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User Manual for Wall-Mounted Series Household Energy Storage Battery Products



CATALOGUE

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1. NOTES

1.1. Useful range

- The Manual is an integral part of wall-mounted 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 WMLFP100-48

WM - wall-mounted

LFP - lithium iron phosphate battery

100 - capacity

48 - 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

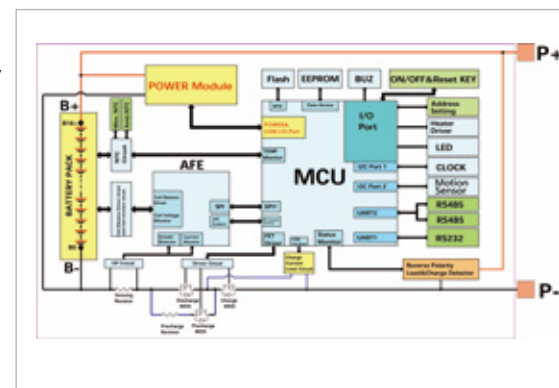
- Please read this section carefully to ensure correct and safe use. Please keep the User Manual properly.
- The products can only be used with inverters or loads of matching voltages.
- Ensure that the existing wires are in good condition without breakage or other defects.
- Do not disassemble any components 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

3.1. Basic characteristics

- The wall-mounted series household energy storage battery product is a high-quality energy storage battery product with a design life cycle of up to 4000 times of cycle use and multiple protections such as 485 and CAN intelligent communication.

- System diagram



3.2. Working modes

Wall-mounted series household energy storage battery products can provide a variety of working modes according to different requirements.

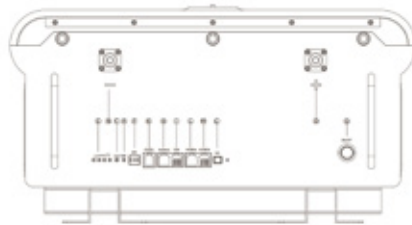
- When the products are used for communication with intelligent inverters, they come with 485 and CAN communication.
- The products are used for off-grid ordinary inverters.
- The products are used for 48V DC loads.
- The products of the same series and model can be used in parallel, and a maximum of 15 products can be used in parallel.
- When a single battery product is used, the output load power shall be less than 4,500W.

3.3. Product dimensions

| Model | WMLFP100-48 WMLFP100-51.2 | WMLFP150-48 WMLFP150-51.2 | WMLFP200-48 WMLFP200-51.2 |
|--|------------------------------|------------------------------|------------------------------|
| Length (mm) | 735±5 | 735±5 | 735±5 |
| Width (mm) | 460±5 | 460±5 | 460±5 |
| Thickness (mm) | 231±5 | 231±5 | 261±5 |
| Thickness (mm) including the thickness of the fixed bracket | 241±5 | 241±5 | 271±5 |

3.4.Introduction to the output panel

| NO. | Name | Function | NO. | Name | Function |
|-----|--------------------------|---|-----|--------------------------|--------------|
| A | Running indicator light | Normal running display | K | Rs232 communication port | Rj12 port |
| C | Alarm indicator light | Alarm status display | L | RS485-A | RJ45 port |
| D | Positive output terminal | HVCN | M | RS485-B | RJ45 port |
| E | Battery indicator light | 0% - 100% | N | Negative output terminal | HVCN |
| F | DIP switch | The DIP switch being used to set the address of each BMS protection board | O | Power switch | Self-locking |
| G | Dry contact | KRY1 (ZEDG-3.81-2P) interface | | | |
| H | RS485 communication port | RJ45 port | | | |
| I | CAN communication port | RJ45 port | | | |



4. TECHNICAL PARAMETERS

4.1.Basic battery parameters

| Model | WMLFP 100-48 | WMLFP 100-51.2 | WMLFP 150-48 | WMLFP 150-51.2 | WMLFP 200-48 | WMLFP 200-51.2 |
|----------------------------------|--------------|----------------|--------------|----------------|--------------|----------------|
| Rated voltage (V) | 48 | 51.2 | 48 | 51.2 | 48 | 51.2 |
| Nominal capacity (Ah) | 100 | 100 | 150 | 150 | 200 | 200 |
| Charging voltage range (V) | 54 ~54.75 | 57.6~58.4 | 54 ~54.75 | 57.6~58.4 | 54 ~54.75 | 57.6~58.4 |
| Standard charging current (A) | 50 | 50 | 75 | 75 | 100 | 100 |
| Maximum charging current (A) | 100 | 100 | 100 | 100 | 100 | 100 |
| Standard discharging current (A) | 50 | 50 | 75 | 75 | 100 | 100 |
| Maximum discharging current (A) | 100 | 100 | 100 | 100 | 100 | 100 |
| Maximum charging voltage(V) | 54.75 | 58.4 | 54.75 | 58.4 | 54.75 | 58.4 |
| Cut-off voltage of discharge(V) | 37.5 | 40 | 37.5 | 40 | 37.5 | 40 |

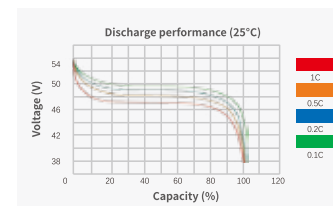
4.2.Working conditions

| | | |
|--|---------------------------------------|--------------|
| Cycle life (+25°C 0.2C 80%DOD) | ≥4000 | Cycles |
| Output efficiency | >99 | % |
| Working temperature | Discharge | -25 to 50 °C |
| | Charge | 0 to 50 °C |
| Storage temperature | 0 to 45 | °C |
| Storage time | 12 months at room temperature of 25°C | |
| Charging current (over-current limiting) | 10 | A |
| Design service life@25°C | 12 | Years |

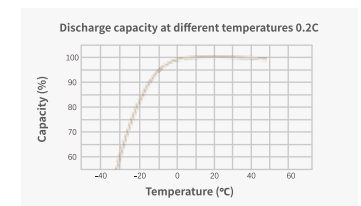
4.3.Cell parameters

| | | |
|-----------------------|-------------|--------|
| Working voltage range | 2.5 to 3.65 | V |
| Nominal voltage | 3.2 | V |
| Service cycle life | ≥4000 | Cycles |
| Cell capacity (Ah) | 100/150/200 | |

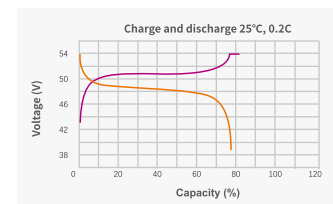
5. PRODUCT PERFORMANCE CURVE



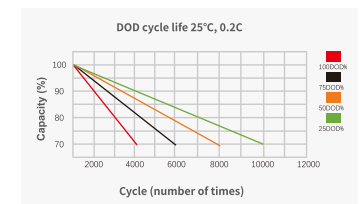
5.1.Discharge performance (25°)



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;



| Serial number | Description |
|---------------|---|
| A | Wall-mounted energy storage battery |
| B | Fixed bracket of wall-mounted energy storage battery |
| C | RJ45 communication line (CAN/485) |
| D | Positive and negative output lines of the battery (one black and one red) |
| E | User Manual |

6.2. Installation notes

- The wall-mounted 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°.

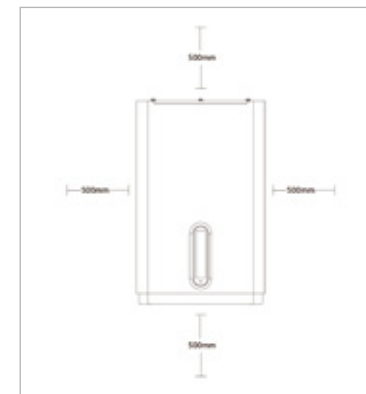


6.3. Following requirements to be met during installation

- The installation of wall-mounted energy storage battery shall meet the following requirements.
- The wall thickness shall not be less than 35cm.
- Installation walls shall be load-bearing walls/concrete walls or walls of equivalent strength.
- If the thickness or strength of the wall is not enough, it must be supported or strengthened.
- During installation and operation, please avoid direct sunlight, rain, water, snow, etc.

6.4. Installation space requirements

The minimum space size at the left, right, top, bottom and front of the installed product shall not be less than 500mm.



6.5. Installation steps

- Tools required for installation include electric drill, automatic/manual wrench, etc.
- Install the wall-mounted fixed bracket on the fixed wall, mark the positions of 12 holes, carefully remove it and put it aside, and drill holes with an electric drill. The hole depth must be more than 100mm to ensure sufficient strength to support the battery. Install the wall-mounted fixed bracket in the holes with expansion nails and tighten them, and then fix the wall-mounted fixed bracket matched with the battery with expansion screws.
- Two people hold the folding handles on both sides of the battery and hang the battery on the wall-mounted bracket.

7. ELECTRICAL CONNECTION

7.1. Inverter connection

- It shall be ensured that the DC input voltage of the inverter is 48V.
- It shall be ensured that the communication protocol of the inverter is compatible with the product.
- Before connecting to the inverter, please install a non-polar DC circuit breaker to ensure that the inverter can be safely disconnected during maintenance.
- The connection diagram of battery and inverter is as follows, 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.
- The communication interface RJ45 pin is defined as follows, as shown in Figure 2.

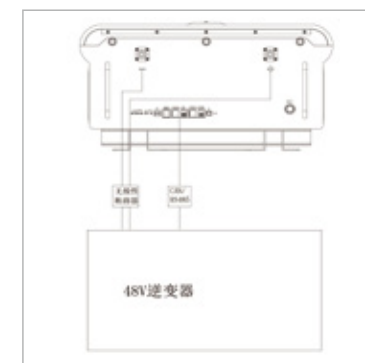


Figure 1



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 |
| | Normal | Flashing once | Off | According to the battery indicator | | | | Standby status |
| Standby | Alarm | Flashing once | Flashing 3 times | Please see the battery indicator | | | | Low voltage |
| | Normal | Always On | Off | Please see the battery indicator | | | | The alarm indicator light turns off when the overvoltage alarm occurs. |
| Charge | Alarm | Always On | Flashing 3 times | Please see the battery indicator | | | | |
| | Overcharge protection | Always On | Off | On | On | On | On | |
| | Temperature, over-current and failure protection | Off | Always On | Off | Off | Off | Off | Stop charging |
| Dis-charge | Normal | Flashing 3 times | Off | Please see the battery indicator | | | | |
| | Alarm | Flashing 3 times | Flashing 3 times | Please see the battery indicator | | | | |
| | 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 | | | | |
|-----------------|----------|-----|----------------|----------------|----------------|-----|-----|-----|----|
| | 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

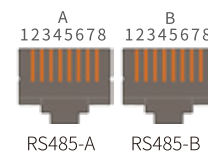
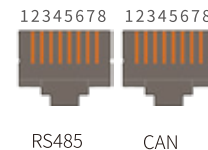
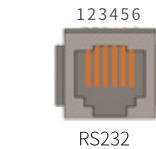
When PACKs are used in parallel, different PACKs can be distinguished by setting the addresses through the DIP switch on BMS. It is necessary to avoid setting the addresses to the same. Refer to the following table for the definition of the BMS DIP switch.



| Address | DIP switch settings | | | |
|---------|---------------------|-----|-----|-----|
| | #1 | #2 | #3 | #4 |
| 0 | OFF | OFF | OFF | OFF |
| 1 | OFF | OFF | OFF | OFF |
| 2 | ON | OFF | OFF | OFF |
| 3 | OFF | ON | OFF | OFF |
| 4 | ON | ON | OFF | OFF |
| 5 | OFF | OFF | ON | OFF |
| 6 | ON | OFF | ON | OFF |
| 7 | OFF | ON | ON | OFF |
| 8 | OFF | OFF | ON | OFF |
| 9 | ON | OFF | ON | ON |
| 10 | OFF | ON | OFF | OFF |
| 11 | OFF | ON | ON | ON |
| 12 | 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. 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 |

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

12.1.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.

12.2.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.

12.3.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.

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.

12.5.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°C±5°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.