EPS100-48(SR4850M-1U) Power System

User's Guide

SUPLET ®

Suplet Shenzhen Co., Ltd.

Document version: 1.00

Modification history: 2019.1.20

Safety Notice

In order to avoid accident, read the manual thoroughly before operation. The rules should be obey are not only the items “careful, attention, warning, danger” included in the manual, they are just complementarities of safety operation. So people who installs or operates the equipment should be trained before operation.

Contents

1 System Overview

System configuration

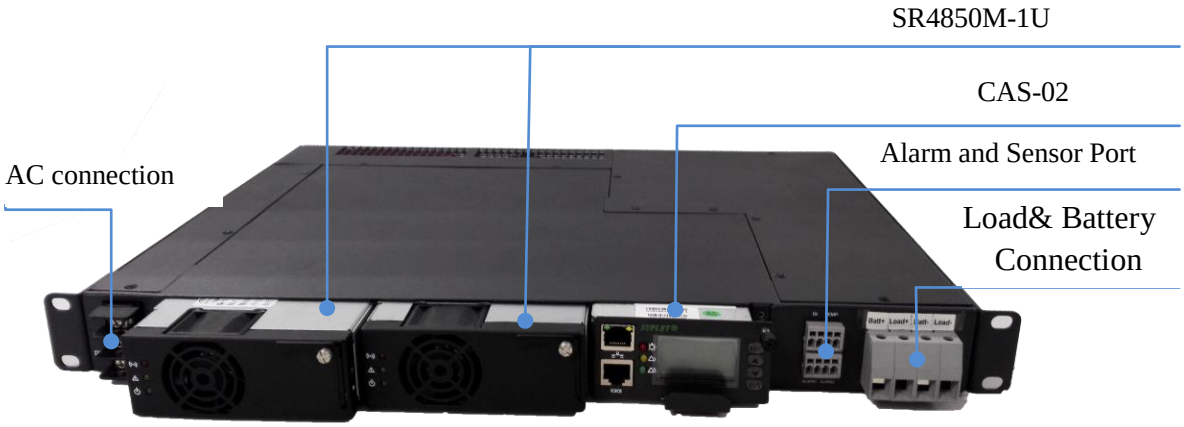


Fig1-1 System view

EPS100-48(SR4850M-1U) Power System is a 19" 1U rack-mount power system. It provides DC power by using two SR4850M-1U rectifiers, the battery can be shut down by BLVD located in the shelf inside while DC voltage is less than the battery protection voltage .The system is supported by a single CAS-02 monitor that provides all control and operational conditions, as well as alarms and output parameter configuration. It operates from -40℃ to +75℃, and it is designed for the harsh outside environment. System view is shown as fig1-1.

System configuration is shown as table1-1.

Table1-1 System configuration

Power	**Input voltage**	**Output voltage**	**Output current**	**Accuracy**	**Part model**
5800W	**90-300Vac**	**53.5V**	**100A**	**≤±1%**	**EPS100-48(SR4850M-1U)**
Distribution Section					
AC input	40A×1				
AC output	N/A				
Load output	80A×1				
Battery input	80A×1				

1.2 Operation principles

When AC input power is in normal condition, the power system is in floating charge. A rectifier converts AC to DC to power the loads and floating-charge battery units. Rectifiers'

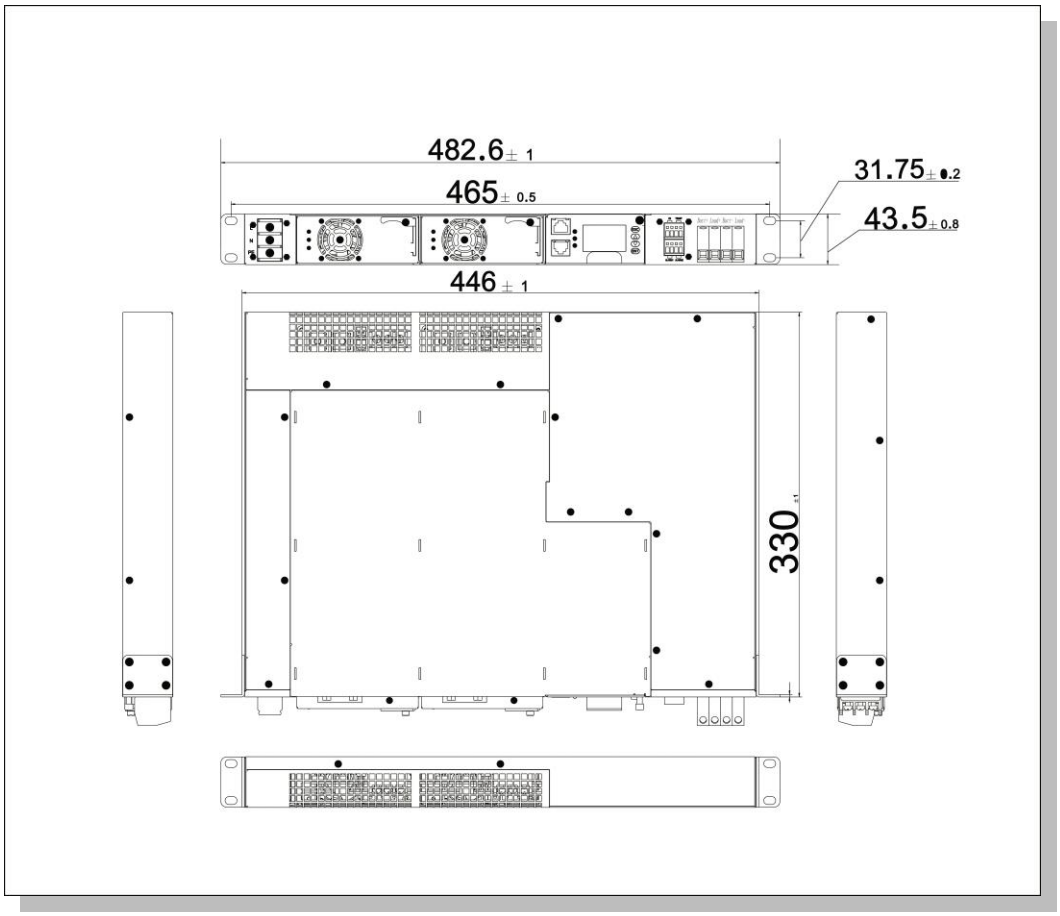
output is in non master-slave mode to keep equilibrium output. The output voltage is adjusted automatically by the Controller for the battery floating charge.

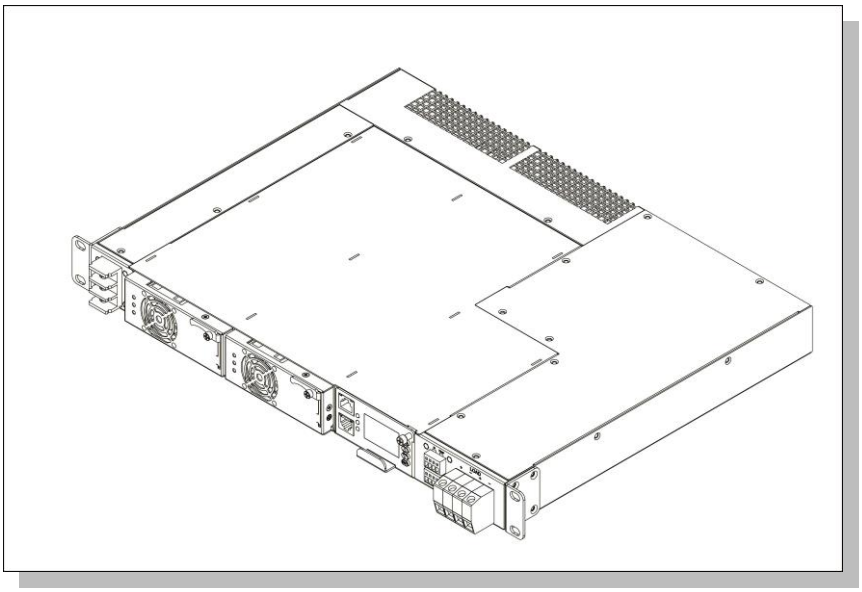
When AC input is off, battery units will power the loads. If battery units are over-discharged, the controller will control the DC contactor to disconnect the battery units from the loads.

When AC input recover, rectifiers output DC current to loads, and at the same time charge the battery units with limited current. When voltage of battery units reaches equalizing value, charging current will be down slowly and it will keep the charge voltage till the charge current is less than change-over current value, then controller controls the rectifiers to enter the floating-charge mode.

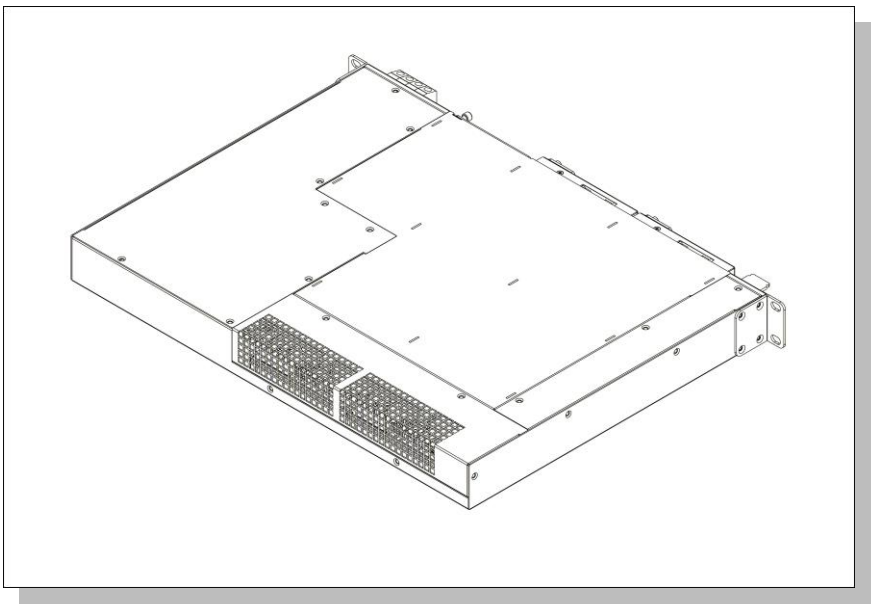
1.3 System Outlines

W*D*H – (mm)	Weight – (kg)
482.6mm ×330mm ×43.5mm	8kg





Top view from the front



Top view from the behind

2 System Features and Specifications

2.1 System Features

(1) Wide single phase input:90VAC-300VAC
(2) High efficiency：>95％
(3) High reliability
(4) High power density
(5) Hot-plug
(6) Operation Temperature Range:-40 ℃- +75 ℃
(7) 1U height shelf

2.2 System Specifications

Input Characteristics

Input Voltage	Rectifier: 176～300Vac full load 90～176Vac De-rating
Input Voltage (maximum)	300Vac
Frequency Range	45 -65Hz
Input Current (maximum)	19A
Power Factor	≥0.99
Efficiency	＞95%
THD	<5%

Output Characteristics

Vo Set Point (min/typ/max)	42/53.5/58 (Vdc)
Io Output	100A @53.5Vdc
Output Power	5800W
Output Noise (maximum)	<200 mV (peak to peak, bandwidth 20MHz)
Psophometric noise	<2 mV
Dynamic Response (maximum)	5%
Turn On Delay (maximum)	10 sec
Load Sharing (min/max)	-5/5 (%)

Protection Characteristics

	Min	Typ	Max	Unit	Notes
Over Temperature protection			75	ºC	
Input over voltage protection		300		Vac	
Input under voltage protection		80		Vac	
Output over voltage protection		59		Vdc	
Short circuit protection					No damage within long time

Environmental Characteristics

Parameter	Min	Typ	Max	Unit	Notes
Storage Temperature	-40		85	ºC	
Operating Temperature (internal cooling)	-40		75	ºC	–5 to +50℃ degree C with full performance, derating from 50℃ to 75C,
Humidity	5		95	%	Relative Humidity Non Condensing
Insulation Resistance	20MΩ				AC-Enclosure(500V DC)
	20MΩ				AC-DC(500VDC)
	20MΩ				DC-enclosure(500V DC)
Dielectric Strength			2121	Vdc	AC-Enclosure
			4242		AC-DC
			707		DC-enclosure

2.3 Rectifier

The SR4850M-1U rectifier is rated for 2900 Watt constant output power when operated at 176/300VAC inputs, it provides approximately half of its rated output when operated at 90VAC. This auto-sensing circuit enables each rectifier to automatically adjust its output to the available input voltage. The rectifier will provide up to 100% of rated power at 50℃. As temperature increase from 50℃ to 75℃, the internal thermal power limit circuit linearly decreases power. In the typical operating range, the rectifier has power factor greater than 0.99, total harmonic distortion less than 5%, and highest efficiency greater than 95%. Each hot-swappable rectifier has an integral multi-speed cooling fan and 3 LED status indicators.

SR4850M-1U/SR4850-1U/SR4850H-1U

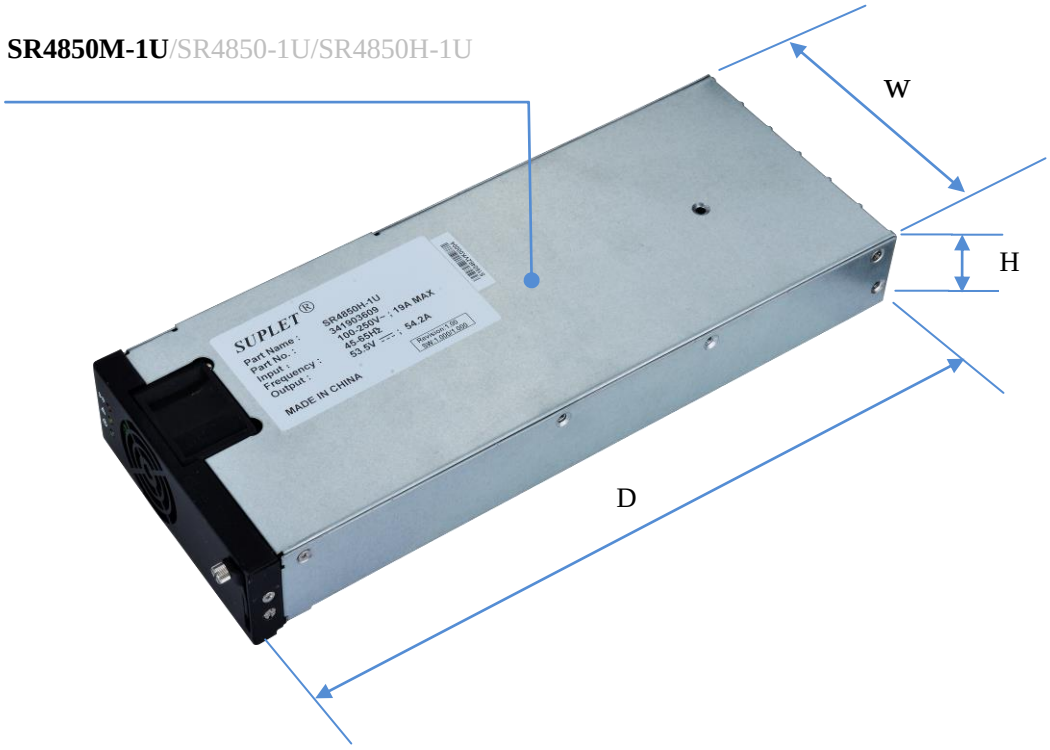


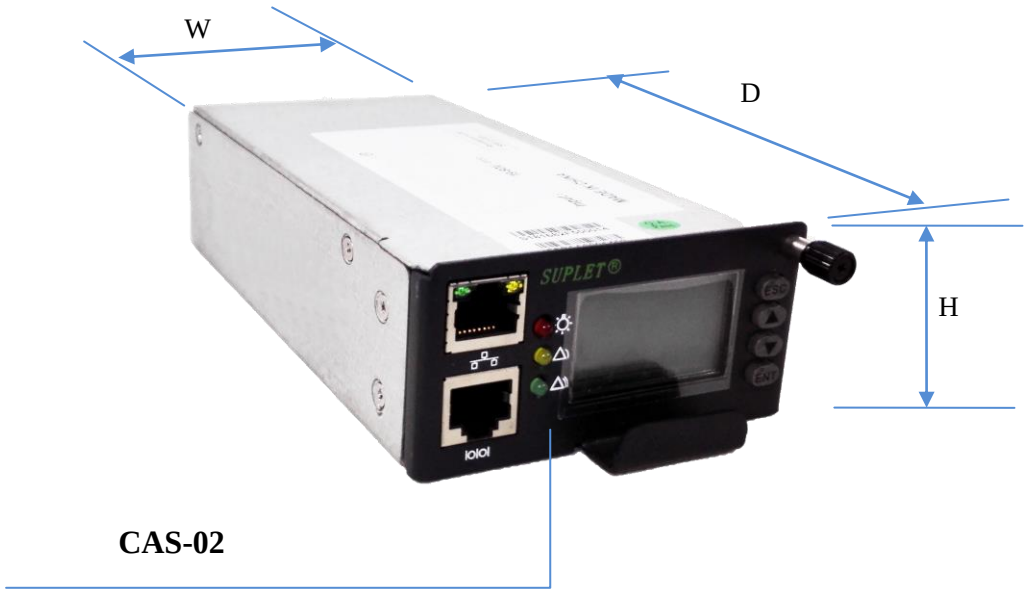
Table 6 Dimension and Weight

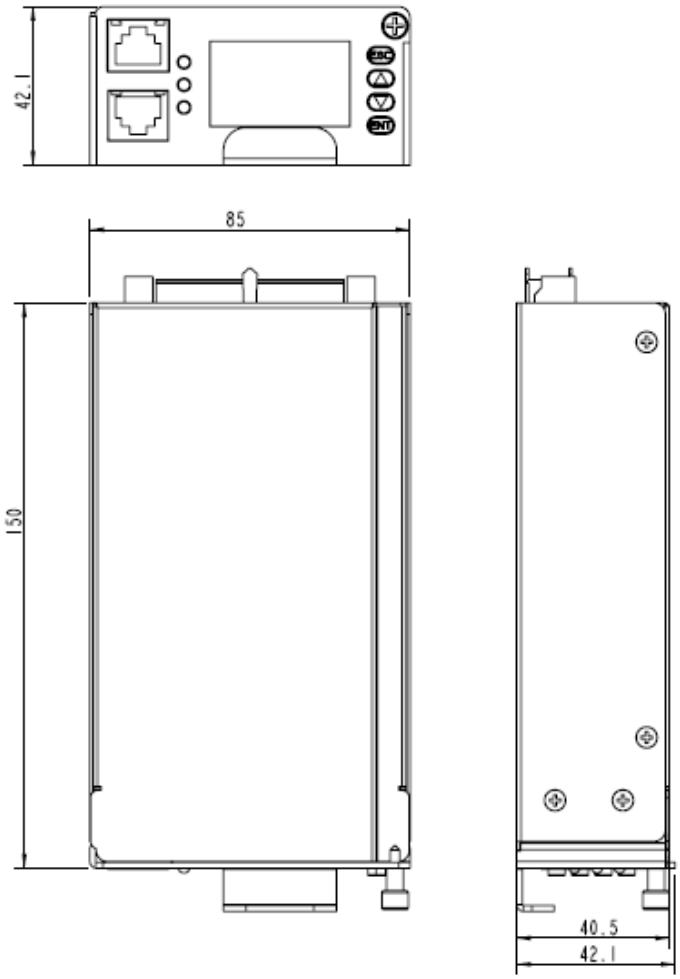
W*D*H – (mm)	Weight – (kg)
105*281*40.5	2.5kg

2.4 Controller

There are LCD display, LED indicators, keys, RS232 communication ports on the front panel of the monitor CAS-02

Parameter measurement and monitoring	AC input voltage, DC output voltage, rectifier output current, charging and discharging current
Fault detection	AC input faults, DC output faults, Rectifier output current limiting, Module over hot, Fan failure, Battery output voltage low, Battery melt fuse failure
Parameter control	Charging current, Auto converting between equalizing and floating charge, Rectifier current limit, Module power On/Off, Primary and secondary power off.
Battery management	Boost/Float change automatically Current limiting for equalizing charge,
Interface	LCD, Chinese character, English optional, 4 key operation
Alarm warning	Sound, light, Dry contact outputs
Communication port	RS232/LAN
Power	DC48V / 0.5A



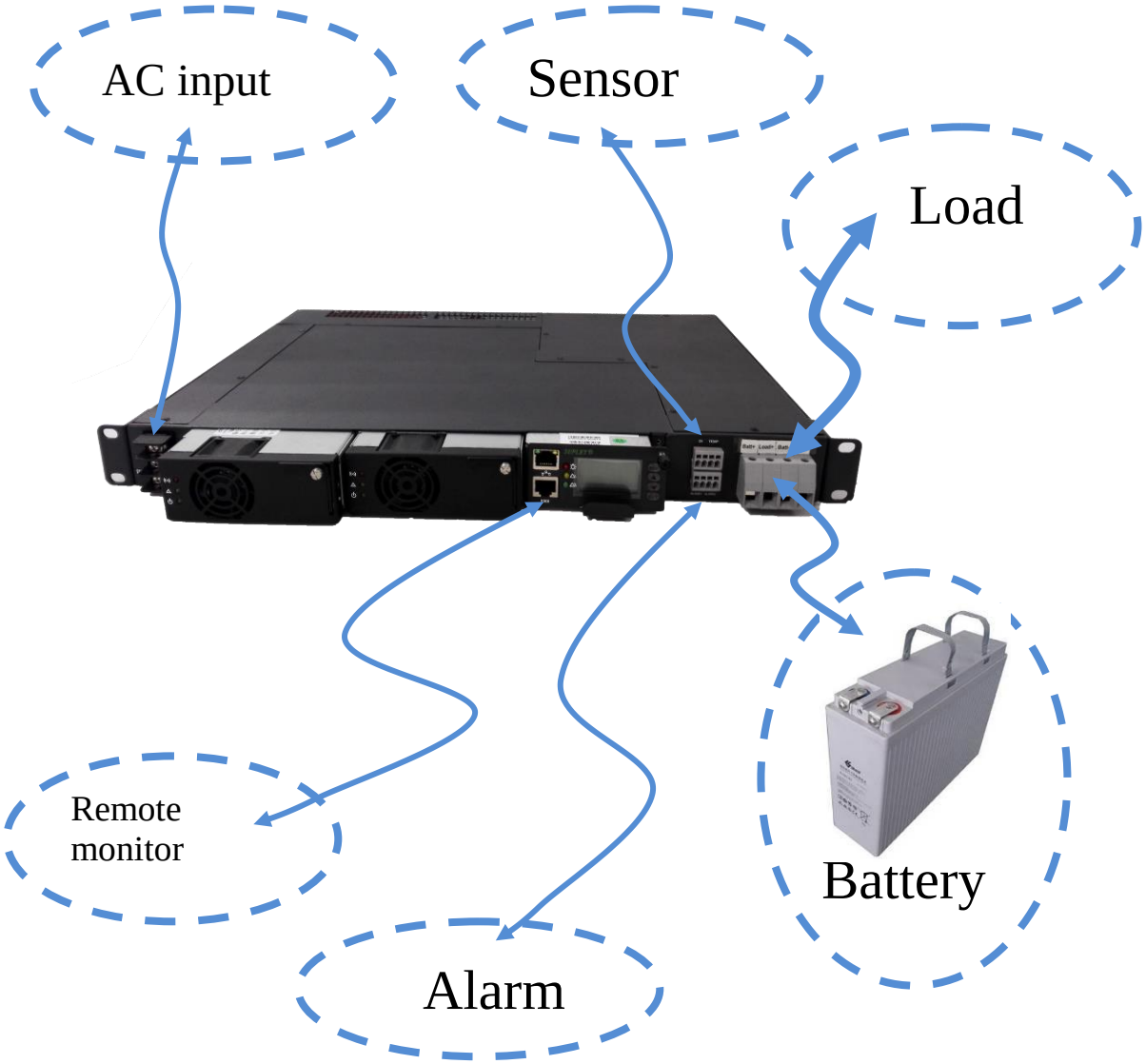


W*D*H – (mm)	Weight – (kg)
85*150*42.1	<0.6kg

3 Installation

Concerning the safety of yourself and this equipment, please follow the following installation procedures.

Warning: Making sure the AC circuit breaker and DC circuit breaker in "Off" position before installation.



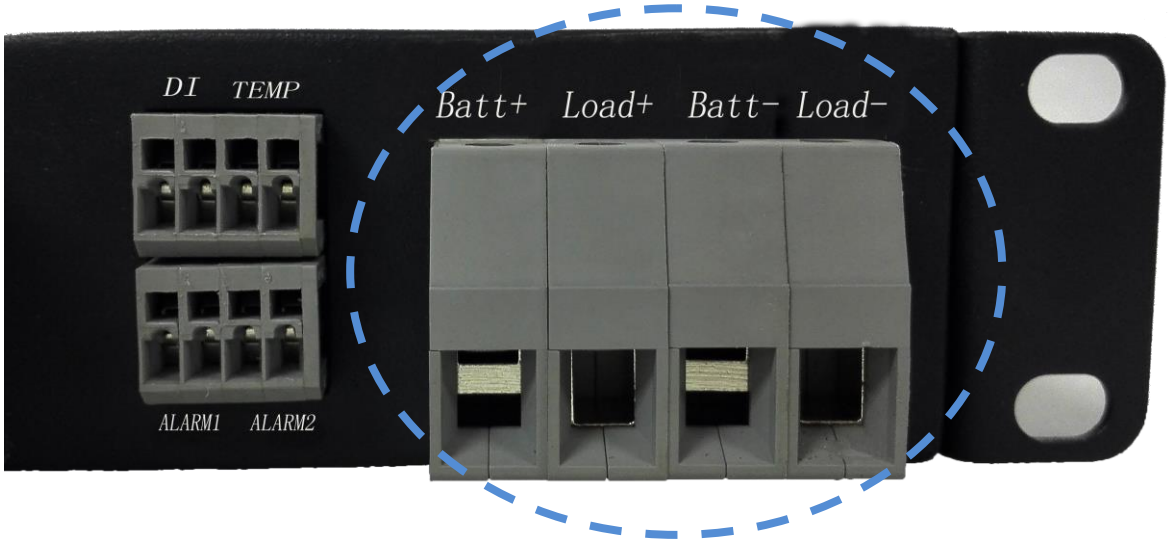
3.1 Shelf installation in the cabinet

Inserting the empty housing into the system rack cabinet and screwing down securely.

3.2 Battery Connection

Connecting the battery cables securely with gaskets to the battery wiring connectors on the distribution panel on the front shelf

Warning: It may damage or equipment if misconnect the "+" and "-" of the batteries.



3.3 Load connection

Connecting the load cables securely with gaskets to copper connectors (+) and connection terminals (-) on the distribution panel on the front shelf.

Warning: It may damage the load equipment if misconnect the "+" and "-" of the load.

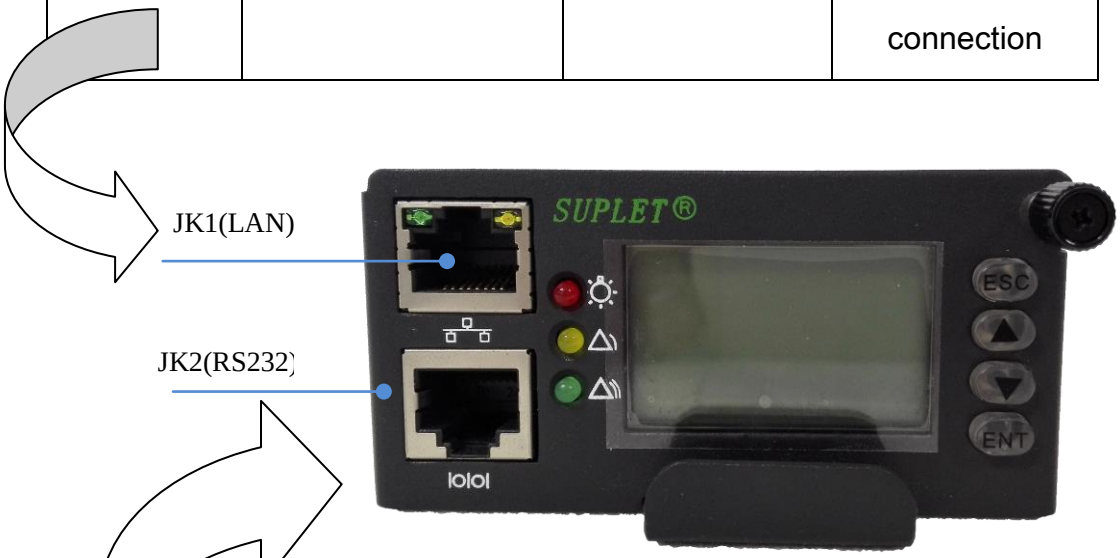
3.4 AC Connection

Connecting the two AC input cables securely with gaskets to the AC input connection terminals on the distribution panel on the front housing. **"L** "---- AC Line terminal, **"N** "--- Neutral terminal; **"PE**" --- protective earth.

Warning: Misconnecting the "L" and "N" is strictly forbidden. Using 6 mm^2 or bigger cable to connect the Earth "E", otherwise the anti-lightning won't work properly.

3.5 **RJ45 and RS232 port of controller**

connector	Pin No	definition	Note
JK1	LAN	network	Standard connection



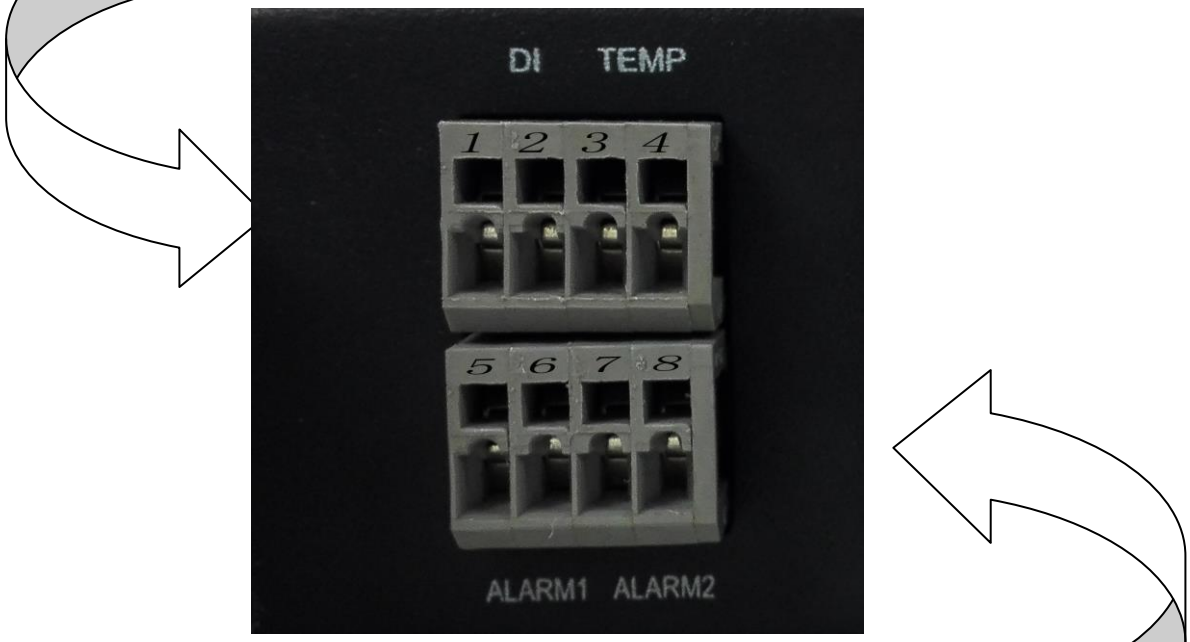
connector	Pin No	definition	Note
JK2(RS232)	1		N/A
	2		N/A
	3	TXD	RS232 TXD
	4	VPGND	RS232 GND
	5		
	6	RXD	RS232 RXD
	7		N/A
	8		N/A

Notice:

In front of the controller, the pin number from left to right of RJ45 is pin1 to pin8.

3.6 Alarm and Sensor Port

1	DI1	Digital input 1
2	DI1+	Digital input 1
3	VT1	Temperature sensor signal
4	V12A	Temperature sensor 12V power



5	DO1O	Relay output 1normal open
6	DO1M	Relay output 1 Common
7	DO2O	Relay output 2 normal open
8	DO2M	Relay output 2 Common

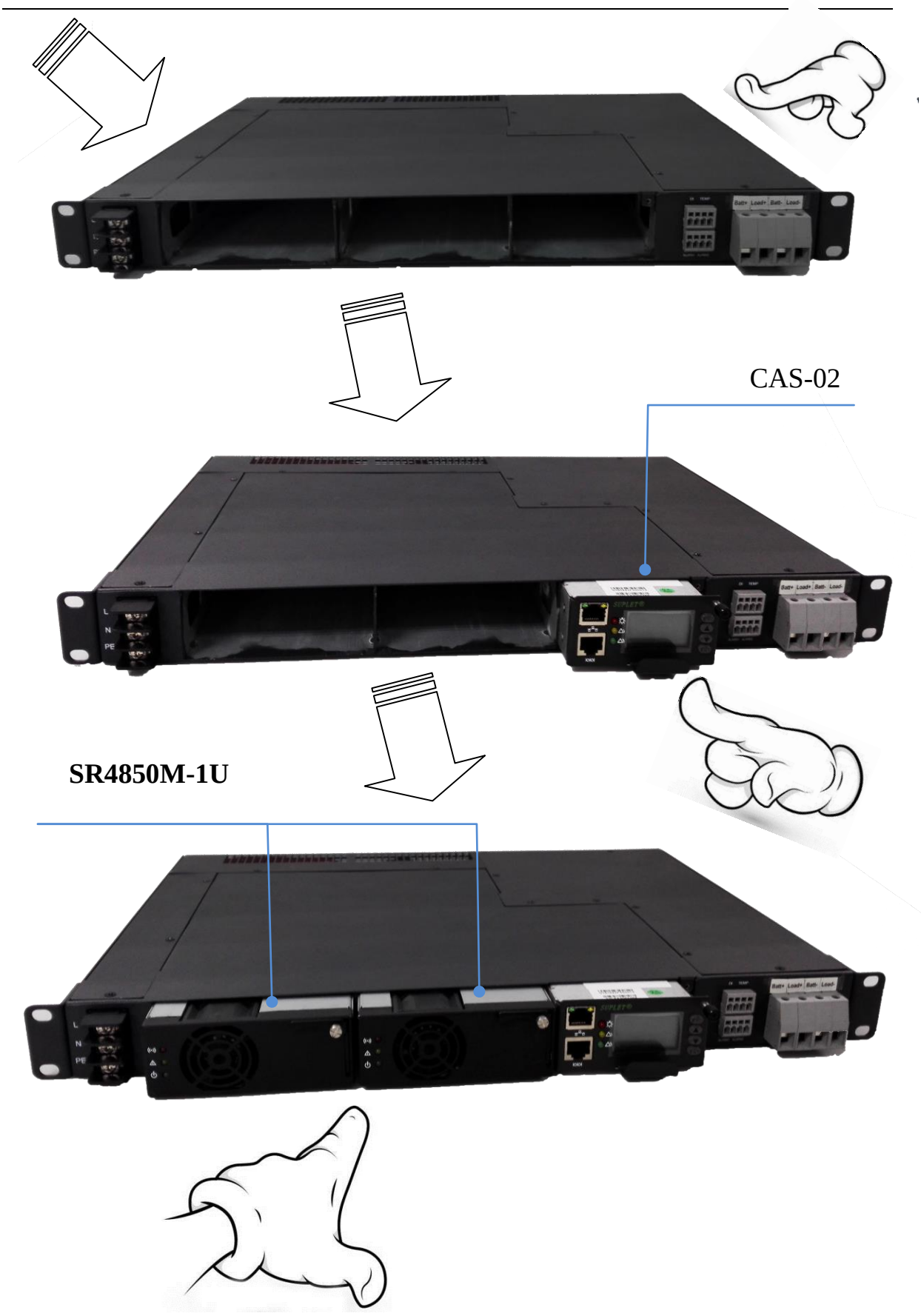
3. 7 Check

After finished the above, make a through check and make sure all the cable connection correct.

3.8 Assemble

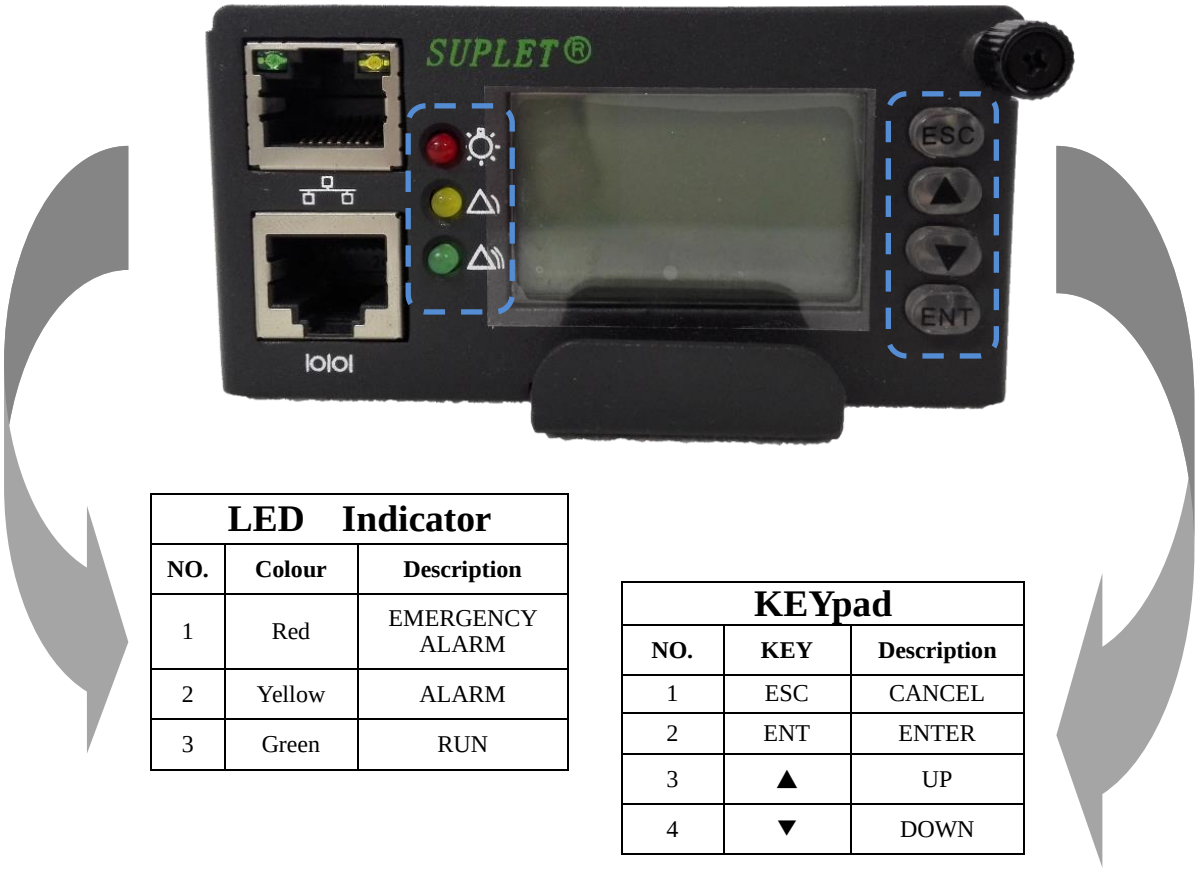
Inserting all the modules including rectifiers into the housing and screwing down securely.

Warning: Making sure the AC circuit breaker and the power switch of the controller in "Off" position when inserting the rectifiers and AC unit.


CAS-02
SR4850M-1U

4 Controller operation

LCD Screen
128*64 Display in English or Chinese



LED Indicator		
NO.	**Colour**	**Description**
1	Red	EMERGENCY ALARM
2	Yellow	ALARM
3	Green	RUN

KEYpad		
NO.	**KEY**	**Description**
1	ESC	CANCEL
2	ENT	ENTER
3	▲	UP
4	▼	DOWN

4.1 Functions and features

(1) Electric parameters detection and measurement:
AC input voltage, DC output voltage, rectifiers output current, charge and discharge current of battery units, temperature of battery units.

(2) System failures detection
Problems and failures can be detected from: AC input, DC input, output current limitation of rectifiers, over temperature of rectifiers, cooling fans, lightning protection and surging protection, battery capacity, melt fuse of battery units and distribution.

(3) Electric parameters Control
Adjusting range of DC output voltage: 42.0V-58V
Limiting range of rectifier output current: 5.0A-55.0A

(4) Battery management
floating voltage switching： Manual /auto
Battery low voltage (LVD) protection
Battery charge mode selection：Equalizing charge mode with limited current, thermal compensation for floating charge, accumulative number indication of ampere-hours of battery discharge.

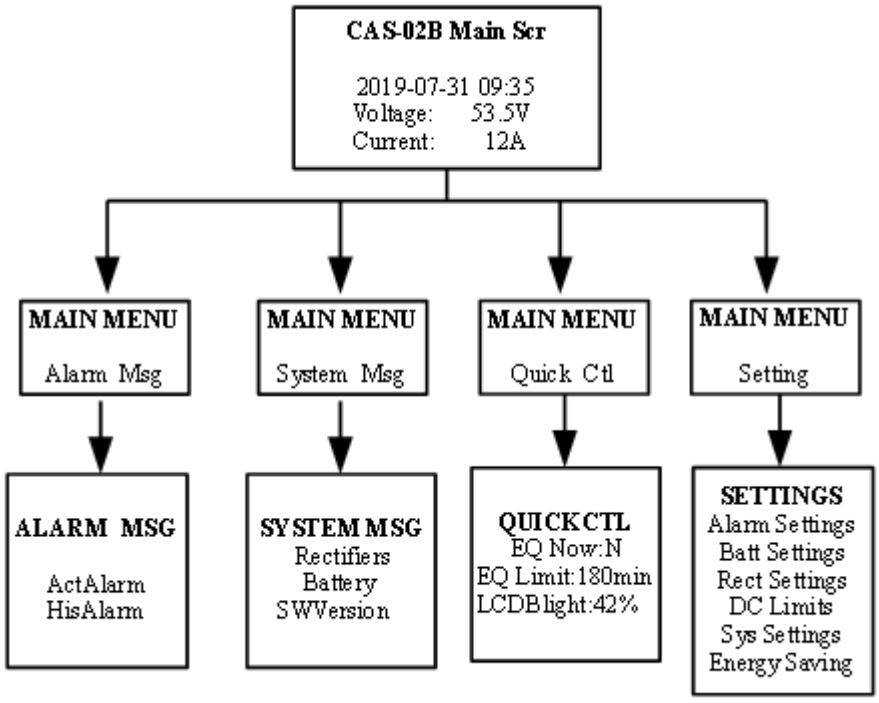
(5) Rectifier control:

Rectifier switch on/off

4.2 Menu Structure

4.2.1 The menu frame of the monitor module.

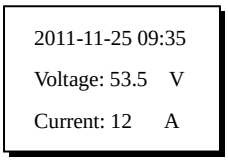
This Monitor adopts multilevel dendriform menu, you could lookup active or history alarm message， the system message, and parameter message. The interface is very terse for user. It could display in English or Chinese that you could set in the "Settings" menu, the English menu frame is as below:



4.2.2 The main menu of the monitor

When it is power on or reset, the monitor displays the system message which is most important for user .if the system has alarm, it will display the alarm in this menu and the beep which is on will ring. Press any key to shut down the alarm tone. In other menu, if no key be pressed in 10 minutes, it will return this menu and shut down the black light of the display module in order to save energy.

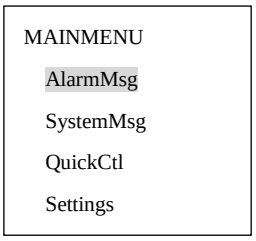
The system message menu frame is as below:



4.2.3 Alarm message

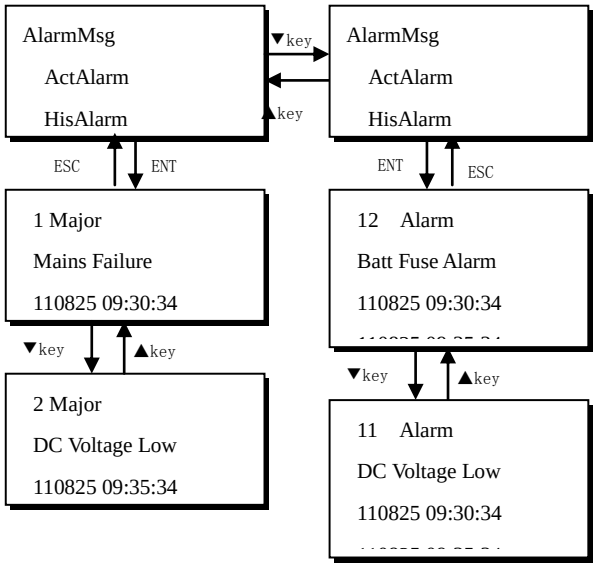
Press the "ENT" key or "ESC" key, it will enter in "MAINMENU" menu which has four items. Such as the alarm message, the system message, the parameter message, and the "QuickCtl" menu.

The main menu frame is as below:



In the present menu, you could enter the selected message's son menu by pressing "ENT" key. It could save 64 active messages and 200 history messages. In the alarm menu, you could get the alarm type and the beginning and ending time of the alarm.

The alarm menu frame is as below:



There are 25 alarm message types in all, the detail as below:

1. Rect N PlugInErr(this item reserved)
2. Rect N DCOverVolt
3. Rect N DCUnderVolt
4. Rect N ACOverVolt,
5. Rect N ACUnderVol
6. Rect N Fan Fault
7. Rect N AmbOverTemp
8. Rect N AmbUnderTemp
9. Rect N DCDCOverTemp
10. Rect N PFCOverTemp
11. Rect N NoRespond
12. Rect N DCDCEEPROM (Rect N Comm Fault)
13. Rect N Derated_AC
14. Rect N DeratedTmp
15. Rect N Curr Share(this item reserved)
16. Rect N PFC EEPROM
17. Rect N Comm Fault
18. AC Input Failure
19. Output Fault
20. Batt Over-Curr
21. TempHighAlarm
22. Batt CBAlarm
23. Load CB Alarm
24. LLVD
25. BLVD

Note:

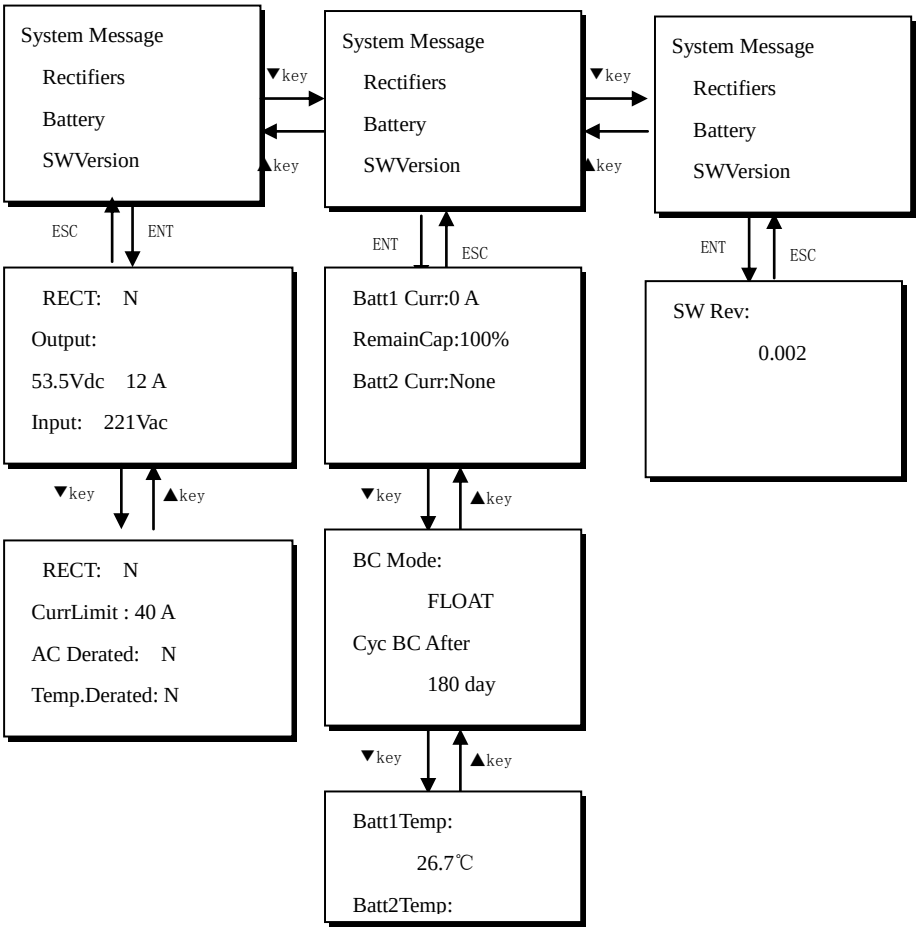
N=1~48(the number of the SMR), If you want to return to his parent menu, press "ESC". If there is no alarm in the system at present, it could not enter the active alarm menu.

4.2.4. System Message

In the System Message Menu, you could look up the rectifier message, the battery message and the software version and so on.

- In the Rectifier menu you could look up the output current and voltage of the rectifier, the current limit and so on. If the communicate between the rectifier and the monitor fails, it's address number will show different color.
- In the battery menu you could look up the current and the capacity of the battery, the charge mode, the next EQ time, and the temperature of the battery.
- In the software menu, you could look up the version of the system software, it is useful for the operator.

The system menu frame is as below:



Note:

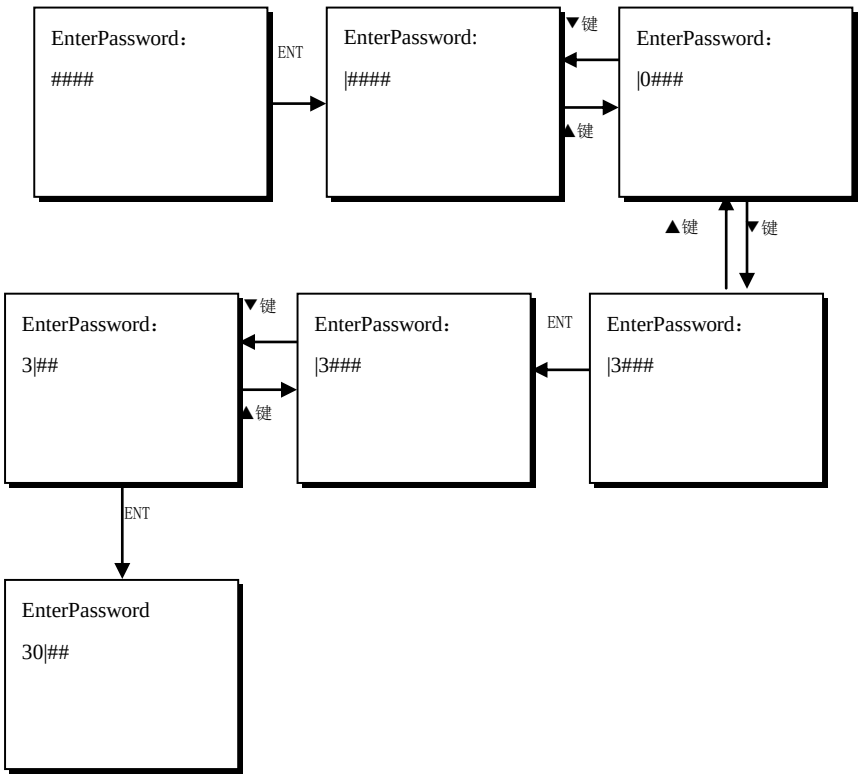
N=1~48(the address number of the rectifier), If you want to return to his parent menu, press "ESC". If there is no rectifier in the system at present, it could not enter his son menu.

4.2.5 Settings menu,

In the Settings menu, you could change the value of the parameter in his son menu, such as battery parameter, alarm parameter, and rectifier parameter. If you want to enter Settings menu, you should know the password which has three levels, the user level, the operator, and the admin level. The admin level is the highest level of all , It means if you have administer password you could get more message .The next passage introduces how to input the password in password menu, the important operation as follow:

- Enter in the password menu, you could see the flashing cursor in the first letter .you could change the first number by pressing "ENT" key.
- the selected letter could be changed by "▼" or ▲". The range is from 0 to 9, If you get the right number you want, and press the "ENT". Then you could move the flashing cursor by pressing "▼" or ▲" to the next letter, then press "ENT" key again.
- When the flashing cursor in the last letter, press "ENT" key , you could enter the Settings menu if you input the right password , or else it will display invalid password ,you may try again .

The menu frame is as below:



Enter in the settings menu, you could see five items in all. Every item could be changed.

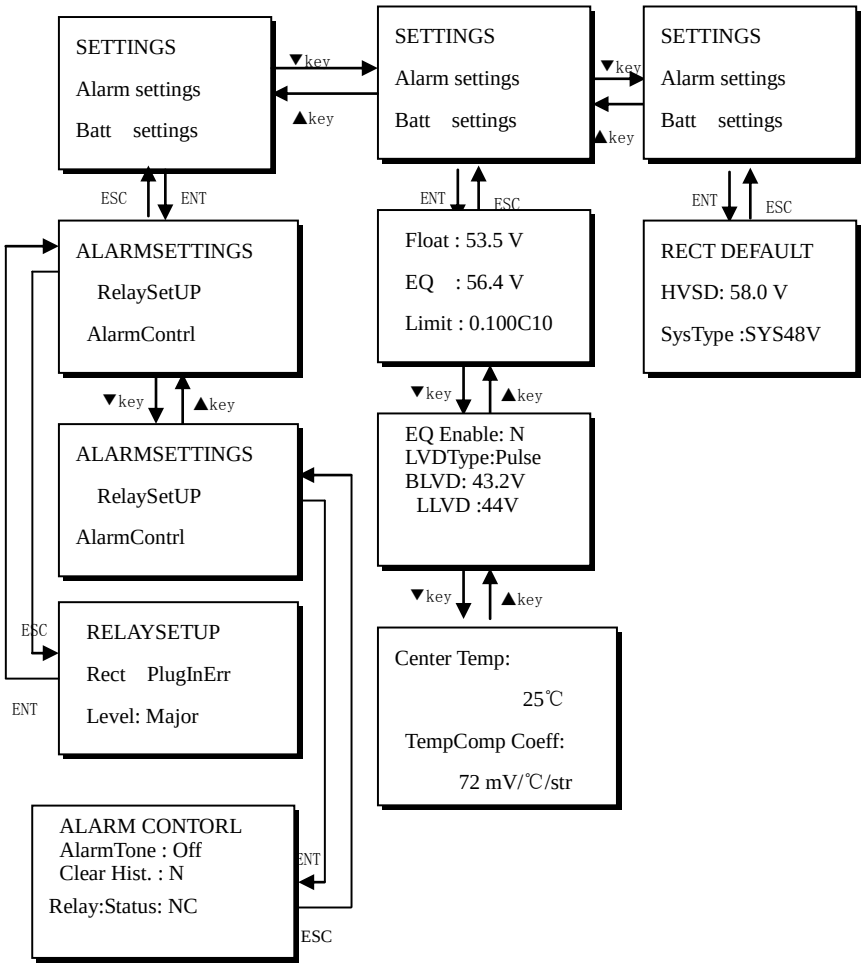
- In alarm settings menu, you could set relay out, the next passage will introduce how to do it. Not only you could clear history alarm message, but also you can control the beep voice on or off.

- In battery settings menu, you could change the value of the EQ and float voltage of the battery, the capacity and the shut down voltage of the battery and so on.

- In rectifier settings menu, you can change the point of the high voltage shut down (HVSD) and the default voltage of the rectifier.

- In DC settings menu, you could change the over and under voltage of the output. If you are an operator or an administer, you could set coefficient of the battery shunt, the load shunt is reserved in the software version.

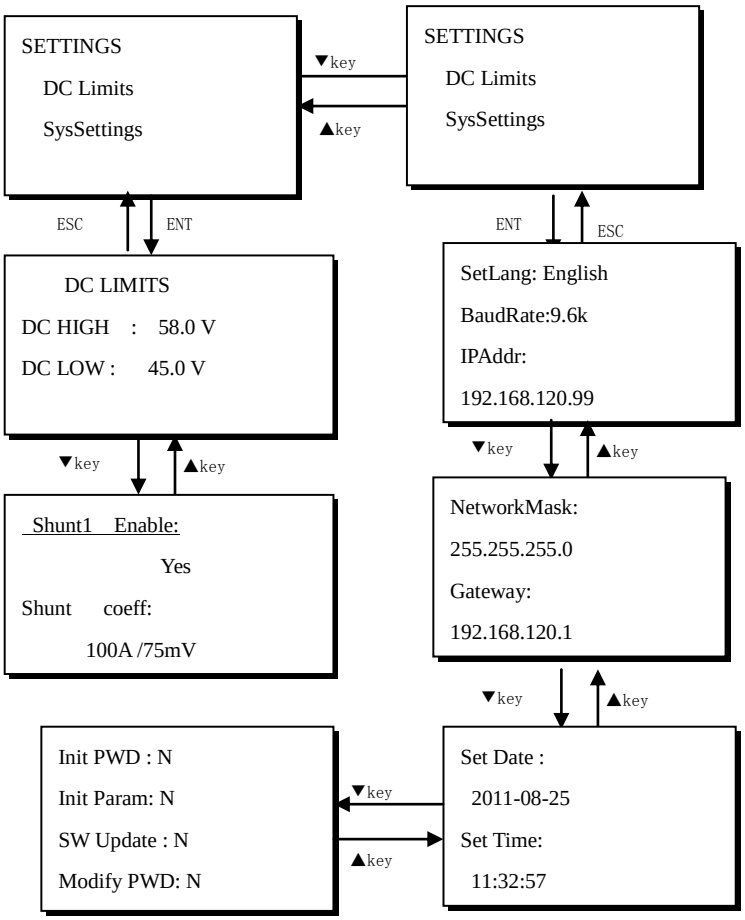
The menu frame is as below:



Press "▼" then you will enter the other settings menu.

- In system settings menu you could select display language, this software supports English and Chinese.
- In system settings menu, you could setup the network parameter, such as the IP address, the network mask, and the gateway.
- In system settings menu, you could update the system data and time.
- In system settings menu, you not only could initial the password if you forget your password, but also you can change the password easily. You could restore all the parameters default value.

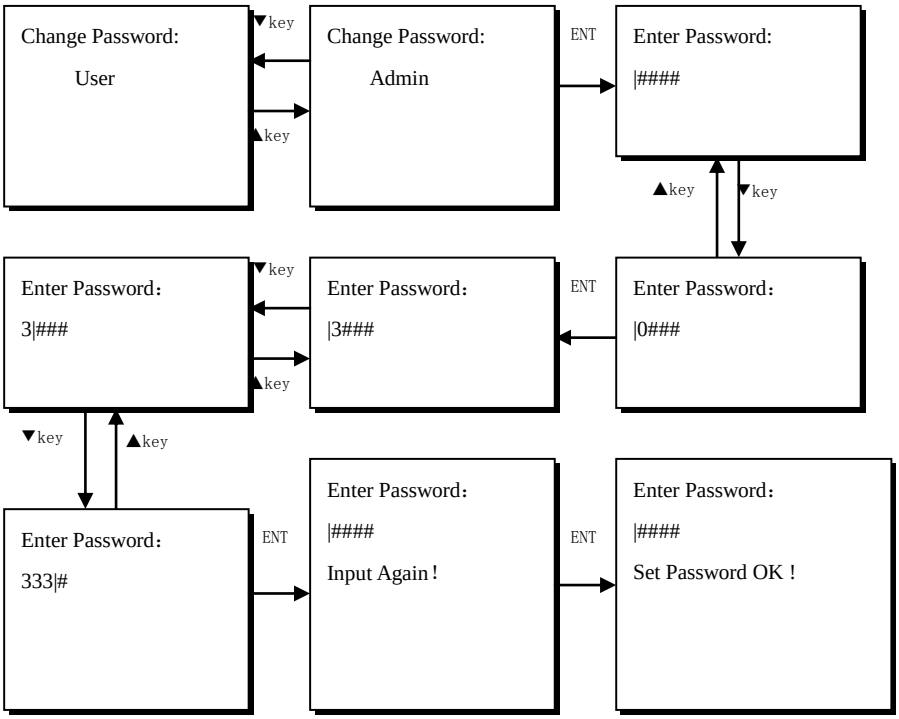
The menu frame is as below:



In this passage, It will introduce how to change the password. The main operation as follows:

- You should select the password level, then press "ENT" key to enter the password menu, the flashing cursor is in the first letter.
- The letter could be selected by pressing the "ENT" key. In this status, you could change the value of the letter by pressing "▼" or ▲". Then press "ENT" to confirm.
- When the flashing cursor in the last letter, press the "ENT" key, you will enter the password menu again, then input the password again. If the password is same as the last password that you input .It will display "Set Password OK". Or else it will display "Set Password failure".

The menu frame is as below:



4.2.6. Change the parameter

In this passage, it will introduce how to change the parameter in Settings menu .

Take the battery parameter for example, you could do same steps if you setup other parameters.

- In the battery settings menu, if you want to change the float voltage. First press "ENT" key, the value will be selected ,In this selected status you change the value by pressing"▼" or "▲ , you will change the value between max and min .
- If you get the value which you want, then press the "ENT" key to confirm . The flashing cursor will move to the next item if you press the "▼" or "▲.

The menu frame is as below:

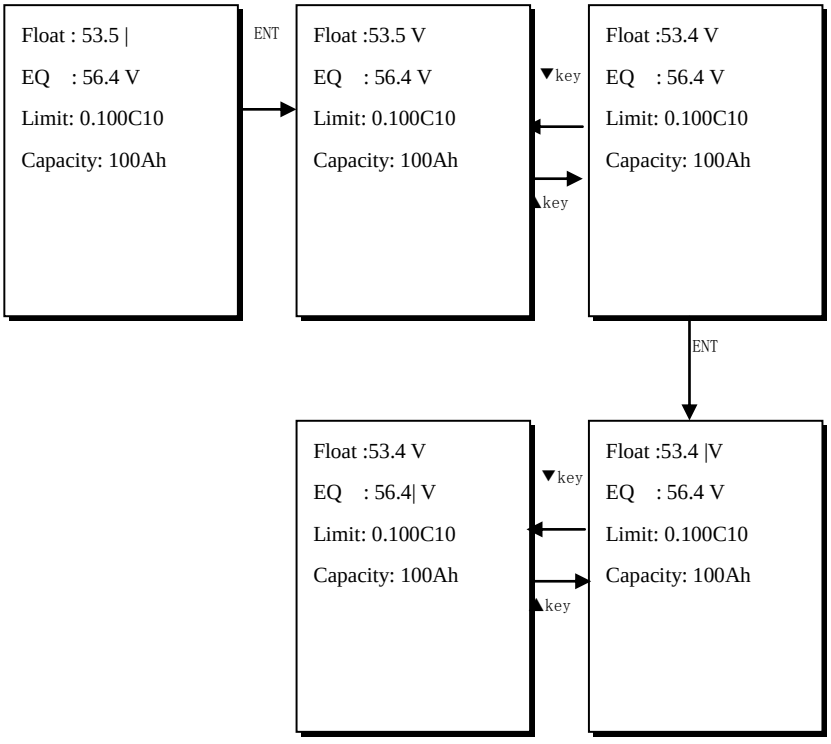


Table 1. the scale of parameters

Parameters	Default	Max	Min
Output over Voltage(V)	58	60	40
Output under Voltage Alarm Trigger(V)	45	60	40
Float Charge Voltage(V)	53.5	58	42
Equal Charge Voltage(V)	56.4	58	42
Battery Capability(Ah)	100	1000	50
Temp Compensation Voltage(mV)	72	500	0
Battery Shut Volt (V)	43.2	60	40
The charge current of battery to be limited(c10）	0.1	1	0.1
Turn to EQ charge if battery current over this value(c10）	0.06	0.08	0.04
Turn to EQ charge if battery capacity lower than this value（%）	80	99	10
EQ charge cycle(days)	180	360	2
Continuous EQ charge time(minutes)	180	2880	60
The Center for temperature compensation(ºC)	25	40	10
Diverter Coefficient（A/mV)	100/75	2000/500	0/1
LLVD(V)	44	60	40

Note: you should not change the LVDtype optionallt after you check the system.

How to setup relay output, the operation is also very simple. Every alarm could be set to output by one of the six relays. At present, we offer 4 relays to the user,. The relay 1 to 4 indicates the alarms as below:

R1----AC Input Failue

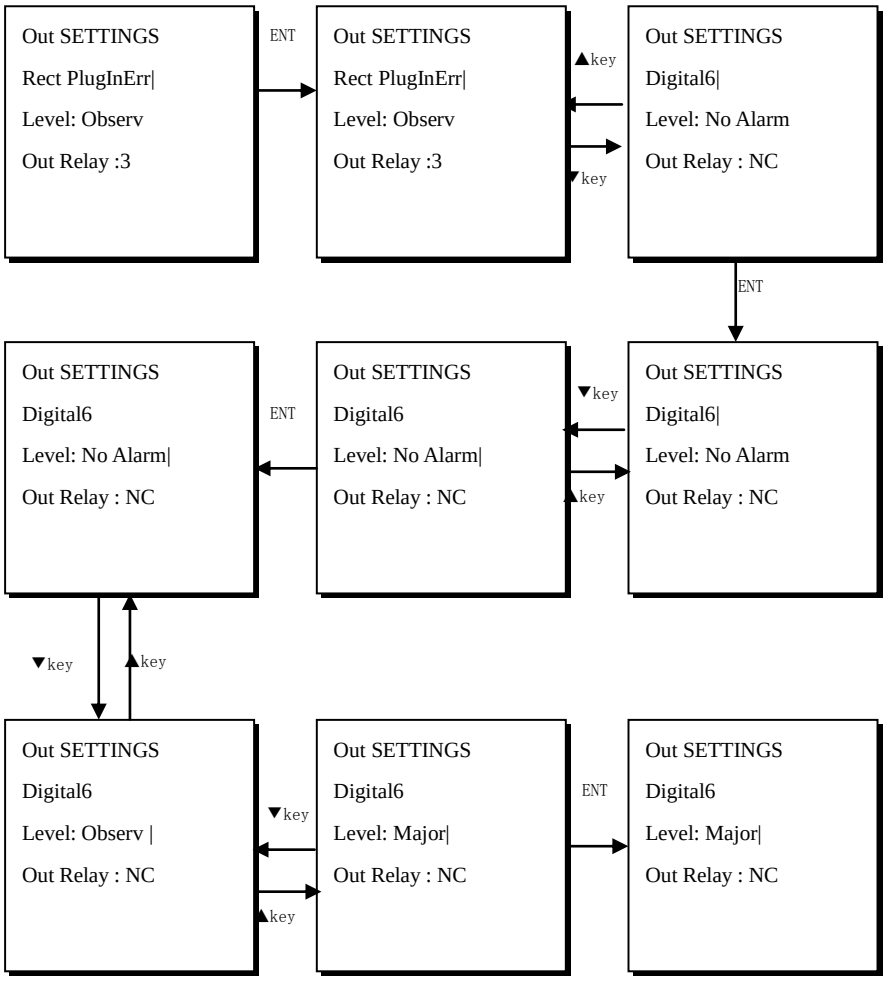
R2----Batt /Load CB break

R3----Rect DC OverVolt/ Rect DC UnderVolt/Rect FanFault/Rect Comm Fault/ Output Fault（reserved for EPS100-48(SR4850M-1U）)

R4----Batt Over Curr/Batt Temp Fault（reserved for EPS100-48(SR4850M-1U）)

- Press the "ENT" key, the letter with the flashing cursor will be selected, in this state you could change the item by pressing "▼"or"▲", then press the "ENT" again to confirm. You could get other alarm type and related alarm level and relay.

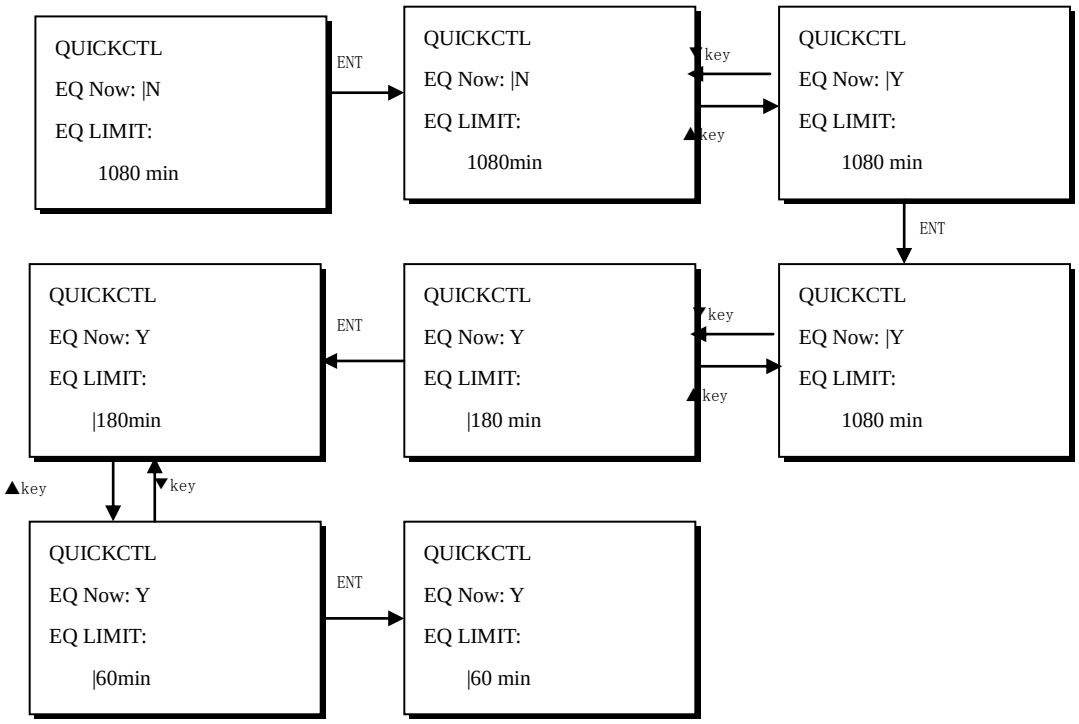
- Then press "▼", the flashing cursor will move to next letter, you could do same steps to change the alarm level and out relay.



4.2.7. "Quick Ctl" menu

In the last passage, it will introduce the "Quick Ctl" menu. It is a shortcut menu for user to control the battery charge mode. There are two types modes float charge mode and EQ charge mode. You could modify this item without password.

The menu frame is as below:



5 Maintenance

Please refer to Table5-1.

Table5-1 Faults Analysis

Faults	Possible causes	Solution
Battery current Inaccurate	The shunt coefficient is set wrong	Check the shunt coefficient in controller ,and insure it match the character wrote on the shunt
Controller can not control the LVD contactor open or close	The LLVD Type or BLVD Type is set wrong	Check the LLVD Type and BLVD Type,and insure it match the contactor type
Communication break off btween controller and rectifiers	The connection is loose or CAN bus is conected wrong	Fasten the connection of the CAN bus ,and check polarity of bus
The LCD display improperly	LCD has an error	Please contact the manufacturer
The Controller does not work	The fuse of the controller is broken	Please contact the manufacturer

6 Service information

6.1 Warranty

This product is warranted against defect in materials and workmanship for a period of one year from date of shipment. During warranty period, Suplet Shenzhen Co. Ltd. will, at its option, either repair or replace products that prove to be defective. For repair services under warranty, the product may be returned to Suplet.

Limitation of Warranty

The foregoing warranty shall not apply to defects resulting from unauthorized modification or misuse, or operations beyond the described in this manual. No other warranty is expressed or implied.

Whilst every care has been taken in compiling the information in this publication, Suplet cannot accept legal liability for any inaccuracies contained herein. Suplet has an intensive program of design and development which may well alter product specification, and reserve the right to alter specification without notice and whenever necessary to ensure optimum performance from its product range.

In particular,Suplet is not responsible for any lost profits or revenue, loss of use software, loss of data, cost of substitute software, claims by third parties, or for other similar costs. In no case shall Suplet's liability exceed the amount of the license fee.

6.2 Service contact

If you have any questions or need more information in using of these rectifier modules, please contact the following:

Shenzhen Suplet Co., Ltd.

☎ Tel: +86(755)-86000600

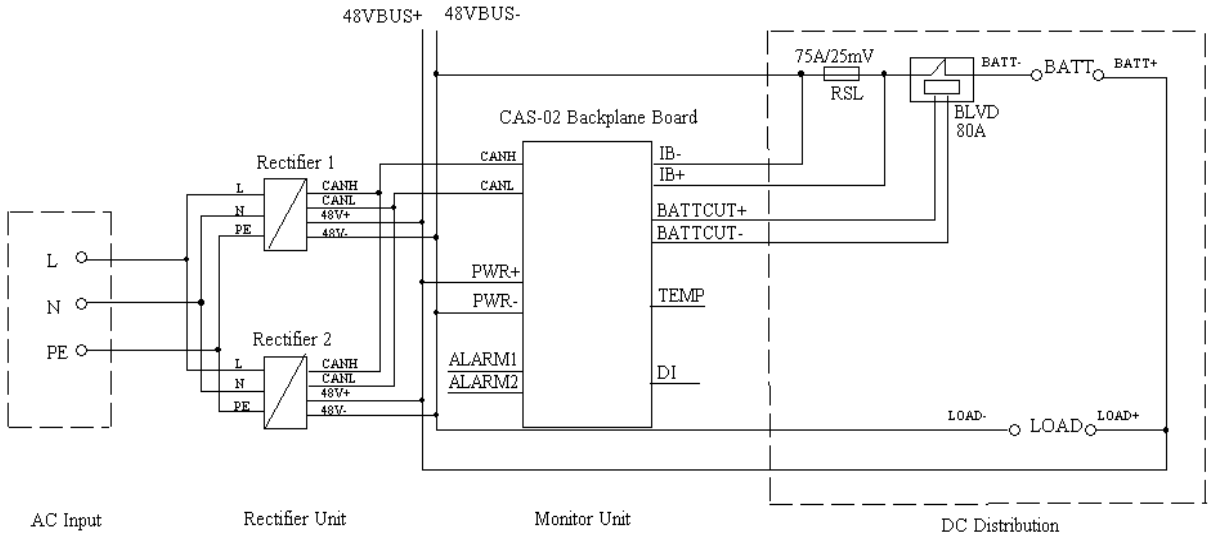
Fax: +86(755)-86001330

✉ E-mail: postmaster@suplethic.com

Web: http://www.suplet.com

☞ Shenzhen, Guangdong, China

Appendix A :Electrical schematic



Appendix B :The Interface Connection