

# Lithium iron phosphate battery user manual

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## 1.Features of LiFePO4 Battery

- **Longer Cycle Life:** Offers up to 20 times longer cycle life and five times longer float/calendar life than lead acid battery, helping to minimize replacement cost and reduce total cost of owner.
- **Lighter Weight:** About 40% of the weight of a comparable lead acid battery. A 'drop in' replacement for lead acid batteries.
- **Higher Power:** Delivers twice power of lead acid battery, even high discharge rate, while maintaining high energy capacity.
- **Wider Temperature Range:** -20°C~60°C.
- **Superior Safety:** Automatic protection with internal battery management system. Lithium Iron Phosphate chemistry eliminates the risk of explosion or combustion due to high impact, overcharging or short circuit situation.
- **Increased Flexibility:** Modular design enables deployment of up to four batteries in series and up to four batteries in parallel.

## 2.Application

Electric vehicles, electric mobility; Solar/wind energy storage system; UPS, backup power ; Telecommunication; Medical equipment; Lighting.

### 3. Battery Specification

MODEL	LP 12-06	LP 12-10	LP 12-12	LP 12-18	LP 12-20	LP 12-36	LP 12-50	LP 12-100	LP 12-200
Nominal voltage	12.8V	12.8V	12.8V	12.8V	12.8V	12.8V	12.8V	12.8V	12.8V
Nominal capacity	6Ah	10Ah	12Ah	18Ah	20Ah	36Ah	50Ah	100Ah	200Ah
Nominal energy	76.8 Wh	128 Wh	153.6 Wh	230.4 Wh	256 Wh	460.8 Wh	640 Wh	1280 Wh	2560 Wh
Standard charge voltage	14.4V	14.4V	14.4V	14.4V	14.4V	14.4V	14.4V	14.4V	14.4V
Discharge cut-off voltage	10.8V	10.8V	10.8V	10.8V	10.8V	10.8V	10.8V	10.8V	10.8V
Standard charge current	2A	2A	3A	5A	5A	6A	10A	20A	20A
Allowed Max. charge current	6A	10A	12A	18A	20A	30A	50A	100A	100A
Allowed Max. Discharge current	10A	10A	20A	30A	30A	40A	50A	100A	100A
Peak discharge current	20A	20A	30A	50A	50A	100A	150A	250A	250A
Terminal	T1 (4.8)	T2 (6.3)	T2 (6.3)	F13 (M5)	F13 (M5)	F12 (M8)	F11 (M6)	F12 (M8)	F12 (M8)
temperature	Charge temperature: 0°C~+45°C / Discharge temperature -20°C~+60°C								
Cycle Life	>2000 cycles @1C 100%DOD / > 8000 cycles @0.5C 50%DOD								

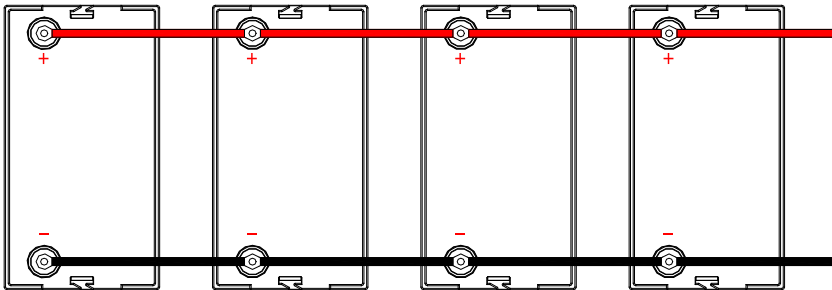
When the battery voltage drops to 10.8V, it means that the battery needs to be charged.

PLEASE USE A SPECIALIZED CHARGER FOR LITHIUM IRON PHOSPHATE BATTERIES.

## 4.Parallel and series batteries

### 4.1.Parallel connection of batteries

- Fully charge all the battery firstly, then connect them in parallel.
- The number of batteries in parallel is  $\leq 4$ PCS. It is forbidden to mix multiple series connection and multiple parallels connection;
- Do not mix in series or parallel with lead-acid batteries or different types of lithium batteries.

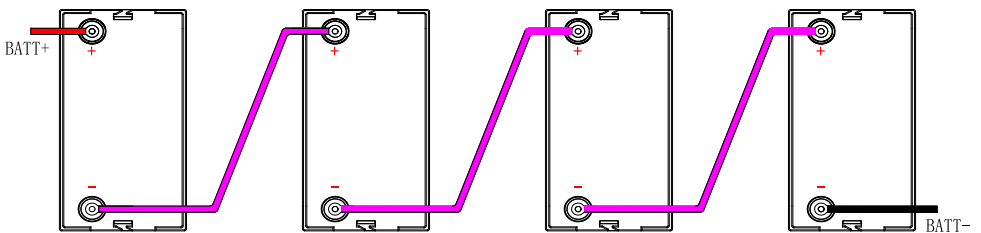


The number of batteries in parallel is  $\leq 4$ PCS

Capacity of parallel battery	Battery Numbers	Charge	Discharge
		Limited voltage	Cut-off voltage
12.8V/Capacity*1	1 pcs	14.6 V	10.8 V
12.8V/Capacity*2	2 pcs	14.6 V	10.8 V
12.8V/Capacity*3	3 pcs	14.6 V	10.8 V
12.8V/Capacity*4	4 pcs	14.6 V	10.8 V

## 4.2. Battery in series

- Fully charge all the battery firstly, then connect them in series .
- The number of batteries in series is  $\leq 4$ PCS. It is forbidden to mix multiple series connection and multiple parallels connection;
- Do not mix in series or parallel with lead-acid batteries or different types of lithium batteries;



**The number of batteries in series is  $\leq 4$ PCS**

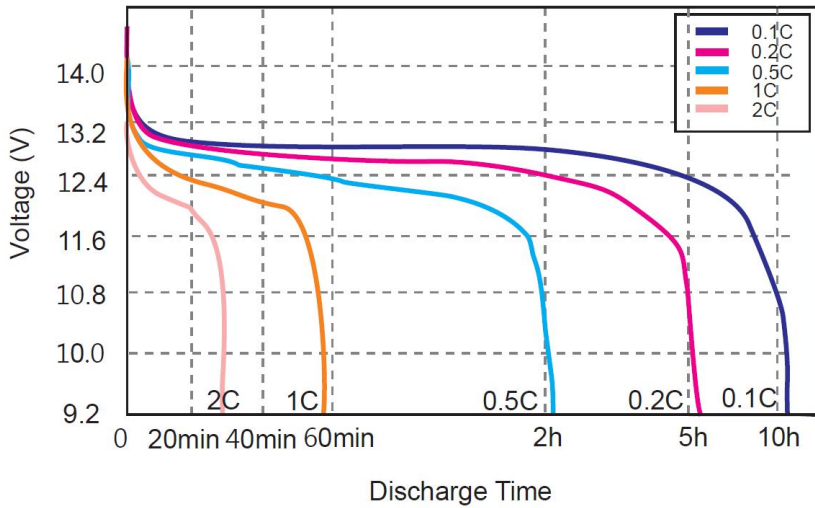
Inverter/ Charger Type	Battery Numbers	Charge	Discharge
		Limited voltage	Cut-off voltage
12 V	1 pcs	14.6 V	10.8 V
24 V	2 pcs	29.2 V	21.6 V
36 V	3 pcs	43.8 V	32.4 V
48 V	4 pcs	58.4 V	43.2 V

## 5. BMS Electrical characteristics

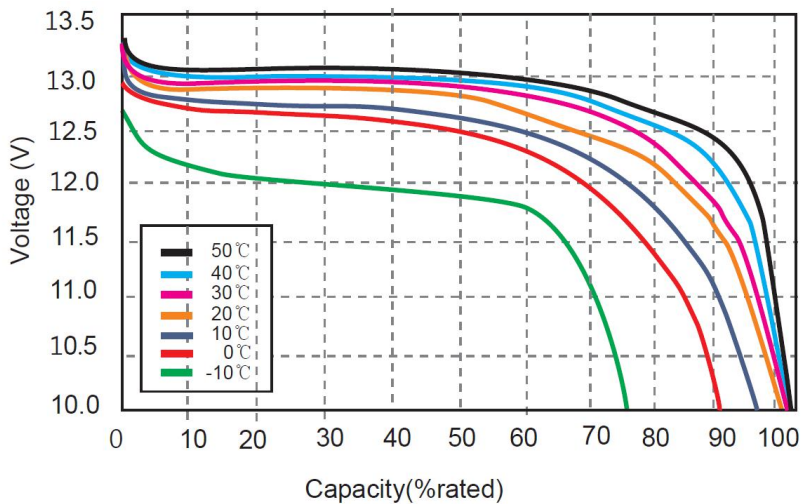
Item	Content	Criterion
Voltage	Charging voltage	DC:14.4V 3.6V/Cell
	Balance voltage for single cell	3.525V/Cell
Current	Balance current for single cell	36mA
	Max continues charge current	6~100Ah@1.0C 200Ah@100A
	Max continues discharge current	6~100Ah@1.0C 200Ah@100A
Over charge Protection	Over charge detection voltage	14.6V 3.65V/Cell
	Over charge release voltage	14.2V 3.55V/Cell
Over discharge protection	Over discharge detection voltage	9.2V 2.30V/Cell
	Over discharge release voltage	10.8V 2.7V/Cell
Over current protection	Over discharge current detection	2.5~3.5C
	Over charge current detection current	1.0~1.5C
Short protection	Short Circuit Protection Current	8.0~12C
Temperature	Charging temperature protection	$\geq +50^{\circ}\text{C}$ or $\leq 0^{\circ}\text{C}$
	Discharge temperature protection	$\geq +70^{\circ}\text{C}$ or $-20^{\circ}\text{C}$

## 6. Characteristics of LiFePO4 battery

### 6.1. Different Rate Discharge Curve @25°C

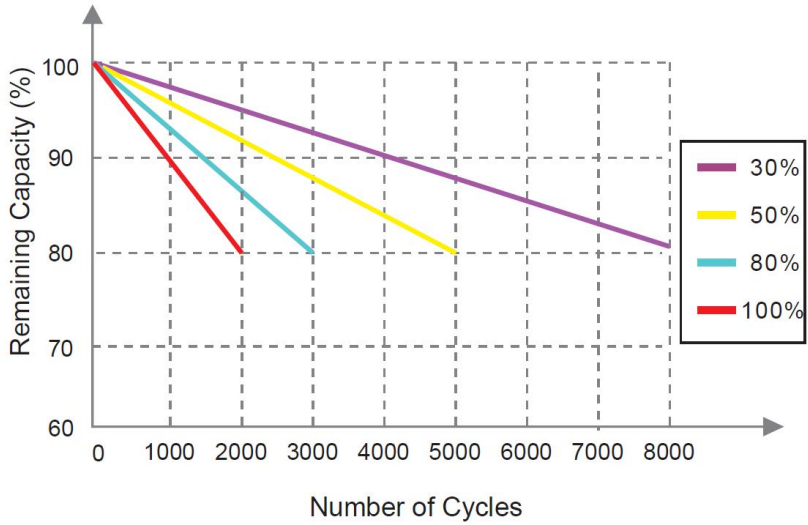


### 6.2. Different Temperature Discharge Curve @0.5C

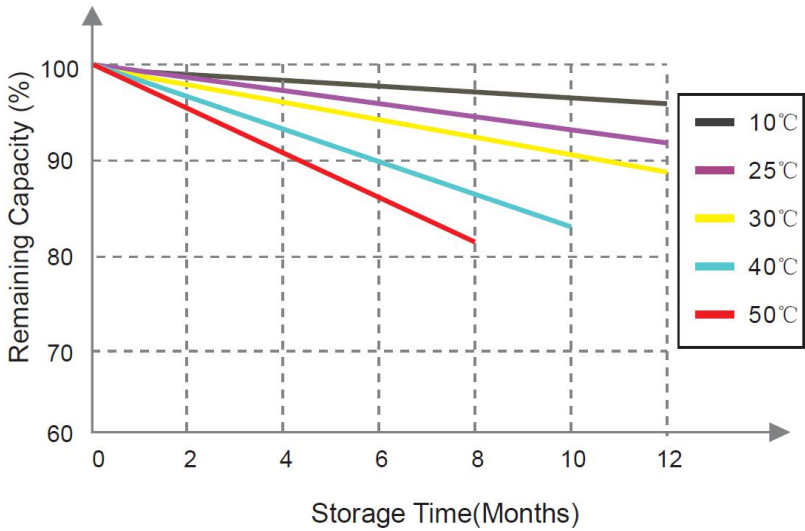




### 6.3. Different DOD Discharge Cycle Life Curve @1C



### 6.4. Different Temperature Self Discharge Curve



## 7. Troubleshooting

Solutions to general failures of lithium iron phosphate batteries:

Problem	Solution
The battery pack cannot be discharged properly	1. Check whether the battery connection is loose or not
	2. Make Sure the battery terminal posts were connected correctly and firmly
	3. Switch off the load and switch on again after 3 seconds
The battery pack cannot be charged properly	1. Use chargers with compatible output;
	2. Only connect to electric appliances with compatible input;
The battery heats up when using	1. Make sure the appliance connected are compatible and not overloaded
	2. Connect the battery packs correctly and firmly

## 8. Warning & Tips.

1. Disassemble or modify the battery is forbidden.
2. Do not reversely connect or short-circuit the positive and negative poles of the battery; do not mix the battery with metal objects avoid short circuit from metal objects touch the positive and negative electrodes of the battery, damaging the battery or even causing danger.
3. It is strictly forbidden to immerse the battery in sea water or throw it into fire.
4. It is strictly prohibited to use chargers that do not meet the requirements for charging.
5. Avoid frequent overcharging. Overcharging will cause the internal temperature rise and harmful to the lithium-ion battery and charger.