User Manual

Lithium-Iron Battery Pack (N1C.CEBM1U 48V20Ah)

Version: 1.0

Table of Contents

Thank you for purchasing Lithium-Iron battery pack. Please read this manual before you install the battery. Follow the instruction carefully during the installation process.

1. Safety Precautions

Reminder

1). It is very important and necessary to read the user manual carefully before installing or using the battery. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death, or can damage the battery, potentially rendering it inoperable.

2) If the battery is stored for a long time, it is required to charge them every six months, and the SOC should be no less than 90%;

3) Battery needs to be recharged within 12 hours, after fully discharged;

4) Do not expose cable outside;

5) All the battery terminals must be disconnected for maintenance;

6) Please contact the supplier within 24 hours if there is something abnormal.

7) Do not use cleaning solvents to clean the battery;

8) Do not expose battery to flammable or harsh chemicals or vapors;

9) Do not paint any part of the battery, include any internal or external components;

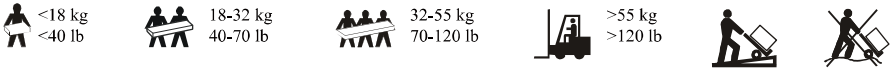
10) The warranty claims are excluded for direct or indirect damage due to the items above.

11) Any foreign object is prohibited to insert into any part of the battery.

⚠ Warning

1.1 Before Connecting

1) After unpacking, please check the product and packing list first, if the product is damaged or missing parts, please contact the local retailer;
2) Before installation, be sure to cut off the grid power and make sure the battery is in the turned-off mode;
2) Wiring must be correct. Do NOT misconnect the positive and negative cables, and ensure no short circuit with the external device.
4) It is prohibited to connect the battery and AC power directly.
5) The embedded BMS in the battery is designed for 48VDC, please DO NOT connect the battery in series.
6) Battery system must be well-grounded and the resistance must be less than 1Ω.
7) Please ensure the electrical parameters of the battery system are compatible with related equipment.
8) Keep the battery away from water and fire.
9) Product handling guidelines



1.2 In Use

1) If the battery system needs to be moved or repaired, the power must be cut off and the battery is completely shutdown
2) It is prohibited to connect the battery with a different type of battery
3) It is prohibited to put the batteries working with faulty or incompatible UPS;
4) It is prohibited to disassemble the battery;

5) In case of fire, only dry powder fire extinguisher can be used, liquid fire extinguishers are prohibited.
6) Please do not open, repair, or disassembly the battery except staff authorized. We do not undertake any consequences or related responsibility which because of violation of safety operation or violating of design, production, and equipment safety standards.

2. Introduction

The lithium iron battery pack is new energy storage product. It is designed to integrate with UPS.

The lithium iron battery pack is built-in smart BMS battery management system, which can manage and monitor cells' information including voltage, temperature, current, etc. Moreover, BMS can balance cells charging and discharging to extend cycle life. The battery pack can be used alone or in parallel, to expand capacity for different requirements.

2.1 Features

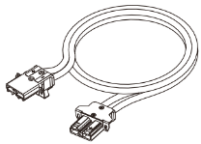
- Non-Toxic, non-polluting, and friendly to the environment.
- LiFeO4 cell material, safety performance, and long cycle life.
- Smart BMS protection functions: over-discharge, high temperature, over-charge, over-current.
- Flexible configuration, multiple battery packs can be operating in parallel for expanding capacity and power.
- Working temperature range is from 0°C to 50°C with excellent discharge performance and cycle life.
- Small size and lightweight: up to the standard of the 19-inch embedded designed module are comfortable for installation and maintenance.

Package Contents

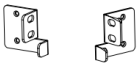
The packaging is recyclable, save it for reuse or dispose of it properly

Module(x1)

Manual(x1)



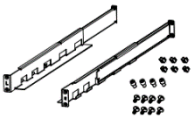
Battery cable(x1)



Ear Kit(x1)

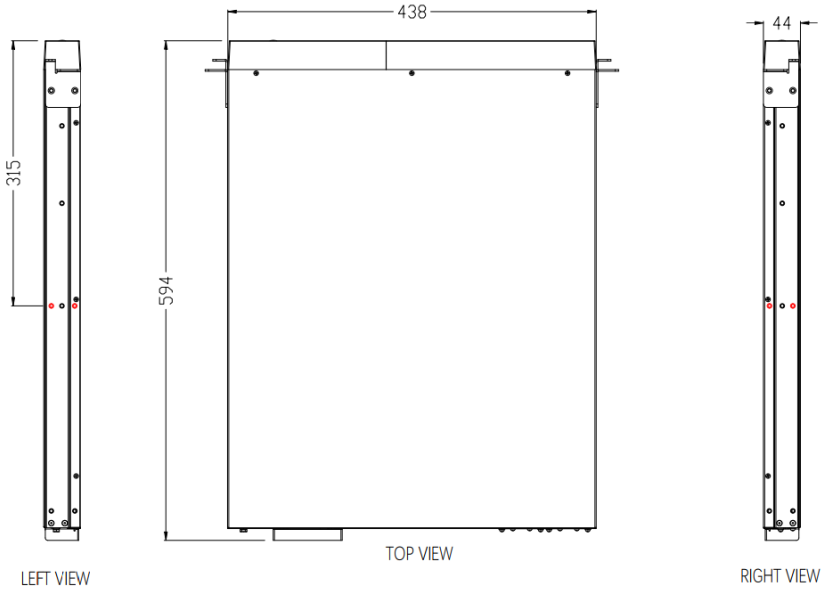
screws(x4)

RJ11 cable(x1)



Rail slide kit(x1)

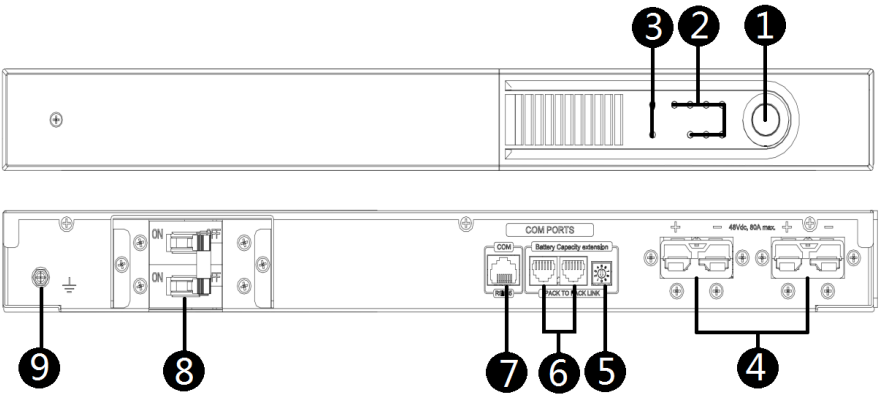
2.2 Dimensions



2.3 Specifications

Model	N1C.CEBM1U
Nominal Voltage	48 VDC
Total Capacity	20 Ah
Nominal Capacity (Wh)	960 Wh
Full Charge Voltage (FC)	52.5 V
Full Discharge Voltage (FD)	34.5 V
Max. Continuous Discharge Current	80 A
Max. Peak Discharge Current	120 A
Protection	BMS, Breaker
Max. Charge Voltage	52.5 V ± 0.1 V
Max. Charge Current	20 A (1C)
Standard Charge Method	0.2C CC (Constant Current) chare to FC, CV (Constant Voltage) charge till charge current decline to <0.05C
Inner Resistance	< 100 m ohm
Storage Temperature	-20ºC ~ 60 ºC 20°C±5 °C is the recommended storage temperature
Dimension (D x W x H) mm	580 x 438 x 44
Net Weight (kg)	14
Operation Temperature	0ºC ~ 50 ºC
Communication	RS485 (RJ45), CAN (RJ11)
Certifications	IEC 62619, UL1973
Transportation	UN38.3
Lifecycle	> 2000 @ 25 ºC

2.4 Product Indicator & Setting



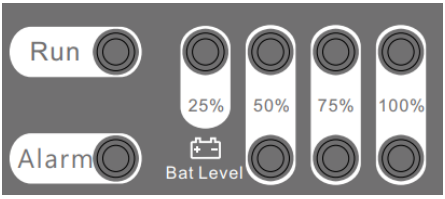
The front and rear panel

❶ **Manual power on/off button** - to wake up or shut down the battery pack.

- If battery pack is off, press and hold the button for approximately 5 seconds to turn on the module.
- If battery pack is working, press and hold the button for approximately 5 seconds to shut down the module.

❷ **Battery Level LEDs** - Indicates battery level. Please refer to the LED indicator table for the details.

❸ **Battery Status LEDs** - Indicates battery pack status. Please refer to the LED indicator table for the details.



LED Indicator:

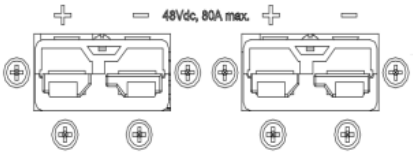
Battery Status			Battery Status LEDs		Battery Level LEDs			
Status		SOC	RUN	ALARM	LED25%	LED50%	LED75%	LED100%
Normal Mode	Charging	0%~25%	ON	OFF	Flash	OFF	OFF	OFF
		26%~50%	ON	OFF	ON	Flash	OFF	OFF
		51%~75%	ON	OFF	ON	ON	Flash	OFF
		76%~100%	ON	OFF	ON	ON	ON	Flash
	Discharging	0%~25%	ON	OFF	ON	OFF	OFF	OFF
		26%~50%	ON	OFF	ON	ON	OFF	OFF
		51%~75%	ON	OFF	ON	ON	ON	OFF
		76%~100%	ON	OFF	ON	ON	ON	ON
Alarm mode	Warning	-	OFF	Flash	-			
	Fault	-	OFF	On	-			
Power Off		-	OFF	OFF	OFF	OFF	OFF	OFF

❹ External Battery Connector

(1). CON1 & CON2 in parallel.

(2). "Positive" marked in "+",

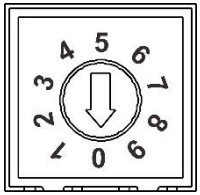
"Negative" marked in "-"



(3). Max current of CON1/CON2 is 80A.

❺ ID Switch

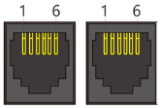
- ID Switch indicates the unique ID code for each battery pack. It's required to assign a unique ID to each battery pack for normal operation.
- Maximum 6 battery packs can be operated in parallel.
- We can set up the ID code for each battery pack by rotating the PIN number on the ID switch. From number 1 to 9, the number can be random; no particular order.
- The ID code of the remaining battery pack MUST be unique. Not the same number for 2 battery packs in parallel system.



PIN	Definition
0	0x0F
1	0x0E
2	0x0D
3	0x0C
4	0x0B
5	0x0A
6	0x09
7	0x08
8	0x07
9	0x06

❻ Extension Port

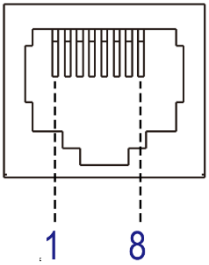
- Connector type: RJ11
- Function:
  1. For battery capacity extension by parallel
  2. BMS signal transmission
- Pin Definition



PIN	Definition
1	CANH
2	CANL
3	PresentA
4	PresentB
5	NC
6	NC

❼ COM Port

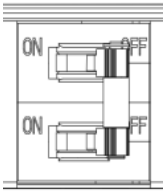
- Connector type: RJ45
- Function: communication between battery pack and UPS.
- Pin Definition

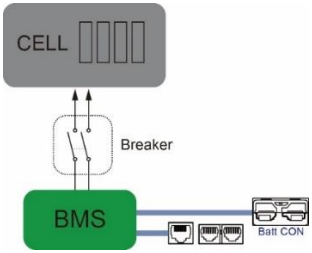


PIN	Definition
1	RS485B
2	RS485A
3	NC
4	RS485B
5	RS485A
6	PresentA
7	PresentB
8	NC

❽ Breaker

- Turn the breaker ON: Connect cells to BMS
- Turn the breaker OFF: Shut down energy between Cells and BMS





3. Installation

3.1 Installation Environment

Make sure that the installation environment meets the following conditions:

- The area is completely waterproof.
- The floor is flat and level.
- There are no flammable or explosive materials nearby.
- The ambient temperature is within the range of 0~50°C.
- The temperature and humidity are maintained at a constant level.
- There is minimal dust and dirt in the area.

⚠ Caution:

If the ambient temperature is out of the operating range, the battery pack will stop operate to protect itself. The optimal temperature range for the battery pack to operate is 0°C to 50°C. Frequent exposure to harsh temperatures may deteriorate the performance and shorten the life cycle of the battery pack.

3.2 Installation

Before connect the UPS with the battery pack, please confirm if there is an internal battery in the UPS.

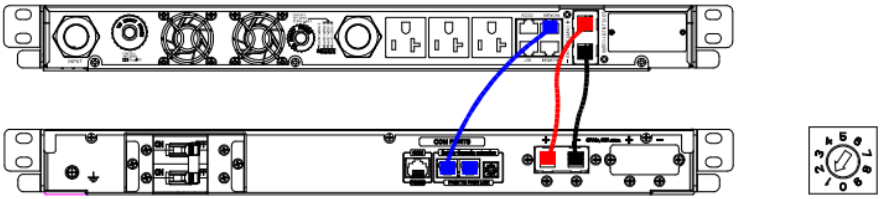
3.2.1 When the UPS is within the internal battery

3.2.1.1 Single Battery Pack Connection

1. Insert the RJ45 to RJ11 signal cable into the "Battery Capacity extension" port on the battery pack. The other end connects to "BAT-CAN" on the UPS.

   *The RJ45 to RJ11 cable is in the UPS package.

2. Use supplied battery cable to connect to UPS "Ext BAT" port.



*The battery pack's address should be one of the number from 1 to 9.

3. Turn the breaker switch "ON". Now, the battery pack is ready for DC output.

4. Press manual ON/OFF button for 5 secs, the battery pack will start up.

   *If the manual button cannot be approached, just simply turn on the UPS. The battery pack will be automatically turned on.

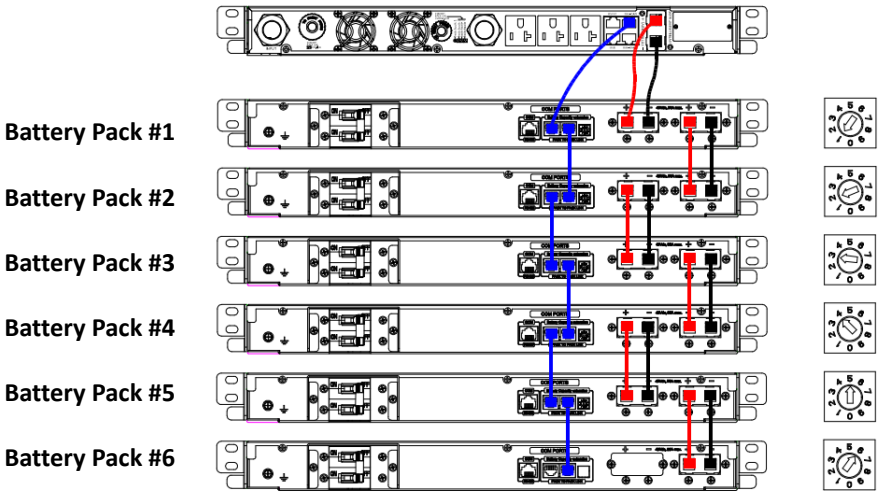
3.2.1.2 Multiple Battery Packs in Parallel

1. Insert the RJ45 to RJ11 signal cable into the "Battery Capacity extension" port (RJ11)on the battery pack #1. The other end connects to "BAT-CAN" (RJ45)on the UPS.

   *The RJ45 to RJ11 cable is in the UPS package.

2. Use supplied battery cable to connect to UPS "Ext BAT" port.

   UPS conneting with multiple battery packs for capacity extension:



*Every battery pack's address is with different ID code from 1 to 9.

3. Insert supplied RJ11 cable to connect the extension port of the battery pack #1. The other end connects to the extension port of the battery pack #2.

4. Use supplied battery cable to connect to the battery pack #1 and battery pack #2.

5. If more battery packs to connect the system, repeat step 4 and 5 to connect more battery packs.

6. After connecting all battery packs, turn the breaker switch "ON" of each connected battery pack. Now, the battery packs are ready for DC output.

7. Press manual ON/OFF button of each connected battery pack for 5 secs. All battery packs will start up.

   *If the manual button cannot be approached, just simply turn on the UPS. The battery pack will be automatically turned on.

3.2.2 When the UPS is without the internal battery

3.2.2.1 Single Battery Pack Connection

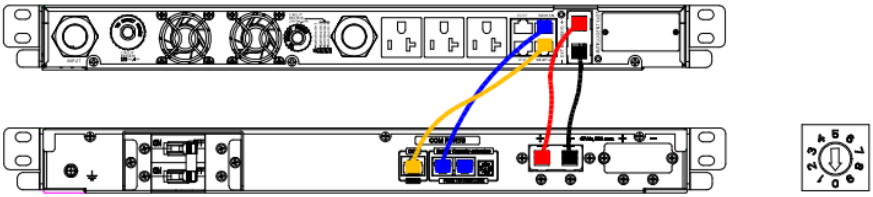
1. Insert the RJ45 to RJ11 signal cable into the "Battery Capacity extension" port (RJ11) on the battery pack #1. The other end connects to "BAT-CAN" (RJ45) on the UPS.

   *The RJ45 to RJ11 cable is in the UPS package.

2. Insert the RJ45 to RJ45 signal cable into the "COMM" port on the battery pack #1. The other end connects to "BAT-RS485" on the UPS.

   *The RJ45 to RJ45 cable is in the UPS package.

3. Use supplied battery cable to connect to UPS "Ext BAT" port.



*The battery pack's address should be set as "0"

4. Turn the breaker switch "ON". Now, the battery pack is ready for DC output.

5. Press manual ON/OFF button for 5 secs, the battery pack will start up.

*If the manual button cannot be approached, just simply turn on the UPS. The battery pack will be automatically turned on.

3.2.2.2 Multiple Battery Packs in Parallel

1. Insert the RJ45 to RJ11 signal cable into the "Battery Capacity extension" port(RJ11) on the battery pack #1. The other end connects to "BAT-CAN" (RJ45) on the UPS.

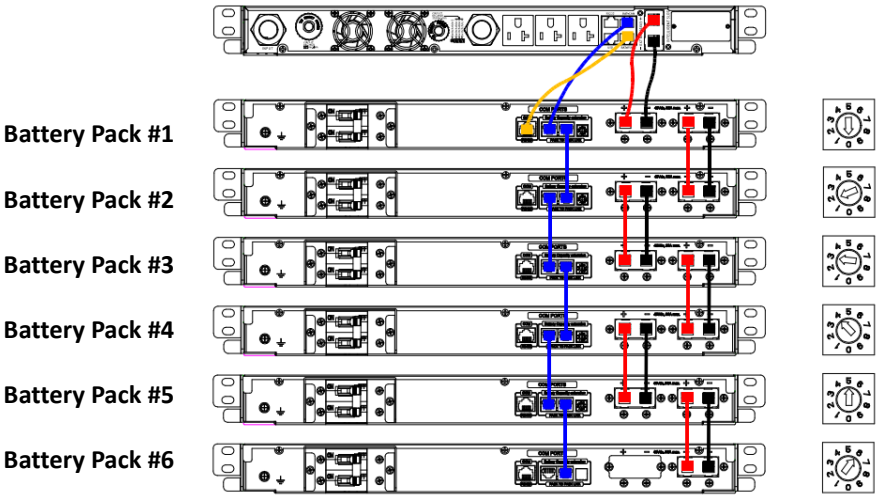
   *The RJ45 to RJ11 cable is in the UPS package.

2. Insert the RJ45 to RJ45 signal cable into the "COMM" port on the battery pack #1. The other end connects to "BAT-RS485" on the UPS.

   *The RJ45 to RJ45 cable is in the UPS package.

3. Use supplied battery cable to connect to UPS.

UPS conneting with multiple battery packs for capacity extension:



*The battery pack connected to the RS485 port on UPS will be master battery pack. Be sure to set ID of master battery as "0". And the other battery address is with different ID code from 1 to 9.

4. Insert supplied RJ11 cable to connect the extension port of the Master battery pack #1. The other end connects to the extension port of the battery pack #2.
5. Use supplied battery cable to connect to the Master battery pack #1 and battery pack #2.
6. If more battery packs to connect the system, repeat step 4 and 5 to connect more battery packs.
7. After connecting all battery packs, turn the breaker switch "ON" of each connected battery pack. Now, the battery packs are ready for DC output.
8. Press manual ON/OFF button of each connected battery pack for 5 secs. All battery packs will start up.

   *If the manual button cannot be approached, just simply turn on the UPS. The battery pack will be automatically turned on.

4. Start-Up/Shut-Off the Battery Pack

4.1 Start up the battery Pack

1. When battery pack is in the shutdown mode, press manual ON/OFF button for 5 secs.

2. Or, simply turn on the the power pack and connect battery pack to operating UPS. The battery pack will be automatically turned on.

4.2 Shut-off the battery pack

1. When battery pack is in the operating mode, press manual ON/OFF button for 5 secs.

2. Or, if battery pack is not operated (charge or discharge) for 10 hours, the battery pack will automatically shut off.

3. Or, the battery pack has no connection to the UPS. After operates without any connection with the COM Port (RS-485) for 24 hours, the battery will shut-off automately.

4. Or, the battery pack is removed from the UPS after 24 hours, the battery will shut-off automately.

5. Or, when the cell voltage is lower than 2.3V/Cell for 10 minutes, the battery pack will shut-off.

5. Trouble Shooting

Use the table below to solve minor installation and operation problems.

Symptom	Possible cause	Remedy
Battery cannot discharge.	Same ID code set in multiple battery packs.	Re-set each battery with different ID codes.
	Protection against under-voltage.	Charge battery.
	Protection against over-temperature or under-temperature (cell temperature is lower than -20°C or higher than 80°C).	Regulate cell temperature in the range of -20°C to 60°C for discharge.
	Protection against over current	Remove some non-critical load and charge battery.
	Battery output is short circuit	Relieve short circuit and charge battery
	System failure detected	Shut down system and call maintenance service
	In parallel battery packs, CAN communication lost and "parallel imbalance" occur.	Ensure communication wires are all correctly connected well.
Battery cannot charge.	Protection against over current.	Ensure the UPS charge current setting is not over 1C for battery.
	Protection against over-temperature or under-temperature (cell temperature is lower than 0°C or higher than 60°C)	Regulate cell temperature in the range of 0°C to 50°C for charge
	System failure detected	Shut down system and call maintenance service.
Communication failure is detected.	Communication cable	Check if communication cable is firmly connected.
	Communication address conflict	Check the parallel batteries address setting and correct them.
	System failure detected	Shut down system and call maintenance service.