LOOM SOLAR

INDIA'S NO.1 SOLAR COMPANY

LiFePO4 Battery System for Solar / Power Backup

CAML100Ah/48V

User manual

Loom Solar Pvt. Ltd.

Contents

Chapter One:- Safety and Warning

- The CAML100Ah/48V LiFePO4 battery system installation, operation, maintenance should following important recommendations in this manual:
- The equipment shall be installed by the professional training staff.
- Battery maintenance should be carried out by the professional staff who are experienced and aware of the preventive measures on the potential harm of the battery.
- Note: Be care of the risk of electric shock for large current in case of battery short circuit, pay attention to the following points during operation.

  - Remove watches, rings or other metal objects.
  - Use tools with insulated handles.
  - Do not place tools or metal objects on the battery.

- Do not direct access to the battery system to the mains grid power outlet.
- Do not put the battery system into fire, do not use or storage the battery near to the high temperature source.
- Do not use liquid or other objects placed into the battery system.
- Do not open or cut the battery, not to hit throw or step on the battery.
- Using special communication iron lithium battery charging rectifier power supply module to charge battery.
- Be sure to subject to charge and discharge parameters setting in this manual.
- The output interface of the system is still voltage when grid power cut, avoid electric shock or short circuit when operation.
- Please check if the box is damaged. If damaged, please immediately notify the supplier.
- If you find leaking liquid or white powder residue on product, prohibit operation.

Chapter Two:- System Introduction

2.1 System overview

CAML100Ah/48V battery system is 48V system for communications back-up type LiFePO4 (lithium iron phosphate) battery products, the system uses the advanced LiFePO4 battery technology with the benefit of long cycle life, small size, light weight, safety and environmental protection, and has a strong environmental adaptability, it is idea for harsh outdoor environments.

The system also integrates a smart battery management and monitoring module, support for remote centralized monitoring and remote battery management and maintenance, to meet the requirements of unattended. Therefore, the NPFC system can fully meet the backup power supply requirements of the access network equipment, mobile communications equipment, transmission equipment, micro base stations and microwave communication equipment.

2.2 Working principle

The CAML100Ah/48V battery system mainly includes Fe lithium battery pack, battery protection, cell balancing unit, monitoring module and charge-discharge management module for optional. Its schematic diagram shown in Figure 2-1Charge-dischargemanagement module DC Input Cell balancing unit Fc lithium battery pack Battery protection Load Monitoring module Figure 2-1

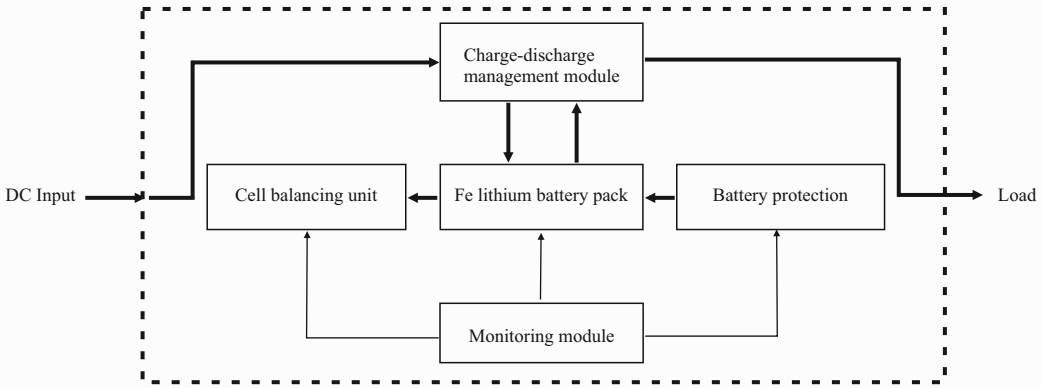

Figure 2-1 Schematic Diagram

Fe Lithium pack: chemical power, energy storage and power supply components. Battery protection: protect Fe lithium batteries from overcharge, over discharge, over current, over temperature, short circuit.
Battery balancing unit: Equalization Fe lithium batteries for cells unbalanced The charge and discharge management module: discharge circuit management, and charging current limit (optional according to customer requirements).
The monitoring module: support centralized monitoring system (optional according to customer requirements)

CAML100Ah/48V battery system working principle

DC power input charge and discharge management unit after filter, DC divided two circuit, one circuit directly supply the load, another circuit to charge Fe lithium pack. When grid power on, the system supplies the loads and charging inside Fe lithium batteries; When grid power failure, Fe lithium inside system supply DC power to the load, to ensure uninterrupted power supply as power system.

2.3 System feature.

- With the latest development technology trends of international communications battery, adopt advanced Fe lithium battery system.
- Advanced intelligent lithium battery management technology to ensure the intelligent automatic management. With balanced patented technology, Narada Fe lithium provide high efficiency balanced and prolong system operate life.
- Excellent electromagnetic compatibility. The outdoor power system with this product comply with the main equipment when they working together, no interfere with each other.
- Complete intelligent design, centralized monitoring unit have function of "three remote" (remote measure, remote communication, remote control), the system managed by computer, communicate with the remote monitoring center, unattended, in line with the requirements of the development of modern communications technology.
- Combine the power control technology and computer technology, real-timemonitoring and control the rectifier, AC and DC power distribution.
- Configuration flexibility, support parallel connection expansion

2.4 Front Panel and Side panel

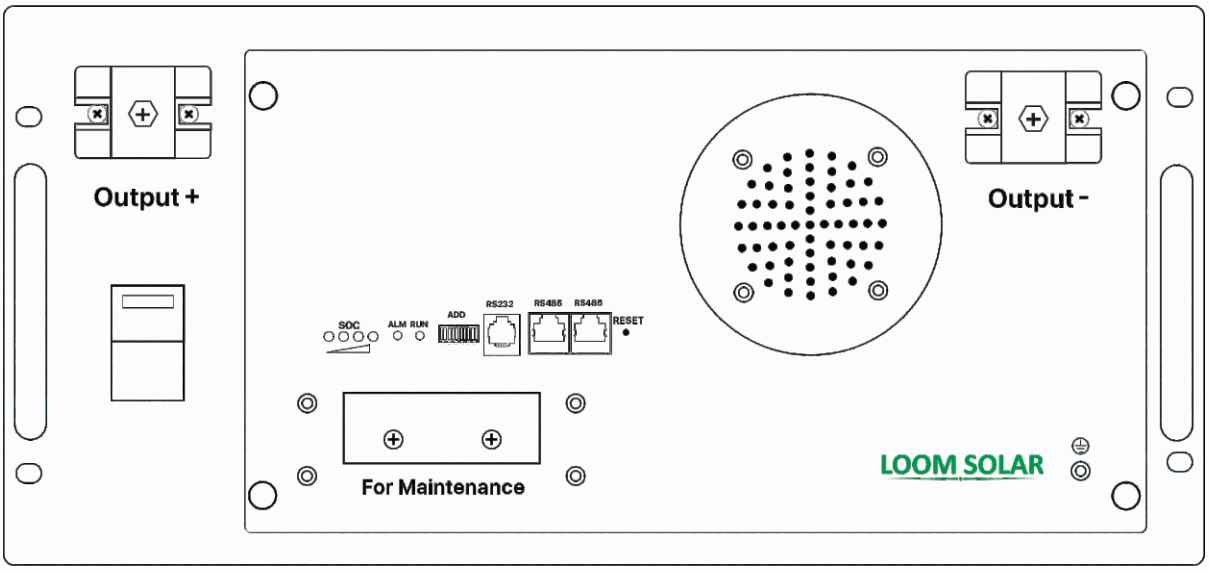

Fig. 2-2 Panel

1. Indicator light for Capacity (SOC): SOC mean State of Capacity

- 4 green light indication. Each light represents 25% of capacity. Capacity meaning shown following table 4-1

2. Alarm light(ALM): ALM indicate the fault condition, il fault, red light on.

3. Run light(RUN): RUN indicate system operation state.

- Green light 0.5 seconds on and 0.5 seconds off during charge.
- Green light 0.5 seconds on and 1.5 seconds off during discharge..

4.Address Dial Number(ADD): ADD indicate system telecom address

- Add adopt four Dial Number as to set up the telecom address when parallel connect system. Table 2-1 is the table of set up number of band switch add

Table 2-2 Panel Band -Switch Address Number Set Up

Dial Number						ADD	PACK Definition	Description
1	2	3	4	5	6			
ON	OFF	OFF	OFF	OFF	OFF	000001	PACK 1	As Slave Pack 1
OFF	ON	OFF	OFF	OFF	OFF	000010	PACK 2	As Slave Pack 2
ON	ON	OFF	OFF	OFF	OFF	000011	PACK 3	As Slave Pack 3

OFF	OFF	ON	OFF	OFF	OFF	000100	PACK 4	As Slave Pack 4
ON	OFF	ON	OFF	OFF	OFF	000101	PACK 5	As Slave Pack 5
OFF	ON	ON	OFF	OFF	OFF	000110	PACK 6	As Slave Pack 6
ON	ON	ON	OFF	OFF	OFF	000111	PACK 7	As Slave Pack 7
OFF	OFF	OFF	ON	OFF	OFF	001000	PACK 8	As Slave Pack 8
ON	OFF	OFF	ON	OFF	OFF	001001	PACK 9	As Slave Pack 9
OFF	ON	OFF	ON	OFF	OFF	001010	PACK 10	As Slave Pack 10
ON	ON	OFF	ON	OFF	OFF	001011	PACK 11	As Slave Pack 11
OFF	OFF	ON	ON	OFF	OFF	001100	PACK 12	As Slave Pack 12
ON	OFF	ON	ON	OFF	OFF	001101	PACK 13	As Slave Pack 13
OFF	ON	ON	ON	OFF	OFF	001110	PACK 14	As Slave Pack 14
ON	ON	ON	ON	OFF	OFF	001111	PACK 15	As Slave Pack 15
OFF	OFF	OFF	OFF	ON	OFF	010000	PACK 16	As Slave Pack 16

5. Up-link communication(RS-232): RS-232 communication interface

- It adopts RS-232 series port communication pattern with system to upload data. Content of data transmitting include system parameter, system status and alarm message. Normally, speed rate of RS-232 is 9600bps.RS-232 to be effective only in system dial number switch is set as Pack (Master Pack) pattern, so as well to communicate with upper computer/machine.

6. Cascading Telecommunication (RS-485): RS-485 communication interface

- When cascading connects, adopt RS-485 series port communication pattern to transfer data, RS-485 is adopted to be the internal communication pattern of after-cascading pack system, the superior system through Master Pack to obtain data from each Slave Pack

7. Reset Button

- When performance unusual with the system, press this button to reset the system, to assure stability of system performance.

8. Circuit Breaker: 125A rated Miniature circuit breaker

9. System DC output (Battery Output): Positive terminal and Negative terminal.

- Use 2 core connecting terminal, mainly for connecting between battery module cascading, connecting terminal device pin are on the front

10. Maintenance Interface

11. GND

Chapter Three:- System Installation

3.1 Unboxing and Check

- Please study this manual before installation the system
- Please inspect the package before unboxing, if any destroy with appearance, contact with the supplier immediately
  - This device should be operated by professional trained person
  - This device should be installed by professional serviceperson

3.2 Preparing Installation

- To prevent battery from placement in direct sunshine or close to heat source
- Put your battery in ventilated place to assure enough dissipation
- To assure battery is in clean and low humidity area
- Please don't put heavy goods on cable or power source cable.

3.3 System Installation

Note:

- Output socket or cable of terminal block should be not exceeding 2 meters
- The essential of electric connecting is safety and reliable
- The battery system provides terminal block for site connection and installation, the terminal block should be tightened by 13.8pound/inch(1.554newton/meter)
- Break, damage, scratch of cable is forbidden.
- The internal circuit of battery system provide protection for over current and short-circuit of DC output
- Concerning the charging voltage of battery system, surrounding temperature and other specification, please refer to the technology specification section of

this manual

- Battery installation and replacement should be implemented by professional who is familiar with battery and precaution.

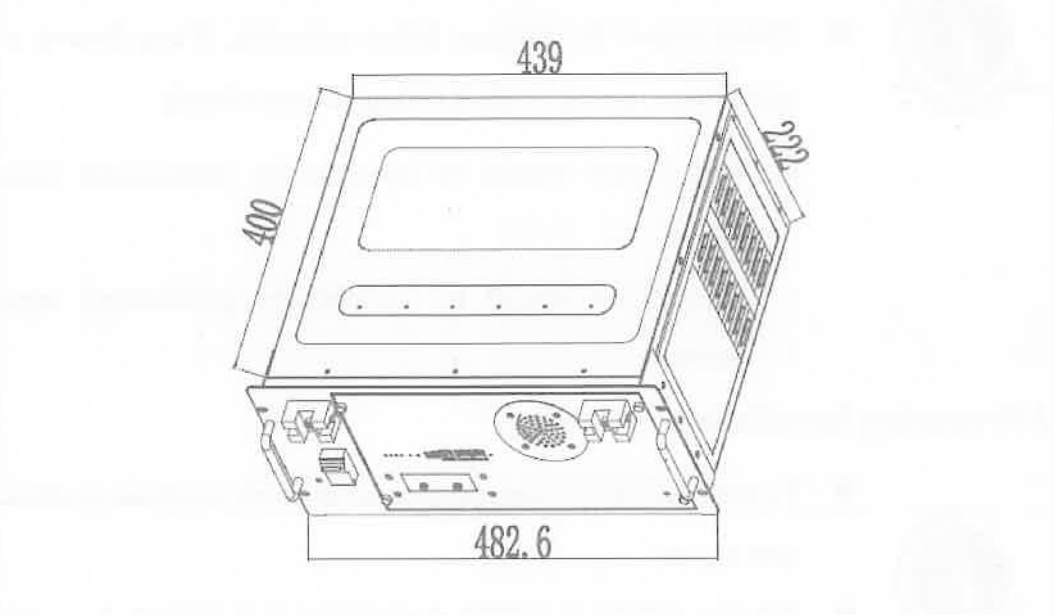

Chart 3-1 CAML100Ah/48V Construction Dimension

No.	Type Code	Dimension L*W*H (mm)	Remark
7	CAML100Ah/48V	439*400*222 (without hanger)	Height 5U

1. Installation and Fasten

- Have system insert 19-inch cabinet, fix system with 4pcs screws on shelf at both side mounting ears of the cabinet
- Hanging installation also can be adopted, fix the system with 4pcs screw on lamp stand at both sides installing ears of cabinet.

2. Earth connection

- Connect earth by flexible cable above 16AWG through earth connecting hole on right side of cabinet back, assure well connection.

3. Battery output connecting

- Connect the output terminal "+" "-" of LiFePO4 battery system cabinet to battery connecting terminal of DC switch power source modules with/by the black & red flexible cable
- If need multi system connected in parallel, please connect output terminal"+"and" +" to busbar directly.

4. System power on

- When system installation is completed, battery should be in dormant state,and will get into normal operation state after power on, can be charged or discharged.

5. Connect RS-232 communication port

- If necessary, the COM1 and COM2 of PC can be connected to RS-232communication port of battery system front panel with/ by communication cable
- Can connect RS232 to monitor section according to different communication software

Chapter Four:- System Operation

4.1 Start System

After installation, system is in dormant & inactive state, when connect charging power source or load to positive and negative electrode, the system will be opened to normal working state automatically

4.2 Close system

Disconnect power source and load, after a certain period, battery system will get into dormant inactive state initiatively.

4.3 Charge

When charging, the charging module parameters should be set in accordance with the following table.

Table 4-1 Charge parameter setting

No.	Item	Parameter	Note
1	Float Voltage	See Annex1	Float Charge Available
2	Max. Charge current	See Annex1	
3	Charge temperature range	-10°C~50°C	

Note

The charging voltage should be adjusted and set by engineer from manufacture, once adjusting is complete, usually do not need to more adjust, unless replace charging module.

4.4 Discharge

To ensure that the load current is not exceed max continuous operation current when connect to load, disconnect voltage set to >40.5V

Note:

To increase load under DC electrify require strict tool and human insulation measurement, prevent from accident of short circuit in operation.

The specification of cable (cross sectional area) can be selected according to following formula,

which is determined by permit voltage drop,

A=EIxL/ (Kx AU)

In formula:

A is across sectional area of wire (mm2) ; EI is the total current through wire (A) ;

L is return circuit length of wire (m) ; AU is the permit voltage drop on wire (V) ;

K is electrical conductivity of wire, For example, for copper, K = 570

Recommend using color code to distinguish polarity of wire: positive is black, negative is blue

4.5 Information Instruction

The information indicated by the six LED indicators on front panel are as table 4-2 and table 4-5

Table 4-2 Status of Capacity

●	●	●	●	State of Charge (SOC)
☼	☼	☼	☼	75% ≥ SOC ≥ 100%
☼	☼	☼	○	50% ≥ SOC ≥ 75%
☼	☼	○	○	25% ≥ SOC ≥ 50%
☼	○	○	○	0% ≥ SOC ≥ 25%

Note: ☼ mean light on, ○ mean light off

Table 4-3 RUN LED Indicator Description

Flash 1	Activation state, but neither charge nor discharge
Flash 2	Charging state
Continue Light	Discharging state
Extinguish	Dormant state

Table 4-4 ALM LED Indicator State

Extinguish	Minor Alarm (Various Alarm Status)
Flash 2	Fail (Various fail)
Flash 3	Major Alarm (Various protection status)
Extinguish	Normal, no alarm

	Light	Extinguish
Flash 1	0.25S	3.75S
Flash 2	0.5S	0.5S
Flash 3	0.5S	1.5S

Chapter Five:- Maintenance

- The battery should be recharged every 3 months if in long time storage
- Please clean the dust by the dust collector when dust is accumulated on vent.
- Please turn off the charging input if system is not in use for long time.
- Please use clean dry cloth/fabric to clean up the cabinet, if need further cleaning, please use neutral un-corrode cleanser. Alcohol or ammonia synthesis are forbidden.
- Carrying should be handled gently, prevent it from severe compact.
- Prevent battery from splashing liquid.
- Installation and maintenance of battery system should be implemented by trained professional.
- Suggestion to inspect the tighten of output screw every two years.

Annex Technical Parameter

Technical Parameter

Ambient Condition

1. Working Temperature range: -10°C— +55°C
2. Storage Temperature range: 0°C— +40°C
3. Relative Humidity: 5% —95% , without condensation
4. Altitude: 0-2000m. Above 2000m demand decease apply.

Working temperature should be reduced 1°C every 200m rise, the max altitude is 4000m.