

# USER MANUAL

LPBA48100-OL

LiFePO<sub>4</sub> Battery System



In order to prevent improper operation before use, please carefully read this manual.

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## 1. INTRODUCTION

The document describes the installation, commissioning, maintenance and troubleshooting of the following low voltage battery listed below.

The battery chemistry of these products is Lithium Iron Phosphate. This manual is designed for qualified personnel only. The tasks described in this document should be performed by authorized and qualified technicians only.

After Installation the Installer must explain the user manual to the end user.

## 2. SYMBOLS

	Caution, risk of electric shock.
	Do not place nor install near flammable or explosive materials.
	Install the product out of reach of children.
	Read the instruction manual before starting installation and operation.
	Do not dispose of the product with household wastes.
	Recyclable.
	Disconnect the equipment before carrying out maintenance or repair.
	Observe precautions for handling electrostatic discharge sensitive devices.
	Protective Class 1.
	Caution, risk of electric shock, energy storage timed discharge.

### 3.SAFETY

Any work on the Batteries should be handled by authorized technicians and hence it is understood that the technicians should familiarize themselves with the contents of this manual before any maintenance or installation is carried out on the system.

### 4.Handling

- Do not expose battery to open flame.
- Do not place the product under direct sunlight.
- Do not place the product near flammable materials. It may lead to fire or explosion in case of accident.
- Store in a cool and dry place with ample ventilation.
- Store the product on a flat surface.
- Store the product out of reach of children and animals.
- Do not damage the unit by dropping, deforming, impacting, cutting or penetrating with a sharp object. It may cause leakage of electrolyte or fire.
- Do not touch any liquid spilled from the product. There is a risk of electric shock or damage to skin.
- Always handle the battery wearing the insulated gloves.
- Do not step on the product or place any foreign objects on it. This can result in damage.
- Do not charge or discharge damaged battery.

#### 4.1 Installation

- After unpacking, please check the product for damages and missing parts.
- Make sure that the inverter and battery is completely turned off before commencing installation.
- Do not interchange the positive and negative terminals of the battery.
- Ensure that there is no short circuit of the terminals or with any external device.
- Do not exceed the battery voltage rating of the inverter.
- Do not connect the battery to any incompatible inverter.
- Do not connect different battery types together.
- Please ensure that all the batteries are grounded properly.
- Do not open the battery to repair or disassemble. Only Felicity is allowed to carry out any such repairs.
- In case of fire, use only dry powder fire extinguisher. Liquid extinguishers should not be used.
- Install the battery away from children or pets.
- Do not use battery in high static environment where the protection device might be damaged.
- Do not install with other batteries or cells.

### 5.RESPONSE TO EMERGENCY SITUATIONS

The batteries comprise of multiple batteries connected in series. It is designed to prevent hazards or failures. However, Felicity cannot guarantee their absolute safety.Under exposure to the internal materials of the battery the following recommendations should be carried out by the user.

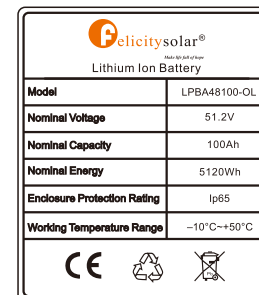
- If there has been inhalation, please leave the contaminated area immediately and seek medical attention.
- If there has been contact with eyes, rinse the eyes with running water for 15 minutes and seek medical attention immediately.
- If there has been contact with the skin, wash the contacted area with soap thoroughly and seek medical attention immediately.
- If there has been ingestion, induce vomiting and seek medical attention.

#### Fire Situation

Use a FM-200 or Carbon Dioxide (CO2) fire extinguishers to extinguish the fire if there is a fire in the area where the battery pack is installed. Wear a gas mask and avoid inhaling toxic gases and harmful substances produced by the fire.

### 5.1Warning Labels

Warning labels and other relevant labels are attached on the battery pack.



### 6.PRODUCT INFORMATION

LPBA48100-OL photovoltaic energy storage system is a 48V energy storage system based on lithium-ion ferrous phosphate battery. It is equipped with a customized battery management system(BMS),Which is designed for energy storage applications of household photovoltaic power generation users.In the daytime,the surplus power of photovoltaic generation can be stored in the battery.At night or when necessary,the stored energy can be provided to the electrical equipment,it can improve the use efficiency of photovoltaic power generation,peak-load shifting,and provide emergency standby power.

#### 6.1 Battery Module Specifications

Specifications For LPBA48100-OL	
Battery Module	LPBA48100-OL
Total Energy [Kwh]	5.12
Nominal Voltage [V]	51.2
MAX. Charge Voltage [V]	57.6
MIN. Discharge Voltage [V]	48
Max. Chargeing Current [A]	50
Max. Discharge Current [A]	50
Communication	CAN,RS485
Enclosure Protection Rating	Ip65
Working Temperature Range [°C]	-10 ~ 50
Cycle Life	> 6000 Cycle@ 80% DOD / 25°C
Net Weight(KG)	48.5kg
Gross Weight(KG)	64.5kg
Product Dimension(MM)	665*440*175
Package Dimension(MM)	760*540*345

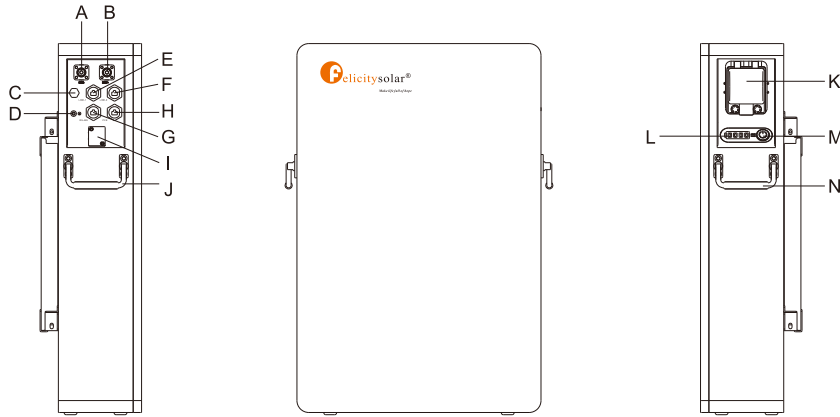
## 7. Electrical Connections

### 7.1 Battery System Features

The batteries have been fitted with multiple protection systems to ensure the safe operation of the system. Some of the protection system includes:

- Inverter interface protection: Over voltage, Over current, External Short Circuit, Reverse Polarity, Ground Fault, Over Temp, In rush current.
- Battery Protection: Internal Short Circuit, Over voltage, over current, over temp, Under voltage The battery system contains the following Interface to allow it to connect and operate efficiently.

### 7.2 Electrical Interface Description of LPBA48100-OL



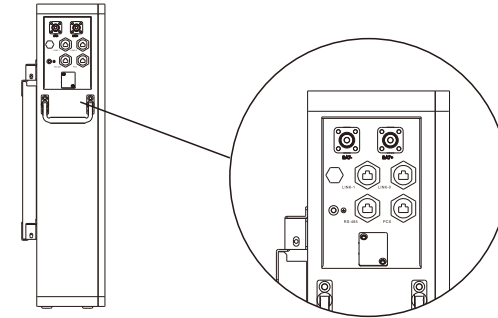
Code	Name
A	BAT-
B	BAT+
C	Breather Valve
D	GND
E	Link-1
F	Link-0
G	RS485 Communication
H	PCS Communication
I	SW
J	Handle
K	Power Breaker
L	LED Display
M	Power Switch

### 7.3 Switch On / Off

Switch on: close the breaker to the ON block, press and hold Power switch for 1 seconds, the battery will perform self-test before output. The LED will show SOC.

Switch off: close the breaker to the OFF block, the battery will shut down directly.

### 7.4 Description for Communication port



#### LINK-0/LINK-1

Pin	Function Definitions	Function Declaration
1	GND	Power/signal ground
2	NC	
3	NC	
4	NC	
5	485B	RS485-B
6	485A	RS485-A
7	CANL	CANL
8	CANH	CANH

#### RS-485

Pin	Function Definitions	Function Declaration
1	GND	Power/signal ground
2	12V	
3	NC	
4	NC	
5	485B	RS485-B
6	485A	RS485-A
7	NC	
8	NC	

## 8. INSTALLATION

### 8.1 Items in the package

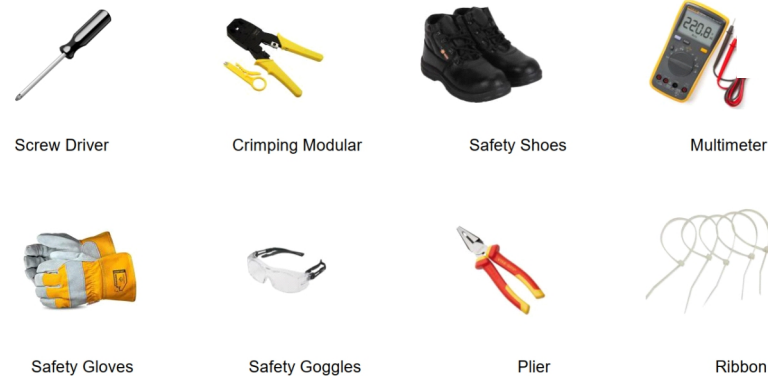
Please check if following items are including with the package:

FOR BCU600050



Code	Items	Code	Items
1	Wall bracket	7	PV wake up line
2	Communication line	8	User manual
3	Communication line	9	Guarantee card
4	Communication line	10	cables
5	adapter	11	
6	screw	12	

### 8.3 Tools



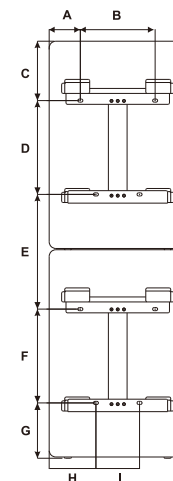
### 8.4 Floor installation with base

#### Installation Location Requirements

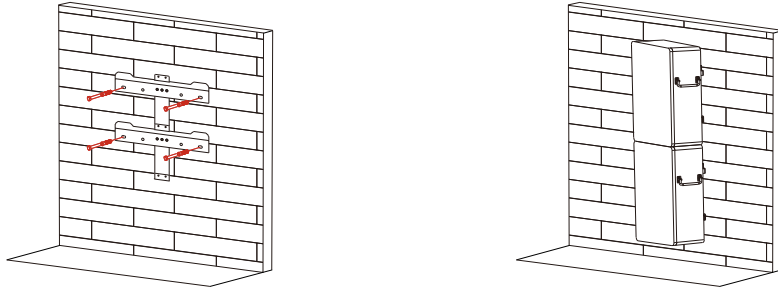
Consider the following points before selecting where to install:

- Do not mount the battery on flammable construction materials.
- The ambient temperature should be between 0°C and 45°C to ensure optimal operation.
- The recommended installation position is to be adhered to the wall vertically.
- Be sure to keep other objects and surfaces as shown in the right diagram to guarantee sufficient heat dissipation and to have enough space for removing wires.

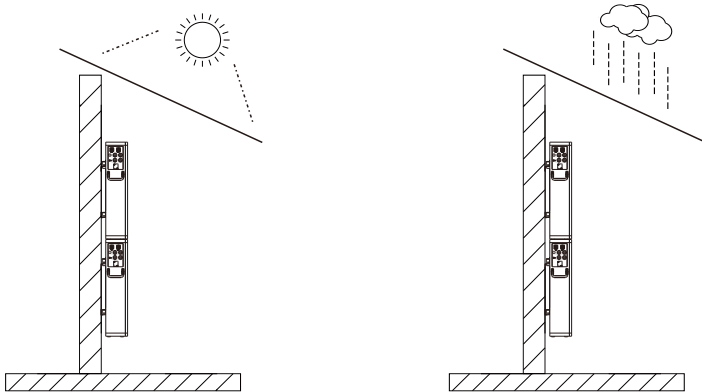
	LPBA48100-OL
A	100
B	240
C	190.5
D	301
E	368
F	301
G	173.5
H	150
I	140



Installation Procedure



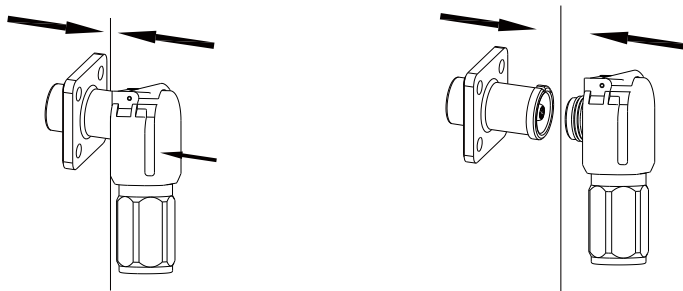
8.5 Install Environment



Note: Build sun & rain shade to avoid direct exposure to sunlight and rain.

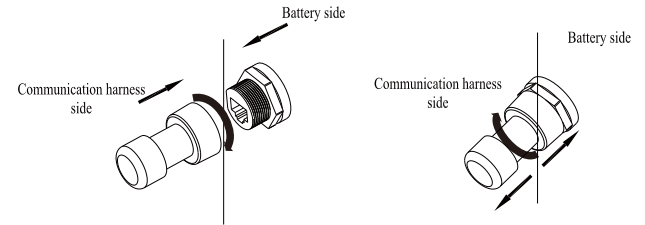
8.6 Terminal Connection

Power terminal

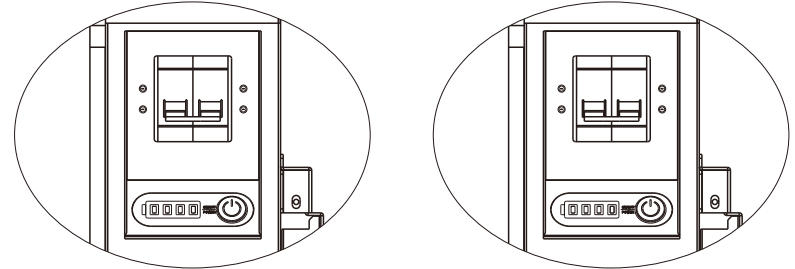


Note: Press the position indicated in the figure above before disconnecting the power terminal.

Communication terminal



8.7 Battery system switch operation



Power on battery system:

Turn the breaker to the "ON" state, press the POWER button 1 seconds, wait for the battery system LED light to light up, indicating that the boot is complete.

Power off battery system:

Turn the breaker to the "OFF" state, turn off the entire battery system.

8.8 Commissioning

There are four LED indicators on the front of the battery packs to show its operating status.

SOC LED indication

100%	75%	50%	25%	Flashing SOC < 10%

## 8.9 ON / OFF or SOC Led (Mode or SOC)

BATTERY MODE	ON/OFF		SOC				REMARK
	GREEN LED	RED LED	LED1	LED2	LED3	LED4	
POWER OFF	OFF	OFF	OFF	OFF	OFF	OFF	
POWER ON	OFF	ON	ON	ON	ON	ON	
STANDBY	OFF	OFF	SOC				SOC < 10%(DEFAULT): LED1 FLASH
NORMAL	ON	OFF	RUNNING/SOC				SOC < 10%(DEFAULT): LED1 FLASH
DISCHARGE	ON	OFF	SOC				SOC < 10%(DEFAULT): LED1 FLASH
CHARGE	FLASH	OFF	RUNNING				
LOW POWER	FLASH	OFF	OFF				
FAULT	OFF	ON	ON	OFF	OFF	OFF	BATTERY VOLTAGE HIGH
			OFF	ON	OFF	OFF	BATTERY VOLTAGE LOW
			ON	ON	OFF	OFF	CELL VOLTAGE HIGH
			OFF	OFF	ON	OFF	CELL VOLTAGE LOW
			ON	OFF	ON	OFF	CHARGING CURRENT HIGH
			OFF	ON	ON	OFF	DISCHARGING CURRENT HIGH
			ON	ON	ON	OFF	BMS TEMPERATURE HIGH
			OFF	OFF	OFF	ON	BMS TEMPERATURE LOW
			ON	OFF	OFF	ON	CELL TEMPERATURE HIGH
			OFF	ON	OFF	ON	CELL TEMPERATURE LOW
ON	ON	OFF	ON	CURRENT SENSOR ABNORMAL			

## 8.10 DIP switch SW1-SW4 Description

DIP switch SW1-SW4 Description ①					DIP switch SW5 Description ②	
Sw1	SW2	SW3	SW4	Remarks	SW5	Remarks
0	0	0	0	means ID=0, communication address is 0x00/0x10 ③	1	means connect 120Ω resistor
1	0	0	0	means ID=1, communication address is 0x01 ④		
0	1	0	0	means ID=2, communication address is 0x02	0	means disconnect 120Ω resistor
1	1	0	0	means ID=3, communication address is 0x03		
0	0	1	0	means ID=4, communication address is 0x04		
1	0	1	0	means ID=5, communication address is 0x05		
0	1	1	0	means ID=6, communication address is 0x06		
1	1	1	0	means ID=7, communication address is 0x07		
0	0	0	1	means ID=8, communication address is 0x08		
1	0	0	1	means ID=9, communication address is 0x09		
0	1	0	1	means ID=10, communication address is 0x0A		
1	1	0	1	means ID=11, communication address is 0x0B		
0	0	1	1	means ID=12, communication address is 0x0C		
1	0	1	1	means ID=13, communication address is 0x0D		
0	1	1	1	means ID=14, communication address is 0x0E		
1	1	1	1	means ID=15, communication address is 0x0F		

Remark①: 1 in SW1-SW5 indicates ON status, and 0 indicates OFF status.

Remark②: When multiple battery packs communicate, the last battery pack SW5 needs to be in the ON status, otherwise the communication may have interference.

Remark③: When the battery pack ID is set to 0, it means stand-alone operation, and it is not necessary to detect whether the parallel condition is satisfied ⑤

Remark④: When the battery pack ID is set to 1-15, it means that the parallel operation is required, and it is necessary to detect whether the parallel condition is satisfied ⑤

Remark⑤: The parallel condition is that the difference between the battery voltage of the local battery and all the battery pack voltages is < 3V, otherwise wait until the condition is satisfied

## 9. WARRANTY

The warranty shall not cover the defects caused by normal wear and tear, inadequate maintenance, handling, storage faulty repair, modifications to the battery or pack by a third party other than Felicity, failure to observe the product specification provided herein or improper use or installation, including but not limited to the following.

- Damage during transport or storage.
- Incorrect Installation of battery into pack or maintenance.
- Use of battery or pack in inappropriate environment.
- Improper, inadequate, or incorrect charge, discharge or production circuit other than stipulated herein.
- Incorrect use or inappropriate use.
- Insufficient ventilation.
- Ignoring applicable safety warnings and instructions.
- Altering or attempted repairs by unauthorized personnel.
- In case of force majeure (ex: lightning, storm, flood, fire, earthquake, etc.).
- There are no warranties-implicit or express-other than those stipulated herein. Felicity shall not be liable for any consequential or indirect damages arising or in connection with the product specification, battery or pack.

## 10. TROUBLESHOOTING AND MAINTENANCE

## 10.1 Maintenance

1. Regularly check whether the service environment of the battery meets the requirements, and the installation position should be far away from the heat source.
2. In case of one of the following situations, it needs to be charged in time:
  - The battery is often under charged;
  - The battery has been out of use or stored for more than 3 months.
3. Regularly check whether the battery and its supporting terminals, connecting cables and indicator lights are normal.

## 10.2 Troubleshooting

When the red / green LED on the panel is flashing or normally on, it does not mean that the Battery system is abnormal, it may be just an alarm or protection. Please check the 'LED fault message' in chapter 7 for the detailed faulty definition before any trouble-shooting steps. In general, the alarm indication is normal without manual intervention. When the alarm triggering state is removed, Battery system will automatically return to normal use.

## - Problem determination based on the following points

- Whether the red light on the LPBA48100-OL is on;
- Whether the battery can be output voltage or not.

## - Preliminary determination steps

Battery system cannot work, when DC switch on and POWER on, the LED doesn't light up or flash, please consider contact the local distributor.