

Energy storage battery

Instruction Manual

Product name: Energy storage battery

Product NO: KEP/ IMPROVE

Product Spe: 12 V 100AH

Date: 2020-08-09

制 作 Producer	审 核 Auditor	批 准 Ratifier

1. 使用范围

Scope of use

本规格书描述了我公司生产的锂电池的使用说明，技术要求，测量方法，运输，储存，注意事项。

This specification describes the instructions, technical requirements, measurement methods, transportation, storage, and precautions of the lithium batteries produced by our company.

2. 产品概述

product description

本产品为铁锂电池电池组,电池组由单片 3.2V 串并联方式组合而成。电池组采用了科学的内部结构设计，先进的电池生产工艺，具有高比能量和长寿命、安全可靠、使用温度范围宽等特性，是绿色储能电源产品。

This product is an iron-lithium battery pack, which is composed of a single 3.2V series-parallel combination. The battery pack adopts scientific internal structure design, advanced battery production technology, high specific energy, long life, safety and reliability, wide operating temperature range, etc. It is a green energy storage power supply product

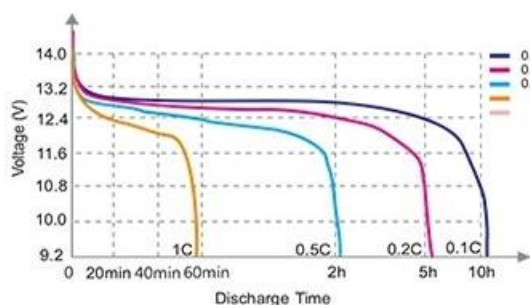
3. 产品技术规格参数

Product technical specifications

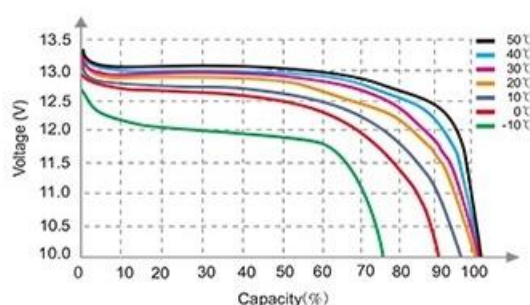
Electrical Characteristics	Nominal Voltage	12.8V
	Nominal Capacity	100Ah
	Energy	1280Wh
	Internal Resistance	≤5mΩ
	Cycle Life	>2500 Cycles @ 0.2C Charge/Discharge at 100%DOD,End of Life 70% Capacity.
	Months Self Discharge	≤3.5% per month at 25°C
Standard Charge	Charge Voltage	14.6±0.2V
	Charge Mode(CC/CV)	At 0°C~45°C temperature, charged to 14.6V at a constant current of 0.2C, and then,changed continuously with constant voltage of 14.6V until the current was not more than 0.02C.
	Standard Charge Current	0.2C
	Max.Charge Current	0.5C
Standard Discharge	Max. Continuous Current	1C
	Peak Current	200A(<3S)
	Discharge Cut-off Voltage	10.0V
Environmental	Charge Temperature	0°C to 45°C(32°F to 113°F) @60±25% Relative Humidity
	Disxcharge Temperature	-20°C to 60°C(-4°F to 140°F) @60±25% Relative Humidity
	Storage Temperature	0°C to 45°C(32°F to 113°F) @60±25% Relative Humidity

	Water Dust Resistance	IP55
Mechanical	Cell & Method	LFE3.2V 100Ah 4S1P
	Plastic Case	ABS
	Dimension(L*W*H*TH)	326*173*215mm/352*174*190mm
	Weight	Approx. 11.5Kg
	Terminal	M6/M8

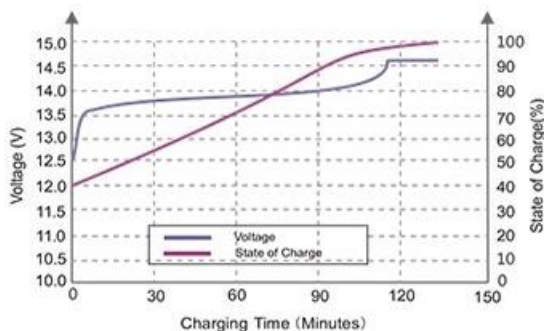
Different Rate Discharge Curve(25°C)



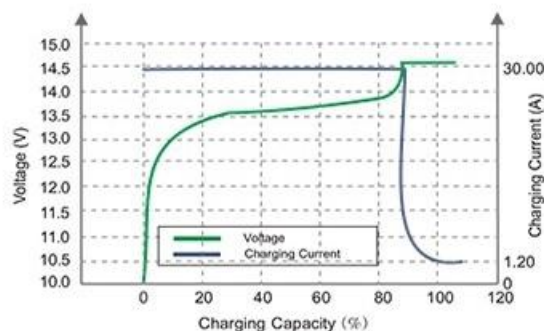
Different Temperature Discharge Curve(0.5°C)



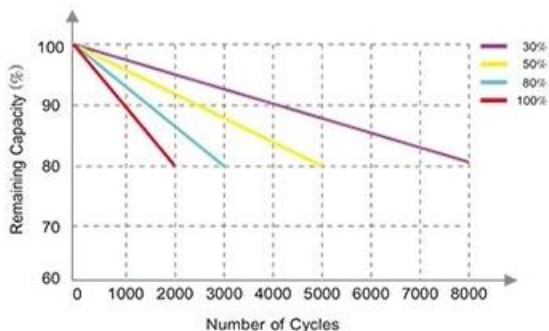
State of Charge Curve(0.5°C,25°C)



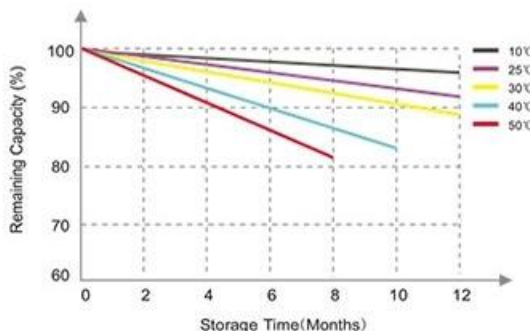
Charging Characteristics(0.5°C,25°C)



Different DOD Discharge Cycle Life Curve(15°C)



Different Temperature Self Discharge Curve



4. 测试条件、方法及性能

Test conditions, methods and performance

4.1 测试条件

Test Conditions

Unless otherwise specified, all tests are performed in an environment with a temperature of 15°C~35°C, a humidity of 25%~85%, and an atmospheric pressure of 86kPa~106kPa.

4.2 Measuring instruments

4.2.1 The accuracy of the DC voltmeter used to measure voltage is not less than 0.5, and the internal resistance of the voltmeter is not less than $1\text{k}\Omega/\text{V}$;

4.2.2 The accuracy of the DC meter for current measurement is not less than 0.5;

4.2.3 The thermometer used for temperature measurement should have an appropriate range, and its division value should not be greater than 1°C ;

4.2.4 The timer used to measure time shall be divided by hour, minute and second, and shall have an accuracy of at least $\pm 1\%$.

4.3 Standard charging

Standard charger or solar charging management system, voltage 14.8V, current $\leq 100\text{A}$

4.4 Standard discharge

After charging according to the method (4.3), use an electronic load to discharge at a constant current of 1C (A) until the total voltage is lower than 10V and cut off.

4.5 Battery capacity

Discharge according to the method (3.4), record the discharge time (h), capacity (Ah) = current (A) * discharge time (h).

4.6Electrical properties

Test items	testing method	Technology requirement
temperature performance	After the battery pack is charged according to the standard specified in 4.3, put it aside for 2h at a normal temperature of $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$, and then discharge according to 4.4 at the temperature	1. Discharge time $>240\text{min}$; 2.No fire, no explosion
High temperature performance	After the battery pack is charged according to the standard specified in 4.3, put it aside for 2h at a high temperature of $55^{\circ}\text{C}\pm 2^{\circ}\text{C}$, and then discharge according to 4.4 at this temperature	1. Discharge time $>240\text{min}$; 2.No fire, no explosion
Low temperature performance	After the battery pack is charged according to the standard specified in 4.3, put it aside for 2h at a low temperature of $-20^{\circ}\text{C}\pm 2^{\circ}\text{C}$, and then discharge according to 3.4 at this temperature	1. Discharge time $>150\text{min}$; 2. No fire, no explosion
Charge retention	After the battery pack is charged according to the standard specified in 4.3, put it aside for 30 days at a normal temperature of $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$, and then discharge according to 4.4 at this temperature	Charge retention rate $\geq 95\%$
Rate discharge performance	After the battery pack is charged according to the standard specified in 4.3, put it at room temperature for 10 minutes, discharge at 1C current, cut-off voltage 9.25V, and record the discharge capacity	Discharge capacity $\geq 95\%$

Cycle life	Under the condition of $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$, the battery pack shall be charged according to the standard specified in 4.3, put it aside for 5min, and then discharged according to 4.4 to the termination condition, and cycle according to this. The battery capacity is tested according to the standard charge and discharge every 25 cycles, and the test is terminated when the capacity is less than 80% of the rated capacity	$\geq 2500\text{TIMES}$
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4.7 Environmental performance

Test items	Test Conditions	standard test
Constant temperature and heat experiment	After the battery pack is charged according to the provisions in 4.3, the battery pack shall be left open for 48 hours under the conditions of an ambient temperature of $40^{\circ}\text{C}\pm 2^{\circ}\text{C}$ and a relative humidity of 90-95%, and then return to a temperature of $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$ and a relative humidity of 25%-85%. After the condition, discharge at 4.4 standard.	The battery pack has no obvious deformation, corrosion, smoke or explosion; the discharge capacity is greater than 80% of the rated capacity.
Temperature shock	After the battery pack is charged according to 4.3, it is opened and placed in the incubator 1) Starting from $-40^{\circ}\text{C}\pm 2^{\circ}\text{C}$, keep the low temperature for 120min; 2) Then heat up to $75^{\circ}\text{C}\pm 2^{\circ}\text{C}$ at $10^{\circ}\text{C}/\text{min}$; 3) Maintain a high temperature of $75^{\circ}\text{C}\pm 2^{\circ}\text{C}$ for 120min; 4) Cool down to $-40^{\circ}\text{C}\pm 2^{\circ}\text{C}$ at $10^{\circ}\text{C}/\text{min}$ Repeat 4 times, return to normal temperature after four complete cycles, take out the battery pack, and let it stand for 120 minutes at 25°C to bring the lithium battery pack to room temperature.	The lithium battery pack has no deformation, cracking, or leakage; the open circuit voltage and charge capacity meet the product specifications, and it can still be charged and discharged normally.

4.8 Safety performance

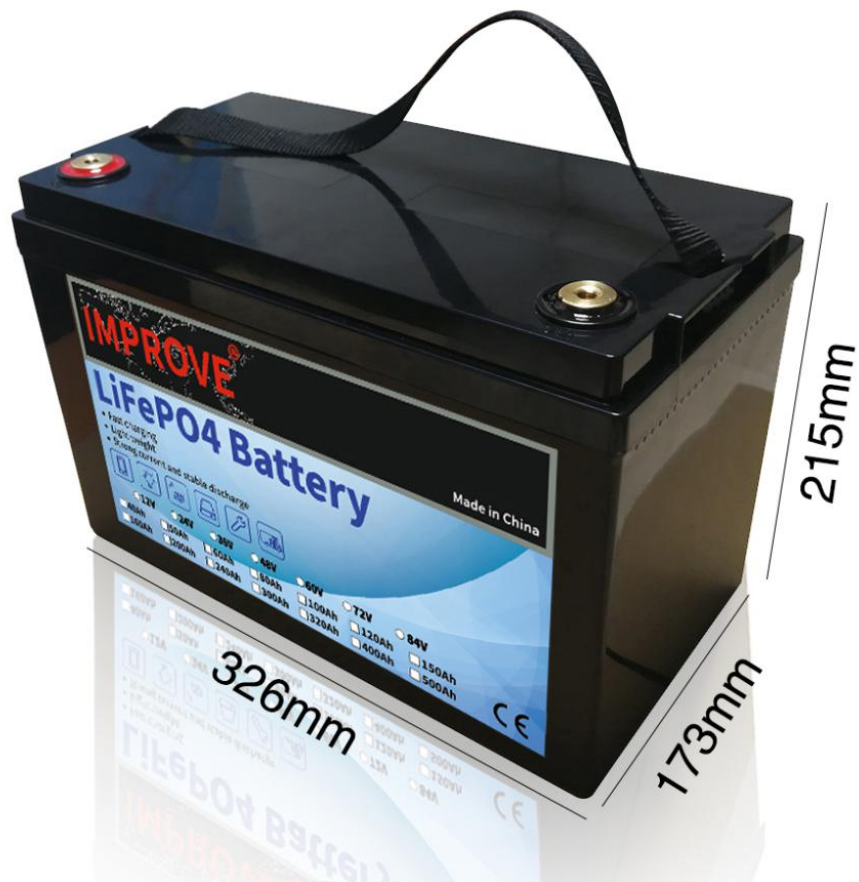
Test items	Test Conditions	standard test
Squeeze test	After the battery pack is fully charged in accordance with 4.3, place it between the two extrusion surfaces of the extrusion device, and gradually increase the pressure to 13KN for 1 min.	The battery pack does not explode or fire
Acupuncture test	Fully charge the battery pack according to 4.3, place the thermocouple in the battery pack, and use a $\Phi 5$ stainless steel needle to penetrate the center of the battery pack at a speed of 20-40mm/s.	The battery pack does not explode or fire
Short circuit test	After the battery pack is charged according to 4.3, put it aside for 1h at $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$. The battery is short-circuited externally for 10 minutes, the external circuit resistance is $<10\text{m}\Omega$.	The battery pack does not leak, explode, or fire

Drop test	After the battery pack is charged according to 4.3, put it aside for 1h at 20°C±5°C, then drop from 1.5m height to the wooden board at 20°C±5°C。	The battery pack does not leak, explode, or fire
Overcharge test	Remove the protective plate, and continue to charge the lithium battery pack with a constant current and constant voltage source charged to 16V at 1C(A) at an ambient temperature of 20°C ± 5°C until a single battery voltage is 4.0V.	The battery pack does not leak, explode, or fire
Over discharge test	Remove the protective plate, and under the condition of 20°C±5°C, the battery will be discharged with 0.5C(A) current until the voltage reaches 0V。	The battery pack does not leak, explode, or fire
Hot box test	After the battery is charged according to 4.3, put it into a constant temperature heating box, and the constant temperature heating box heats the battery core at a temperature rise rate of 5±2°C per minute. When the temperature of the constant temperature box reaches 130±2°C, keep it for 30 minutes.	The battery pack does not leak, explode, or fire

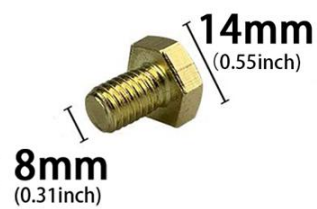
5. Product structure characteristics

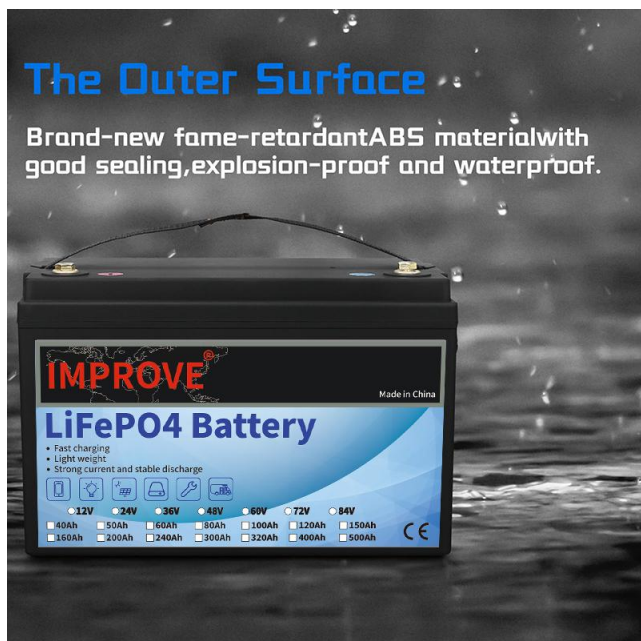
Schematic diagram of the overall product appearance size:





Pure copper
terminal M8





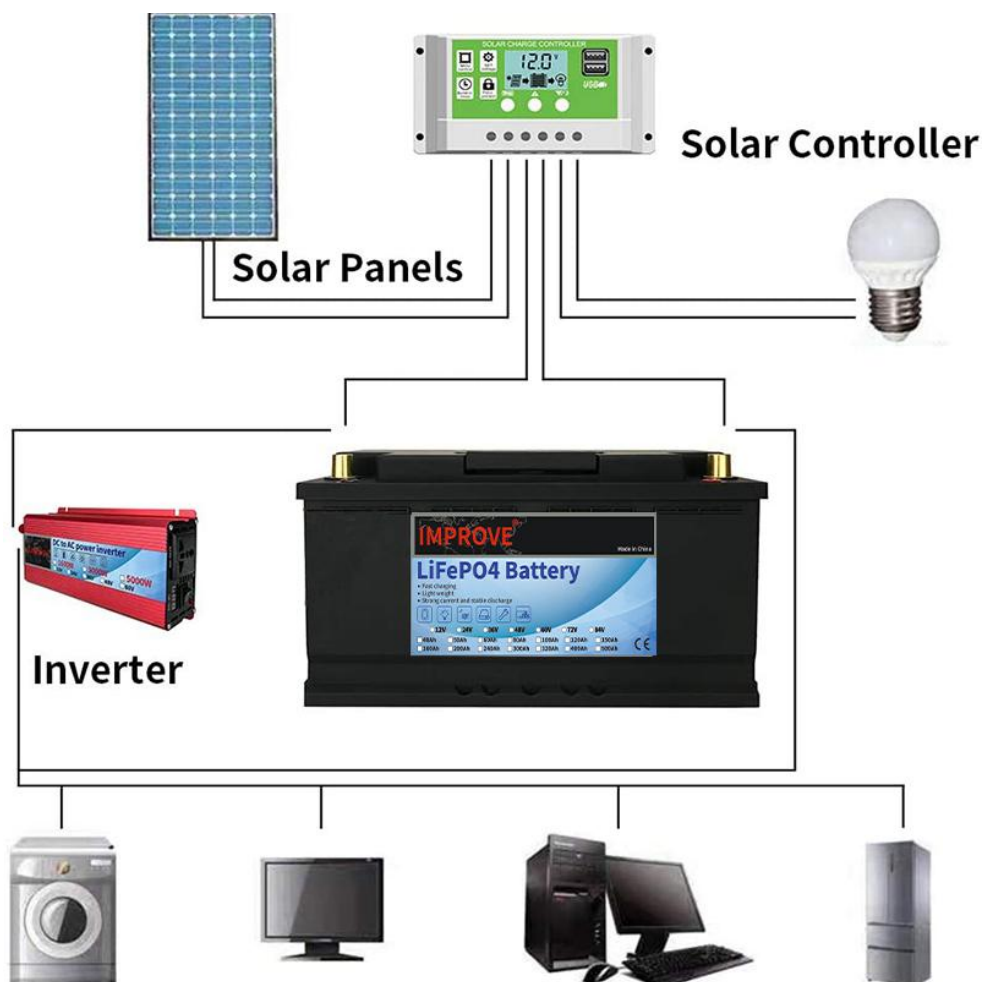
Professional BMS Board

LiFePO4 Battery Cell Grade A

Protection from :

- Overcharge
- Over-Discharge
- Over-Current
- Short Circuit

- High Energy Density
- Highest-level Safety
- Longest Service Life



6. Storage, maintenance and transportation

6.1 Storage

When the battery pack needs to be stored for a long time, after the battery is discharged, please charge the battery until the battery display shows 12V), place it in a dry and ventilated place, and cycle once every three months. The battery pack should be stored in a clean, dry, ventilated place, avoid contact with corrosive substances, and keep away

from fire and heat sources.

6.2 Transportation

The battery pack should be packed and transported. During transport, it should be protected from severe vibration, impact or squeezing, and protected from the sun and rain. It can be transported by vehicles, trains, ships, planes and other means of transportation.

6.3 Maintenance

6.3.1 When the battery pack is stored, it should be stored at a state of charge of 40% to 60%;

6.3.2 When the battery pack is not in use for a long time, it is recommended to charge it every three months or so, and charge the battery to 50% of the power displayed on the display every time the battery is recharged;

6.3.3 During the maintenance process, please do not reinstall and remove the batteries in the battery pack by yourself, otherwise it will cause the degradation of battery performance;

6.3.4 Do not disassemble or replace any battery in the battery pack without authorization, and dissect the battery is strictly prohibited.

7. Notes on battery usage

7.1 Do not reverse the positive and negative poles to prevent short circuits;

7.2 Do not put the battery pack in water or soak it;

7.3 It is strictly forbidden to charge the battery pack under fire or extreme heat conditions! Do not use or store battery packs near heat sources (such as fire or heaters);

7.4 It is strictly forbidden to pierce the battery pack shell with nails or other sharp objects, and forbid hammering or pedaling the battery pack;

7.5 It is strictly prohibited to disassemble battery packs and batteries in any way;

7.6 If the battery pack emits peculiar smell, heat, deformation, discoloration or any other abnormal phenomenon, it should be immediately removed from the electrical appliance or charger and stop using it;

7.7 If the electrolyte accidentally spills into the eyes after the battery leaks, do not wipe it off, rinse with water immediately, and seek medical help in serious cases;

7.8 The ambient temperature will affect the discharge capacity. When the ambient temperature exceeds the standard environment ($25^{\circ}\text{C}\pm 5^{\circ}\text{C}$), the discharge capacity will be slightly reduced;

7.9 During the charging process of the battery pack, if there is a peculiar smell or abnormal sound, please stop charging immediately;

7.10 In the process of discharging the battery pack, if there is a peculiar smell or abnormal sound, please stop discharging immediately;

7.11 If the above phenomenon occurs, please contact the manufacturer and do not disassemble it privately.