User Manual

51.2V280Ah-HV

CONTENT

1 General Information

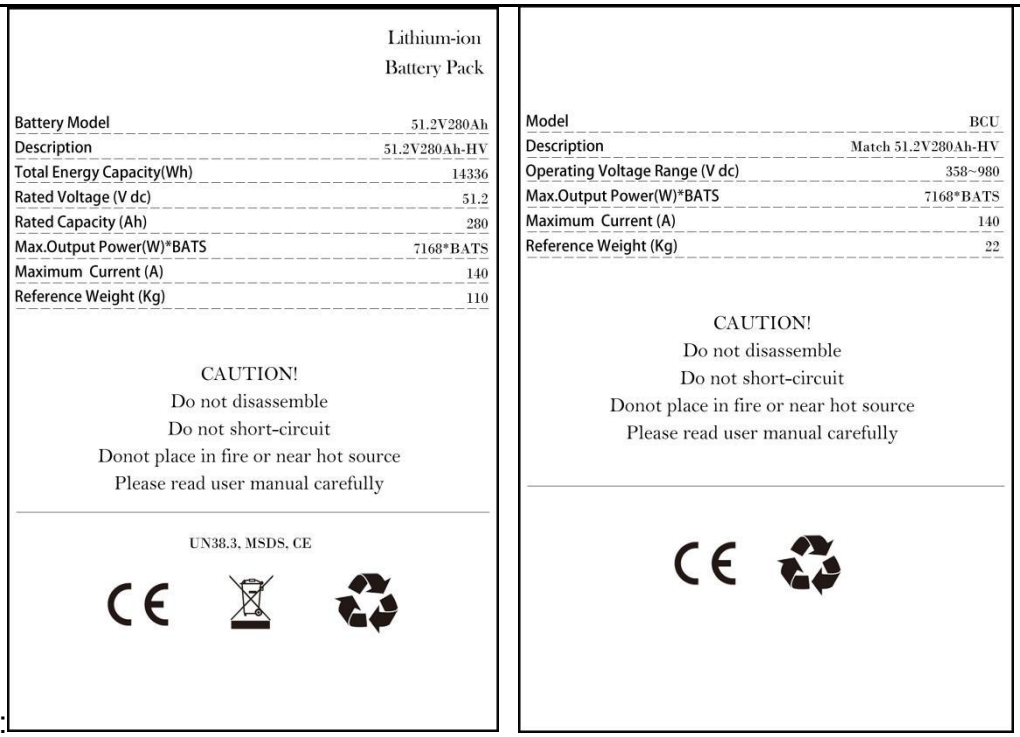
This manual introduces 51.2V280Ah-HV battery products. Please read this manual carefully before using the battery. If you have any questions, please contact the authorized dealer for advice and assistance.

51.2V280Ah-HV is an energy storage unit designed for residential or commercial grid applications with short-term backup capability. Which is not suitable for supporting life-sustaining medical devices. This product is intended for used only in accordance with the information provided in the enclosed documents and applicable local standards and regulations. Any other use may result in personal injury or property damage. The illustrations in this manual are only intended to help explain the concept of the system configuration, including use guidelines, safety precautions, common operating problems, and subsequent battery maintenance.

Alterations to the product, e.g. changes or modifications, are only permitted with the express written permission of the authorized dealer. Unauthorized changes will not be allowed by warranty claims. the authorized dealer shall not be liable for any damage resulting from such changes. Any use of the product other than described in the intended use section does not qualify as appropriate. The enclosed documentation is an integral part of this product. Please keep the documentation in a safe and convenient place for future reference.

The label is attached to the product and contains product identification information. For safe use, the user must fully understand the contents of the label.

The label:



Lithium-ion
Battery Pack

Battery Model	51.2V280Ah
Description	51.2V280Ah-HV
Total Energy Capacity(Wh)	14336
Rated Voltage (V dc)	51.2
Rated Capacity (Ah)	280
Max.Output Power(W)*BATS	7168*BATS
Maximum Current (A)	140
Reference Weight (Kg)	110

CAUTION!
Do not disassemble
Do not short-circuit
Donot place in fire or near hot source
Please read user manual carefully

UN38.3, MSDS, CE

Model	BCU
Description	Match 51.2V280Ah-HV
Operating Voltage Range (V dc)	358~980
Max.Output Power(W)*BATS	7168*BATS
Maximum Current (A)	140
Reference Weight (Kg)	22

CAUTION!
Do not disassemble
Do not short-circuit
Donot place in fire or near hot source
Please read user manual carefully

2 Security Measures

This section contains safety information that must be followed at all times when using or installing batteries. To prevent personal injury or property damage, and to ensure the long-term operation of batteries, read this section carefully and always watch for "warnings" issued by all safety information.

Environmental requirements

1. Do not expose the battery to more than 50°C;
2. Do not place the battery near any heat source;
3. Do not expose the battery to moisture or liquid;
4. Do not expose the battery to corrosive gases or liquids;
5. Do not expose the battery to flammable gases or liquids;
6. Keep the battery in a safe place away from children and animals.

Operation Precautions:

1. Do not disassemble the battery;
2. Do not touch the battery pack with wet hands;
3. Do not smash, fall, or puncture the battery;
4. Do not short-circuit the terminal, and remove all metal jewelry items that may produce a short-circuit before installation and repair;

5. Always handle the products in accordance with the local safety regulations;
6. Store and use the battery in the user's manual, ensure reliable grounding;
7. Disconnecting all batteries to the wires before installation and repair;
8. The stacking of packaging batteries shall not exceed the quantity specified on the packaging.

3 Technical Parameters

51.2V280Ah-HV										
Basic Parameters	HV-115K	HV-129K	HV-143K	HV-158K	HV-172K	HV-186K	HV-201K	HV-215K	HV-229K	HV-244K
Number of Battery Module	8	9	10	11	12	13	14	15	16	17
Electrical parameters										
System Rated Voltage (V)	409.6	460.8	512	563.2	614.4	665.6	716.8	768	819.2	870.4
System Rated Capacity (KW.h)	114.69	129.02	143.36	157.7	172.03	186.37	200.7	215.04	229.38	243.71
System Usable Capacity (90%DOD, KW.h)	103.22	116.12	129.02	141.93	154.83	167.73	180.63	193.54	206.44	219.34
Maximum current	140A(170A，Lasts 60S)									
Maximum power	7168W*battery module number									
General parameters										
Cabinet Size (W*D*H, mm)	1048*831*1281	1048*831*1281	1048*831*1531	1048*831*1531	1048*831*1781	1048*831*1781	1048*831*2031	1048*831*2031	1572*831*1531	1572*831*1531
Weight (kg)	1140	1250	1360	1470	1580	1690	1800	1910	2030	2140
Battery type	LiFePO4									
Maximum number of parallel	4 sets									
Cooling Mode	Fan cooling									
Protection Level	IP20									
Discharging working	-20℃ ~ 60℃									
Charging working temperature	0℃ ~ 60℃									
Standing Storage Temperature	≤25℃,12 Months									
	≤35℃, 6 Months									
	≤45℃, 3 Months									
Working humidity	≤85%rh									
Store humidity	≤85%rh									
Operating Altitude	<2000m									
Communication port	CAN, RS485, WIFI									
Certificate	UN38.3, MSDS, CE									
Cycle Life	≥8000 times									
Warranty	5 years									

Battery Module Parameters	
Rated Voltage	51.2V
Rated Storage Capacity	280Ah
Weight	110Kg
Dimensions (W*D*H)	498*798*227(mm)
Protection Level	IP20

4 Product Overview

4.1 Product Profile

51.2V280Ah-HV high voltage lithium battery energy storage system, consisting of 8-17 battery modules (51.2V280Ah) and a BCU (Battery Control Unit) in series, with an operating voltage range of 358.4V-979.2V, is used for household / commercial energy storage applications, working with a high voltage inverter for energy storage purposes.

51.2V280Ah-HV has a built-in BMS (battery management system, including the main BMS in BCU and the slave BMS in battery module), which can manage and monitor

battery information, including voltage, current and temperature. In addition, BMS can balance battery charging to prolong service life. BMS has over discharge, over charge, over-current, high / low temperature and other protection functions. The system can automatically manage the charge state, discharge state and balance state.Each battery module is equipped with a cooling fan, plus a porous sheet metal design, which effectively alleviating the problem of working heat.

51.2V280Ah-HV built-in wireless WIFI module, which can realize remote monitoring and debugging by mobile phone. External touch screen, status indicator and power indicator can also clearly observe the status of the energy storage system.

51.2V280Ah-HV have soft-start circuit inside so it can support inverters without soft-start function.

4.2 BCU Module

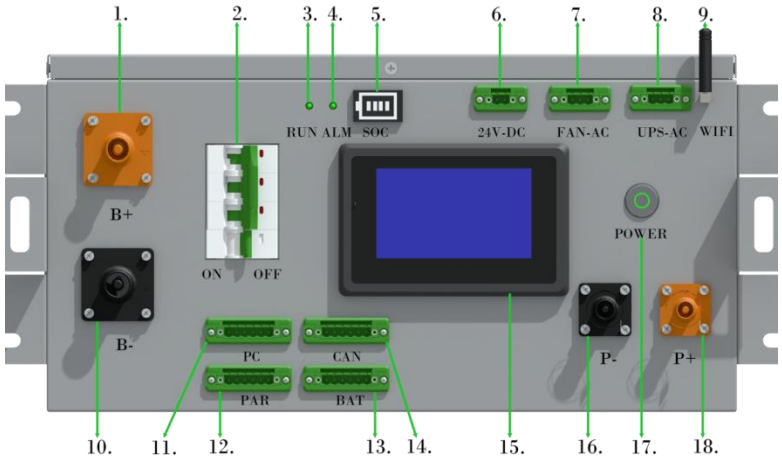
The BCU includes the master BMS, DC fuse, soft starting circuit, charging circuit, discharge circuit, 24VDC/DC power supply module, cut off protection switch, wireless WIFI module, status indicator.

The BMS in the battery module collects the battery voltage and temperature data uploaded to the master BMS via the internal CAN. BMS's BCU controls the charging voltage / current and discharge voltage / current.

4.2.1 BCU Technical Data

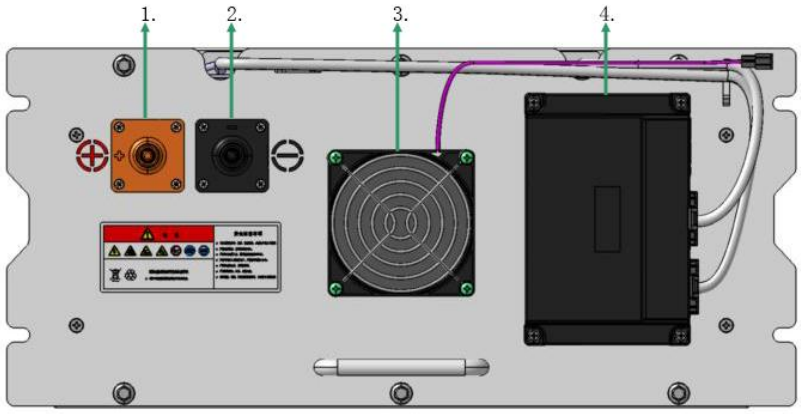
Adaptable battery model	51.2V280Ah-HV
Rated voltage	358.4V-979.2V
Max. power	7168W*battery module number
Max. Current	140A
Refer dimension (W*D*H)	498*620*222(mm)
Refer Weight	22Kg

4.2.2 BCU Port



	Name	Description	NO.	Name	Description
1.	B+	Connection position of battery positive pole	2.	ON/OFF	Cut-off protection switch
3.	RUN	Normal operation	4.	ALM	Alarm
5.	SOC	Power indicator	6.	24VDC	Fan power supply
7.	FAN-AC	Fan power input	8.	UPS-AC	Controller power input
9.	WIFI	WIFI module	10.	B-	Connection position of battery negative pole
11.	PC	Connect to the computer debug port	12.	PAR	Parallel communication port
13.	BAT	Battery communication port	14.	CAN	Inverter communication port
15.		Touch screen	16.	P-	Connection position of PCS negative pole
17.	POWER	Power switch	18.	P+	Connection position of PCS positive pole

4.3 Battery Module



NO.	Name	Description
1.	B+	Battery module positive pole (orange)
2.	B-	Battery module negative pole (black)
3.	FAN	Cooling fan
4.	BMU	Salve BMS

The battery module includes battery cell, the salve BMS and the cooling fan. The slave BMS collects and transfers the battery voltage and temperature of the battery cell in real time and the BCU to the main BMS via internal communication.

5 Installation Guide

5.1 Inspection Before the Installation

5.1.1 Check the Outer Packaging

Packaging materials and components may be damaged during transportation. Check the outer packaging material before installing the battery. Check the packaging material surface for damage, such as holes and cracks. If any damage is found, do not unpacking the battery and contact the dealer as soon as possible. It is recommended that you remove the packaging material within 24 hours before installing the battery.

5.1.2 Check Deliverables

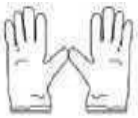
After unpacking the package, check that the deliverables are intact and complete. If any damage or missing parts is found, please contact the authorized dealer.

Accessories list in the package

51.2V280Ah-HV					
NO.	Name	Model	Unit	Qty	Mark
1	Battery module	51.2V280Ah-HV	PCS	1	
2	Communication cable		PCS	1	For battery connection
3	Power cable	Red/black 4AWG	SET	1	For battery connection
NO.1~3 are accessories for battery module; NO.4~10 are accessories for BCU.					
4	Battery control unit	BCU	PCS	1	
5	Power cable	Red/black 4AWG	PCS	2	For battery connection

6	Communication cable		PCS	1	For battery connection
7	Matching resistor		PCS	1	For BCU PAR port connection
8	User manual	User manual	PCS	1	
9	WIFI manual		PCS	1	
10	Upper computer cable	USB-CAN	PCS	1	For computer connection
11	Cabinet	Steel	SET	1	

5.2 Tools

Type	Tools			
Installation	Measuring tape 	Hammer drill 	Socket wrench 	Cross Screwdriver 
Protection	ESD gloves 	Safety goggles 	Dust mask 	Safety shoes 

5.3 Installation Requirements

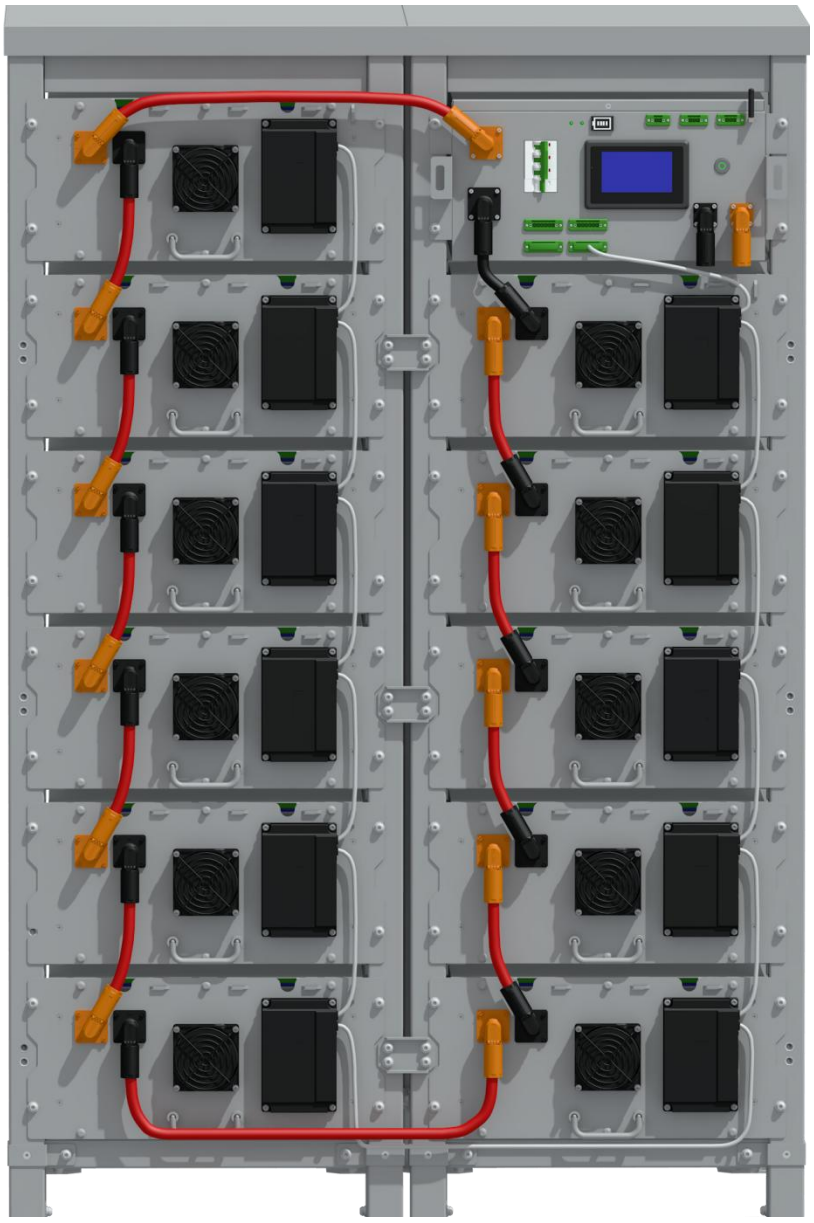
1. Install the battery in an indoor environment.
2. Place the battery in a safe position away from children and animals.
3. Do not place the battery near any heat source, and avoid generating sparks.
4. Do not expose the battery to moist air or liquid.
5. Do not expose the battery to direct sunlight.
6. Do not expose the battery to a combustible gas or liquid.
7. The mounting carrier shall be fire resistant. Do not install batteries on flammable buildings.
8. Ensure ground connection.

5.4 Fix the Battery

Insufficient or no grounding may cause an electric shock. Device malfunctions, and insufficient or no grounding may cause device damage and life-threatening electric shocks.

Install the battery module and BCU on the mounting ear sheet metal, and install them

into the cabinet one by one.



5.5 Connect the Power Cable, Communication Cable

Before connecting the battery power cable, verify that the installed battery module and the BCU are sent together. Do not mix the battery module with the BCU. Otherwise, system exceptions may occur.

6 External Touch Screen

6.1 User Mode

First boot, enter user mode.

Click anywhere on the screen to pop up the translucent button, with specific instructions as follows:

Click ‘left-right’ different user mode styles (including day/night mode) can be switched; Slide ‘left-right’ adjustable screen brightness; Click ‘setting’ to enter engineering mode to view more information; Click ‘return’ to return to the interface.

6.2 Engineering Mode

The top left shows the date, the right shows the time, between the date and time is the real-time status bar.

In the middle, the total voltage, SOC, real-time current, maximum/minimum voltage of the cell, maximum/minimum temperature of the cell are displayed.

The sub-menu is displayed at the bottom. Click to view the interface.

'Cell Vol': the voltage of a single battery cell;

Cell Temp: the temperature of a single battery cell.

'Heating Temp: MOS temperature, ambient temperature;

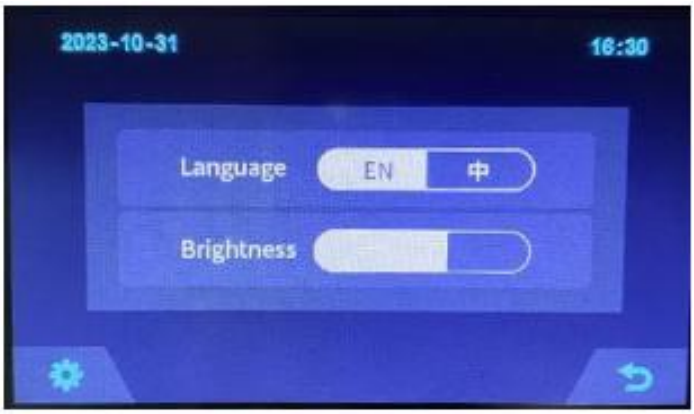
'Relay Status': Relay details interface, including relay-name, on/off status, and alarm status. You can slide left and right to see more relay information.

'Chg_Inf': Displays the charging details screen, where you can view the charging time, BMS request information, and charger information.

"Others": Access heating information, insulation resistance, diagnosis information, and accumulated time information. Click each icon to enter the three-level interface to view details.

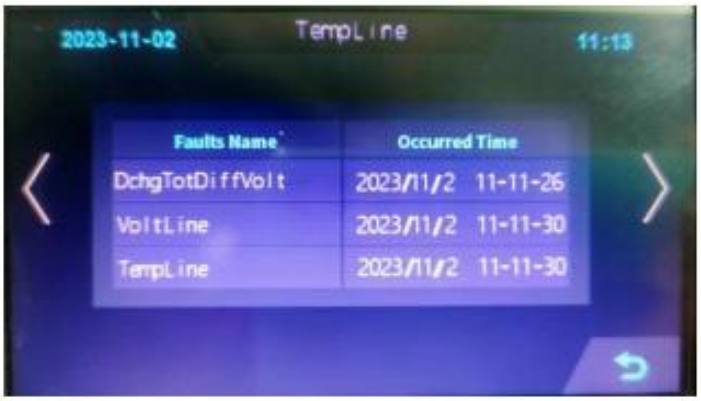
6.3 Setting

Click 'Settings' to enter the Settings screen, including language Settings and brightness Settings.



6.4 Information Record

Click the real-time status bar to enter the fault information record page, and view the fault name and occurrence time. Swipe left and right to see more faults.



7 Cleaning and Maintenance

7.1 Cleaning Work

Please note: please turn off the power supply of the system before cleaning. It is recommended to clean battery regularly. If the shell is dirty, please use a soft and dry brush or dust collector to remove the dust. Do not use solvents, or corrosive liquids to clean the enclosure.

7.2 Maintenance

7.2.1 Recharging Requirements During Normal Storage

The battery shall be stored in an environment with a temperature range of -10℃~45℃ and shall be maintained regularly according to the following table to 0.5C current is charged until 60%SOC after long storage.

Charging conditions during storage

Store the ambient temperature	Relative humidity of the storage environment	Storage time	SOC
Below -10℃		Prohibit	/
-10~25℃	5%~70%	≤12 months	30%≤soc≤60
25~35℃	5%~70%	≤6 months	30%≤soc≤60
35~45℃	5%~70%	≤3 months	30%≤soc≤60
Above 45℃		Prohibit	

7.2.2 Recharging Requirements for Excessive Discharge

Charge the over-discharge (90%DOD) battery within the time of meeting the table below, otherwise the over-discharge battery module will be damaged.

Charging requirements for excessive battery discharge

Storage environment temperature	Storage time	Note:
-10~25℃	≤ on Day 15	The battery pack disconnected to PCS, charge the battery with DC charger.
25~45℃	≤ on Day 7	
-10~45℃	<12 hours	Battery pack connect to the Inverter, charge the battery with PV or grid.

8 Common Issues and Solutions

8.1 Common Issues and Solutions

The user can monitor the operating status, warning, and alarm information through the battery LCD display.

1. The battery cannot be turned on, and the LED indicator lights all turn off, the battery depth discharge and requires charging first. If still fault, contact the authorized dealer.

2. If red light shows system abnormal, please check below values:

1) Temperature: Above 60℃ or below 0℃, the battery protection turns on, could not charge.

Solution: Move the battery to normal operating temperature range between 0°C to 60 °C.

2) Temperature: above 60℃ or below -20℃, the battery cannot discharge.

Solution: Move the battery to normal operating temperature range between -20°C to 60 °C.

3) Current: If 51.2V280Ah-HV's current is greater than 140A, the battery protection device will be turned on.

Solution: Stop using electrical appliances that exceed the maximum battery power load.

4) High voltage: If the single battery cell's voltage is above 3.6V or higher, battery charging protection turns on.

Solution: The inverter will stop charging the battery if it sets the intelligent LI mode or a reasonable charging voltage.

5) Low voltage: If the single battery cell's voltage is below 2.9V or lower, battery charging protection turns on.

Solution: Charge the battery.

Excluding the above five points, if the fault cannot be found, turn off the battery and contact the authorized dealer.

3. It's normal that the SOC LED are different if in multiple battery parallel systems. Before installing batteries in parallel, measure the voltage of each battery to ensure that the voltage difference of each battery is within 1V, and the the battery production date within 1 year.

1) When installing for the first time, please charge in full first to balance the capacity gap;

2) If the error is within 10% when the lowest SOC display percentage is compared with the highest SOC display percentage, and the SOC display percentage is the same within 10 minutes, it is normal operation;

3) Before expanding battery capacity, please charge and discharge the online battery to 45%-50%SOC; After expanding the capacity, charge the battery system to balance the capacity gap. Ensure that the capacity difference before parallel is no more than 10%. If the capacity gap is large, it will take about 2 cycles to balance the capacity gap. The actual equilibrium time depends on the capacity difference and the charge-discharge current.

Exclude the above three points. If the SOC display still fails, please contact the authorized dealer.

8.2 Emergency

Please cut off the power supply and turn off the battery in an emergency.

1. **If the battery pack is damp or immersed in water**, do not get close to the battery, and then contact the authorized dealer for technical support.
2. **Do not use water to fire when a fire!** Only dry powder extinguishers; place the battery pack in a safe area if possible.
3. **Battery leaking the electrolyte.** If the battery pack leaks the electrolyte, avoid contact with leaking liquid or gas.

If someone is exposed to the leaking material, do the following immediately:

Inhalation: evacuate the contaminated areas and seek medical treatment.

Contact eye: Rinse eyes with running water for 15 minutes and seek medical treatment.

Contact skin: Wash the infected site with soap and water and seek medical treatment.

Swallow in: urge vomiting, and seek medical treatment.

Battery damage: Damaged battery is dangerous and must be treated with very carefully. Battery cannot be used or may be dangerous to person or property. If the battery pack is damaged, contact the authorized dealer for handling.

8.3 About Battery System

1.The system treatment must comply with the locally applicable disposal regulations of electronic waste and second-hand batteries.

2.Do not treat the battery system along with household waste.

3.Avoid exposing the battery to high heat or direct sunlight.

4.Avoid exposing the battery to high humidity or corrosive environments.

5.Do not expose the battery to a combustible gas or liquid.