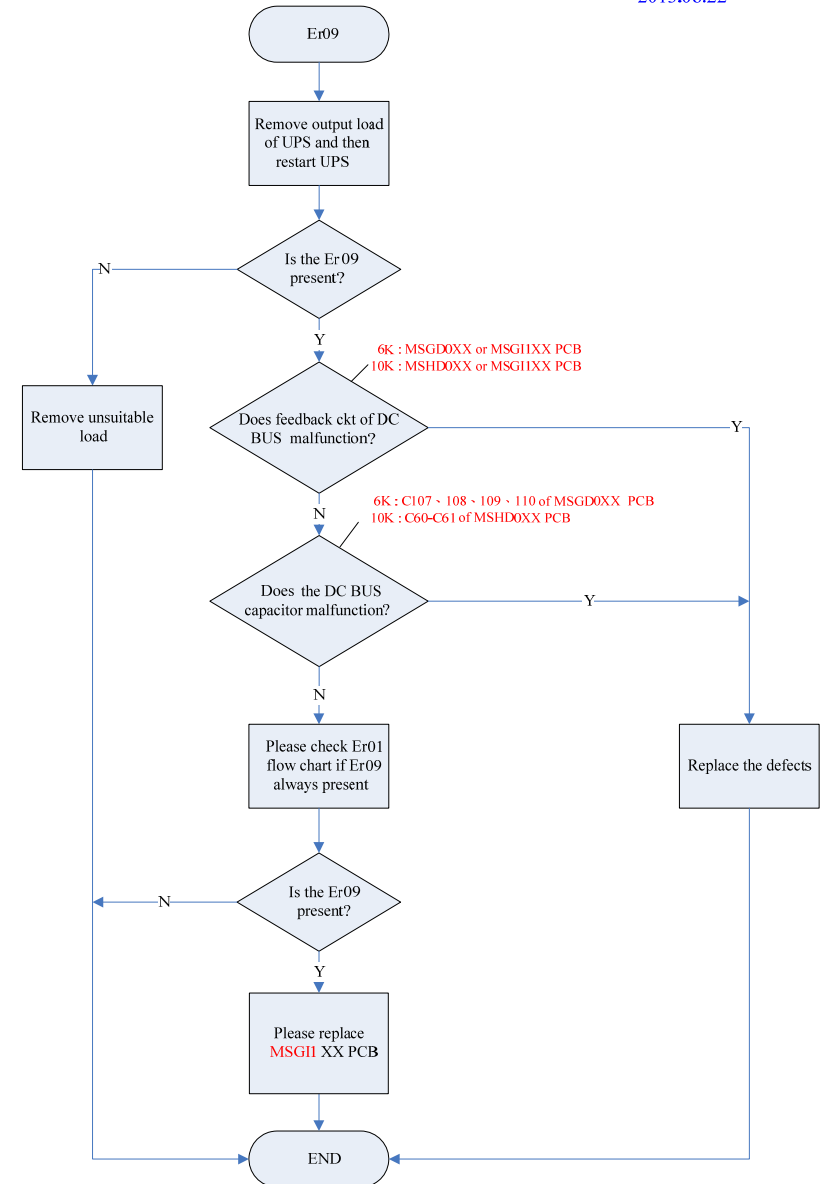


1.33 Error Code Er09

Definition : It means the DC Bus of the UPS is under-voltage.

Flow Chart

2013.08.22

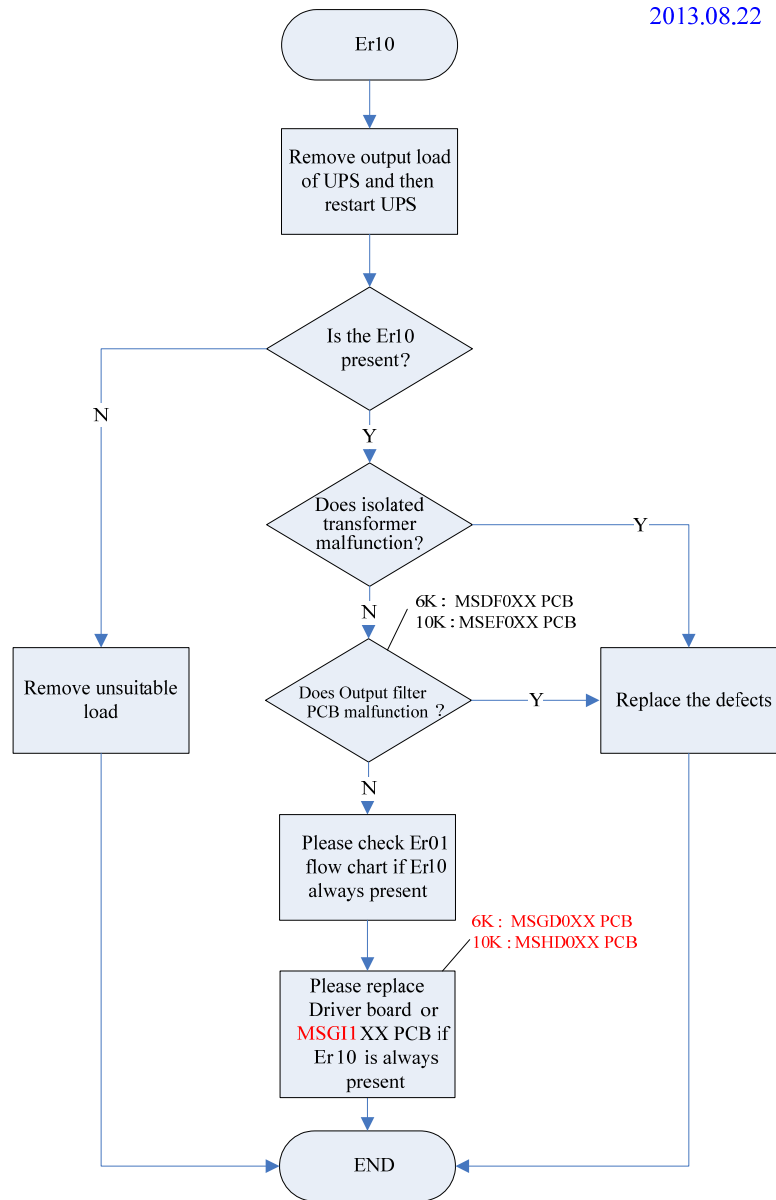


1.34 Error Code Er10

Definition : It means the UPS Inverter is over-current.

Flow Chart

2013.08.22

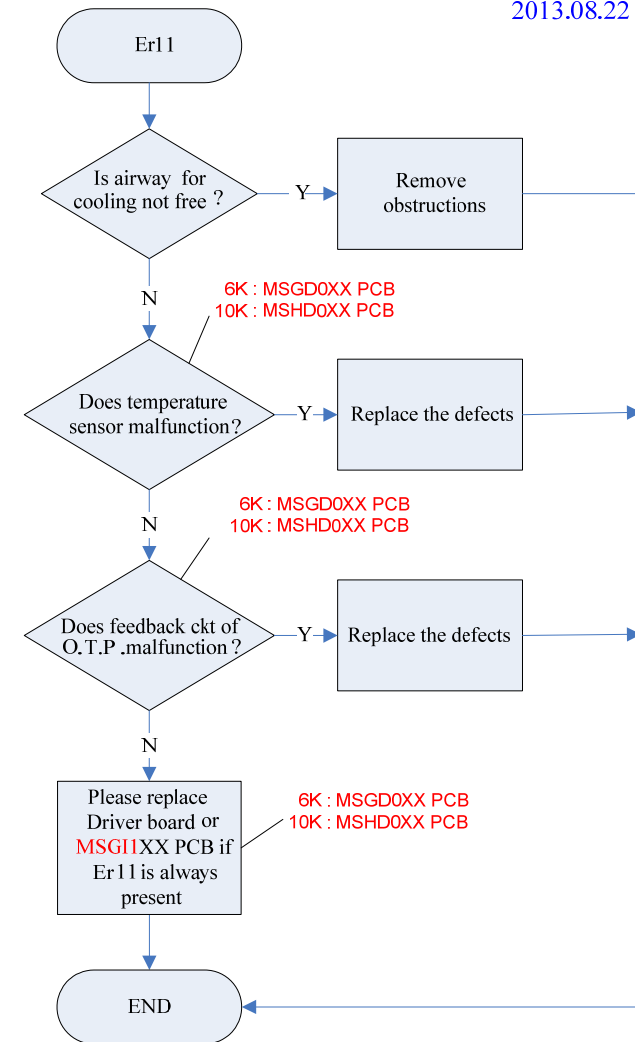


1.35 Error Code Er11

Definition : It means the UPS is over-heat.

Flow Chart

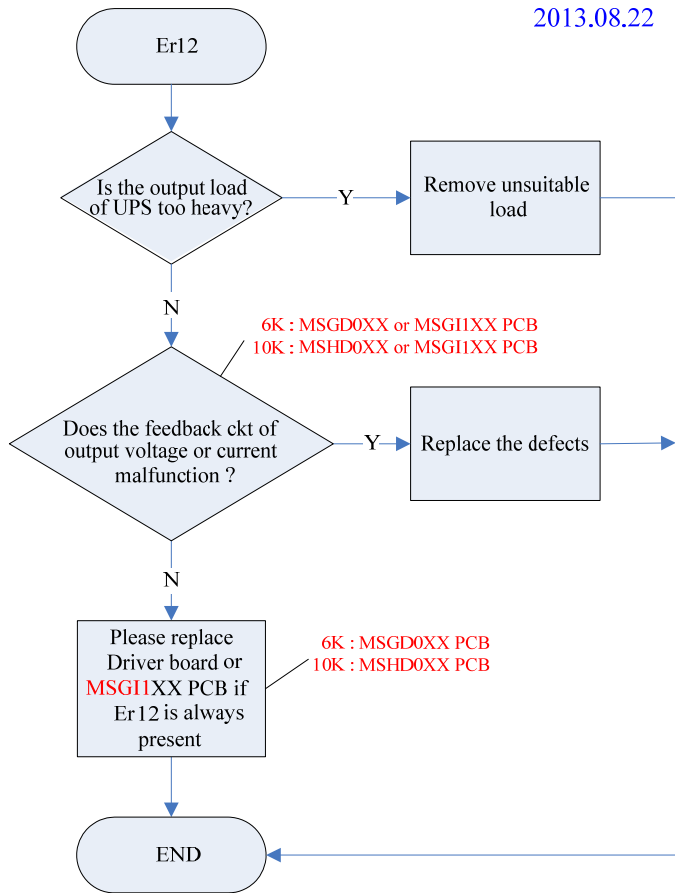
2013.08.22



1.36 Error Code Er12

Definition : It means the UPS inverter is overloaded.
Flow Chart

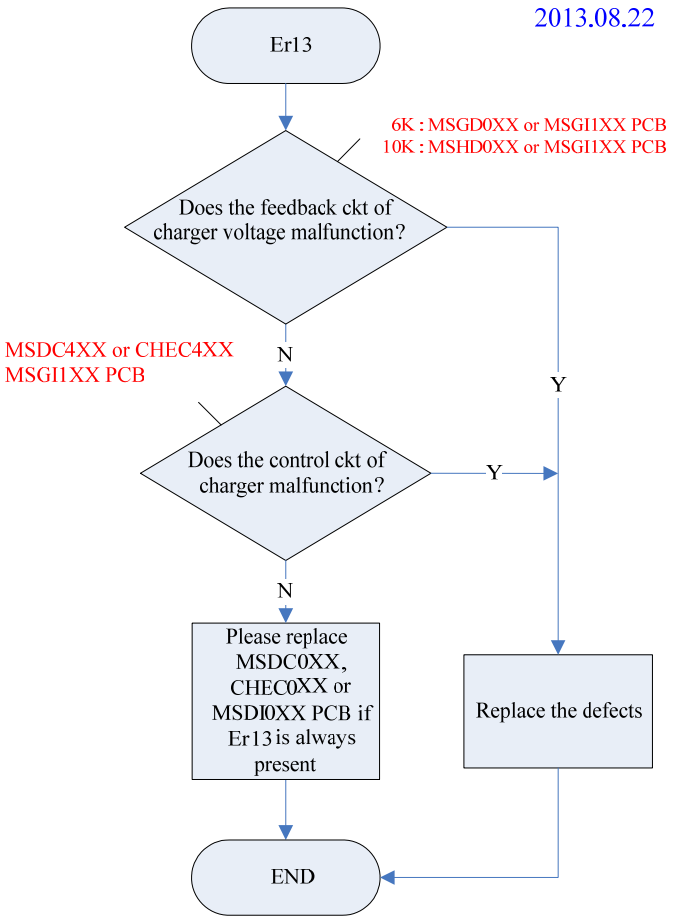
2013.08.22



1.37 Error Code Er13

Definition : It means the charger is out of order.
Flow Chart

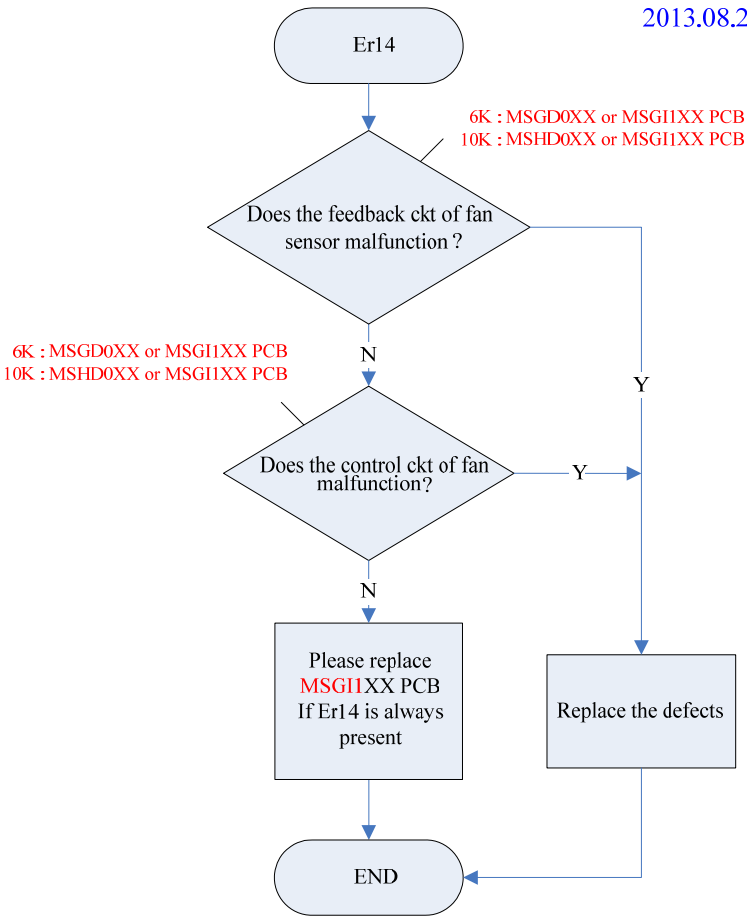
2013.08.22



1.38 Error Code Er14

Definition : It means the fan of the UPS is abnormal.
Flow Chart

2013.08.22

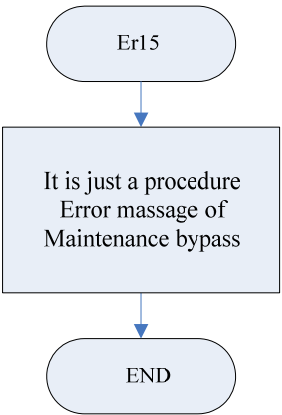


1.39 Error Code Er15

Definition : It means Maintenance Bypass Switch(CAM Switch) is not used properly, or the Maintenance Bypass Switch is activated when the UPS is in CVCF mode.

Flow Chart

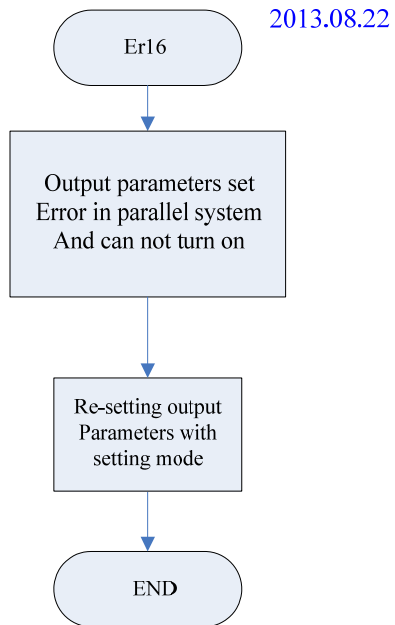
2013.08.22



1.40 Error Code Er16

Definition : It means the output parameter set error in parallel system.

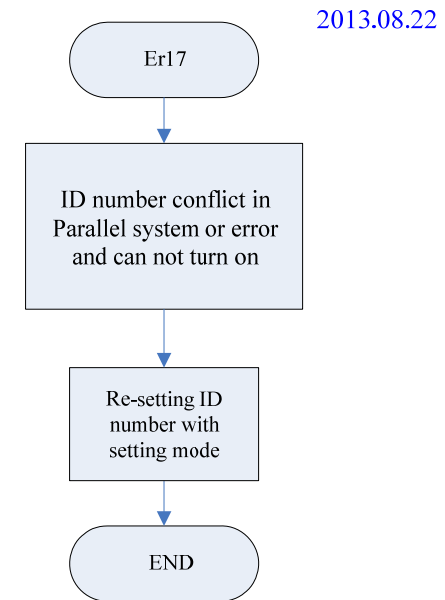
Flow Chart



1.41 Error Code Er17

Definition : It means the ID number is in conflict in parallel system or ID number error in single unit.

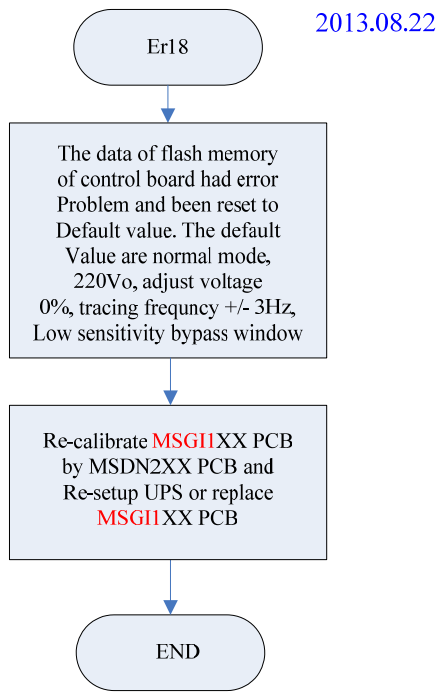
Flow Chart



1.42 Error Code Er18

Definition: It means the data inside of the EEPROM on the control board is abnormal and the data is set as default values.

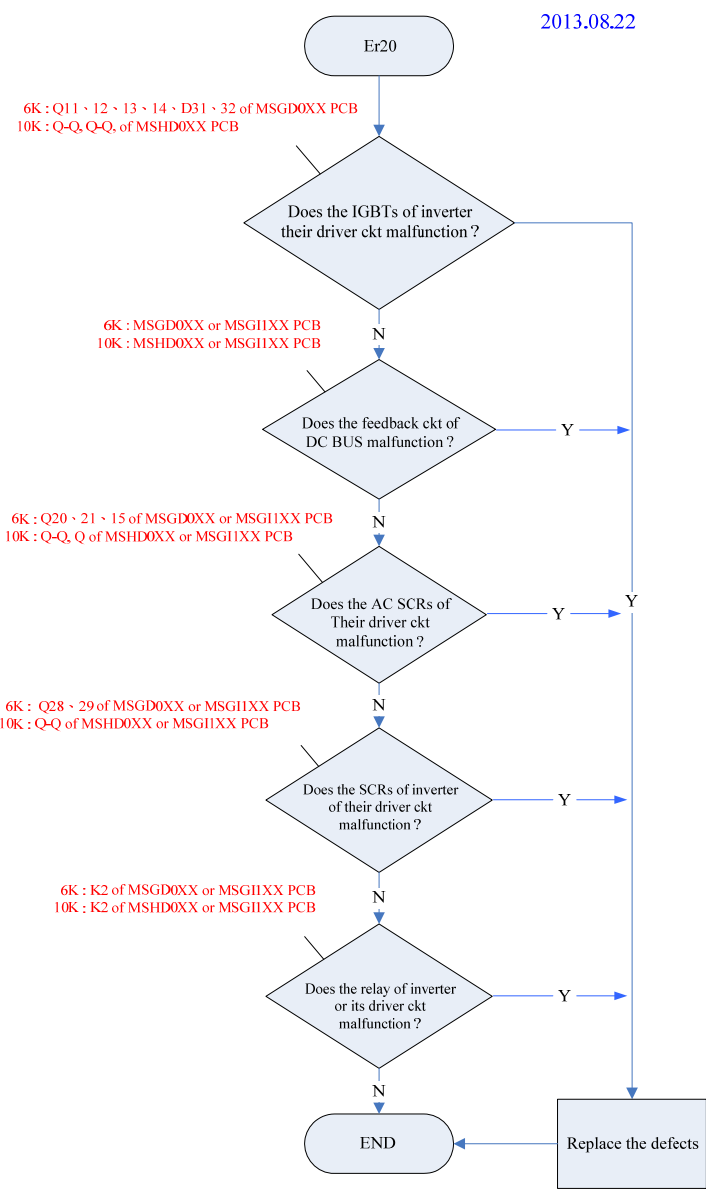
Flow Chart



1.43 Error Code Er20

Definition : It means the capacitor in the DC Bus of the UPS can not be discharged.

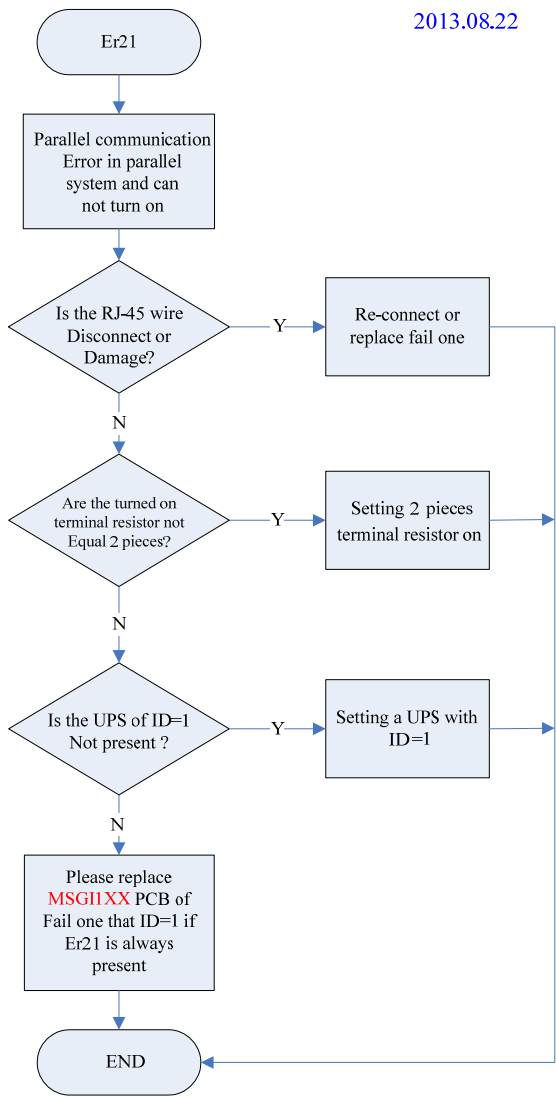
Flow Chart



1.44 Error Code Er21

Definition : It means the communication error in parallel system or can't find the UPS which ID =1.

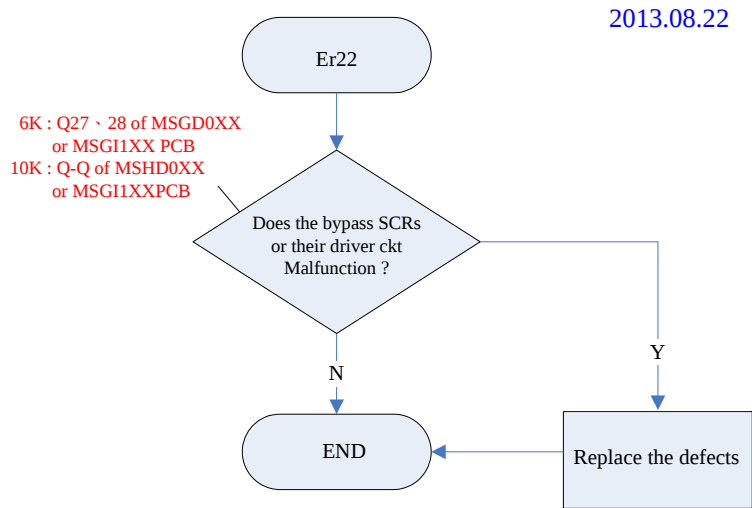
Flow Chart



1.45 Error Code Er22

Definition : It means the SCR or the output fuse in UPS bypass loop is abnormal.

Flow Chart

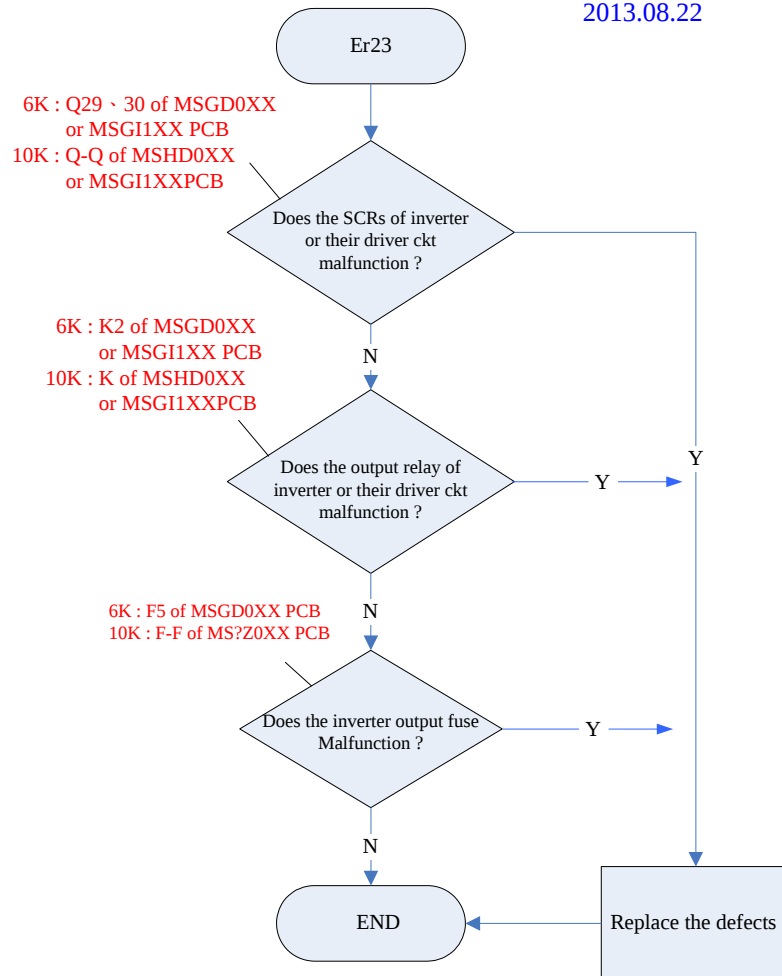


1.46 Error Code Er23

Definition : It means the SCR, Relay or output fuse of the UPS Inverter is abnormal.

Flow Chart

2013.08.22

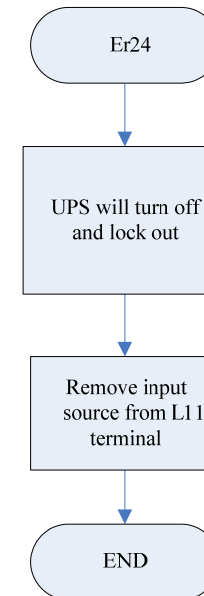


1.47 Error Code Er24

Definition : It means there is voltage in bypass loop when the UPS is operated in CVCF mode.

Flow Chart

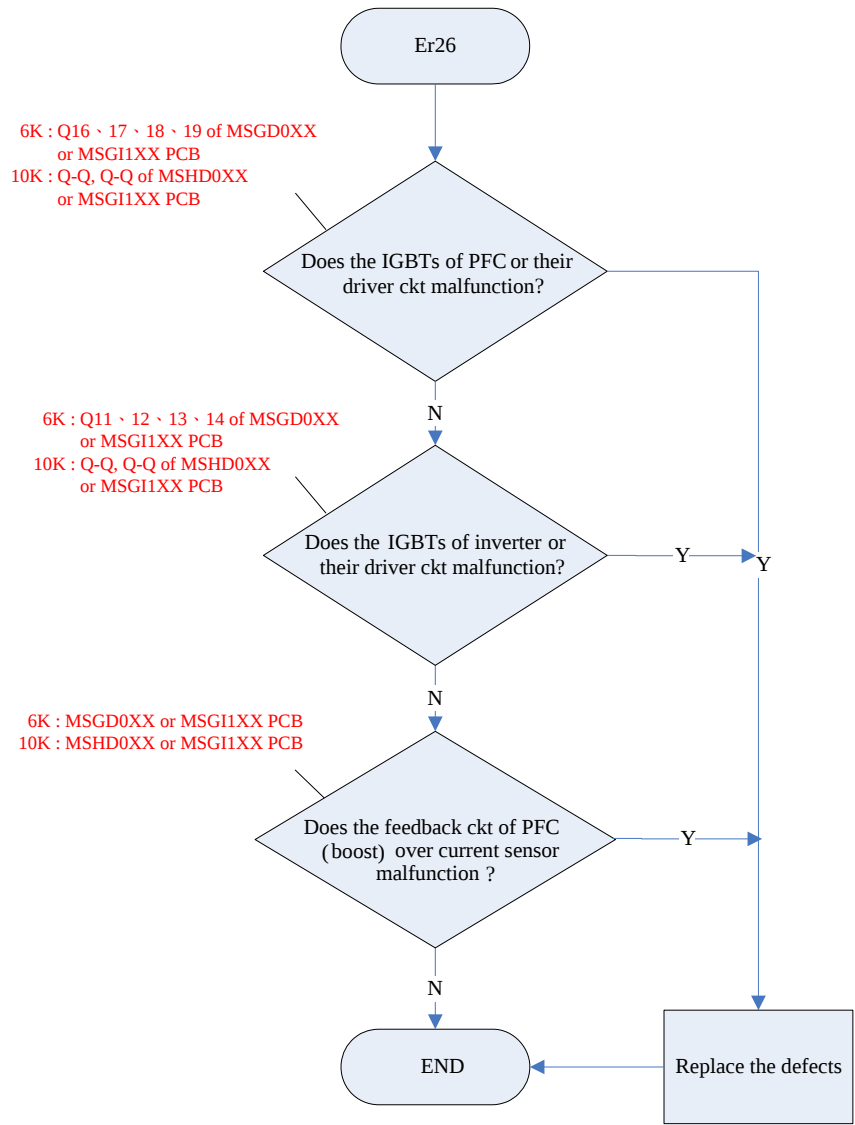
2013.08.23



1.48 Error Code Er26

Definition : It means the PFC of the UPS is over-current.
Flow Chart

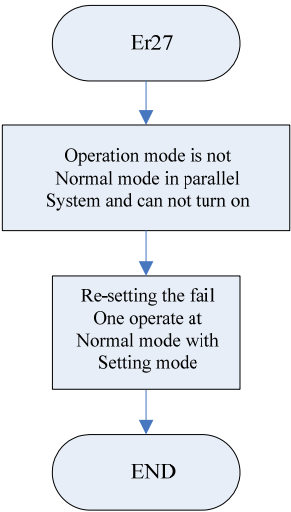
2013.08.23



1.49 Error Code Er27

Definition : When UPS works on parallel mode, UPS be not set in Normal mode
Float Chart

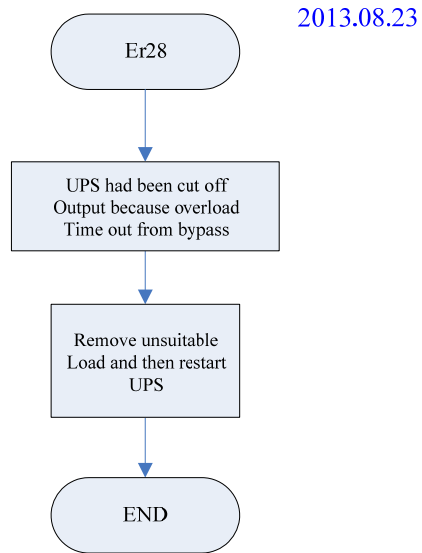
2013.08.23



1.50 Error Code Er28

Definition : It means when the UPS is operated in bypass mode, there is an overload time out occurred. (Please refer to Chapter 0)

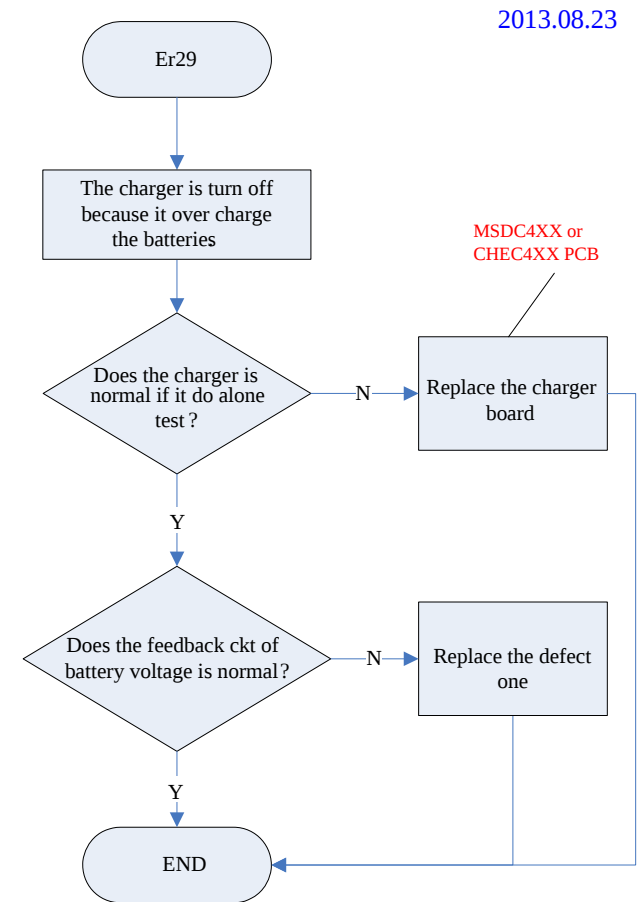
Flow Chart



1.51 Error Code Er29

Definition : It means the charger voltage is higher than 300Vdc and the charger is been off.

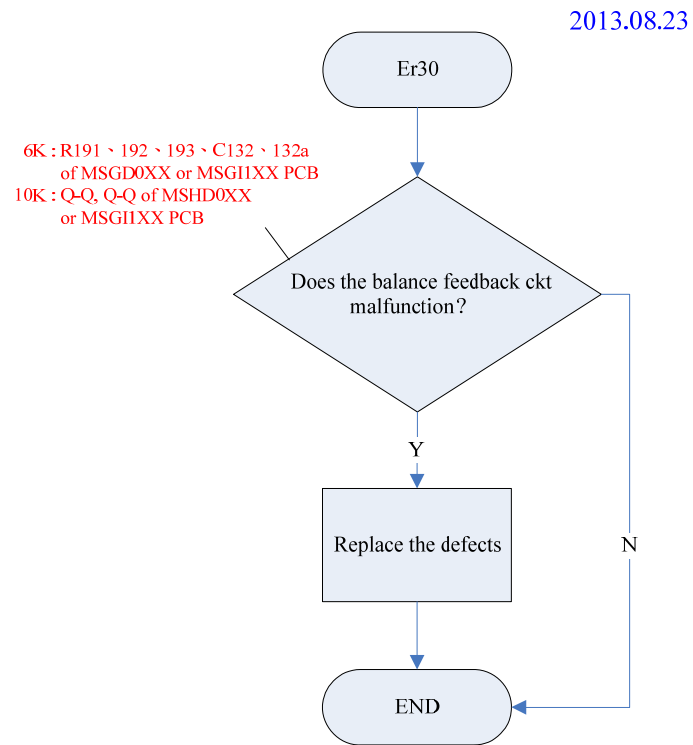
Flow Chart



1.52 Error Code Er30

Definition : It means the inverter balance error over than 30 seconds.

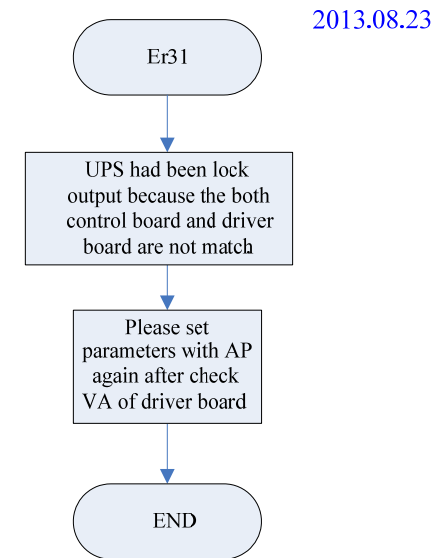
Flow Chart



1.53 Error Code Er31

Definition : It means the capacity of driver board is less than control board setting value.

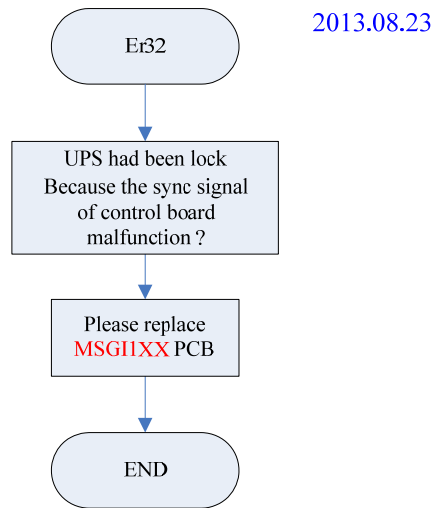
Flow Chart



1.54 Error Code Er32

Definition : It means the signal of sync error occurred in communication for parallel function.

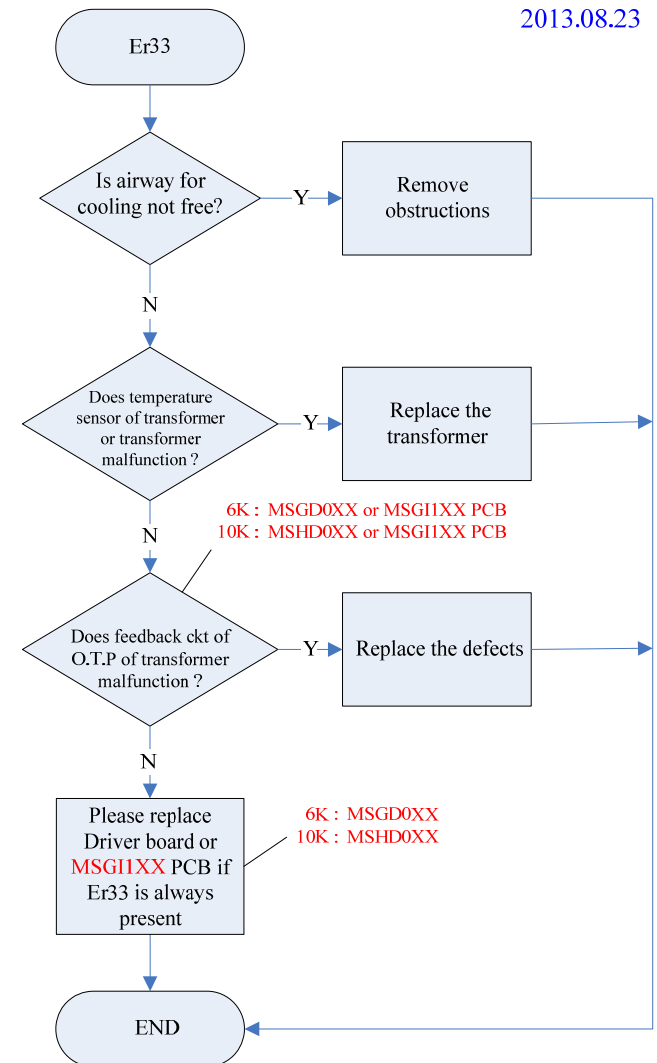
Flow Chart



1.55 Error Code Er33

Definition : It means the isolated transformer of the UPS is protected from over-heat.

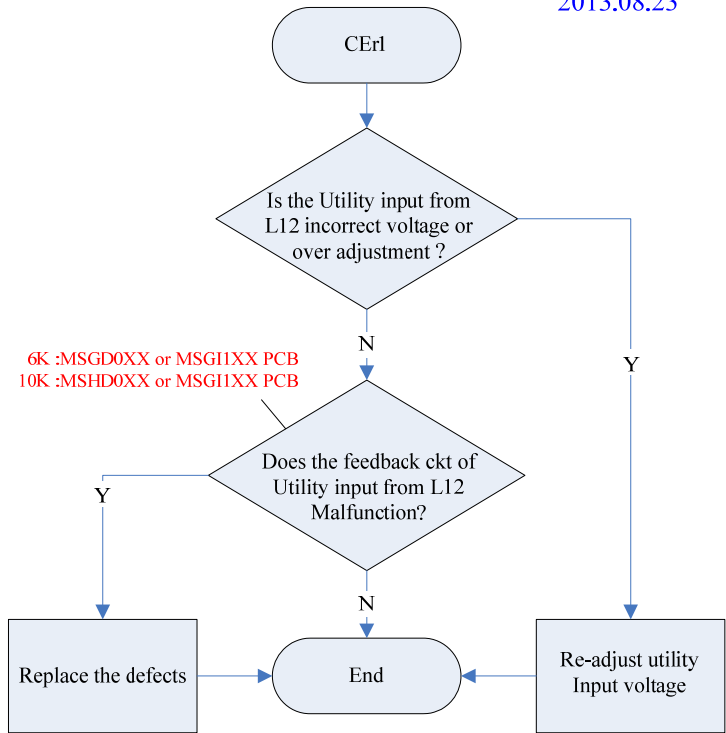
Flow Chart



1.56 Calibration Error Code CEr1

Definition : It means the input voltage of the UPS is excessive of adjustable range.
Flow Chart

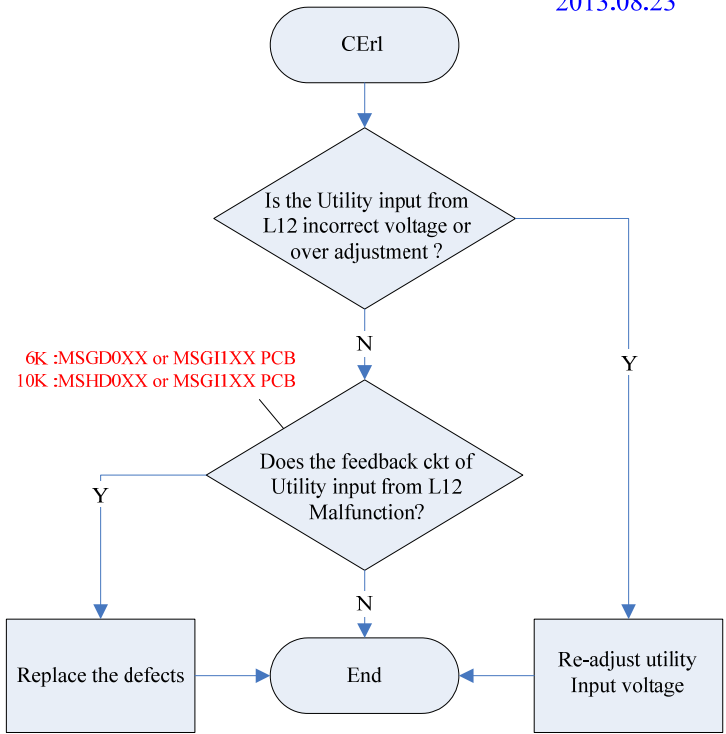
2013.08.23



1.57 Calibration Error Code CEr2

Definition : It means the bypass input voltage of the UPS is out of adjustable range.
Flow Chart

2013.08.23

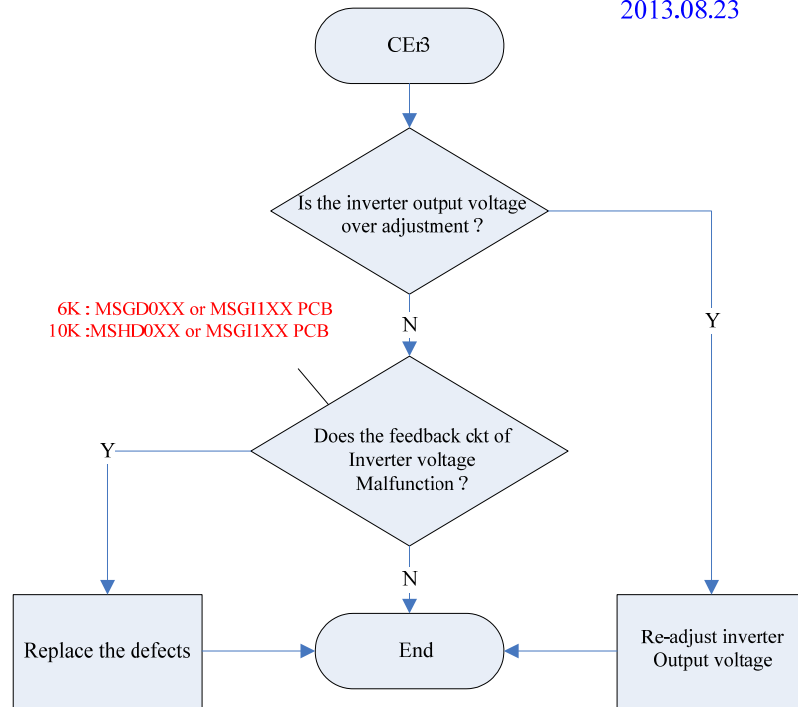


1.58 Calibration Error Code CEr3

Definition : It means the Inverter Output Voltage of the UPS is out of adjustable range.

Flow Chart

2013.08.23

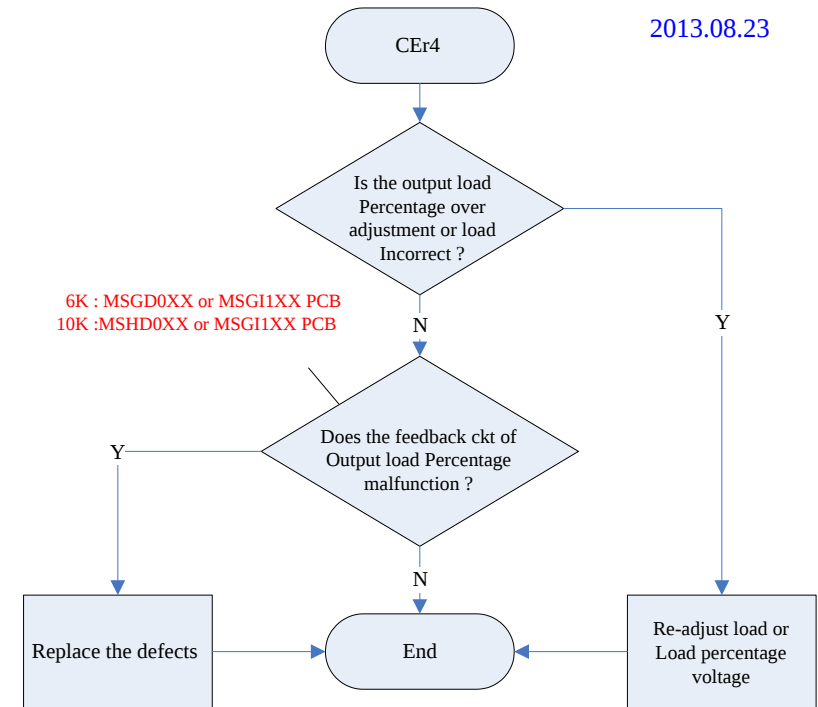


1.59 Calibration Error Code CEr4

Definition : It means the output load level of the UPS is out of adjustable range.

Flow Chart

2013.08.23

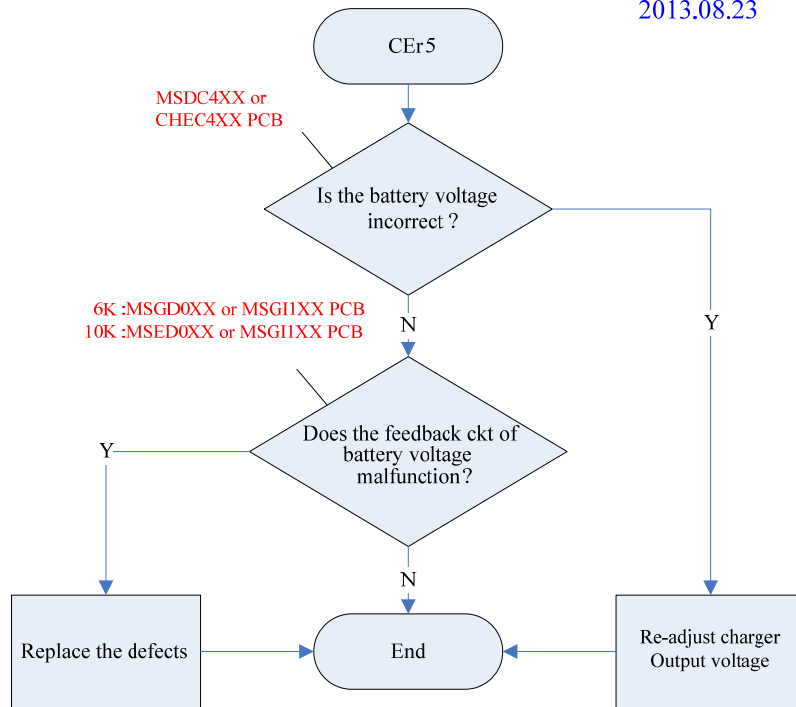


1.60 Calibration Error Code CEr5

Definition : It means the battery voltage of the UPS is out of adjustable range.

Flow Chart

2013.08.23

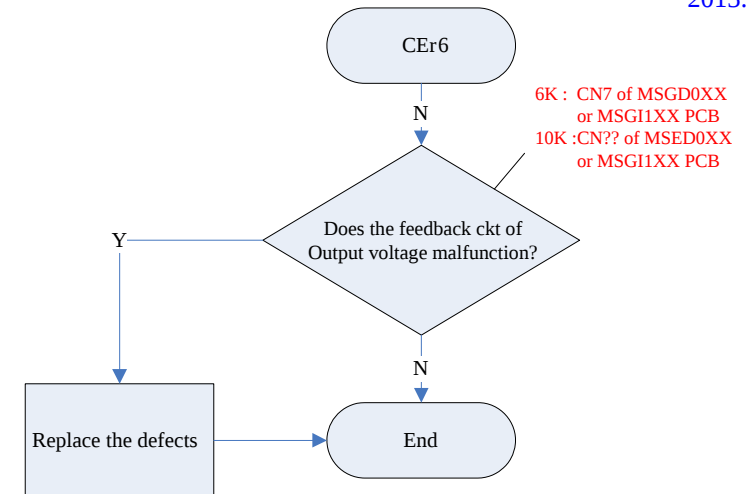


1.61 Calibration Error Code CEr6

Definition : It means the output voltage of the UPS is out of adjustable range.

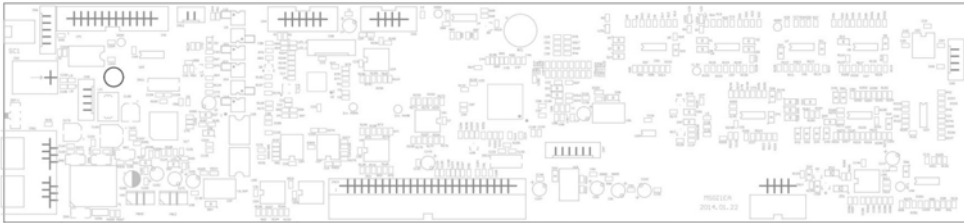
Flow Chart

2013.08.23

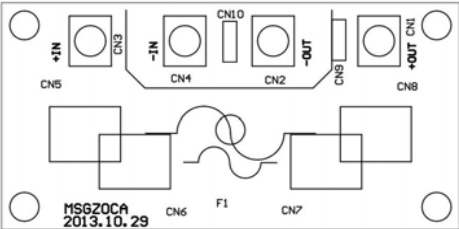


Appendix A PCB Placement

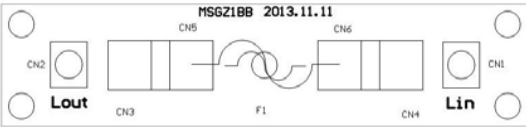
MSGI0XX PCB



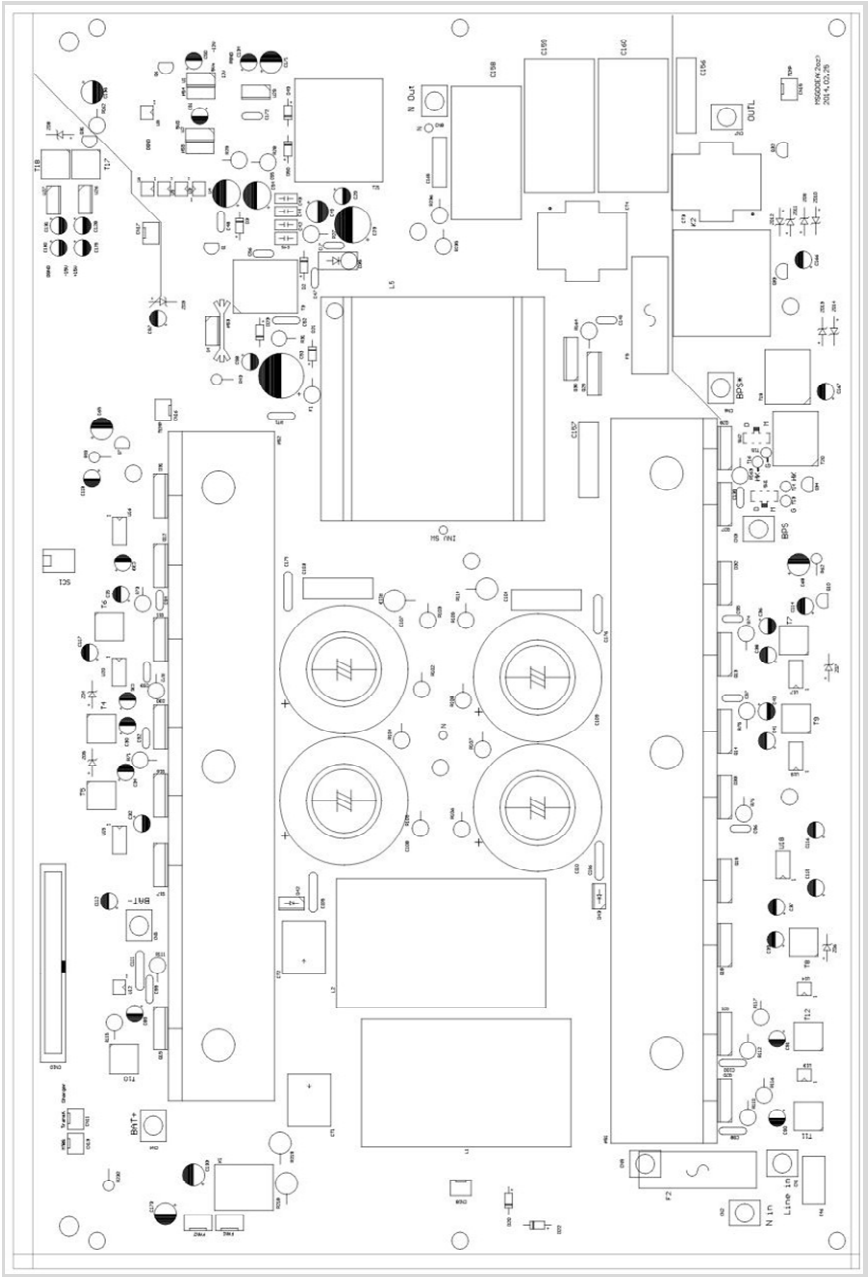
MSGZ0XX PCB



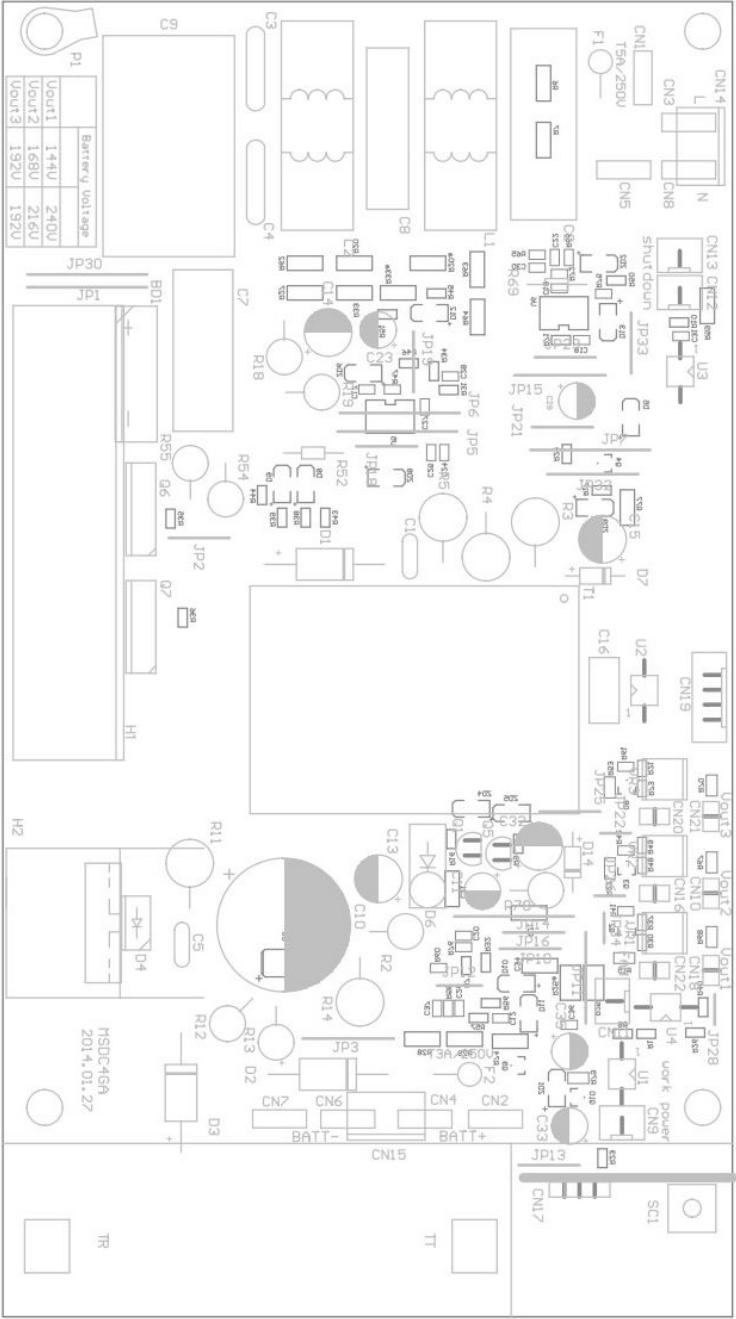
MSGZ1XX PCB



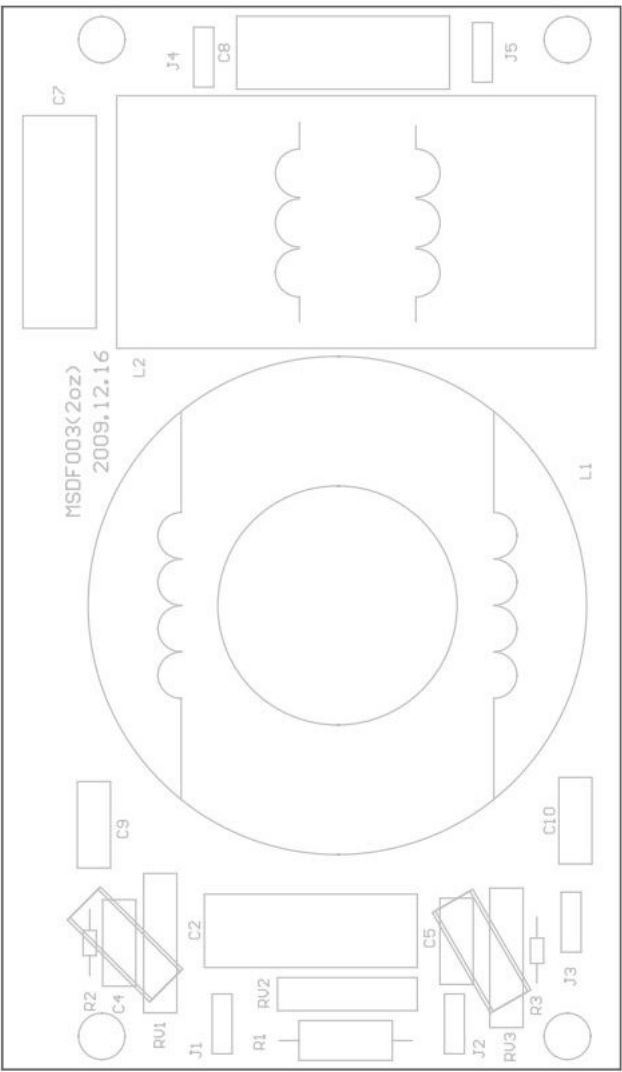
MSGD0XX PCB



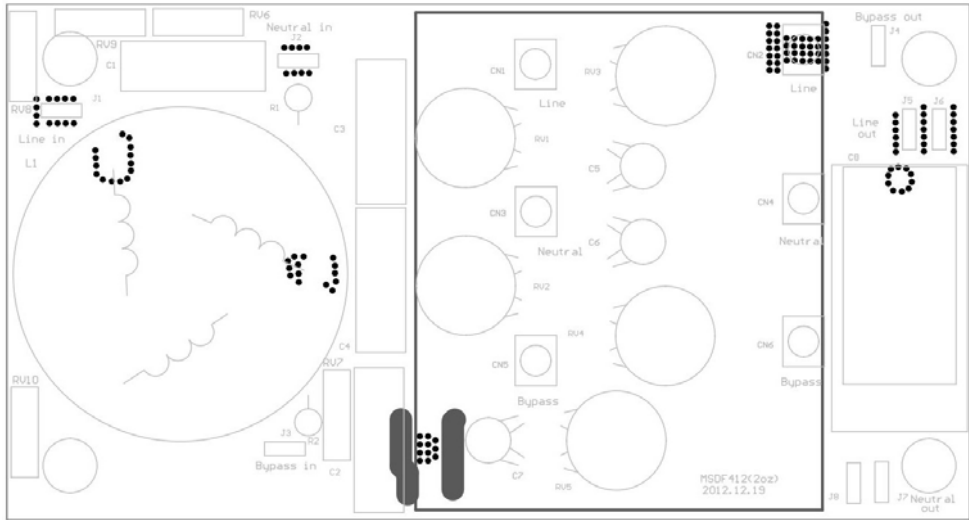
MSDC4XX/MSHC0XX PCB



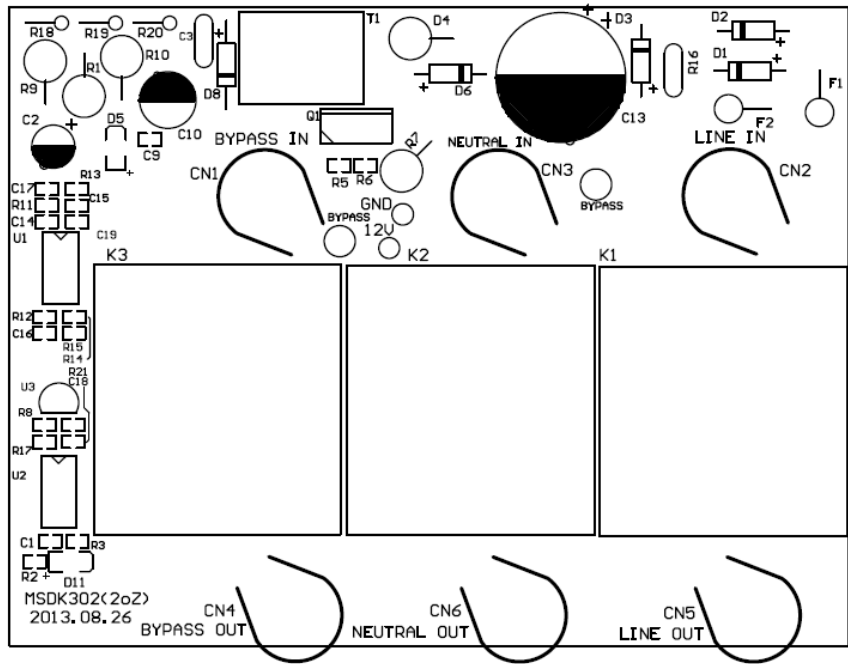
MSDF0XX PCB



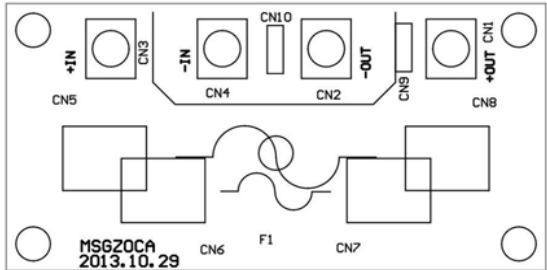
MSDF4XX PCB



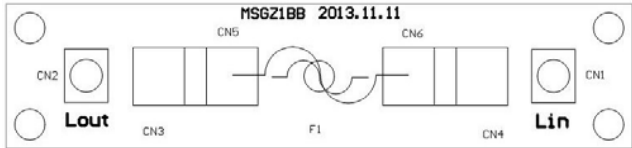
MSDK3XX/ MSDK4XX PCB



MSGZ0XX PCB



MSGZ1XX PCB



MSDM3XX PCB

