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User Manual for Cabinet Series Household Energy Storage Battery Products

APEX POWER CONCEPTS

1. Notes	1
1.1. Useful range	1
1.2. User objects	1
.....	
2. Safety	1
2.1. Important safety instructions	1
2.2. Caution	1
2.3. Warning	1
2.4. Others	1
.....	
3. Introduction	2
3.1. Basic characteristics	2
3.2. Working modes	2
3.3. Dimensions Dimensions and weight	2
3.4. Introduction to the output panel	3
.....	
4. Technical parameters	3
4.1. Basic battery parameters	3
4.2. Working conditions	4
4.3. Cell parameters	4
.....	
5. Product performance curve	4
5.1. Discharge performance (25°)	4
5.2. Discharge capacity at different temperatures 0.2C	4
5.3. Charge and discharge 25°C, 0.2C	4
5.4. DOD cycle life 25°C, 0.2C	4
.....	
6. Installation instructions	5
6.1. Physical check	5
6.2. Installation notes	5
6.3. Following requirements to be met during installation.	5
6.4. Installation space requirements	6

7. Electrical connection	6
7.1. Inverter connection	6

8. Function description	7
8.1. LED indication description	7
8.2. Buzzer action description	8
8.3. Key description	9
8.4. Dormant	9
8.5. Wakeup	9

9. Communication description	10
9.1. RS232 communication	10
9.2. CAN communication	10
9.3. RS485 communication	10
9.4. DIP switch settings	10

10. Interface definition	10
10.1. Interface diagram	10
10.2. Electrical interface definition	10

11. Host computer software	11
11.1. Software description	11

12. Troubleshooting	11
----------------------------	-----------

13. Product liability, storage, transportation, maintenance, and instructions for use	12
13.1. Product liability	12
13.2. Storage	12
13.3. Transportation	12
13.4. Maintenance	12
13.5. Instructions for battery use	12

1.NOTES

1.1.Useful range

- The Manual is an integral part of cabinet series household energy storage battery products. It describes the composition, installation, commissioning, maintenance and instructions for use of the products.
- Please read the Manual carefully before operation.
- The naming rules are as follows, for example, in JXLFP200-51.2

JX-cabinet

LFP-lithium iron
phosphate battery

200 - capacity

51.2-voltage

1.2.User objects

The Manual is intended for qualified electricians, and the tasks described in the Manual can only be performed by qualified electricians.

2.SAFETY

2.1.Important safety instructions

- Danger, the voltage output from the battery is life-threatening! All work must be done by qualified electricians.
- Unless supervised or instructed, children or people feeling uncomfortable or with physical ability or lack of experience and knowledge shall not use the battery products.
- Qualified electricians with physical discomfort and decreased mental ability shall not use the products for installation or commissioning.
- Children shall be supervised to ensure that they do not use the battery products.

2.2.Caution

- Overheating of shell components may cause burns.
- During operation or product running, the body shell will become hot.
- During the running of the machine, do not touch the output lines and terminals.

2.3.Warning

- At any time, the positive and negative poles of the output terminal shall not be short circuited.
- Please turn off the power switch of the product before connecting to the inverter or other loads.
- Authorized maintenance personnel must turn off the power switch of the product before attempting any maintenance, cleaning or operation of any circuit.
- Do not perform any operations while the battery is running.
- There is a risk of electric shock.

2.4.Others

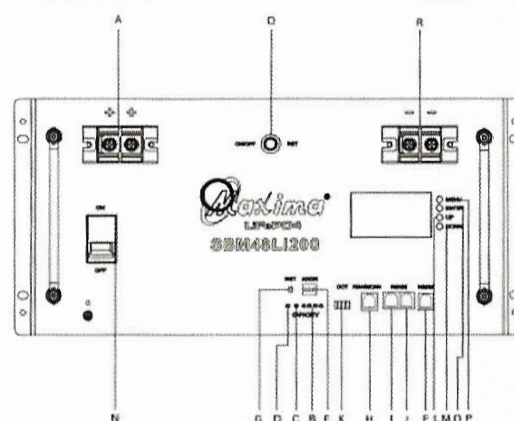
- Please read this section carefully to ensure correct and safe use. Please keep the User Manual properly.
- The products can only be used with inverters or loads of matching voltages.
- Ensure that the existing wires are in good condition without breakage or other defects.
- Do not disassemble any components of the battery.
- Please keep away from inflammables and explosives to avoid fire.
- The installation site shall be away from damp or corrosive substances.
- Do not touch the positive and negative terminal devices at the same time.
- Do not place metal tools or similar metal objects on the battery products.

3.INTRODUCTION

3.4.Introduction to the output panel

NO.	Name	Function
D	Running indicator light	Normal running display
C	Alarm indicator light	Alarm status display
A	Positive output terminal	HVCN
B	Battery indicator light	0%-100%
E	DIP switch	The DIP switch being used to set the address of each BMS protection board
K	Dry contact	KRY1 (2EDG-3.81-2P) interface
	RS485 communication port	RJ 45 port
H	CAN communication port	RJ45 port
F	RS232 communication port	RJ12 port
I	RS485-A	RJ45 port
J	RS485-B	RJ45 port
R	Negative output terminal	HVCN
Q	Power switch	Self-locking

NO.	Name	Function
P	LCD menu button	Menu options
O	LCD confirm button	Option confirmation
N	A-SW	125A
M	LCD down button	Select down
L	LCD return button	Back to confirm
G	Reset switch	Long press



4.TECHNICAL PARAMETERS

4.1.Basic battery parameters

Model	JXLFP200-51.2
Rated voltage (V)	51.2
Nominal capacity (Ah)	200
Charging voltage range (V)	57.6 ~58.4
Standard charging current (A)	50
Maximum charging current (A)	100
Standard discharging current (A)	50
Maximum discharging current (A)	100
maximum charging voltage (V)	58.4
Cut-off discharge voltage (V)	40

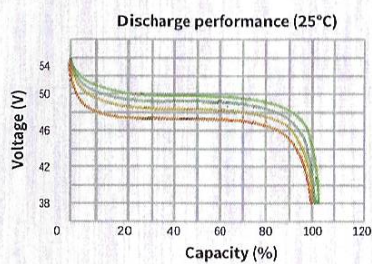
4.2. Working conditions

Cycle life (+25°C 0.2C 80%DOD)		≥4000	Cycles
Output efficiency		>99	%
Operating temperature	Discharging	-25 to 50	°C
	Charging	0 to 50	°C
Storage temperature		0 to 45	°C
Storage time		12 months at normal temperature 25°C	
Charging current limiting (overcurrent and current limiting)		20	A
Design working life@25°C		12	Years

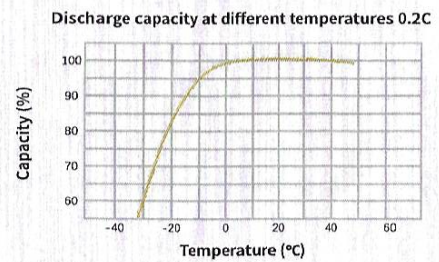
4.3. Cell parameters

Working voltage range	2.5 to 3.65	V
Nominal voltage	3.2	V
Cycle life	≥4000	Cycles
Cell capacity (Ah)	200	

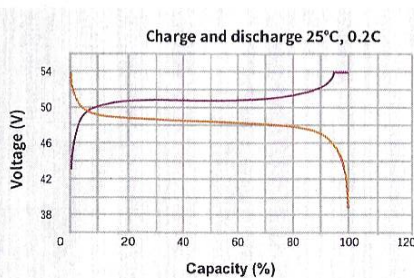
5. PRODUCT PERFORMANCE CURVE



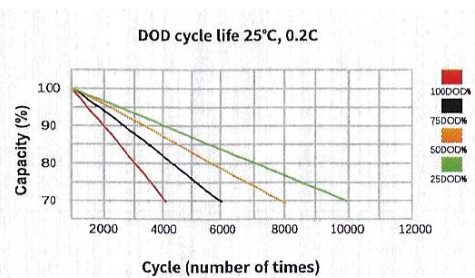
5.1. Discharge performance (25°)



5.2. Discharge capacity at different temperatures 0.2C



5.3. Charge and discharge 25°C, 0.2C

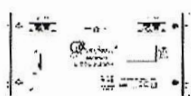


5.4. DOD cycle life 25°C, 0.2C

6.INSTALLATION INSTRUCTIONS

6.1.Physical check

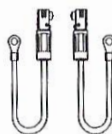
- Check whether there is any damage to ensure that the product is intact during transportation. If there is any damage, please contact your dealer immediately;
- Open the package and take out the product. Please check the accessories first. The accessories in the packing list are as shown in the figure;



A



B



C



D

Serial number	Description
A	Cabinet energy storage battery
B	RJ45 communication line (CAN/485)
C	Positive and negative output lines of the battery (one black and one red)
D	User Manual

6.2.Installation notes

- The cabinet series energy storage products are designed for indoor and outdoor installation. It shall be ensured that the installation site meets the following requirements.
- For outdoor installation, the installation site shall not be exposed to direct sunlight.
- The installation site shall not be located in the area where highly flammable materials are stored.
- The installation site shall not be located in a potentially explosive area.
- The installation site shall not be directly exposed to cold air.
- The installation site shall not be near TV antennas or other signal receivers.
- The altitude of the installation site shall not be higher than the altitude of about 2,000m.
- The installation site shall not be in the environment of precipitation or humidity (>95%).
- The installation site shall be well ventilated.
- The ambient temperature at the installation site shall be within the range of -25°C to +45°C.
- The slope of the wall at the installation site shall be less than 5°.

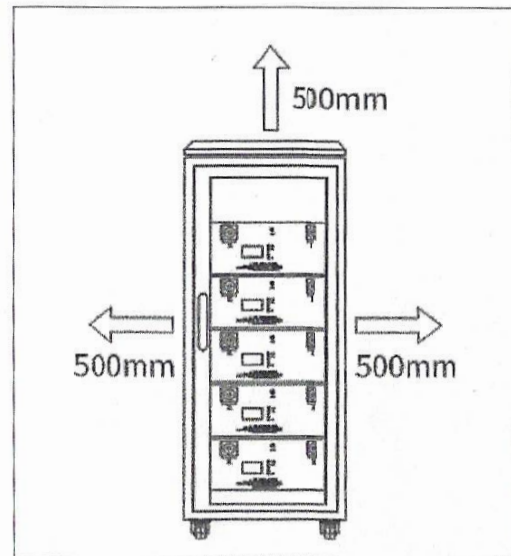


6.3.Following requirements to be met during installation

- The installation of cabinet energy storage battery shall meet the following requirements.
- It needs to choose a standard size cabinet.
- The selection of the cabinet size is on the basis of the number of products in parallel to select the corresponding size.
- The size of this product is a standard 4U chassis.
- During installation and operation, please avoid direct sunlight, rain, water, snow, etc.

6.4. Installation space requirements

The left, right, top and minimum space dimensions of the cabinet where the product is installed shall not be less than 500mm.



7. ELECTRICAL CONNECTION

7.1. Inverter connection

- Making sure the DC input voltage of the inverter is 48V.
- Making sure that the communication protocol of the inverter is compatible with this product.
- Before connecting to the inverter, please install a non-polar DC breaker to ensure the inverter can be safely disconnected during maintenance.
- Battery and inverter connection diagram, as shown in Figure 1.
- The communication interface between the battery and the inverter is RS485 or CAN, and the communication line interface is RJ45.
- Communication interface RJ45 pin definition, as shown in Figure 2.

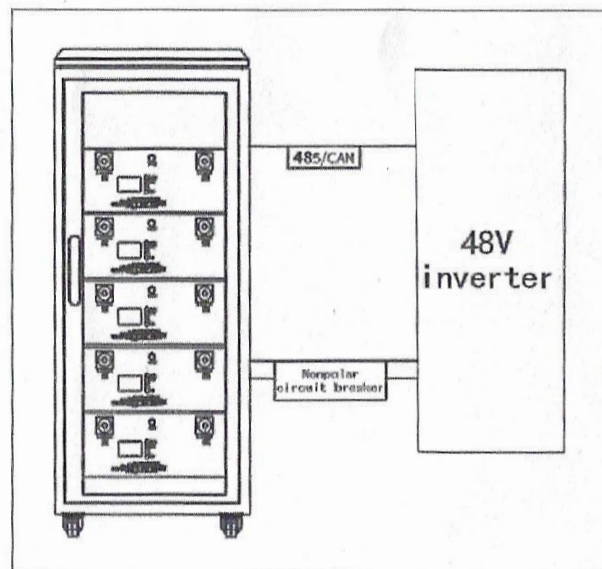


Figure 1

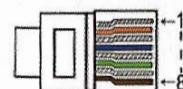


Figure 2

Interface	1	2	3	4	5	6	7	8
485	RS485-B1	RS485-A1	GND	NC	NC	GND	RS485-A1	RS485-B1
CAN	NC	NC	NC	CANL	CANH	NC	GND	NC

- Note that the communication between the battery and the inverter can work properly only when the inverter is compatible with the battery in terms of communication.
- The inverter connection steps are as follows.

Step 1. Turn off the inverter and battery power switches.

Step 2. Read the inverter manual to check whether the communication of the inverter is RS485 or CAN, and connect the battery correspondingly.

Step 3. The positive and negative poles of the inverter shall be connected with the positive and negative devices of the battery, and the screws at the terminal positions shall be locked and fixed firmly.

Step 4. The positive and negative poles of the battery shall not be reversed to avoid short circuit of the inverter or the battery.

8. FUNCTION DESCRIPTION

8.1. LED indication description

- LED working status indication.

Status	Normal / Alarm / Protection	Running light	Alarm light	Battery indicator light				Description
		Green	Red	Green4	Green3	Green2	Green1	
Power off	Dormant	Off	Off	Off	Off	Off	Off	All off
Standby	Normal	Flashing once	Off	According to the battery indicator				Standby status
	Alarm	Flashing once	Flashing 3 times					Low voltage
Charge	Normal	Always On	Off	Please see the battery indicator				The alarm indicator light turns off when the overvoltage alarm occurs.
	Alarm	Always On	Flashing 3 times					
	Overcharge protection	Always On	Off	On	On	On	On	If the charger is not connected, the indicator light is the same as the power standby state.
	Temperature, over-current and failure protection	Off	Always On	Off	Off	Off	Off	
Dis-charge	Normal	Flashing 3 times	Off	Please see the battery indicator				
	Alarm	Flashing 3 times	Flashing 3 times					
	Over discharge protection	Off	Off	Off	Off	Off	Off	Stop discharging
	Over discharge protection	Off	On	Off	Off	Off	Off	Stop discharging
Failure		Off	On	Off	On	Off	Off	Stop discharging

• Battery indication description

Status		Charging				Discharging			
Battery indicator light		L4	L3	L2	L1	L4	L3	L2	L1
Electricity (%)	0~25%	Off	Off	Off	Flashing twice	Off	Off	Off	On
	25~50%	Off	Off	Flashing twice	On	Off	Off	On	On
	50~75%	Off	Flashing twice	On	On	Off	On	On	On

• LED flashing description

Flashing mode	On	Off
Flashing once	0.25S	3.75S
Flashing 2 times	0.5S	0.5S
Flashing 3 times	0.5S	1.5S

• Switch light description

Switch light description	
Power on	The LED lights start from the lowest battery light (VL1) for 0.5S, and then light up at the same time until the end of pre-charging.
Power off	After the LED lights light up at the same time for 1.5S, then start from the lowest battery light (VL1) for 0.5S.

8.2. Buzzer action description

- In case of fault, the buzzer will make a buzzing noise 0.25s every 1s;
- During protection, the buzzer will make a buzzing noise 0.25s every 2s (excluding over-voltage protection);
- In case of alarm, the buzzer will make a buzzing noise 0.25s every 3s (except for over-voltage alarm);
- The buzzer function can be enabled or disabled by the host computer, and it is disabled by default when it leaves the factory.

8.3.Key description

- When BMS is in a dormant state, press the key (3~6s) and release it, so that the protection board is activated, and the LED indicator lights are on for 0.5 seconds successively from "RUN".
- When BMS is in the activated state, press the key (3~6s) and release it, so that the protection board is dormant, and the LED indicator lights are on for 0.5 seconds successively from the minimum battery indicator light.
- When BMS is in the activated state, press the key (6~10s) and release it, so that the protection board is reset, and all the LED lights are on for 1.5 seconds at the same time.
- After BMS is reset, the parameters and functions set by the host computer are retained, and if it is necessary to restore to the initial parameters, it can be achieved by the "Restore Defaults" of the host computer, but the relevant running records and storage data remain unchanged (such as battery, number of cycles, protection records, etc.)

8.4.Dormant

When any of the following conditions is met, the system enters the low power consumption mode:

- The single or overall over-discharge protection has not been released within 30 seconds.
- Press the key (3~6s) and release it.
- The minimum single voltage is lower than the dormancy voltage, and the duration reaches the dormancy delay time (at the same time, the conditions of no communication, no protection, no balance and no current are met).
- The standby time is longer than 24 hours (no communication, no charging and discharging, and no mains supply).
- Forced shutdown is performed via host computer software.
- Before entering the dormancy mode, it shall be ensured that the input terminal is not connected to an external voltage, otherwise it will not be able to enter the low power consumption mode.

8.5.Wakeup

When the system is in the low power consumption mode and any of the following conditions is met, the system will exit the low power consumption mode and enter the normal running mode:

- When a charger is connected, the output voltage of the charger must be greater than 48V.
- Press the key (3~6s) and release it.
- RS232 communication is activated (in case of dormancy due to over-discharge, the motherboard cannot be waked up using this method).

Remarks

After the individual or overall over-discharge protection, it enters the low power consumption mode and is waked up regularly every 4 hours, and the charge and discharge MOS is started. If it can be charged, it will exit the dormant state and enter the normal charging mode; if it cannot be charged after 10 consecutive automatic wake-ups, it will not be automatically waked up.

When the system is defined as that the recovery voltage is not reached after 2 days of standby (the set value of standby time) after the end of charging, the charging will be forcibly resumed until the end of the recharging.

9.COMMUNICATION DESCRIPTION

9.1.RS232 communication

BMS can communicate with the host computer through RS232 interface, so that it can monitor all kinds of battery information, including battery voltage, current, temperature, status and battery production information, etc. The default baud rate is 9,600bps.

9.2.CAN communication

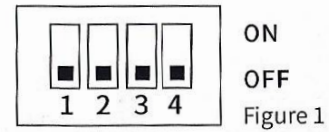
The default communication rate of CAN communication is 500K.

9.3.RS485 communication

There are dual RS485 interfaces, the PACK information can be viewed, and the default baud rate is 9,600bps. If it is necessary to communicate with the monitoring equipment through RS485, the monitoring equipment will act as the host and poll the data according to the address.

9.4.DIP switch settings, as shown in Figure 1

When PACKs are used in parallel, different PACKs can be distinguished by setting the addresses through the DIP switch on BMS. It is necessary to avoid setting the addresses to the same. Refer to the following table for the definition of the BMS DIP switch.



ON

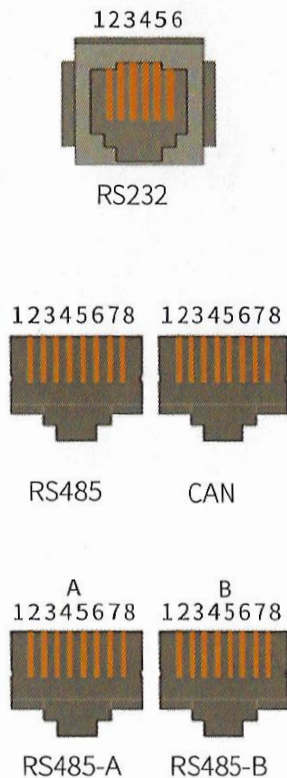
OFF

Figure 1

Address	DIP switch settings			
	#1	#2	#3	#4
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

10.INTERFACE DEFINITION

10.1.Interface diagram



Interface		RS232 Definition description	
Communication port definition: RJ45 port	PIN1	NC (empty)	
	PIN2	NC (empty)	
	PIN3	TX The protection board sends data (the computer receives the data pin)	
	PIN4	RX The protection board receives the data (the computer sends the data)	
	PIN5	Grounding Signal area	
	PIN6	NC (empty)	
Interface		RS485 Definition description	CAN Definition description
Communication port definition: RJ45 port	PIN1	RS485-B1	CANL
	PIN2	RS485-A1	CGND
	PIN3	RS485-GND	NC (empty)
	PIN4	RS485-B1	CANH
	PIN5	RS485-A1	CGNL
	PIN6	RS485-GND	NC (empty)
	PIN7	NC (empty)	CGND
	PIN8	NC (empty)	CANH
Interface		RS485-A Definition description	RS485-B Definition description
Communication port definition: RJ45 port	PIN1	RS485-B2	RS485-B2
	PIN2	RS485-A2	RS485-A2
	PIN3	RS485-GND	RS485-GND
	PIN4	NC (empty)	NC (empty)
	PIN5	NC (empty)	NC (empty)
	PIN6	RS485-GND	RS485-GND
	PIN7	RS485-A2	RS485-A2
	PIN8	RS485-B2	RS485-B2

10.2.Electrical interface definition

11. HOST COMPUTER SOFTWARE

11.1. Software description

- The running status of the protection board such as voltage, current, temperature, alarm and protection can be read by the host computer software, the parameters of BMS can be set, the historical records of the protection board can be viewed, and the function module of BMS can be opened.
- For specific operations, please refer to the BMS Host Computer Software Operation Manual.

12. TROUBLESHOOTING

If you encounter the following problems, please refer to the following solutions. If the problem is still not solved, please consult your local dealer.

Problems	LCD/LED/BUZZER	Description/ possible causes	Solutions
During startup, the equipment is automatically turned off	The LCD/LED and buzzer will be activated for about 60 seconds and then completely turned off.	The voltage of the energy storage battery is too low (<45V, or <2.8V in case of the internal single battery unit)	Charge the energy storage battery
There is no reaction after power on	There is no display or action, and the LCD/LED red indicator light flashes and the buzzer gives an alarm signal	The battery level is too low. (<10%, or <2.8V in case of the internal single battery unit)	Charge the energy storage battery
It is unable to charge	There is a display, and the LCD/LED red indicator light flashes	1. The battery level is reached. (100%, or 3.7V in case of the internal single battery unit) 2. Through the LCD display, you can view the internal information and identify the status	The energy storage battery is fully charged
It is unable to charge and discharge	There is a display, and the LCD/LED red indicator light flashes	1. There may be a BMS fault 2. Through the LCD display, you can view the internal information, identify the status, and take treatment measures according to the status	1. BMS needs to be replaced
There is a power supply, but the equipment is running in battery mode	The LCD shows that the output voltage is 0, and the red LED indicator light flashes	1. The output is protected 2. The DC power line is not fastened	1. Check whether the DC wire is fastened. 2. Check whether the circuit breaker trips and whether the wiring is properly connected
When the inverter equipment is started	It turns off automatically after startup for 30s	The inverter is overloaded by 110% and the waiting time is exceeded	Turn off some devices to reduce the load of connection
The energy storage battery cannot be turned on	There is no any display when pressing the switch	The weak current switch is broken	The switch needs to be replaced

13. PRODUCT LIABILITY, STORAGE, TRANSPORTATION, MAINTENANCE, AND INSTRUCTIONS FOR USE

13.1. Product liability

- We will not be liable for any accident caused by the operation in violation of the provisions of the specification.
- If the contents of the specification are changed due to the improvement of product quality or the upgrading of relevant technical parameters, we will not give further notice. For the latest product information, please contact us to obtain it.

13.2. Storage

- When the battery packs need to be stored for a long time, please charge the battery packs to about 50% of the electric capacity (after discharging, charge them with a constant current of 0.2C for 2 hours), and place them in a dry and ventilated place; cycle the operation every three months. The battery packs shall be stored in a clean, dry and ventilated place. The battery packs shall not be in contact with corrosive substances and shall be far away from fire and heat sources.

13.3. Transportation

- The battery packs shall be packaged for transportation, and shall be protected from severe vibration, impact or extrusion during transportation and protected from the sun and rain. They can be transported by cars, trains, ships, planes and other means of transportation.

13.4. Maintenance

- When the battery packs are stored, they shall be stored at a state of charge of 40% to 60%.
- When the battery packs are not used for a long time, it is recommended to recharge them every three months or so and charge them with a current of 0.2C for about 1 hour.
- During maintenance, do not assemble and disassemble the batteries in the battery packs again by yourself, otherwise the battery performance will be degraded.
- Do not disassemble or replace any batteries in the battery packs without authorization, and do not dissect the batteries.

13.5. Instructions for battery use

- Do not reverse the positive and negative poles to prevent short circuit.
- Do not put the battery packs in water or soak them.
- It is strictly forbidden to charge the battery packs under fire or extremely hot conditions! Do not use or store the battery packs near heat sources (such as fire or heaters).
- It is strictly forbidden to pierce the battery pack shells with nails or other sharp objects, and it is forbidden to hammer or pedal the battery packs.
- It is strictly forbidden to disassemble battery packs and batteries in any way.
- If the battery packs have any abnormal phenomenon, such as peculiar smell, heating, deformation or discoloration, they shall be removed from the electrical appliances or the chargers immediately and their use shall be stopped.
- If the electrolyte is accidentally splashed into the eyes after the battery leaks, please do not wipe it. It is required to rinse it with water immediately. Seek medical assistance in time in severe cases.
- 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 decrease slightly.
- In the process of charging the battery pack, if there is any peculiar smell or abnormal sound, please stop charging immediately.
- In the process of discharging the battery pack, if there is any peculiar smell or abnormal sound, please stop discharging immediately.
- If one of the above phenomena occurs, please contact the local distributor and do not disassemble it without permission.



APEX POWER CONCEPTS