

Specification For Approval

Spec.No. :

File. No.:

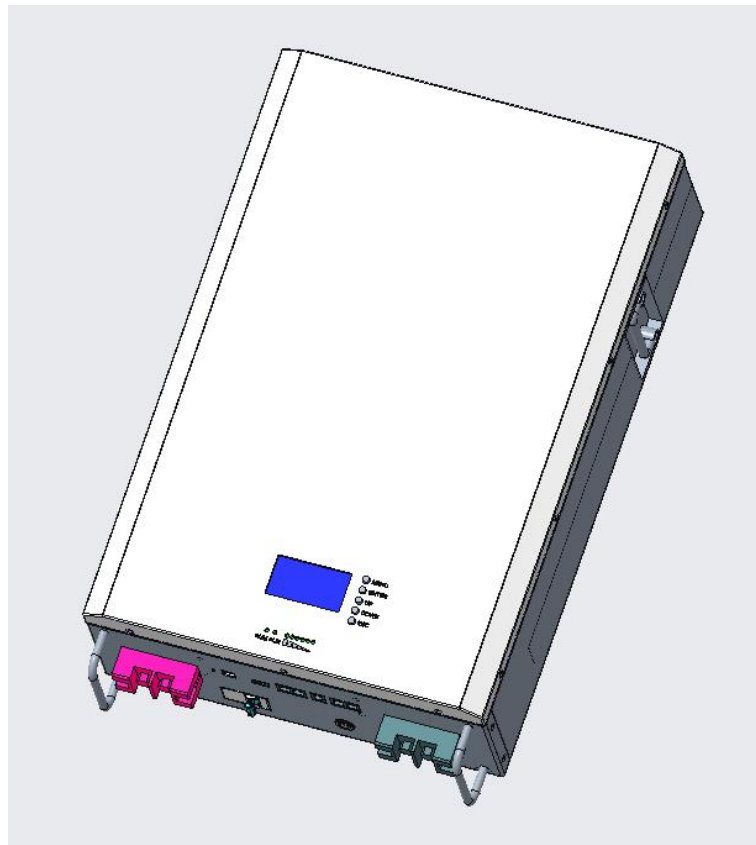
Ver: A/00

Date: 2021-07-22

ENERGY MANAGEMENT COMPANY SAL

Specification For Approval

Description	48V100Ah (Power wall/Rack mounted)
Effective Date	2022/07/22



Contents

1. Scope	3
2. The Specification Amendment.....	3
3. Product or Cell testing conditions.....	3
4. Standard	3
4.1 Reference Standard.....	3
4.2 Measuring Instrument and Apparatus.....	3
4.3 Testing Conditions (Unless Specially Requirements)	3
5. Main specifications	4
5.1 Cell Battery specifications.....	5
5.2 Battery Pack specifications.....	6
5.3 System composition parameters.....	7
5.4 Battery Management System.....	8
5.4.1 BMS function introduction.....	8
5.4.2 BMS Protect parameter.....	8-9
6. Appearance and structural dimensions	9-10
6.1 Function interface description	
6.2 SOC Indicator & Status Indicator GuidesSOC	
6.3 Address Switch function (Only in Parallel)	
6.4 Complete product image:	
7. Storage and Others	13
Appendix	14

Specification For Approval

1、Scope of application documents

This product specification only applies to the protection parameters of rechargeable lithium-ion battery products and batteries designed by our company

2、The Specification Amendment

If the raw materials, production processing, production system or battery usage environments & other conditions need to be changed, the amendment side needs provide the written advice to the other side, only the both sides come to agreement, the amendment will be effective.

3、Product or Cell testing conditions

It is recommended to use newly produced battery packs and new cells for related tests. Unless specified, testing and measurement shall be done under temperature of $20\pm 5^{\circ}\text{C}$ and relative humidity of 45~75%.

4、Standard

4.1 Reference Standard

Refer to GB 31241-2014 Safety Requirements for Lithium-ion Cells and Battery Packs for Portable Electronic Products

Refer to UL1642 safety standard - (lithium battery)

Refer to GB/T 31486-2015 Electrical performance requirements and test methods for traction batteries for electric vehicles

Refer to GB/T 31485-2015 Safety Requirements and Test Methods for Power Batteries for Electric Vehicles

Refer to GB/T 31484-2015 Cycle Life Requirements and Test Methods of Power Batteries for Electric Vehicles

4.2 Measuring Instrument and Apparatus

.1 Dimension Measuring Instrument

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.02mm.

.2 Voltmeter

Standard class specified in the national standard or more sensitive class having inner impedance more than $10\text{k}\Omega/\text{V}$

.3 Ammeter

Standard class specified in the national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01Ω .

.4 Impedance Meter

Impedance shall be measured by a sinusoidal alternating current method(1kHz LCR meter).

4.3 Testing Conditions (Unless Specially Requirements)

Atmosphere Pressure : $86\sim 106\text{kPa}$

Temperature: $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$ Relative Humidity: $\leq 75\%$

5.Main specifications

5.1 Cell Battery specifications

No	Item	General Parameter		Remark
1	Rated Capacity	Typical	100Ah	Standard discharge after Standard charge
2	Nominal Voltage	3.2V		Mean Operation Voltage

Specification For Approval

3	Internal Impedance	$\leq 0.65m\Omega$	Under $20\pm 5^{\circ}C$ Environment Temperature , the Usage Frequency of Fully Charge(1KHz) , Use AC Internal Impedance test machine to test $20\pm 5^{\circ}C$
4	Standard charge	Constant Current $0.5C_5A$, Constant Voltage 3.6V, $0.02C_5A$ cut-off	
5	Rapid Charge	Constant Current $1C_5A$, Constant Voltage 3.6V, $0.02C_5A$ cut-off	
6	Standard Charge Cut-off Voltage	3.65V	Voltage of the battery when the Charge is stopped
7	Standard Discharge Cut-off Voltage	2.5V	Voltage of the battery when the discharge is stopped
8	Standard discharge	Constant current $0.5C_5A$ end voltage 2.5 V	50A
9	Maximum discharge current	Constant current: $1C_5A$ end voltage: 2.5 V	$100A@ \cong 0^{\circ}C$
10	Dimension	Thickness:	
		Width:	
		Height:	
11	Weight	$2050g \pm 0.10kg$	
12	Operating Temperature Range	Temperature: $-20\sim 55^{\circ}C$, Humidity: $\leq 60\pm 25\%RH$	
13	Storage Temperature Range	Recommend ($25\pm 3^{\circ}C$) ; $\leq 60\pm 25\%RH$ storage moisture range.	

Specification For Approval

5.2 Battery Pack specifications for single module

No	Item	General Parameter		Remark)
1	Combination method	15S1P		
2	Rated Capacity	Typical	100Ah	Standard discharge after Standard charge (package)
		Minimum	98Ah	
3	Factory Voltage	48V-51V		
4	Voltage at end of Discharge	≤40.5V		Discharge Cut-off Voltage
5	Charging Voltage	53.2V		
6	Internal Impedance	≤40mΩ		Under 20±5°C Environment Temperature , the Usage Frequency of Fully Charge(1KHz) , Use AC Internal Impedance test machine to test.
7	Max Charging Current (Icm)	100A		Ampere-meter ,Maximum allowable charging current of the battery pack
8	Limited Charging Voltage(Uc1)	54V		Volta-meter (15*3.6V) ,Battery pack safe charging voltage
9	Max Discharging current	100A		Maximum discharge current allowed by the battery pack
10	Discharge Cut-off voltage(Udo)	41V		Voltage of the battery when the discharge is stopped
11	Operation Temperature Range	Charge:0~55°C/Discharge: -20~55°C		
12	Storage Temperature Range	Recommend (25±3°C) ; ≤60±25%RH storage moisture range.		
13	Single module Size/weight	390*580*160mm Around 50Kg		
	Main control box size/weight			

5.3 System composition parameters

No	Item	General Parameter		Remark
1	Combination method	MAX PACK*6		Max connect by parallel 6
2	Rated Capacity	Typical	standard	Standard discharge after Standard charge (package)
		Minimum	standard	
3	Factory Voltage	48V-51V		Mean Operation Voltage
4	Voltage at end of Discharge	≤40.5V		Discharge Cut-off Voltage
5	Charging Voltage	53.2V		
6	Internal Impedance	≤100mΩ		Internal resistance measured at AC 1KHz after 50% charge The measure must uses the new batteries that within one week after shipment and cycles less than 5 times
7	Standard charge	standard		Recommend 0.2C(max) charge current
8	Standard discharge	standard		Recommend 0.2C(max) discharge current
9	Maximum Continuous Charge Current	standard		
10	Maximum Continuous Discharge Current	standard		

Specification For Approval

12	Operation Temperature Range	Charge: 0~55°C
13		Discharge: -20~55°C
14	Storage Temperature Range	Recommend (25±3°C) ; ≤60±25%RHRH storage moisture range.
15	System size	
16	System weight	standard
17		

NOTE:

Specification For Approval

5.4 Battery Management System

A: BMS function introduction

- 1) :The BMS is designed for lithium battery.
- 2) : The BMS have all functions which are :
 - .1 overcharge detection function
 - .2 over discharge detection function
 - .3 over current detection function
 - .4 short detection function
 - .5 Temperature detection function
 - .6 balance function
 - .7 communicate function
 - .8 Alarm function
 - .9 Total capacity function
 - .10 Storage history function

B: BMS Protect parameter

Items	Details	Standard
Cell overcharge protection	Overcharge detection voltage	$3.65 \pm 0.025V$
	Overcharge detection delay time	Typical:1.0s
	Overcharge release voltage	$3.4 \pm 0.05V$
Cell over-discharge protection	Over-discharge detection voltage	$2.7 \pm 0.5V$
	Over-discharge detection delay time	Typical:1.0s
	Over-discharge release voltage	$3.1 \pm 0.1V$ or charge release
Over-current protection	discharge Over-current protection current1	$110 \pm 5A$
	discharge Over-current detection delay time 1	5S
	discharge Over-current protection current 2	$200 \pm 10A$
	discharge Over-current detection delay time 2	$\leq 600m \pm 50ms$
	Charge Over-current protection current	$110 \pm 5A$
Short protection	Short protection current	$300 \pm 50A$
	Protection condition	Load short
	Detection delay time	$\leq 30ms$
	Protection release condition	Charging release
Temperature (T) protection	Charge high T protection	$55 \pm 3^{\circ}C$
	Charge high T recover	$47 \pm 5^{\circ}C$
	Discharge high T protection	$55 \pm 5^{\circ}C$
	Discharge high T recover	$50 \pm 5^{\circ}C$
	Charge low T protection	$0 \pm 5^{\circ}C$
	Charge low T recover	$5 \pm 5^{\circ}C$
	Discharge low T protection	$-20 \pm 5^{\circ}C$
	Discharge low T recover	$-10 \pm 5^{\circ}C$
Balance	Balance threshold voltage	3.4V

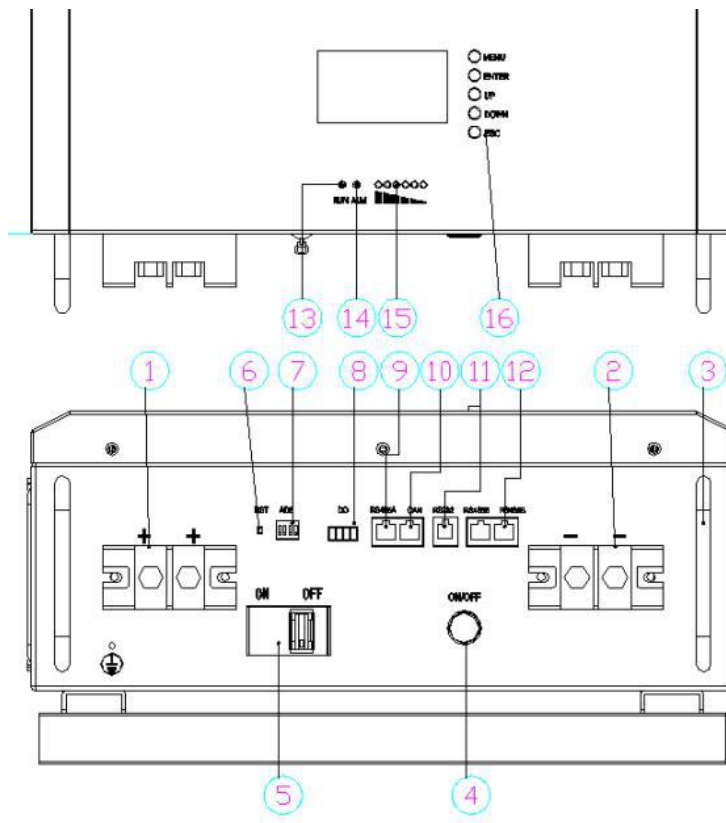
Specification For Approval

Communication	<p>It has CAN and RS485 ,RS232 standard communication interface, it real-time monitoring the capacity of battery bank, the voltage, current, environment temperature, and charging/discharging current,</p> <p>RS485,RS232,Baud rate:9600Kb/S,CAN common Baud rate:500K/S, Master address:CODE 1.slave address:2-15 ,any number</p>
Alarm	<p>It has over-temperature, over charge, under-voltage, over-current, short circuit alarm Function.</p>

Appearance and structural dimensions

The surface of the battery pack should have no obvious scratches, burrs and mechanical scratches, and the exposed metal terminals should be free of oxidation and rust.

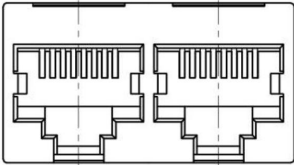
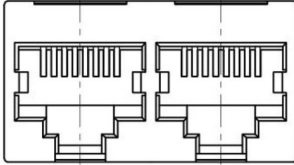
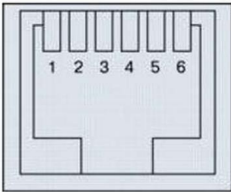
Function interface description



Specification For Approval

No.	Description	Silk-screen	Remark
1	Output terminal	P+ P+	Output terminal
2	Output terminal	P- P-	Output terminal
3	Handle		
4	Power Switch	ON OFF	
5	Air Switch	ON OFF	
6	Reset button	RST	For reset the batter
7	Dial switch	ADS	Set the address
8	Dry port	DO	
9	RS485A Port	RS485A	RS485A and inverter connection port
10	CAN bus Port	CAN	CAN bus and inverter connection port
11	RS232 Port	RS232	RS232 and computer connection port
12	RS485B Port	RS485B	battery and battery connection port
13	LED indicate	RUN	Operation indicator
14	LED indicate	ALM	Alarm indicator
15	LED indicate	CAPACITY	Capacity indicator
16	LCD	LCD KEY	

there is any change in the pin position of the communication line, the customer shall be notified in writing or provided with supporting communication wire.

Parallel communication		RS485-8P8C		RS485-8P8C		
		RJ45 NO.	Describe	RJ45 NO.	Describe	
		1, 8	RS485-B	9, 16	RS485-B	
		2, 7	RS485-A	10, 15	RS485-A	
		3, 6	GND	11, 14	GND	
External communication		RS485 vertical RJ45 socket		CAN vertical RJ45 socket		
		RJ45 NO.	Describe	RJ45 NO.	Describe	
		1, 8	RS485-B1	9, 10, 11, 14, 16		
		2, 7	RS485-A1	12	CAN-L	
		3, 6	GND	13	CAN-H	
Communication with host computer		RS232 vertical RJ11 socket				
		RJ11 NO.	Introduce	RJ11NO.	Describe	
		1	NC	4	RX	
		2	NC	5	GND	
		3	TX	6	NC	

6.2 SOC Indicator & Status Indicator Guides

Chart 1: Pack led indicate

L8	L7	L6	L5	L4	L3	L2	L1
RUN	ALARM	SOC					

Chart 2: Pack Capacity indicate

status	charge	discharge
--------	--------	-----------

Specification For Approval

SOC(%)	L6	L5	L4	L3	L2	L1	L6	L5	L4	L3	L2	L1
0-16.6%	OFF	OFF	OFF	OFF	OFF	Flash2	OFF	OFF	OFF	OFF	OFF	light
16.6-33.2%	OFF	OFF	OFF	OFF	Flash2	light	OFF	OFF	OFF	OFF	light	light
33.2-49.8%	OFF	OFF	OFF	Flash2	light	light	OFF	OFF	OFF	light	light	light
49.8-66.4%	OFF	OFF	Flash2	light	light	light	OFF	OFF	light	light	light	light
66.4-83%	OFF	Flash2	light	light	light	light	OFF	light	light	light	light	light
83-100%	Flash2	light	light	light	light	light	light	light	light	light	light	light
RUN LED	light						Flash(flash 3)					

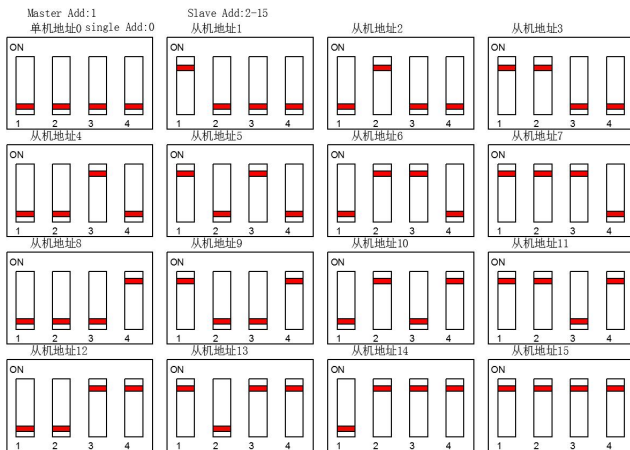
Chart 3: LED flash and buzzer mode

MODE	ON	OFF	MODE	ON	OFF
Led Flash1	0.25S	3.75S	Buzzer1	0.25S	0.25S
Led Flash2	0.5S	0.5S	Buzzer2	0.25S	2S
Led Flash3	0.5S	1.5S	Buzzer3	0.25S	3S

Chart4: LED flash mode

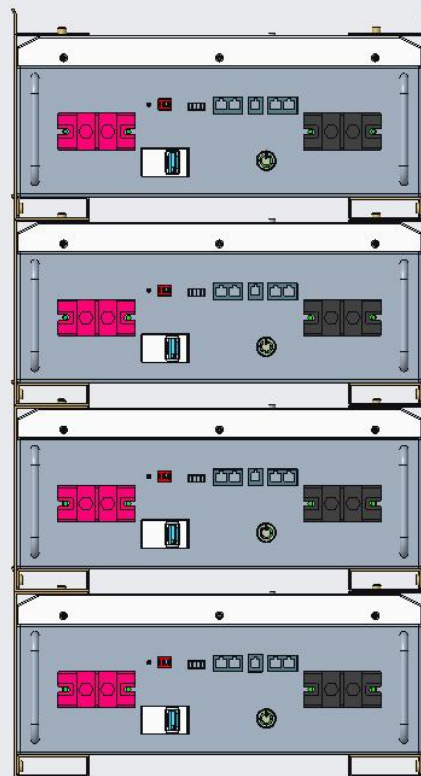
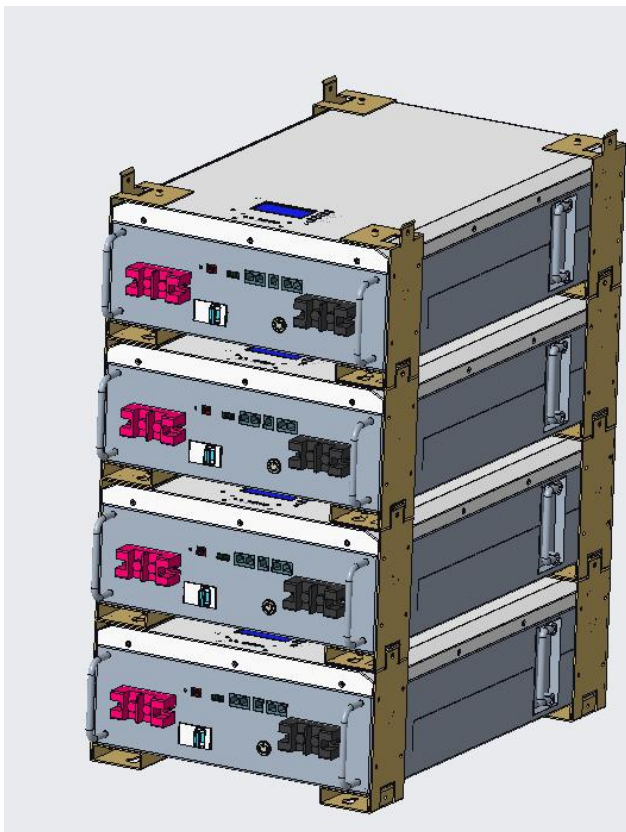
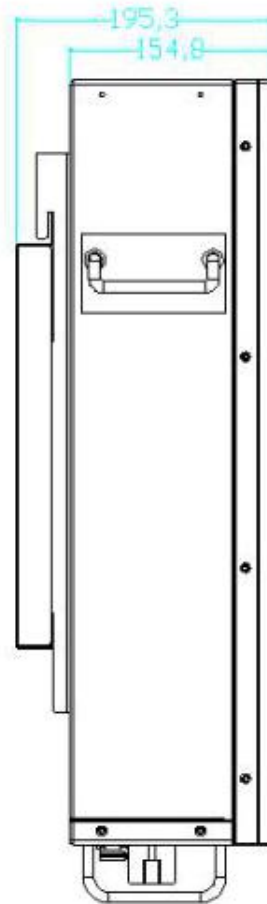
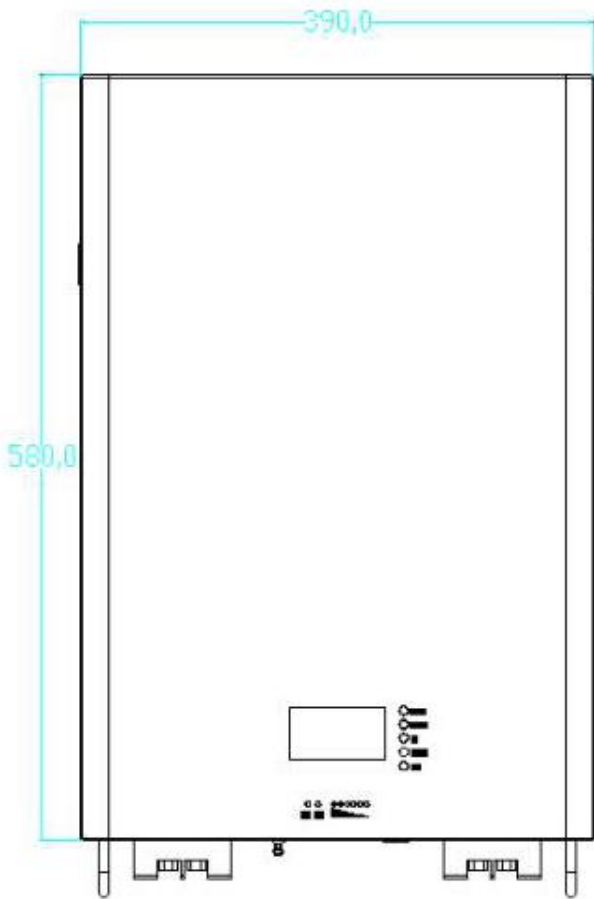
System status	Run status	ON/OFF	RUN	ALM	SOC						REMARK	
Power off	SLEEP	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	All led off
Stand by	NORMAL	Light	Flash1	OFF	Lighting for SOC						stand by mode	
	ALARM	Light	Flash1	Flash3	Lighting for SOC						Low volt alarm	
CHARGE	NORMAL	Light	Light	OFF	Lighting for SOC(The LED flash2,while it is the high SOC)Alarm LED do not flash,when the BMS into OVP mode.							
	ALARM	Light	light	Flash3	Lighting for SOC							
	OVP	Light	Light	OFF	Light	Light	Light	Light	Light	Light		No charge in, into standby
	OTP, OCP, Fail	Light	OFF	Light	OFF	OFF	OFF	OFF	OFF	OFF		Stop charge
Discharge	NORMAL	Light	Flash3	OFF	Lighting for SOC							
	ALARM	Light	Flash3	Flash3	Lighting for SOC							
	UVP	Light	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		Discharge off
	OTP, OCP, SCP, Fail	Light	OFF	Light	OFF	OFF	OFF	OFF	OFF	OFF		Discharge off
FAIL		OFF	OFF	Light	OFF	OFF	OFF	OFF	OFF	OFF	NO Charge or discharge	

6.3 Address Switch function (Only in Parallel) (地址设置)



Specification For Approval

6.4 Complete product image:



Specification For Approval

7.Storage and Others

Long Time Storage

If stored for a long time (don't used, exceed three months), the cell and pack should be stored in drying and cooling place. The PACK is to be stored in a condition that the temperature of $23\pm 2^{\circ}\text{C}$ and the humidity of 45%– 75%. Long-term use of unused batteries to recharge every 3 months. Ensure that the battery voltage is within the above range.

Appendix

Battery Pack Operation instructions and precautions

This product specification only applies to the protection parameters of rechargeable lithium-ion battery products and batteries designed by our company.

Note(1):

If the usage scenarios of the battery are beyond those specified in this specification, you should contact our company. in advance to conduct specific experimental tests to confirm the performance and safety under the usage conditions.

Note(2):

our company shall not be liable for any accidents caused by customers using batteries under conditions other than those specified in this specification.

Note(3):

If necessary, our company will inform the customer in writing
Updated technical documents or operating manuals

Caution!

Do not use or store the battery where is exposed to extremely hot, such as under window of a car in direct sunlight in a hot day. Otherwise, the battery may be overheated. This can also reduce battery performance and/or shorten service life, Cause personal injury .

If the electrolyte enters the eyes after the battery leaks, do not wipe it, rinse with clean water, and seek medical help immediately.

Danger!

- It is forbidden to throw the battery into water or fire!
 - It is forbidden to put the battery in a microwave oven or pressure vessel!
 - Do not use or store the battery near sources of heat such as a fire or heater.
 - Please use a dedicated lithium battery charger!
 - It is forbidden to directly connect the battery output terminal to AC power for charging!
 - It is forbidden to connect the positive and negative poles of the output terminal in reverse!
 - It is forbidden to short-circuit the battery output terminal with wires or other metal objects, and it is forbidden to transport or store the battery together with necklaces, hairpins or other metal objects!
 - Do not hit, throw or puncture the battery box.
 - It is forbidden to disassemble the battery in an unauthorized manner!
 - Different specifications of battery packs cannot be mixed.
 - If the battery emits abnormal smell, heat, deformation, discoloration, etc., stop using it immediately;
-