

Product Specification



Lithium-ion Battery

Title	Lithium-ion Cell LiFePO ₄
Customer Product Model	KN24 212TL
Product Specification	25.6V 212Ah
Modell	KN24 212TL

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1. Product Overview

This product is a lithium-ion battery pack manufactured in China. It adopts high-performance and high-safety power-type lithium batteries, equipped with a safe and reliable battery protection board that provides multiple safety protections against overcharging, over-discharging, overcurrent, temperature, and short circuits. It is suitable for lithium battery applications in light trucks, heavy trucks, commercial vehicles, parking air conditioners, and starting power supplies.

2. Standard

This product is manufactured in accordance with the following standards: The National Standard of the People's Republic of China GB 31241 "Safety Requirements for Lithium-ion Batteries and Battery Packs for Portable Electronic Products" and GB/T 36276-2018 "Lithium-ion Battery for Power Storage"

3. Specifications

3.1 Battery Pack Specifications

No.	Item	Rated Performance		Remark
1	Lithium-ion Cell	LiFePO ₄ 3.2 V / 106 Ah		106Ah
2	Rated Capacity	Typical	212Ah	Standard Discharging
		Minimum	200Ah	
3	Standard Voltage	25.6 V		/
4	Shipment Voltage	25.8~26.5 V		Within 10 days of shipment
5	Charge Cut-off Voltage	29.2 V		PACK
6	Discharge Cut-off Voltage	25.2 V		PACK
7	AC (1kHz) Impedance New Cell Max. (mΩ)	≤40 mΩ		AC 1kHz Impedance
8	Standard Charging Method	0.5C constant current (CC) charge to 29.2V, then constant voltage (CV) 29.2V charge until charge current declines to 0.05C		Charging time: Approx. 3h. PACK (module)
9	Standard Discharging Method	0.5C constant current discharge to 25.2V		PACK
10	Max. Charge Current	≤220A		Charging time: Approx. 80 min (Ref.) PACK

11	Maximum Discharge Current	≤220A		Continuous discharge mode PACK
12	Max. Instantaneous Discharge Current	2400A (1s)		Ambient temperature 25 °C
13	Operating Temperature and Relative Humidity Range	Change: -30~45 °C, 60 ± 25 % R. H.		/
		Discharge: -20~60 °C, 50 ± 25 % R. H.		
14	Long-term Storage Temperature	0~25 °C, 50 ± 25 % R. H. (50 %~70 % SOC)		Must be charged once every six months; for batteries with protection circuit, must be charged once every three months.
15	Weight	Max.: 55 kg (PACK)		Whole product
16	Temperature Performance	After standard charging, discharge at 0.5C constant current until voltage drops to 50V at different temperatures. Then measure the capacity. If the charging temperature and discharging temperature are different, the time difference is equivalent to 3 hours.		-20℃ ≥ 80%
				0℃ ≥ 85%
				35℃=100%
17	Product Dimensions	L:	480mm max	Refer to product drawing
		W:	380mm max	
		H:	200mm max	
18	Appearance	By sight: Vertical 30 cm		No damage, no leakage, no contamination, markings clear.
19	IP Protection Grade	IP65		
20	PACK Shell Material	A3 iron, 1.5mm thick, black		

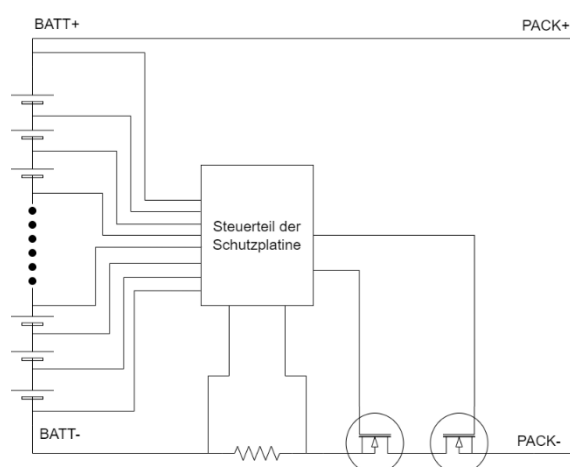
3.2 PCM Parameters

Details		Min.	Typ.	Max.	Unit
Input Charging Voltage		/	29.2	/	V
Input Charging Current			≤220		A
Continuous Output Discharging Current			≤220		A
Type of Charger		Please use the national standard charger with long output or pulse output, and support national standard charger from 0V charging			
Operating Condition	Operating Temperature	-40	/	80	℃
	Operating Humidity (No Water-Drop)	0%	/	90%	RH
Protection Parameters (for Individual Cell)					
Over-Charge Voltage Protection (OVP)		3600	3650	3700	mV
Over-Charge Voltage Protection Release (OVPR)		3400	3450	3500	mV
Over-Charge Delay Time		1000	2000	3000	ms
Over-Current Charge Protection (OCCP)		200	220	240	A
Over-Current Charge Protection Delay Time (OCPDT)		80000	10000	12000	ms
Over-Discharge Voltage Protection (ODVP)		3100	3150	3200	mV
Over-Discharge Voltage Delay Time		200	1000	1800	ms
Over-Discharge Voltage Protection Release (UVPR)		The lowest voltage higher than recovery voltage, or recovery by charging			
Over-Current Discharge Protection (OCDP)		300	320	340	A
Over-Current Protection Delay Time (OCPDT)		50	60	70	s
Over-Discharge Protection Release		Disconnect load or charge release			
Short Circuit Current Protection		Enable Short Circuit Protection			
Short Circuit Current Protection		Short circuit load P+/P-, then open the air switch, and the short circuit test is OK			
Short Circuit Protection Delay Time		/	250		us
Short Circuit Protection Release		Disconnect load or charge release			
Main Loop On-State Resistance (MOS-RDS)		≤10			mΩ
PCBA Size (L*W*H)		172(±2)×105(±1)×<18(±2)			mm
Temperature Protection	Charging High Temperature Protection			75±2℃	
	Charging High Temperature Recovery			55±2℃	
	Discharge High Temperature Protection			85±2℃	
	Discharge High Temperature Recovery			75±2℃	
	Charging Low Temperature Protection			0±2℃	
	Charging Low Temperature Recovery			5±2℃	
	Discharge Low Temperature Protection			-40±2℃	
	Discharge Low Temperature Recovery			-10±2℃	
Notice: Make sure the design parameters and conditions of usage are followed, and do not exceed the values specified in this specification.					

3.3 PCM Parts List

Type	Specification/Modell	Manufacturer
Protection IC-1	IC\MC665\LCC-22*20-101P	Guang and Tong
Protection IC-1	IC\OZ3717\LQFP48L	O2 Micro
MOSFET	MOS\SMD\HYG011N04LS1TA\TOLL	HUAYI-Micro
NTC	NTC*2\10K\3950\250 mm\ with terminal \HY2.0	Temp-sen
Please note: In the process of batch shipment of our various models of protection plates, our company may replace different brands and models of charge/discharge tubes and protection ICs for different batches of orders, but the premise is that the changes are made under the condition that the above performance indicators are met.		

3.4 Block Diagram



4. Test Conditions and Instruments

4.1 Test Conditions

Unless otherwise stated, tests shall be conducted within one month before delivery under the following conditions:

4.1.1 Newly produced batteries: less than 5 cycles.

4.1.2 Relative Humidity: 45% ~ 85% R.H.

4.1.3 Ambient Temperature: $25 \pm 2^\circ\text{C}$.

4.2 Test Instruments

4.2.1 Dimension Measuring Instrument

The dimension measurement shall be carried out with instruments having a precision scale of 0.01 mm or higher.

4.2.2 Voltmeter

Voltmeter of standard class specified in the national standard or of higher sensitivity class, with an internal resistance $\geq 10 \text{ k}\Omega/\text{V}$.

4.2.3 Ammeter

Ammeter of standard class specified in the national standard or of higher sensitivity class, with a total resistance including ammeter and wire $\leq 0.01 \Omega$.

4.2.4 Internal Impedance Meter

The impedance shall be measured by the AC 1kHz sinusoidal current method (AC 1kHz LCR meter).

5. Electrochemical Performance Testing

5.1 Standard Charge

0.5C CC/CV charging until the current drops to 0.05C, at 25°C.

5.2 Standard Discharge

0.5C constant current discharge until cut-off voltage.

5.3 Battery Capacity

Discharge according to the standard method, record the discharge time. Capacity (Ah) = 0.5C × discharge time (h).

5.4 Electrochemical Performance

Test Items	Test Methods	Technische Anforderungen
Open-Circuit Voltage	Within 24 hours after full charge	$\geq 26.8 \text{ V}$
-15°C Discharge Capacity	After standard charge, stored at -15°C $\pm 2^\circ\text{C}$ for 16h, then discharge to cut-off voltage.	$\geq 60 \%$ Nominal Capacity
60°C Discharge Capacity	After standard charge, stored at 60°C $\pm 2^\circ\text{C}$ for 5h, then discharge to cut-off voltage.	$\geq 90 \%$ Nominal Capacity
Charge Retention and Capacity Recovery	After standard charge, stored at 25°C $\pm 2^\circ\text{C}$ for 30 days, then standard discharge. Capacity recovery measured after 3 cycles.	Capacity retention $\geq 80 \%$ Capacity recovery $\geq 90 \%$
Cycle Life	Standard Charge Rest for 30 minutes Standard Discharge Rest for 30 minutes Repeat steps 1~4 for up to 2000 cycles at an ambient temperature of $25 \pm 2^\circ\text{C}$.	/

5.5 Reliability Test (For Cell)

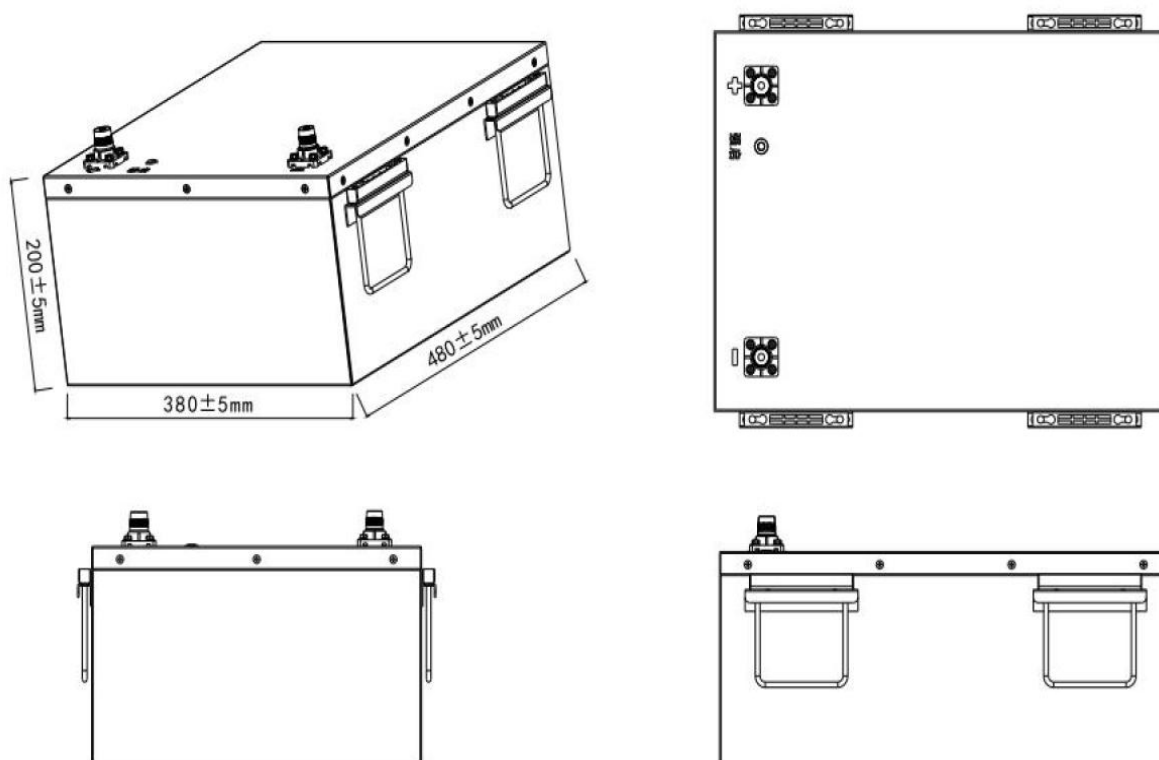
Test Items	Test Methods	Requirement	Battery Condition
Crush Test	A cell is placed between two flat plates of the crush equipment, with the cylindrical axis parallel to the plates. Pressure is gradually increased to approximately 13kN and maintained for 1 min.	No fire, no explosion	Fresh, fully charged

Heat Abuse	Standard Charge and then place the cell in a circulation air oven. Increase temperature at a rate of $(5\pm 2)^{\circ}\text{C}/\text{min}$ to $(130\pm 2)^{\circ}\text{C}$, and maintain for 30 min. At $130\pm 2^{\circ}\text{C}$ the oven is to remain for 10 minutes before the test is discontinued.	No fire, no explosion	Fresh, fully charged
Overcharge Test	A cell is discharged to cut-off voltage at 0.2C, then connected to CC/CV power supply. Current is set to 3 times the maximum charge current and voltage set to 3.9V. Charging continues until the battery temperature decreases by 20% from its peak, and is maintained for 7h or until the voltage no longer increases.	No fire, no explosion	Fresh, fully charged
Short-Circuit Test	After standard charge, connect the positive and negative terminals with a $(80\pm 20)\text{ m}\Omega$ wire. Monitor the temperature during the test. The test ends when the cell temperature decreases by 20% from the peak value.	No fire, no explosion Max. temperature $<150^{\circ}\text{C}$	Fresh, fully charged
Drop Test	After standard charge, the cell is dropped onto a concrete floor from a height of 1.0 m. Total of 4 drops: 2 drops on cell terminals (head and tail), and 1 drop on each side.	No smoke, no explosion	Fresh, fully charged
Vibration Test	After standard charge, the fully charged cell is subjected to sinusoidal vibration with amplitude 0.76 mm (double amplitude 1.52 mm), frequency range 10 Hz~55 Hz, varying at 1 Hz/min, along X, Y, and Z directions, 90 min $\pm$ 5 min for each direction.	No leakage, no fire, no explosion	Fresh, fully charged
Constant Temperature and High Humidity	After standard charge, the cell is stored in a constant temperature and humidity chamber at $40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and 95%RH for 48h. Then it is	1. No deformation, no smoke, no rust, no explosion 2. Discharge after	Fresh, fully charged

	placed at room temperature for 2h. After that, check the cell's appearance and discharge at 0.2C constant current to the cut-off voltage.	storage, capacity retention $\geq 80\%$	
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6. Structural Characteristics of the Product

6.1 Product Profile Dimensions



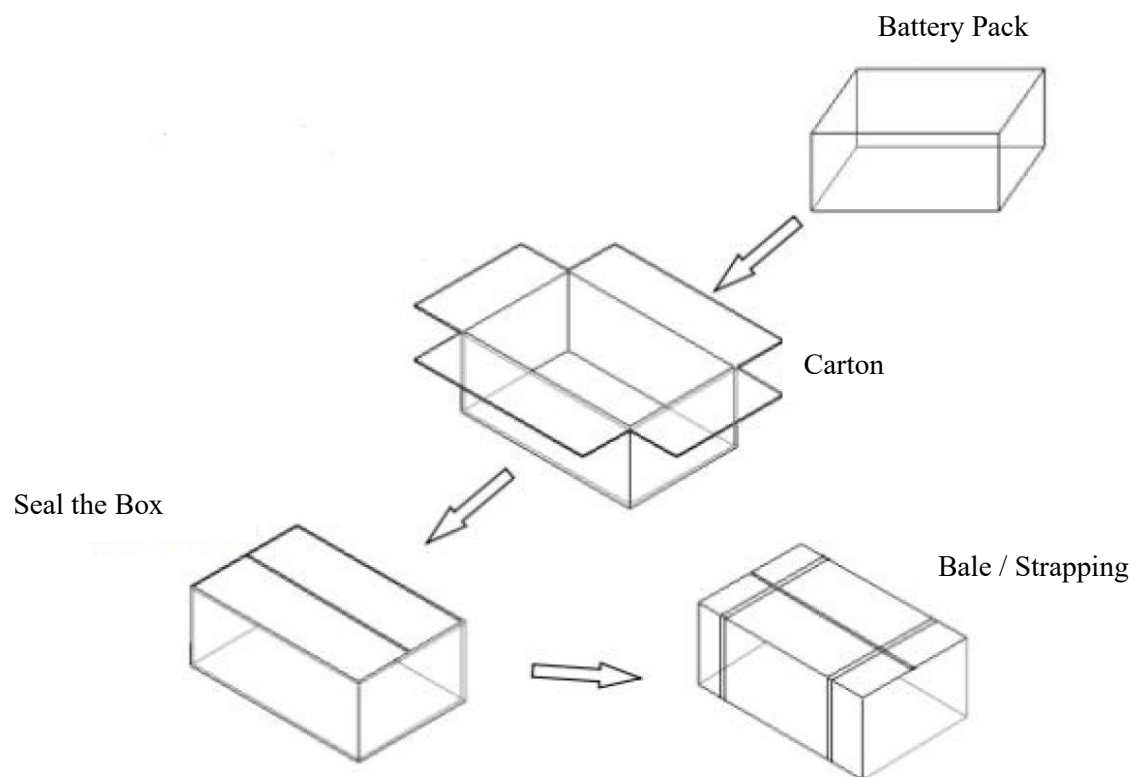
6.2 PACK Interface Definition

No.	Interface Definition	
1	Charge and Discharge Interface	200A terminal post, red positive, black negative

6.3 Physical Object Diagram, Labeled Schematic Diagram



6.4 Schematic Diagram of Packaging



7. Storage and Transportation

7.1 Storage

The Li-ion battery should be stored in a cool, dry, and well-ventilated area, away from fire and high temperatures.

The optimal storage condition is with the battery at 50%~70% state of charge (SOC).

The battery should be stored according to the requirements specified in this specification. A complete charge and discharge cycle shall be performed every three months, recharging the battery to 70% SOC.

7.2 Transportation

For transportation, the battery shall be shipped in a partially charged state, generally maintained at 20%~50% SOC.

During transportation, the battery must be handled with care to avoid collision, severe vibration, impact, direct sunlight, and rain. Short circuits must be strictly prevented. It is strictly prohibited to transport batteries together with corrosive substances such as acids and alkalis.

During loading and unloading, the battery should be handled gently, and strictly protected against dropping, rolling, or heavy pressure.

Do not mix the battery with other cargo during transportation.

Do not stack batteries more than 4 layers high, or place them upside down.

Do not transport the battery when the ambient temperature exceeds 60°C.

8. Typical Trouble and Troubleshooting

Trouble Symptom	Trouble Reason	Troubleshooting
Battery pack no output	Battery cable not connected	Connect the output cable of the battery pack correctly according to the specification
	Battery power is too low	Charge the battery
Charger power indicator is off	The mains power input plug of charger is not inserted correctly	Plug the charger input plug into the utility socket according to the manual
The battery pack cannot be charged	The output plug of charger is loose	Check whether the charger output plug is firmly connected with the battery pack
	The battery pack is fully charged	The battery pack can be used normally

9. Precautions for Using Battery

To ensure the proper use of the battery, please read the following precautions carefully.

Do not dispose of the battery in fire or expose it to heat.

Do not connect the battery to a charger or equipment with reversed positive and negative terminals.

Do not shock or vibrate the battery.

Do not short-circuit the battery.

Do not disassemble the battery.

Do not immerse the battery in water or allow it to get wet.

Do not mix batteries of different types, batches, or manufacturers.

Keep batteries out of the reach of children.

Batteries must be charged with an appropriate charger.

Do not use modified or damaged chargers.

Do not use chargers that do not comply with this specification.

Do not discharge the battery with a current exceeding the specification.

Do not discharge the battery when the ambient temperature is outside the specified range.

Do not over-discharge the battery.

Dispose of used batteries properly in accordance with local regulations. Ensure recycling or safe disposal of waste batteries.

10. Product Liability and Consulting

We shall not be held liable for any accidents resulting from operations in violation of this specification.

Note: Any items not covered in this specification shall be determined by mutual agreement between both parties.

The contents of this specification are subject to change without prior notice due to improvements in product quality or upgrades of relevant technical parameters. For the latest product information, please contact our company.

If you have any questions, please contact us :

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