

	Specification	Versions	A0
		Date	Jul. 11, 2024
		DOC No:	LW-YJY-CN2024071103-14-WXX
Address: Economic Development Zone of Hangbu town, Shucheng County, Lu'an City, Anhui Province, China.			
Tel:+86-18055169245	Post Code:231323	Web: www.lvwo-energy.com	

NO.: LW-YJY-CN2024071103-14-WXX

Product Development Agreement

Power Battery Specification for 25.6V6.4Ah

A0 Version

Prepared By	Checked By	Approved By

Customer Approved	Signature:
	Date:
	Company Name: （Company Stamp）



A0

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I. Battery System Design Reference Technical Document

- GB 2894 safety signs (neq ISO 3864: 1984)
- GB 16179 Guidelines for the use of safety signs
- GB 8897.4-2008 Primary batteries (Part 4) Safety requirements for lithium batteries
- GB 21966-2008 Safety requirements for lithium primary cells and batteries in transportation
- GJB 4477-2002 General Specification for Lithium-ion Battery Packs

II. Supply list

No.	Version	unit	quantity	note
1	25.6V 6.4Ah battery	pcs	1	
2		pcs		
3		pcs		

III. Requirements for the use of the battery system

- Battery system operating external ambient temperature requirements: charge and discharge: charge $-30^{\circ}\text{C}\sim 60^{\circ}\text{C}$, discharge $-50^{\circ}\text{C}\sim 60^{\circ}\text{C}$;
- Battery system working external environment humidity requirements: $10\%\leq\text{humidity}\leq 90\%\text{RH}$;
- Battery system operation state try to maintain more than 20% SOC;
- When the battery system is not in use for a short period of time, it is required to maintain more than 60% SOC and be stored in a dry, clean and well-ventilated warehouse at $-20^{\circ}\text{C}\sim 45^{\circ}\text{C}$.
- During the loading process of the battery pack, it is required to carry and put it gently, and strictly prevent it from falling, rolling and impacting;
- The battery pack shall not be placed upside down or lying down in the storage state; it is strictly prohibited to expose the battery pack to sunlight, rain or water for a long time;
- Ensure that the battery system in the operation or storage state away from flammable and explosive substances, high temperature environment;

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8. It is strictly prohibited to force the battery system to operate under the state of short circuit, overcharge and high temperature alarm;
9. Strictly prohibit customers from disassembling the battery system without permission;

IV. Battery parameters

4.1 Testing conditions

If there is no special requirement, the experiment should be carried out in the environment of temperature: $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, relative humidity: 15~90 %RH, atmospheric pressure: 70kPa~106kPa.

4.2 Basic performance

Cell parameters			
No.	Items	Parameters	Note
1	Battery Type	Lithium Iron Phosphate Battery	
2	Rated voltage/capacity	3.2V/3.2Ah (IFR26650)	
3	Single Cell Voltage Range	2.0V-3.65V	
4	Individual Battery Weight	$\approx 85\text{g}$	
5	Dimension	height: $65.7 \pm 0.2\text{mm}$ dia.: $26.3 \pm 0.2\text{mm}$	
6	operating temperature	Charge- 30°C - 60°C Discharge- 50°C - 60°C	
7	Charge retention capability	95% (25°C , 28days)	
8	Cycle times	More than 1500 times (0.2C, normal temperatures, capacity retention: 80%)	

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Battery system parameters			
1	Rated voltage	25.6V	8S2P
2	Battery pack voltage range	16-29.2V	By Single Cell 2.0-3.65V
3	Rated capacity	6.4Ah	
4	total energy	163.84Wh	
5	SOC range	10%-100%	
6	Charge and Discharge Capacity Efficiency	≥96%	
7	Standard charging current (A)	6.4A (1C)	Recommended 0.5C and below
8	Standard discharge current (A)	12.8A (2C)	Recommended 0.5C and below
9	Total weight	2.5kg(estimation)	
10	Ambient relative humidity	10%-90%	
11	Shell material	Epox plate heat shrink film	
12	Battery pack composition	8S2P	
3	Battery system charging and discharging ambient temperature	Charge -30℃~60℃, Discharge -50℃~60℃	
14	Product Dimension (mm)	182*127*75mm (L*W*H) ±2mm	
15	Input/Output Method	FASTIN-FASTON250	
16	Whether to configure Bluetooth function	not	

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4.3 Environmental characteristics

不同温度放电性能 temperature discharge performance	按 3.4 的低温测试标准，以 1C 的电流恒流放电至 1.5V According to the low temperature test standard in 3.4, discharge to 1.5V with 1C current $\frac{-40^{\circ}\text{C 放电容量}}{25^{\circ}\text{C 放电容量}} \geq 90\%$ $\frac{\text{discharge capability at } -40^{\circ}\text{C}}{\text{discharge capability at } 25^{\circ}\text{C}} \geq 90\%$
	按 3.4 的低温测试标准，以 1C 的电流恒流放电至 2.0V According to the low temperature test standard in 3.4, discharge to 2.0V with 1C current $\frac{-20^{\circ}\text{C 放电容量}}{25^{\circ}\text{C 放电容量}} \geq 90\%$ $\frac{\text{discharge capability at } -20^{\circ}\text{C}}{\text{discharge capability at } 25^{\circ}\text{C}} \geq 90\%$
	按 3.2 的规定充电结束后，以 1C 的电流恒流放电至 2.0V After charging as specified in 3.2, discharge at constant current of 1C to 2.0V $\frac{60^{\circ}\text{C 放电容量}}{25^{\circ}\text{C 放电容量}} \geq 98\%$ $\frac{\text{discharge capability at } 60^{\circ}\text{C}}{\text{discharge capability at } 25^{\circ}\text{C}} \geq 98\%$

4.4 Safety Characteristics

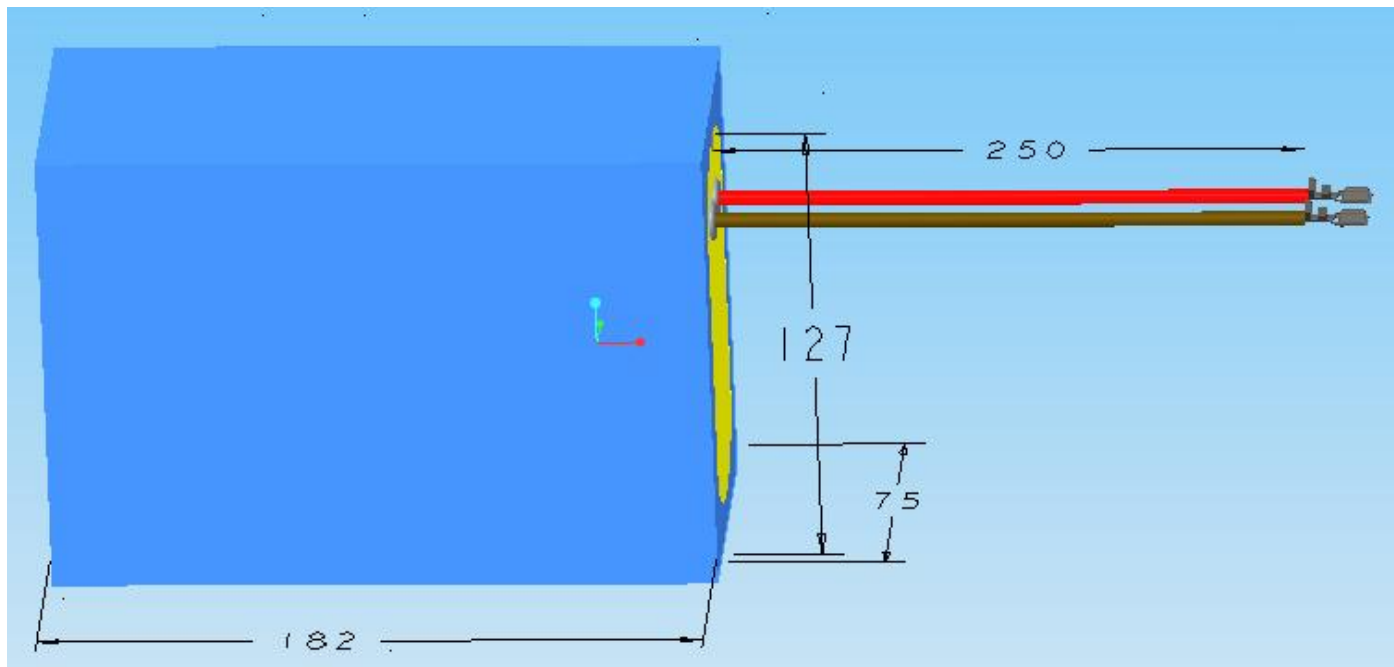
Items	Specification Parameters	Notes
Insulated electricity	$\geq 10\text{M}\Omega$	With insulation resistance tester DC 500V test voltage, the battery positive and negative terminal interface (terminal) were tested on the battery pack metal shell, insulation resistance value $\geq 10\text{M}\Omega$.
Highly insulated	No breakdown, no flaring	Battery positive and negative terminal interface respectively on the battery pack metal casing can withstand 50Hz, RMS 500V AC voltage (leakage current $\leq 10\text{mA}$) or 710V DC voltage for 1min, there should be no breakdown, no flaring.
anti-soaking	No leakage, smoke, fire or explosion	Immerse the fully charged battery pack in a 3.5% NaCl solution. The water depth should completely submerge the battery pack and keep it for 2 hours. After taking it out, place it for 4 hours under the environmental conditions of a temperature ranging from 15°C to 35°C, a relative humidity ranging from 25% to 85%, and an atmospheric pressure ranging from 86 kPa to 106 kPa.

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drop-resistance	no obvious damage, no leakage, shell rupture, fire or explosion, and the battery pack and each position have no displacement when shaking up and down	When the battery pack is fully charged, choose any 6 angles, and drop to the cement floor once from the highest height set (0.8m ~ 1.8m).
Constant humidity	No apparent deformities, rust, smoke, or explosions, with a capacity not less than 90% of the measured baseline capacity.	Once the battery pack is fully charged and equipped with a Battery Management System (BMS), it is placed in a constant temperature and humidity chamber at $60^{\circ}\text{C} \pm 2^{\circ}\text{C}$ with a relative humidity of 90% to 95% for 12 hours. Subsequently, it is removed and allowed to stand for 2 hours at an ambient temperature of $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for visual inspection before discharging with a current of 1.0I1A to the cut-off voltage.
Vibration measurement	No explosion, no fire, no deformation, no parts falling off, no abnormal voltage, no sharp discharge current.	After fully charging the battery pack, it is securely fixed on a vibration table in the horizontal plane. The battery pack is then subjected to vibrations with an amplitude of 5mm and a maximum stroke of 10mm, with vibration frequencies ranging from 10Hz to 55Hz. Vibration tests are conducted in the x, y, and z directions of the battery pack, with each direction undergoing frequency-sweep testing between 10Hz and 55Hz for a duration of 90 minutes $\pm$ 5 minutes. After the completion of the test, it is left idle for 1 hour.

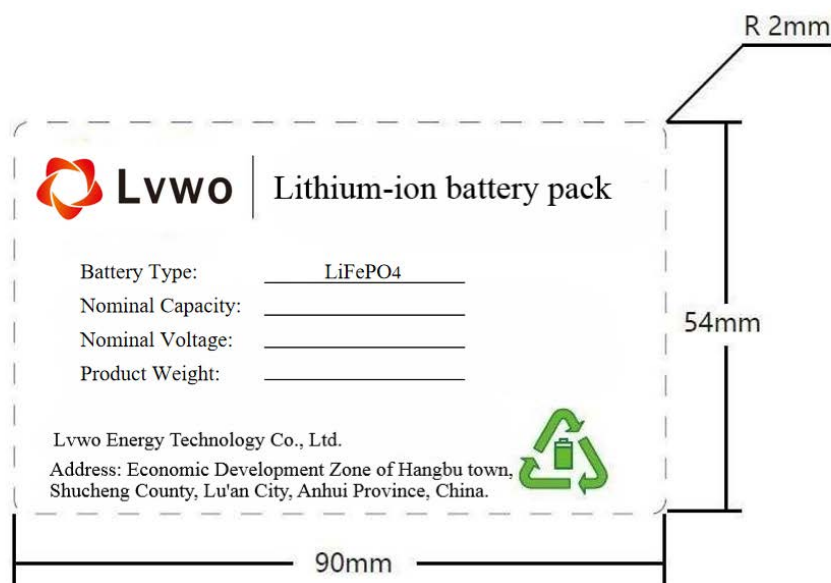
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V. Schematic diagram of product external dimensions



Overall dimension.

VI. Warning labels and nameplates

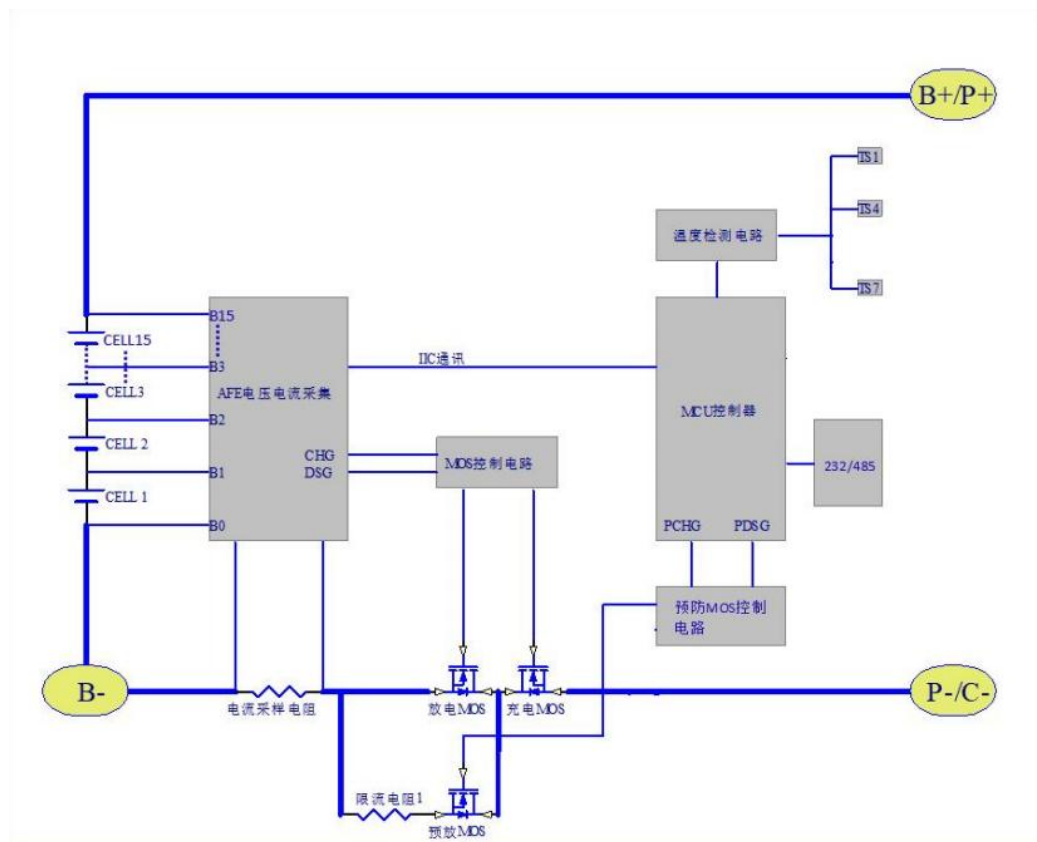


nameplates

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VII. Batty Manager System specifications and parameters

7.1 Physical and wiring diagram of the BMS



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7.2 Electrical parameter

Function	Test Item	Parameter	Accuracy	Unit
Charging Voltage	Rated charging voltage	29.2V	±0.25	(V)
Sustained Current	Maximum Charging Current	6.5A	Settable	(A)
	Maximum Discharge Current	13A	Settable	(A)
Charging protection	Overcharging protection voltage	3750	±25	(mV)
	Overcharging protection delay	1000	±500	(mS)
	Overcharging protection restore voltage	3500	±50	(mV)
	Overcharge protection recovery condition	The voltage of each battery is lower than the overcharge protection recovery voltage.		
	Charging overcurrent	13	±5	(A)
	Charging overcurrent delay	1000	±500	(mS)
	Charging overcurrent release condition	Disconnecting charger		
Equilibrium	Equalizing opening voltage	3300	±50	(mV)
	Equalizing current	33	±5	(mA)
	Equalizing mode	Charging equalization		
Discharging protection	Overdischarging protection voltage	2300	±80	(mV)
	Overdischarging protection delay	1000	±500	(mS)
	Overdischarging protection restore voltage	2500	±100	(mV)
	Overshoot protection recovery condition	Disconnecting the load or plug in the charger		
	Discharging overcurrent protection	18.4	±100mA	(A)
	Discharging overcurrent protection delay	1000	±100	(mS)
	short-circuit protection	Yes		

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	Short-circuit protection delay	400	\	(μ S)
	Overcurrent/ short-circuit protection delay recovery condition	Disconnecting the load or plug in the charger		
Temperate protection	Charging high temperature protection	60	± 3	($^{\circ}$ C)
	Charging high temperature protection recovery	40	± 3	($^{\circ}$ C)
	Charging low temperature protection	-30	± 3	($^{\circ}$ C)
	Charging low temperature protection recovery	-40	± 3	($^{\circ}$ C)
	Discharging high temperature protection	70	± 3	($^{\circ}$ C)
	Discharging high temperature protection delay	60	± 3	($^{\circ}$ C)
	Discharging low temperature protection	-50	± 3	($^{\circ}$ C)
	Discharging low temperature protection recovery	-40	± 3	($^{\circ}$ C)
Consumable power	Single-cell self-consumption power	22.1	≤ 50	(μ A)
Internal resistance	Internal resistance of charge/discharge loop	6.3	≤ 30	($m\Omega$)
Dimension	L*W*H	120*63*10		(mm)

Charger

1. Special Charger for Lithium Iron Phosphate Battery
2. Maximum Input Voltage ≤ 29.2 (CC/CV)
3. Maximum Continuous Output Current $\leq 6.5A$

Note: To prevent overcharging due to charger or protection board failure, the charger end shall cut off first at the end of charging.

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IX. the use of conditions

9.1 Packaging

9.1.1 Method: Neutral carton (domestic) Dangerous goods carton (export) Wood pallet (bulk container export).

9.1.2 Each battery pack should have outer packaging and should be accompanied by a product manual and a certificate of conformity. The packaged product should be placed in a dry, dust-free, and moisture-proof packaging box. The outer packaging of dangerous goods should indicate the product name, model, voltage, capacity, quantity, gross/net weight, logo, battery serial number, etc. Neutral packaging does not include the above content. There should be necessary signs such as “Handle with care,” “Keep dry,” “This side up,” “Keep away from fire,” and so on.

9.1.3 Shipping documents: Shipping inspection report, product manual, host computer software, communication protocol (electronic file), etc.

9.1.4 Shock and pressure prevention measures: Fill shock-absorbing materials on both external sides (top and bottom) of the battery module.

9.1.5 Waterproofing, anti-scattering, handling: Battery module in nylon bag, tightened with strapping, pallet.

9.2 Transportation

Battery packs should be packaged in boxes for transportation, ensuring protection against severe vibrations, impacts, or compression. They should be shielded from exposure to sunlight and rain, and can be transported using vehicles such as cars, trains, ships, or airplanes.

9.3 Storage

9.3.1 Battery packs are typically stored at a state of charge of 20%-40% in a clean, dry, well-ventilated indoor area with an environment temperature of -20°C to 35°C and a relative humidity not exceeding 75%. The packs should be placed flat with a minimum distance of 100mm from the ground.

9.3.2 Batteries should not be stored together with reactive chemicals or dusty items.

9.3.3 Batteries should not be subjected to any mechanical impact or heavy pressure.

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9.3.4 Batteries should be kept away from direct sunlight, heat sources, with a distance from heat sources not less than 2 meters.

9.3.5 Every 3 months from the date of manufacture, a 0.2-0.5C current charge should be applied for 30-60 minutes, at a temperature range of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$.

X. Responsibility for use

The use of a letter of responsibility requires users to follow the instructions on the battery label or the specifications provided by Anhui Lvwo Energy Technology Co., Ltd. If any loss is incurred due to the user's improper use leading to overheating of the power system, fire, explosion, or similar incidents, the company will not be held liable.

XI. Dangerous matters

Failure to read the following precautions carefully may result in battery leakage, explosion, or fire.

- (1) Do not submerge the battery in water or get it wet;
- (2) Do not use or store the battery near a heat source (such as fire or heater);
- (3) Do not reverse the positive and negative poles;
- (4) Do not directly connect the battery to a wall outlet or car cigarette lighter socket;
- (5) Do not throw the battery into fire or heat it;
- (6) Do not short-circuit the positive and negative poles of the battery with wires or other metal objects, and do not transport or store the battery with necklaces, hairpins, or other metal objects;
- (7) Do not strike, throw, or subject the battery to mechanical vibrations;
- (8) Do not pierce the battery casing with nails or other sharp objects, and do not hit or step on the battery;
- (9) Do not disassemble the battery in any way;
- (10) Do not charge the battery in a fire or under extreme heat conditions.

XII. Warnings and Precautions

- ◆ - No unqualified personnel are not allowed to dismantle or repair the battery system.
- ◆ - Only use the designated charger for charging the battery system.

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- ◆ - Do not immerse the power system in water or saltwater. Store the battery in a cool, dry environment when not in use.
- ◆ If the power system emits odors, heats up, changes color or shape during charging or discharging, or shows any abnormalities, stop operation immediately and seek professional assistance.
- ◆ In case of a battery fire, use dry sand or a nitrogen fire extinguisher.
- ◆ - Do not dispose of the battery system in fire or heat sources.
- ◆ - When installing or using the battery, remove metal jewelry or other metal items, handle the battery carefully, especially when placing it in a metal container.