48V rectifier System

LK-48VXXA

Technical Brochures

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Chapter1 System overview

1. Model description

Rectifier Model

LK-48V50A

50： current /Power, that is 50A 3000W

48： Output voltage 48Vdc

2. System structure

The system configuration is flexible. All the functional modules are easy to embed into the system.

3. System Feature

MINI embedded DC power systems advanced modular design makes the whole system are small, but it can provide enough power to meet the requirements of communication systems, consistent with the characteristics of the rack-mounted. The system is suitable for all sizes of exchange room, base stations, satellite communications, data communications, railways and power systems. MINI DC power system is easy to operate, install and maintain. Module subrack adopts inset-box installation for flexible expansion capacity and replacement controller.

Features：

●With active power factor compensation technology power factor of rectifier is up to 0.99

●Standard height 2U，the weight of each module is 2.6kg and output current is Max 50A , with high power density.

★**Rectifier modules adopted soft switch technology. When load rate is 10％, efficiency can be 91％; 50％ load rate ,the efficiency can be above 96％**

●Complete battery protection and load disconnect management. It has LVD function, which maximizes to protect battery.

●Rectifier and monitor modules adopt hot swap technology, Plug and play；

●Standard RS232 communication interface; 3-class alarm dry contact: Emergency alarm, main alarm and minor alarm.

●Complete fault protection, alarm function；

●Low radicalization: Advanced EMC rectifier design can meet the communication power rectifier equipment electromagnetic compatibility limits and measurement methods in the PRC telecommunications industry and standard YD/T983 conducted and radiated interference requirements.

●System configuration is flexible and easy to expand; N +1 redundant power supply. It can be configured according to customer demand；

★ Products have passed the inspection of the Ministry of Information Industry Quality Supervision and Inspection Center.

Chapter 2 Rectifier Module

1. Introduction

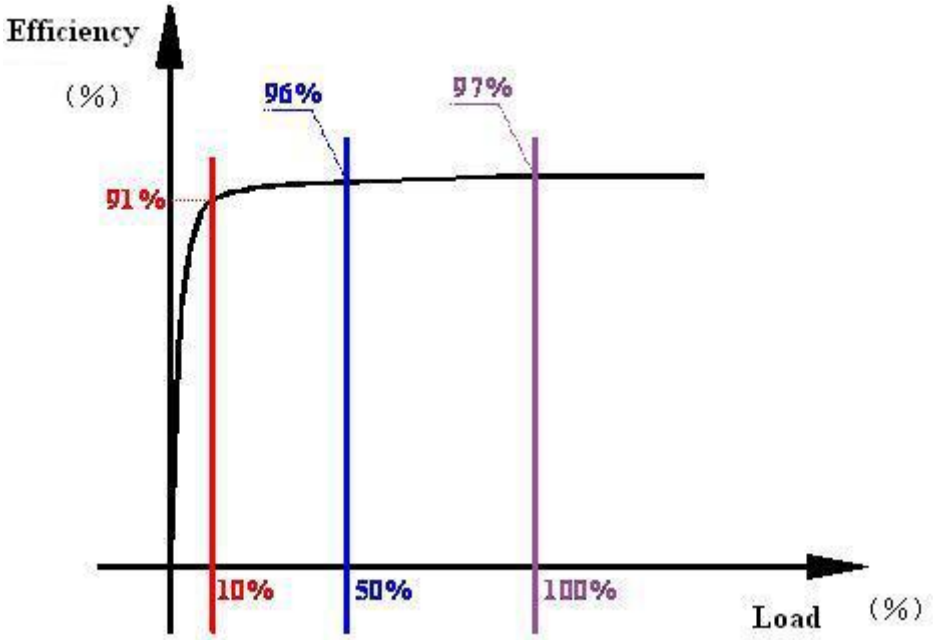
Our rectifier modules adopt pure resonant soft-switching technology and Plug and play. Each module is equipped with advanced microprocessors. On the front panel, each rectifier modules has 3 Led indicators: power supply indicator, communication indicator and failure indicator.

Indicators	Normal state	Abnormal states	Reasons
Power supply Indicators	On	Off	No AC input or input fuse is damaged
Communication Indicators	Off	Twinkling	Communication fail
Failure Indicators	Off	On	There is a damage inside the module

2.Functions：

●Soft switch

Rectifier power circuit is divided into active PFC and DC to DC converter which can make the wide input voltage range (220V) and high efficiency (above 96%). High power density has reached the international advanced level. Efficiency curve is shown as below.



- **Forced wind cooling**

Advanced design of Circuit makes for low-heating with heat sink.

- **Hot swappable**

The monitoring module is hot-pluggable. When the module is plugged into the system, it will not cause the system output voltage fluctuations. Damaged modules can be replaced in less than 1min without stopping the system operation.

- **Protection & failure alarm**

In different protection / fault types rectifier has different reaction / action mode.

- **Auto equalized output in low-gap voltage of modules**

Adopted auto equalized output in low-gap voltage of modules technology. When the monitor module or individual rectifier is failure the other modules can maintain current sharing.

- **Stepless limiting technology**

With stepless limiting technology, it can be continuously adjusted between rated current 0~110%

- **Monitor**

Monitor has built-in CPU, monitoring the operation status of modules, and is responsible for the communication. The rectifier module receive ON/OFF current limit point and voltage setting sending by monitor through RS485, and send back the voltage, current, temperature limiting point ON/OFF status and alarm in real time to the monitor module.

- **Fan control and dust-proof**

Stepless temperature control fan speed, and change with the output power of module, which minimize noise and extend fan life.

3. Specification

Specification	LK-48V15A	LK-48V30A	LK-48V40A	LK-48V50A
Input voltage (AC)	220V			
Output voltage (DC)	48V (42V-59V Continuously adjustable)			
Output current (A)	15A	30A	40A	50A
Power (W)	900W	1800W	2400W	3000W
Operating temperature	-25℃ ~ 45℃			
Relative Humidity	≤97%RH			
Load regulation	≤0.5%			
Voltage regulation	≤0.10%			
Dimension	103mm(W)*261mm(D)*88mm(H)			
Weight	2.6kg			

1. Environment

Work temperature: -25℃ ~ 45℃

Storage temperature: -40℃ ~ 70℃

Relative humidity：≤97%RH

Height above sea level：≤3000m

2. Input properties

Input 220V±10%AC　normal output

Input　220V±10%AC　reduce output

3. Output properties

48VDC output，maximum output power 3000W

DC output voltage 42V ~ 59V, It can be continuously adjusted by monitoring module

DC output current 0A ~ 50A

Voltage regulation precision：　≤ 0.6%

Load regulation：≤ 0.5%

Voltage regulation：≤ 0.1%

4. Output current-limiting properties

In the range of 0 ~ 110% rated current can be continuously adjusted.

5. Power factor：　≥ 0.99

6. Efficiency：　≥ 96%

7. equalized-current imbalance：　≤ 3%

8. Temperature compensation coefficient：Can be set manually,unit (mV/℃)

9. Dc output noise：

Peak noise voltage：≤200mV　0 ~ 20MHz

Weighted psophometric noise voltage：　≤ 2mV

Wide frequency noise voltage：　≤50mV　3.4kHz ~ 150kHz

≤20mV　0.15 MHz 30MHz

Discrete noise voltage： ≤5mV 3.4kHz ~ 150kHz

≤3mV 150kHz ~ 200kHz

≤2mV 200kHz ~ 500kHz

≤1mV 0.5MHz ~ 30MHz

10. Noise：≤45dB（A）

11. Alarm & Protection

1）Over-current protection

Over-current protection of input (use fuse)

Over-current protection of output (use fuse)

Over-current protection of PFC (use diverter)

Short circuit protection (reduce input current to protect)

2）Over-voltage & low-voltage protection **(**The following parameters can be adjusted by hardware.**)**

Input low-voltage protection: 130±5V， hysteresis：10V ~ 20V

Input over-voltage protection: 500±5V，hysteresis：5 ~ 20V

Output over-voltage protection：59 ±1V

3) Other protection

Over- temperature protection (default value 80℃, hysteresis：10℃)

12. Size of the module：

88mm(H)×103mm(W)×261mm(D)

13. Weight：≤2.6Kg

Chapter3 Monitor module

1. Appearance

M16 monitoring module has LCD screen (128*64 Blue background white text), key and indicators. It can display data of the system in real time and setup by keys.

Indicators	Normal	Abnormal	Reasons
Power supply indicator	On	Off	No AC input or input fuse is damaged
Equalized &float charging indicator	Off	On	Equalized charging(On) Float charging(Off)
Failure indicators	Off	On	There is a damage inside the system

A

dvanced microprocessors make accurate, reliable and fast.

It has local control and remote monitoring, truly intelligent system.

2. Features and Functions

2.1. Input specification

Rating DC output voltage：48VDC

Range of voltage： 42V~59VDC

Work temperature： -25℃~ 45℃

2.2. Display and setting

Monitor module will display: operating parameter, states, warning, setting parameter and control parameters.

Key Description: There are 4 bottoms on the monitor panel: ↰ ", "↑", "↓", "↵ ". Press"↵ " to change the parameter. Press "↑", "↓" to change its data, and "↵ " to save.

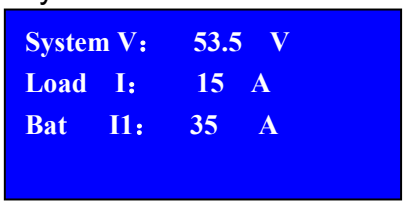
keys: "↰ " "↑" "↓" "↵ ". Press the keys to change the data, and save the change.

Operation process and instruction

1.Screensaver:

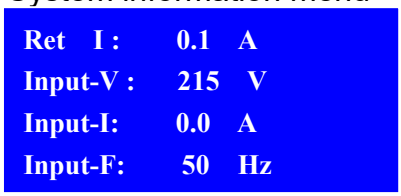
Display the current time and date. Press " ↵ " to enter system information menu.

2. System information menu:



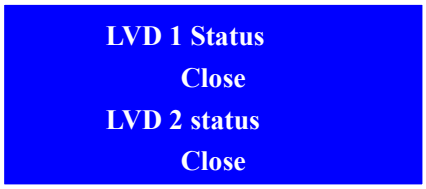
Display the current system voltage (online voltage), load current, battery current and module current. Press "↵ " to enter the password menu .

3. System information menu



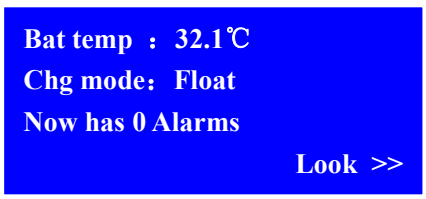
Display AC input voltage, AC input current and AC input frequency.
Press "↵ " to enter the password input menu

4. System information menu



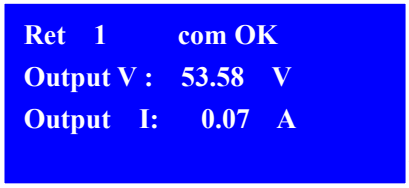
Display LVD Status.
Press "↵ " to enter the password input menu

5. System information menu:



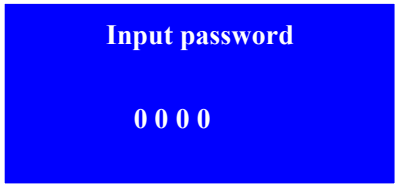
Display battery temperature, charge mode (Equalized/Float charging) and the alarms event.
Press"↵ "to view more alarms content

6. Modules information:



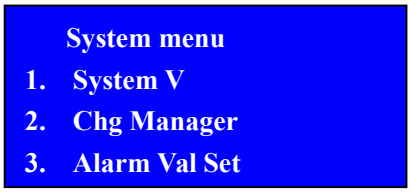
Display module 1-N info。
Press "↑" "↓" to check the other modules information. Press "↵ " to enter the password input menu

7. Input password:



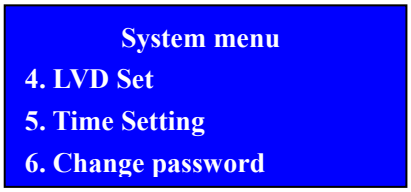
The default password is 0000. The user can enter the system menu to change your password.

8. Main menu:



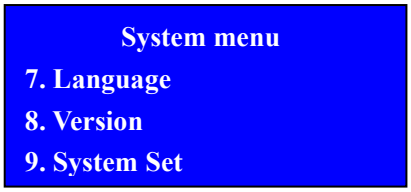
Press "↑" "↓" to choose the item, and press "↵ " to view the details.

9. Main menu:



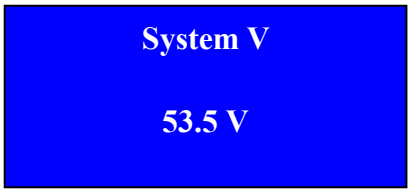
Press "↑" "↓" to choose the item, and press "↵ " to view the details.

10. Main menu:



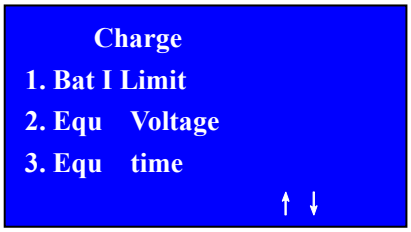
Press "↑" "↓" to choose the item, and press "↵ " to view the details.

11. System voltage setup:



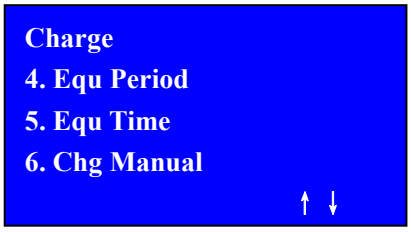
Set System float voltage.
Press "↑" "↓" to change the value, and press "↵ " to confirm.

12. Charge management:



Press "↑" "↓" to choose the item, and press "↵ " to view the details.

13. Charge management:



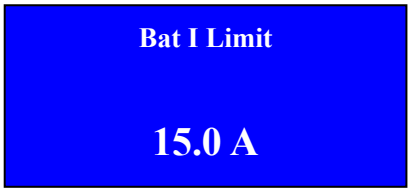
Press "↑" "↓" to choose the item, and press "↵ " to view the details.

pages

14. Charge management:

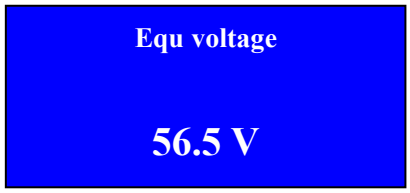
Press "↑" "↓" to choose the item, and press "↵ " to view the details.

15. Battery charge current limit value:



Set battery charge limit value

16. Value of Equalized Charging voltage:

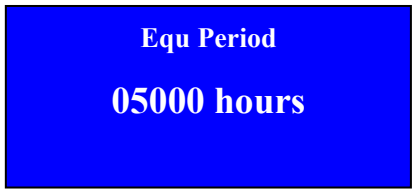


Set value of Equalized Charging

17. Value of Equalized charge time:

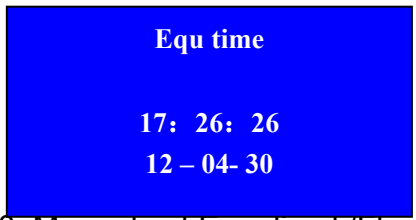
Value of Equalized charging time

18. Value of Equalized charge period



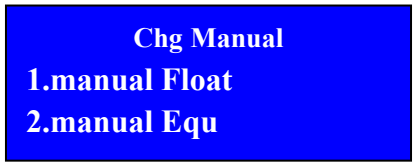
Value of Equalized charge interval

19. Equalized charging in specified time:



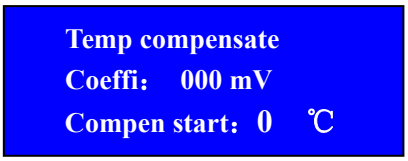
Set the specified charging time. When the time reaches the specified time, the charging status will change to Equalized charge, and the output of system is also Equalized voltage

20. Manual set Equalized /Float charging:



The user can change the charging model manually. When set OK, the charge time will start from 0.

21. Temperature compensates:



It can set compensation coefficient the starting point. For example, the coefficient is 2mV, and the starting point 40℃, the output voltage should minus 20mV at 50℃.

22. Set alarm limit value:

Here, it can set the values of battery high/low voltage and AC over voltage alarm value.

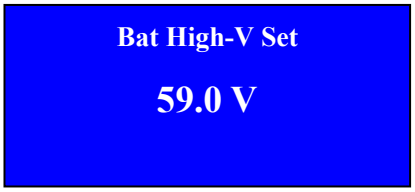
23. Set alarm limit value:

Set AC under voltage value, AC over current value and AC frequency range value

24. Set alarm limit value

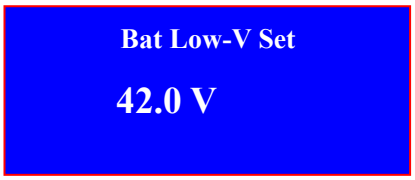
Set battery temperature alarm value and alarm sound control (ON/OFF).

25. Set over voltage alarm value:



Set overvoltage value. When the system voltage exceeds this value, the system will shut down the module and not recoverable.

26. Set under voltage alarm value:

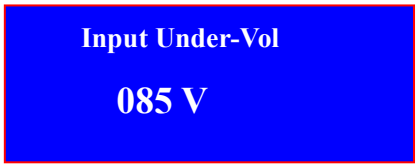


Set under voltage alarm value. When the system voltage is below this value, the system will sound single audible alarms.

27. Set AC over voltage alarm value

AC overvoltage setting. When the AC voltage is higher than this value, the system will sound single audible alarms.

28. Set AC under voltage alarm value



AC under voltage setting. When AC voltage is below this value, the system will sound single audible alarms.

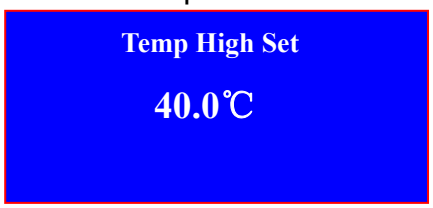
29. Set AC over current value

AC over current setting. When AC current is over this value, the system will sound single audible alarms.

30. Set AC frequency range

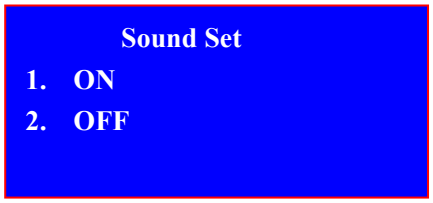
AC frequency range setting. When AC frequency is over this range, the system will sound single audible alarms.

31. Set temperature alarm value



Set the battery temperature alarm value. When the battery temperature is over this value, the system will sound single audible alarms.

32. Audible alarm setting

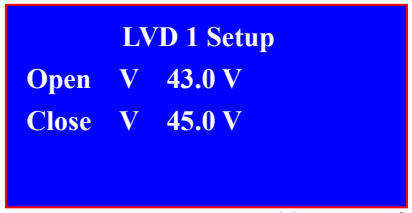


The user can set if the system will sound alarm or not. The default is ON.

33. Low voltage disconnection set

2-class LVD.
press "↵ " to view the details.

34. LVD 1

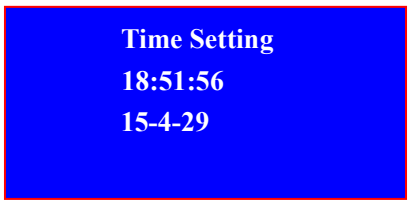


Low voltage disconnection 1 connects the main load. When the battery voltage is shortage, the main load disconnected. When the battery voltage is recovery to the working voltage, it will automatically work.

35. LVD 2

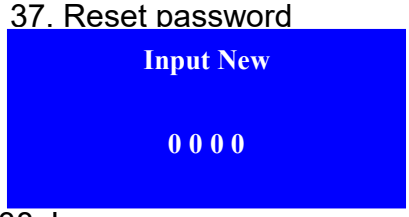
Low voltage disconnection 2 connects the main load. When the battery voltage is shortage, the main load disconnected. When the battery voltage is recovery to the working voltage, it will automatically work.

36. Set time



Set system time and date.

37. Reset password



Here to change the new password. Input new password, and press "↵ ".

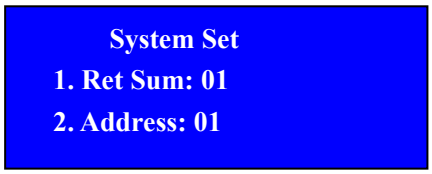
38. Language

Select the language.

39. Version

Monitor device version.

40. System Set configuration



Configure the number of modules of the current system.

2.3 Control functions

The MINI System can release control signals according to the operation of the system. Monitor module supports both automatic and manual battery management. Manual mode includes: equalized/float charging of battery groups, adjust rectifier modules voltage (it can change the system voltage), and set

battery charging time. In automatic mode, the device will automatically complete the battery charge management according to charge interval and the specified date. When the system works, it can also change the charge mode (equalized or float charging). That is manual mode. In manual mode, all timing starts from zero, and continue to timing by the automatic mode, which can effectively prevent human operational errors to result in losses.

2.4 Complete communication functions

Host can monitor and control all the parameters, the status of the lower machine. At the same time, for safety and reliable, the host and the lower machine not only install the communication protocol to constrain each other, but also must know the monitor password of the lower machine, and sent it to the lower machine, when the host wanted to get the all parameters of the lower machines or monitor the lower machine. After the lower machine checked correctly, it can monitor and control. This is to ensure the stability of the power and avoid unnecessary losses caused by human.

2.5 Alarm & Record

Monitoring module has sound and light alarm function according to collect data and a corresponding action. The main alarms are emergency, main and minor.

2.6 Automatic battery management

Monitor module can implement various conservation measures to protect the battery, such as charging current limit, temperature compensation according to user set data, and charging current limit, average and float charge conversion time, average and float charge voltage etc. battery charging methods.

2.7 Communication

Monitor module has the host and the lower device communication functions. It communicates with the host by RS232; communication with the lower device by RS485.

2.8 Dry contact output

There are 3 dry contact outputs.

Emergency dry contact: Mains failure, over-voltage module, module fan failure.
Main dry contact: Battery fuse alarm, MCB alarm.
Minor dry contact: battery temperature alarm, communication failure.
About dry contact：

Level 1：line lack of phase、low-vol break away、modules over-vol、failure of modules fan

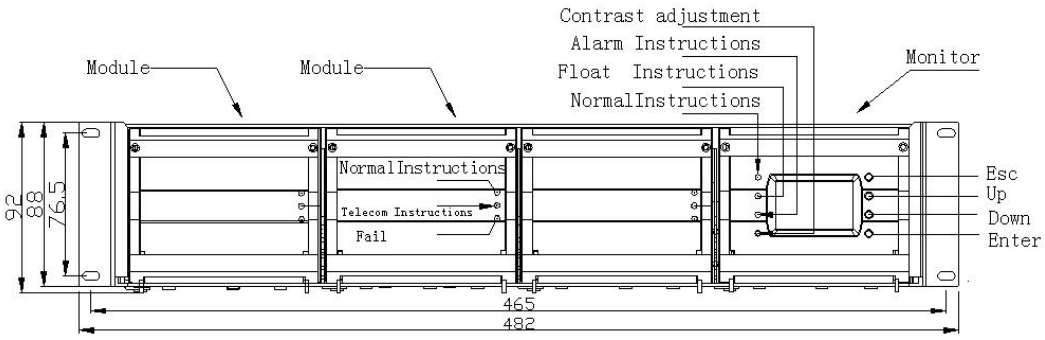
Level 2：loads switch alarm、batteries switch alarm

Level 3：batteries over-tem，modules communications

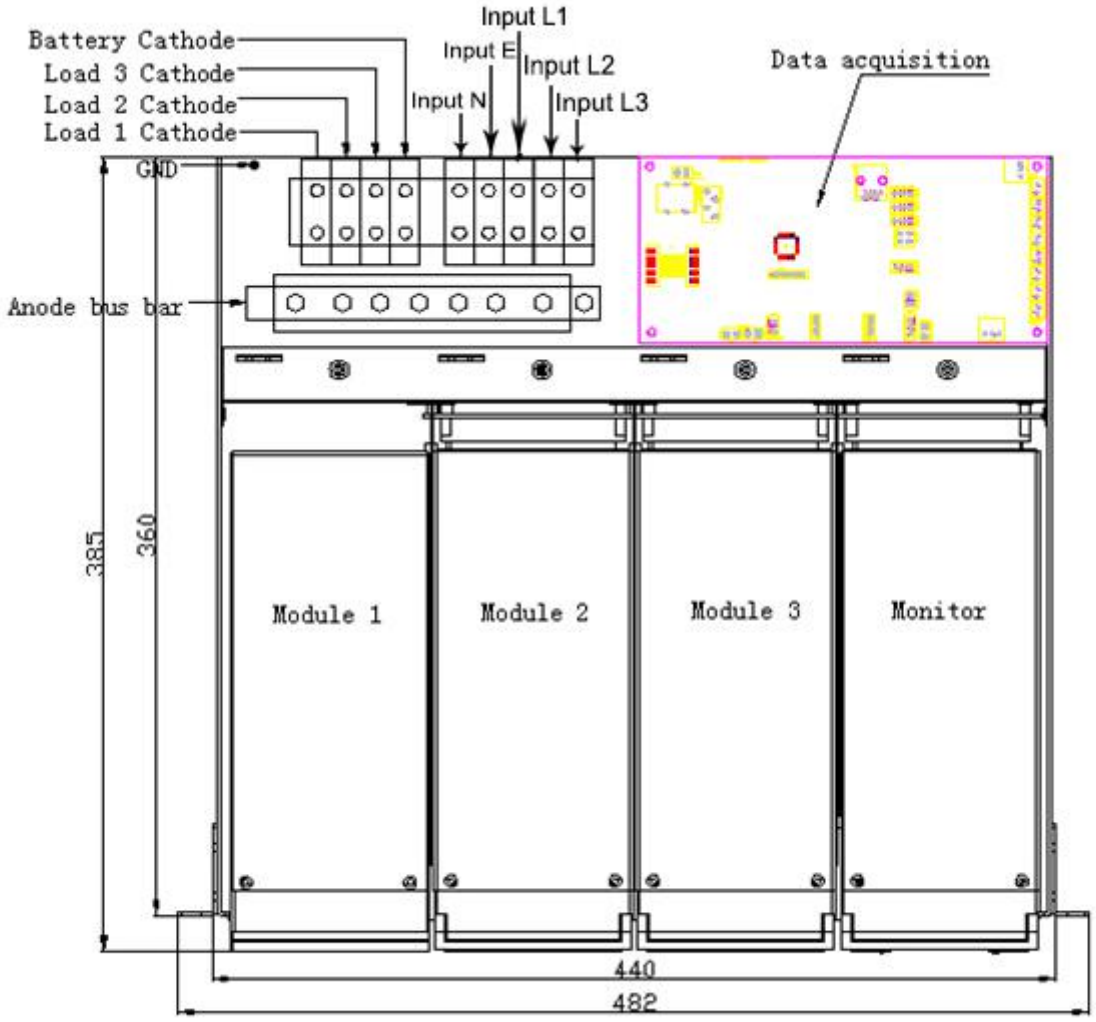
Chapter4 Rack system

1. Front panel

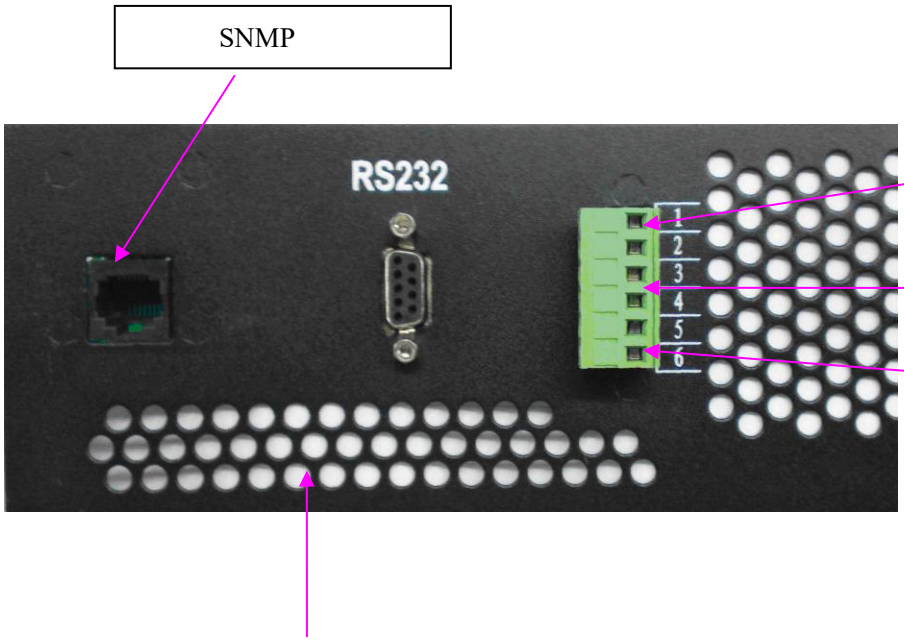
3pcs 50A module, 1pcs monitor (From left to right place)



2 Back panel


Input L1
Input E
Input L2
Input N
Input L3
Battery Cathode
Load 3 Cathode
Load 2 Cathode
Load 1 Cathode
GND
Data acquisition
Anode bus bar
385
360
Module 1
Module 2
Module 3
Monitor
440
482

3. Communication Dry Contact



About dry contact：

Level 1：line lack of phase、low-vol break away、modules over-vol、failure of modules fan

Level 2：loads switch alarm、batteries switch alarm

Level 3：batteries over-tem，modules communications

Warranty Card

To ensure good quality product, the MINI power supply system was thoroughly checked before leaving the factory. The manufacturer guarantees to the user that the system is in good condition. The manufacturer provides 2-years warranty service from date of delivery to the original purchaser

Please refer to the warranty statement.

User's Information

User Company:_____Contact person:

Address:_____Phone:

Dealer company: _____Post code:

Model:_____Serial number:

Purchase date:_____Handling person:

Repair Record

Date	Record	Abstract	Technician	Signature