4U 48V Lithium Iron Phosphate Battery – Installation Instructions

Product Description

The PowerUpESS LIFEPO4 battery is the most advanced lithium battery in the industry. The battery uses UltraLifeA™ cells with the longest life in the industry. The PowerUpESS SmartLogicBMS™ battery management system provides advanced battery management with the tools to configure it for any application. The BMS also allows for commutation, monitoring, and data collection for all common invertors.

Product Numbers

B48LPI5 V2	4U 48V LiFEPO4 Battery

Warning/Caution Notations

CAUTION	All work should be completed by qualified personnel.
CAUTION	The batteries contain a large amount of energy (power) wiring or connecting improperly may result in a large explosive spark, electrocution or fire.
CAUTION	Improper wire sizing, loose connections or improper wiring polarity can result in a large arc fault, fire or death.
WARNING	Batteries modules are heavy and should be lifted by two people.

Required Tools

- Phillips #2 screwdrivers
- 13mm wrench
- 3/8" torque wrench with 13mm socket
- Personal protective equipment

Expected Installation Time

One battery	30 minutes.

Prerequisites

- Review these instructions before beginning.
- All wiring must comply with the National Electric Code (NEC) and local regulations.

Battery Physical Installation

- Only install batteries on a level and dry location. Powerup modules should never be in a wet or humid environment. (<85% humidity)
- Batteries should be placed horizontal or vertical, NEVER upside down.
- Keep battery terminals protected from short circuit risks.
- Using PowerUpESS Modular Rack Part # BR2T4U17, BR3T4U17 or BR4T4U17 Modular rack with terminal protection is recommended.
- Keep flammable and combustible materials away from batteries.
- Batteries should not be stacked on top of each other, there should be a space or gap for temperature management. Recommended powerup modular battery rack Part # BR2T4U17, BR3T4U17 or BR4T4U17
- Batteries should be installed in a temperature-controlled environment and the best temperature is around 75deg F and not greater than 85% humidity.

Battery Power Wiring

- PowerUpESS recommends using the copper bus bar kits BBK2100 through BBK4100 to parallel modules together. Do NOT exceed the total ampacity per battery string over the busbar's total ampacity. See Figure 2.
- Another way to connect the battery strings to load is using proper sized battery cables from each battery to powerup distribution block. BD4L500 or #BD4L500. see Figure 1.
- Powerup recommends sizing the Battery strings ampacity to the load/inverter being used. Example: 1–5000-watt inverter can draw approximately 100amps @ 48-51vdc. This would demand 100amps from 1 battery or 50amps from 2 batteries or 33.3amps from 3 batteries.
- PowerUpESS recommends that you size your battery strings around a C/4 discharge amp. C/4 is ¼ of the battery's amp rating.

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Example: 100ah battery if used in a C/4 design would only be demanding 25amps of output energy from that single battery. If the inverter/load is 100amps, you would need 4 batteries to keep the C rating within a C/4 ampacity. 1C would be 100amps, C/2 would be 50amps.

- Do NOT exceed 60in -lbs. or 6.8nm of torque when tightening the battery terminal bolts.

- Make sure that the battery terminals are protected from anything that can short against the battery terminals. Recommended modular battery rack Part BR2T4U17, BR3T4U17 or BR4T4U17.
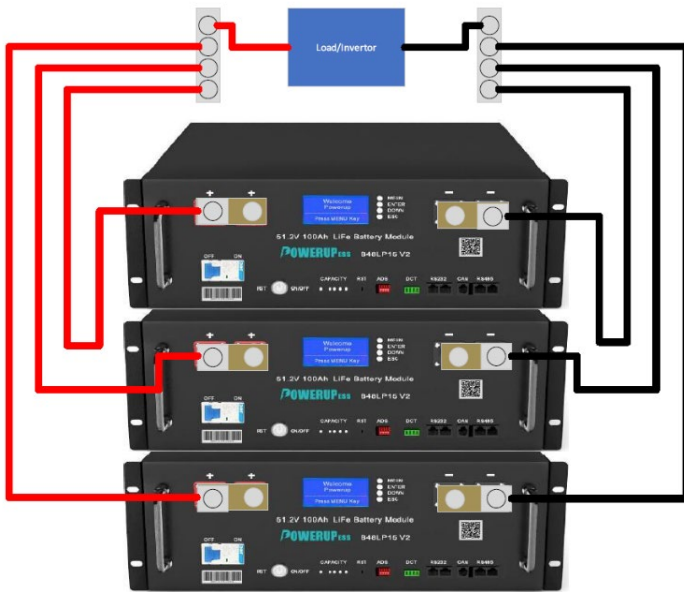

Figure 1

- When using the copper busbars BB2.5 and BB8.25 on a 3-battery paralleled configuration, it's recommended using equal length battery cables for each string of batteries to the distribution block. see figure 2.
- It's recommended to keep the inverter and equipment close to the battery modules to reduce the voltage drop in the battery cables to equipment. see fig 1 and 2.
- Battery cables to distributor from battery strings should be equal length to distributor block.
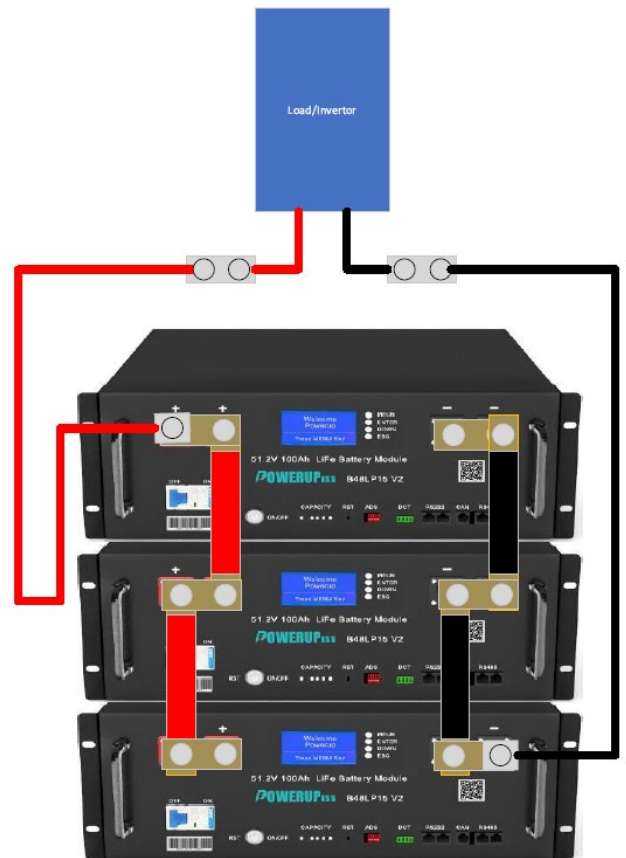

Figure 2

- It's recommended to use zip ties or nonmetallic ties for wire management. Do not leave battery cables in a pinch hazard, draped on the floor or in a position to be tugged.

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Battery Communication Wiring

The PowerUpESS battery can communicate in several ways with different devices.

PC Configuration Tool via RS232.
The PC Software configurator tool allows for monitoring and adjustment of battery parameters.

CAUTION	Battery parameters should only be adjusted by a qualified technician. Adjusting safety parameters in the battery can cause fire or electrical hazard and void warranty.

Refer to the software installation instructions which comes with the software to install the program on a PC.

Utilize PowerUpESS RS232 communication cable to communicate directly to the battery via RS232 (PN BC1RS232). For the software user manual to connection and configuration information.
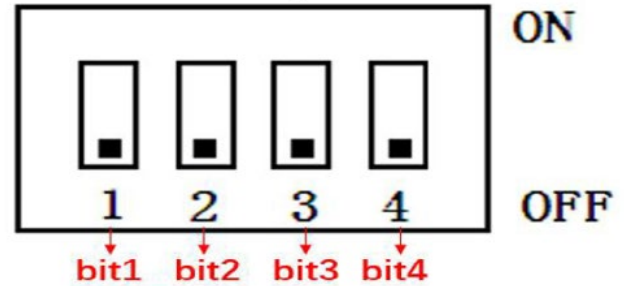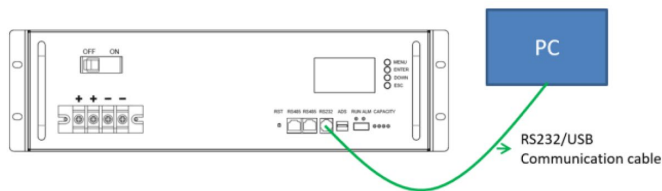
Address	Dial Switch				Remark
	Bit1	Bit2	Bit3	Bit4	
1	ON	OFF	OFF	OFF	Battery1
2	OFF	ON	OFF	OFF	Battery2
3	ON	ON	OFF	OFF	Battery3
4	OFF	OFF	ON	OFF	Battery4
5	ON	OFF	ON	OFF	Battery5
6	OFF	ON	ON	OFF	Battery6
7	ON	ON	ON	OFF	Battery7
8	OFF	OFF	OFF	ON	Battery8
9	ON	OFF	OFF	ON	Battery9
10	OFF	ON	OFF	ON	Battery10
11	ON	ON	OFF	ON	Battery11
12	OFF	OFF	ON	ON	Battery12
13	ON	OFF	ON	ON	Battery13
14	OFF	ON	ON	ON	Battery14
15	ON	ON	ON	ON	Battery15
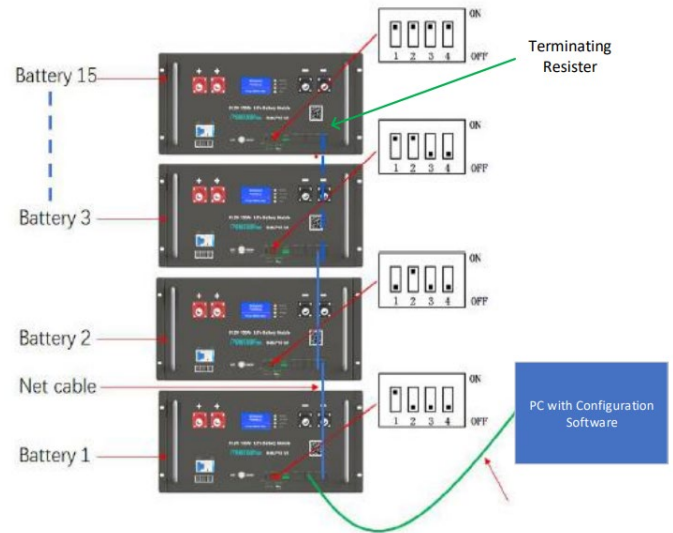
Communication is capable of up to 15 batteries. By addressing each battery via the DIP switches and tying each battery together via CAT6 jumper cables in a daisy chain fashion with a terminating resister at the last battery. (PN BCKxxRS485)

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Inverter via RS485 or CAN

Communication can be established between multiple batteries and several common invertors using either CAN or RS485. Use the appropriate respective port based on the protocol supported by the invertor.

Compatible Inverters

Growatt, Sol-Ark, Lux, Schnieder, Deye, Victron
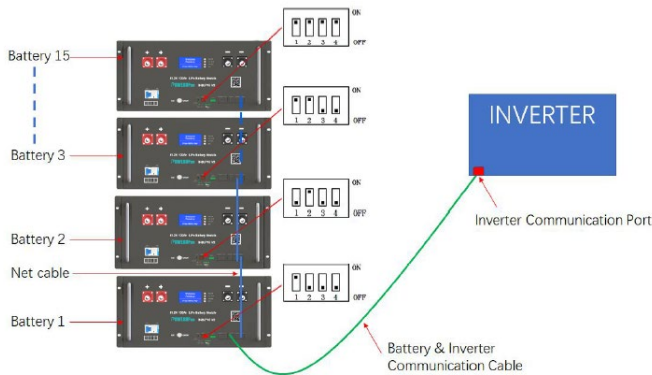
Refer to invertor communication configuration documentation for set up instructions.
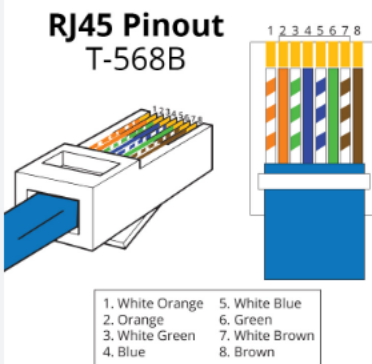

RS232 Connections

RS232--Using 6P6C vertical RJ11 socket	
RJ11 pin	Description
2	NC
3	TX
4	RX
5	GND

RS 485 and CAN Connections

RS485--Using 8P8C vertical RJ45 socket A		CAN --Using 8P8C vertical RJ45 socket B	
RJ45 pin	Description	RJ45 pin	Description
1、8	RS485-B1	1、2、3、6、8	NC
2、7	RS485-A1	4	CANH
3、6	GND	5	CANL
4、5	NC	7	GND

RS 485 connection between batteries

RS485--Using 8P8C vertical RJ45 socket A		RS485--Using 8P8C vertical RJ45 socket B	
RJ45 pin	Description	RJ45 pin	Description
1、8	RS485-B	1、8	RS485-B
2、7	RS485-A	2、7	RS485-A
3、6	GND	3、6	GND
4、5	NC	4、5	NC

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Battery & Invertor Parameter Settings

Unless otherwise indicated in a specific Application Guide for the invertor, created by PowerUpESS, the following are recommended settings for battery charging.

Battery Bulk Charge setting: 56.4 volts.
Battery Float Charge setting 54.5 volts.

Setting these parameters above this in the charger is not necessary and may cause battery cell overcharge and degradation of cell integrity.

In addition, we recommend setting the individual cell balancing voltage at 3.31volts with a 20mV delta to start the auto balancing function as early as possible. This will minimize overvolt issues with the batteries.

The batteries should also be **charged fully on initial installation**, or if they have been sitting un-used for long period of time, to ensure the "State or Charge" counter reflects the true charge of the battery.

Accessories

Part Number	Description
BR2T4U17	2 tier modular battery rack for B48LPI5 V2 batteries with cover.
BR3T4U17	3 tier modular battery rack for B48LPI5 V2 batteries with cover.
BR4T4U17	4 tier modular battery rack for B48LPI5 V2 batteries with cover.
BRCA300	4 battery rack casters 300lb
BBK2100	100AMP bus bar kit for 2 - B48LPI5 V2 batteries in BR2T4U17 Rack
BBK3100	100AMP bus bar kit for 3 - B48LPI5 V2 batteries in BR3T4U17 Rack
BBK4100	100AMP bus bar kit for 4 - B48LPI5 V2 batteries in BR4T4U17 Rack
BCK2RS485	RS485 communication kit for 2 - B48LPI5 V2 batteries
BCK3RS485	RS485 communication kit for 3 - B48LPI5 V2 batteries
BC1RS232	RS232 USB to RJ11 communication cable
BB2.5BLK	2.5" Bus bar bridge plate black
BB2.5RED	2.5" Bus bar bridge plate red
BB8.25BLK	8.25" Bus bar battery link black
BB8.25RED	8.25" Bus bar battery link red
BB9.5BLK	9.5" Bus bar battery link black
BB9.5RED	9.5" Bus bar battery link red
BD4L500BLK	Battery distribution block 4 LUG, 500 AMP Black
BD4L500RED	Battery distribution block 4 LUG, 500 AMP Red

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