

Premium quality Lithium battery for Telecom application



Telecom Series Lithium Battery User Manual

Issue: V3.0
Date: 2022-04-19



Copyright © EverExceed Corporation. All rights reserved.

No part of this document may be reproduced or transmitted in any form or by any means without prior written consent of EverExceed Corporation.

Trademarks and Permissions

EverExceed®
power your applications And other EverExceed trademarks are trademarks of EverExceed Corporation.

All other trademarks and trade names mentioned in this document are the property of their respective holders.

Notice

The purchased products, services and features are stipulated by the contract made between EverExceed and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

EverExceed Corporation

Content

Section-1

Safety and Warning	1
Product Introduction	2
Product Features	2
Main application	2
Parameter and Dimension	3
Layout	5
Working principle	7

Section-2

Battery Installation	8
Battery Connection (parallel and communication)	9
Battery Work Mode Instruction	10
Battery Charging settings	11
Battery Discharging settings	13
Battery Storage	15
Maintenance	15
Troubleshooting and Solutions	16

Section-3

Annex1- Instructions for LED Flash	17
Annex2- Instructions for ADS Dip Switch	19
Annex3- Communication Protocol for RS485	20
Annex4- LCD Menu Instruction	21
Annex5- Monitoring Software Instruction	22
Annex6- SNMP Monitoring Instruction	25
Annex7- Gyroscope anti-theft Instruction	28
Annex8- GPS Instruction	30
Annex9- Fire protection function	32

Safety and Warning

The EV series LiFePO4 battery system installation, operation, maintenance should follow important recommendations in this manual:

The equipment shall be installed by the professional trained staff.

Battery maintenance should be carried out by the experienced professionals and should be aware of the preventive measures on the potential harm of the battery.

Note: Be careful of the risk of electric shock for large current in case of battery short circuit, pay attention to the following points during operation:

- Remove watches, rings or other metal objects
- Use tools with insulated handles
- Do not place tools or metal objects on the battery

Do not directly access to the battery system to the mains grid power outlet.

Do not put the battery system into fire; do not use or storage the battery near to the high temperature source.

Do not use liquid or other objects placed into the battery system. Do not open or cut the battery, do not hit, throw or step on the battery.

Using special communication between battery module and power plant to charge battery is sure to subject to charge and discharge parameters setting in this manual.

The output interface of the system is still voltage when grid power cut, avoid electric shock or short circuit when operation.

Please check if the box is damaged. If damaged, please immediately notify the supplier

If you find leaking liquid or white powder residue on product, prohibit operation.

Please take care of the following marks

				
Warning	Electricity danger	Protecting your eyes	Watch Short-circuits	With adults custody
				UN38.3
Read the manual	Fire forbidden	Circle used	Do not put batteries into dustbin	The product has passed the UN38.3 authentication

According to UN38.3, batteries cannot be shipped fully charged, so after installation, the batteries should be fully charged before use.

Product Introduction

EV series lithium battery system is 48V system for communications back-up type LiFePO₄ (lithium iron phosphate) battery products, the system uses the advanced LiFePO₄ battery technology with the benefit of long cycle life, small size, light weight, safety and environmental protection, and has a strong environmental adaptability, it is idea for harsh outdoor environments. The system also integrates a smart battery management and monitoring module, support for remote centralized monitoring to meet the requirements of unattended. Therefore, the EV series lithium battery can fully meet the backup power supply requirements of the access network equipment, mobile communications equipment, transmission equipment, micro base stations and microwave communication equipment.



EV series telecom LFP battery

Product Feature

- ◆ 15+ years of design life, 19" rack mounting module design;
- ◆ Direct Lead Acid Battery (AGM/GEL) replacement for 48V 50Ah/100Ah/150Ah/200Ah;
- ◆ Faster charge, 1 hour of charging can provide up to 90% charge;
- ◆ High energy density and conversion efficiency;
- ◆ Excellent high and low temperature operation;
- ◆ High cycle times and longer service life of >3000 cycles @100% DOD;
- ◆ Can support paralleling use for increased requirement;
- ◆ Safety in use: Intelligent, user friendly BMS inside,
- ◆ No explosion, No fire;
- ◆ Intelligent automatic protection for overcharge, over discharge and temperature conditions;
- ◆ Ultra low self discharge rate <1.5%/month;
- ◆ No maintenance required throughout the lifetime;
- ◆ Great power saver;
- ◆ Superior DOD (100%) over lead acid batteries;
- ◆ RS485 communication output, and RS232, CAN , SNMP optional;
- ◆ BMS with internal cell balancing function to ensure long service life;
- ◆ Excellent high temperature performance, ultra low life decay rate in operating when harsh environment;

Main application

- ◆ Network Telecommunication Facilities
- ◆ OSP
- ◆ Terminal of FTTX
- ◆ Access network system
- ◆ Indoor distribution system
- ◆ Telecom BTS
- ◆ Integrated outdoor power cabinet
- ◆ Internet data center (IDC)
- ◆ Common Bonding Network (CBN)
- ◆ Isolated Bonding Network (IBN)

Parameter and Dimension

Cell and Battery Pack Voltages

Lithium Iron Phosphate (LiFePO4) Nominal Voltage	Lead-Acid Equivalent Nominal Voltage
Cell = 3.2V	Cell = 2.0V
12.8V – 4 cells in series	12V
25.6V – 8 cells in series	24V
38.4V – 12 cells in series	36V
48.0V – 15 cells in series	48V
51.2V – 16 cells in series	48V

Parameter of 48V Battery (15 cells in series):

Model	EV4850-T	EV48100-T	EV48150-T	EV48200-T
Cell in series	15 cells in series			
Nominal voltage	48VDC			
Rated capacity	50Ah	100Ah	150Ah	200Ah
Rated reserved energy	2400Wh	4800Wh	7200Wh	9600Wh
Standard charging current	10A	20A	30A	40A
Maximum charging current	50A	100A	100A	100A
Maximum charging voltage	54.7VDC			
Standard discharging current	10A	20A	30A	40A
Maximum continuous discharging current	50A	100A	100A	100A
Cut-off voltage of discharging	40.5VDC			
Charging temperature range	0°C~60°C			
Discharging temperature range	-20°C~60°C			
Storage temperature	-20°C~60°C			
Dimension (W×L×H)	483*480*133mm	483*480*177mm	483*580*200mm	483*680*225mm
Weight	26.0kg	45.0kg	58.0kg	73.0kg

Parameter of 51.2V Battery (16 cells in series):

Model	EV4850-T	EV48100-T	EV48150-T	EV48200-T
Cell in series	16 cells in series			
Nominal voltage	51.2VDC			
Rated capacity	50Ah	100Ah	150Ah	200Ah
Rated reserved energy	2560Wh	5120Wh	7680Wh	10240Wh
Standard charging current	10A	20A	30A	40A
Maximum charging current	50A	100A	100A	100A
Max Charging voltage	58.4VDC			
Standard discharging current	10A	20A	30A	40A
Maximum continuous discharging current	50A	100A	100A	100A
Cut-off voltage of discharging	43.2VDC			
Charging temperature range	0°C~60°C			
Discharging temperature range	-20°C~60°C			
Storage temperature	-20°C~60°C			
Dimension (W×L×H)	483*480*133mm	483*480*177mm	483*580*200mm	483*680*225mm
Weight	27.0kg	48.0kg	61.0kg	76.0kg

Layout

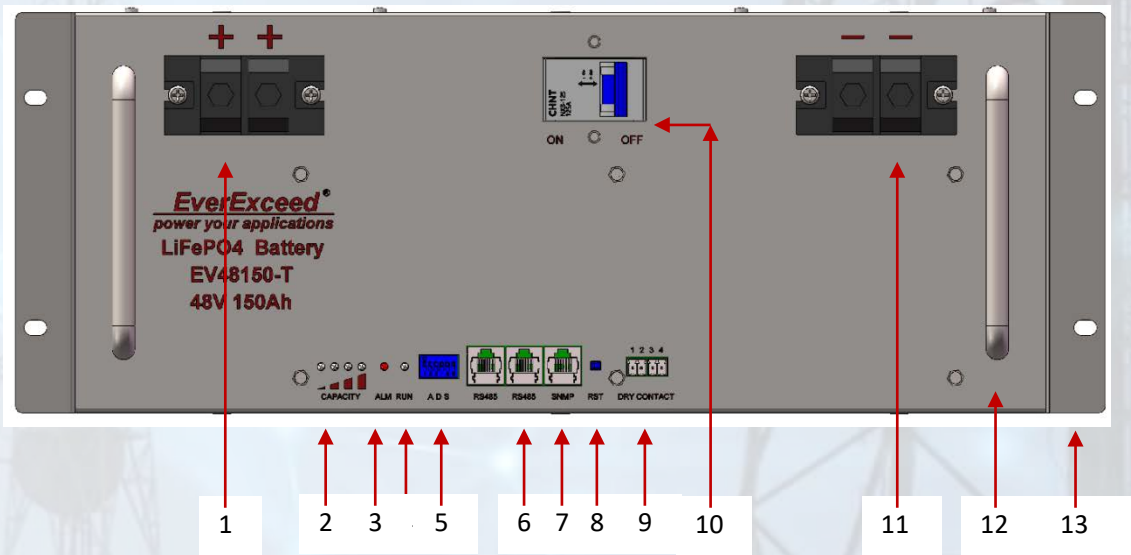


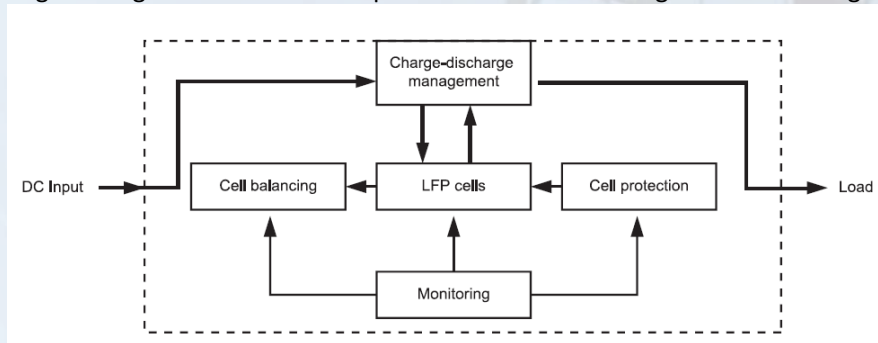
Table - Instruction for Layout of Front Panel:

No.	Description	Functions	Detailed Information
1	Positive Terminal	Positive Output	Type F-M6 x 2pcs
2	SOC	Indicators for capacity	SOC is short for state of charge. There are four green LED lights in front panel indicating SOC. Each SOC LED light represents 25% of rated capacity. Detailed information is shown in Annexed Table
3	ALM	Indicator for alarms	There is one red LED light in front panel indicating alarms. Detailed information is shown in Annexed Table
4	RUN	Indicator for running status	There is one green LED light in front panel indicating running status. Detailed information is shown in Annexed Table 1.2.
5	ADS Dip switch	Address communication of	ADS are applicable to modules connected in parallel. ADS consist of six binary bits. Detailed information is shown in Annex 2.
6	RS485	communication port	It is adopting RS485 series port communication pattern to upload data. Contents of data transmit include BMS parameters, battery running status, alarms, etc. Communication of modules connected in parallel is available through RS485
7	SNMP	communication port	SNMP Remote monitoring; RS232/CAN communication port support optional
8	RST	Reset button	Press RESET button when abnormality occurs to assure stability of battery performance. Wake up battery. Close battery.

9	Dry contact	Dry contact indicators	Optional function. Support two-way dry contact output, normally open in normal state, and close when abnormality occurs. Dry contact 1: BMS system has protection, fault and alarm; Dry contact 2: The BMS system is protected or faulty.
10	MCB	Micro circuit breaker	Physical isolation
11	Negative Terminal	Negative Output	Type F-M6 x 2pcs
12	Handle	Handle	The handle is used to push and pull the battery easily from battery cabinet. Not recommend use handle to handing the battery.
13	Side mounting	Wall-hanging installation	The side mounting is used to wall-handing installation battery. Also use the ear to handle the battery.
14	LCD	Display information battery	Optional

Working Principle

The EV Series lithium battery system mainly includes Lithium battery pack, battery protection, cell balancing unit, monitoring module and charge-discharge management module for optional. Its schematic diagram shown in Figure



LFP cells	Chemical power, energy storage and power supply components.
Cell protection	Protect LFP cells against overcharge, over discharge, over current, over temperature, short circuit
Cell balancing	Equalization LFP cells for cells unbalanced
Monitoring	Support centralized monitoring system (optional according to customer requirements)
Anti-theft function	Support 3 type Anti-theft function optional Type 1: Communication anti-theft function Type 2: Gyroscope anti-theft function Type 3: GPS anti-theft function
Fire protection function	Support Aerosol-Fire-Extinguisher module optional
Parallel function	Regular model support 15 batteries in parallel. Optional 31 batteries in parallel function before manufacture.

EV series battery working principle:

DC power input rectifier after filter, DC divided two circuits, and one circuit directly supply the load, another circuit charge lithium battery. When grid power on, the system supplies the loads and charging inside lithium batteries; When grid power failure, lithium inside system supply DC power to the load, to ensure uninterrupted power supply as power system.

Battery Management System (BMS)

Smart BMS technology is adopted for battery modules of EV series battery to assure smart automatic management for batteries. Features of BMS are shown as below:

There is a centralized monitoring unit in BMS. Functions such as remote communication are available. Battery modules can be monitoring remotely by staffs in control center. EV series battery is in line with the requirements of the development of modern communications technology.

It is combined by technologies of power source and computer. Parameters and status of rectifiers and AC/DC distributions can be detected and controlled.

This device has excellent electromagnetic compatibility. BMS used for battery modules of EV series battery can comply with the outdoor power plants during operation, no interfere with each other.

- BMS can provide protections against overcharge, over-discharge, over-temperature, over current, short circuit, etc., to assure reliable safety and operation life.
- With patented cell balancing technology, BMS provide high efficiency for cell balancing and prolong system operate life.
- Configuration flexibility, support max 15pcs battery in parallel connection to expansion.(31pcs batteries in parallel is optional)
- Supports remote monitoring via SNMP (optional).

Battery Installation

Un-boxing & Inspection

Please study this manual before installation.

Please inspect the package before un-boxing, if there is any **damage** in the appearance, contact with the supplier as soon as possible.

This device shall be installed and operated by professionals.

Preparation for Installation

- Batteries shall not be placed in direct sunshine or close to heat source.
- Batteries shall be installed in place with good ventilation to assure enough heat dissipation.
- Batteries shall be placed in are with clean ambient and low humidity.
- Heavy weight shall not be placed on any cable.
- Following are the tools possibly but not limited are use for installation:



Tool items (possibly but not limited)

Installation of Battery Modules

Battery modules of EV series batteries are applicable to installation in cabinets and wall-hanging.

Cabinet installation

Insert battery module into cabinet, and fix two handles of battery module with cabinet rack using 4pcs M6 screws.

Wall-hanging installation

Wall-hanging installation also can be adopted, fix two handles of battery module with triangle rack on the wall using 4pcs M6 screws.

Battery Connection

1. Single battery connection

Connect positive terminal '+' of battery output with positive copper bar of power plant, and negative terminal '-' with negative copper bar or power switch.

2. Batteries Parallel Connection

If multi battery modules will be connected in parallel, please take note of follows:

- The battery modules connected no more than 15 in parallel.
- The minimum spacing between batteries is 10mm.
- Connect positive terminal '+' of battery output of each battery module with positive copper bar of power plant, and negative terminal '-' with negative copper bar of power plant or power switch separately.
- Length of cable between battery module and power plant shall be less than 2.0m. To make sure similar voltage drops of cable for each battery.
- Length of all positive and negative cables should be the same when in parallel connection.
- Use the communication cable that comes with the battery to connect one by one through the RS485 communication port.



Layout of
paralleling
connection
for EV Series
Batteries

3. Power on for battery module

When installation is accomplished, battery module is in dormant state. Once power is on for the power plant and battery module, battery will go into normal running status, and discharge/charge will be available. Parameter settings for lithium battery modules in power plant are shown in Table 3-1.

4. RS485 communication connection

- If there is only one battery module in operation, communication between battery module and computer can available through RS485.
- If there are more than one battery modules in operation, parallel communication can be available using RS485.
- Communication protocols for RS485 are shown in Annex 3.

Battery Work Mode Instruction

Basic work mode

1. Charge Mode

When the BMS detects that the external charging voltage is greater than or equal to 48V, and the cell voltage and temperature are both within the charging range, it will turn on the charging MOSFET for charging. When the charging current reaches the effective charging current, the charging mode is entered. In charge mode, both charge and discharge MOSFETs are turned on.

2. Discharge Mode

When the BMS detects that the load is connected, the cell voltage and temperature are within the dischargeable range, and the discharge current reaches the effective discharge current, it enters the discharge mode.

3. Standby Mode

When the above two modes are not satisfied, enter standby mode.

4. Sleep Mode

After the normal standby time, the battery triggers under-voltage protection, executes the button shutdown or the host computer executes the shutdown command, the BMS enters the sleep (shutdown) mode.

Wake-up conditions for sleep mode: 1. Charge activation; 2. Press key to power on;

5. Buzzers

The buzzer function can be enabled or disabled by the host computer, and the factory default is disabled.

6. Description of the reset key

When the BMS is in the sleep state, press the button for 1S and then release it, the BMS board is activated, and the LED indicator lights start from the "L4" light for 0.5 seconds.

When the BMS is active, press the button 3S-6S and release it, the BMS board is put to sleep, and the LED indicators light from the "RUN" light for 0.5 seconds in sequence.

When the BMS is in the active or dormant state, press the button for 15 seconds and release it, the BMS board is reset, and the LED lights start from the "L1" light for 0.5 seconds.

7. Sleep and wake up

Sleep

When any of the following conditions are met, the system enters a low-power mode:

- a) The individual under-voltage protection or the overall under-voltage protection has not been released within 30 minutes.
- b) Release the button after pressing the button for 3 seconds.
- c) The minimum cell voltage is lower than the sleep setting voltage (default value 3150mV), and the duration reaches the sleep delay time (default value 1440 minutes) (at the same time, no communication and no charge and discharge current are satisfied).
- d) Forced shutdown through the host computer software.

Before entering the sleep mode, make sure that the P-terminal is not connected to an external voltage; otherwise it will not be able to enter the low power consumption mode.

Wake up

When the system is in low-power mode and meets any of the following conditions, the system will exit the low-power mode and enter the normal operation mode:

- a) Connect to the charger, the output voltage of the charger must be greater than or equal to 48V.
- b) Press the button for 1S and release the button.

Battery Charging Settings

Charging Parameter of 48V Battery (15 cells in series):

Model	EV4850-T	EV48100-T	EV48150-T	EV48200-T
Standard charging current	10A	20A	30A	40A
Maximum charging current	50A	100A	100A	100A
Boost/ Equalization charging voltage	54 - 54.7VDC			
Float charging voltage	51.5 - 52VDC			
Recommend charge method	CC-CV			
Condition to float charge	0.05C			
Equalization charge duration	NA			
Condition to equalization charge	NA			
Temperature compensation for charge	NA			
Low temperature alarm in charging	2°C (adjustable)			
Low temperature protection in charging	0°C (adjustable)			
High temperature alarm in charging	50°C (adjustable)			
High temperature protection in charging	55°C (adjustable)			

Note:

1. Equalization charge is requested to switch off for battery.
2. Rectifier parameter shall be set according to specific site requirement based on battery units used.
3. If the battery connected more than 2 in parallel, the max. Charge current and discharge current recommend 0.5C.

Charging Parameter of 51.2V Battery (16 cells in series):

Model	EV4850-T	EV48100-T	EV48150-T	EV48200-T
Standard charging current	10A	20A	30A	40A
Maximum charging current	50A	100A	100A	100A
Boost/ Equalization charging voltage	57.6 - 58.4VDC			
Float charging voltage	55 - 55.5VDC			
Recommend charge method	CC-CV			
Condition to float charge	0.05C			
Equalization charge duration	NA			
Condition to equalization charge	NA			
Temperature compensation for charge	NA			
Low temperature alarm in charging	2°C (adjustable)			
Low temperature protection in charging	0°C (adjustable)			
High temperature alarm in charging	50°C (adjustable)			
High temperature protection in charging	55°C (adjustable)			

Note:

1. Equalization charge is requested to switch off for battery.
2. Rectifier parameter shall be set according to specific site requirement based on battery units used.
3. If the battery connected more than 2 in parallel, the max. Charge current and discharge current recommend 0.5C.

Battery Discharging Settings

Discharging Parameter of 48V Battery (15 cells in series):

Model	EV4850-T	EV48100-T	EV48150-T	EV48200-T
Standard discharging current	10A	20A	30A	40A
Maximum continuous discharging current	50A	100A	100A	100A
Low voltage alarm	44VDC			
Recovered of Low voltage alarm	46VDC			
Cut-off voltage of discharging	40.5VDC			
Recovered voltage after cut-off protection	48VDC			
Recommend LLVD	47VDC			
Recommend BLVD	43.2VDC			
Recovered LLVD voltage	50VDC			
Low temperature alarm in discharging	2°C			
Low temperature protection in discharging	-20°C			
High temperature alarm in discharging	50°C			
High temperature protection in discharging	60°C			

Discharging Parameter of 51.2V Battery (16 cells in series):

Model	EV4850-T	EV48100-T	EV48150-T	EV48200-T
Standard discharging current	10A	20A	30A	40A
Maximum continuous discharging current	50A	100A	100A	100A
Low voltage alarm	47VDC			
Recovered of Low voltage alarm	49VDC			
Cut-off voltage of discharging	43.2VDC			
Recovered voltage after cut-off protection	51VDC			
Recommend LLVD	50VDC			
Recommend BLVD	46VDC			
Recovered LLVD voltage	53VDC			
Low temperature alarm in discharging	2°C			
Low temperature protection in discharging	-20°C			
High temperature alarm in discharging	50°C			
High temperature protection in discharging	60°C			

Battery Storage

Recommend storage temperature range: 0°C to 40°C.

Maximum storage temperature range: -20°C to 60°C.

Storage battery should be at 50%-80%SOC.

Recharge charge before using to recover capacity loss of self-discharge during storage and transport.

Recharge battery during long-term storage for self-discharge. Recharge program as follow table:

0°C-30°C	Every 6 months	1) Charge with 0.2C to 100%SOC 2) Discharge with 0.2C to 0%SOC 3) Charge with 0.2C per module for 4 hours
30°C-40°C	Every 3 months	

Storage battery over 40°C or under 0°C will reduce battery life,

Storage battery in dry and low temperature, well ventilated place

Battery performance degradation after long-term storage, please shorten shelf time as possible as you can.

According to UN38.3, batteries cannot be shipped fully charged, so after installation, the batteries should be fully charged before use.

Maintenance

Proper maintenance will prolong the life of a battery and will aid in assuring that it can satisfy its design requirements. A good battery maintenance program will serve as a valuable aid in determining the need for battery replacement. The users must consider their application and reliability needs if maintenance procedures, other than those recommended in this document, are used. Battery maintenance should be performed by personnel knowledgeable of batteries and the safety precautions involved.

- The battery shall be recharged every three months if in long time storage
- Please clean the dust by the dust collector when dust is accumulated on vent
- Please use clean and dry cloth/fabric to clean up the cabinet, if need further cleaning, please use neutral cleanser. Alcohol or ammonia synthesis is forbidden.
- Carrying shall be handled gently, prevent from severe compact
- Prevent battery from splashing liquid
- Suggest inspect the tighten of output screw every two years

Troubleshooting and Solutions

Troubles	Troubleshooting	Solutions
Battery cannot discharge	Protection against under-voltage	Charge battery
	Protection against over-temperature or under-temperature (cell temperature is lower than -20°C or higher than 70°C)	Regulate cell temperature in the range of -20°C to 70°C for discharge
	Battery output is short circuit	Relieve short circuit and charge battery
	Protection against over current	Remove some unimportant load and charge battery
	System failure	Shutdown system and call maintenance service
Battery cannot charge	Battery is fully charged. Normal charge management	Do not need to solve
	Protection against over voltage	Do not need to solve
	Protection against over-temperature or under-temperature (cell temperature is lower than -10°C or higher than 70°C)	Regulate cell temperature in the range of 0°C to 55°C for charge
	System failure	Shutdown system and call maintenance service
All LED indicators on	System failure	Shutdown system Call for maintenance service
Communication failure	Fault of communication cable	Inspect communication cable
	Halt of System communication management	Press RESET button
	System failure	Shutdown system Call for maintenance service

Different flash status of LED indicators represents corresponding running status or alarms. Detailed information is shown Annex 1.

Annex1- Instructions for LED Flash

1. Definition of indicator lights:

					
SOC				ALM	RUN

SOC: State of charge

ALM: Alarm

RUN: Work status

2. SOC LED Indicators Description:

Status	Charge				Discharge			
SOC	L1●	L2●	L3●	L4●	L1●	L2●	L3●	L4●
0~25%	○	○	○	●	○	○	○	●
25~50%	○	○	●	●	○	○	●	●
50~75%	○	●	●	●	○	●	●	●
75~100%	●	●	●	●	●	●	●	●

Note: ● mean light on, ○ mean light off.

3. RUN Indicators Description:

Note: ● mean light on, ○ mean light off.

System state	Abnormal event	RUN	ALM	SOC			
		●	●	●	●	●	●
Shutdown		○	○	○			
Standby	Normal	●	○	Display according to battery level			
	Alarm	●	●	Display according to battery level			
Charge	Normal	●	○	Display according to battery level The highest indication LED flashes			
	Over voltage alarm	●	○	Display according to battery level The highest indication LED flashes			
	Over temperature alarm	●	●	Display according to battery level The highest indication LED flashes			
	Over voltage protection	●	○	Always bright			
	Over current protection	●	○	Display according to battery level The highest indication LED flashes			

Discharge	Normal	●	○	Display according to battery level
	Alarm	●	●	Display according to battery level The highest indication LED flashes
	Under voltage protection	●	●	Display according to battery level
	Over current, short circuit, temperature, reverse connection, protection	○	●	All extinguish

Annex2- Instructions for ADS Dip Switch

ADS Dip Switch is applicable to modules connected in parallel. ADS consists of six binary bits, the first four binary bits is for battery address setting.

Instructions for ADS Dialing				Module No.	Binary Code
1	2	3	4		
OFF	OFF	OFF	OFF	Default ADS	0000
ON	OFF	OFF	OFF	PACK 1	1000
OFF	ON	OFF	OFF	PACK 2	0100
ON	ON	OFF	OFF	PACK 3	1100
OFF	OFF	ON	OFF	PACK 4	0010
ON	OFF	ON	OFF	PACK 5	1010
OFF	ON	ON	OFF	PACK 6	0110
ON	ON	ON	OFF	PACK 7	1110
OFF	OFF	OFF	ON	PACK 8	0001
ON	OFF	OFF	ON	PACK 9	1001
OFF	ON	OFF	ON	PACK 10	0101
ON	ON	OFF	ON	PACK 11	1101
OFF	OFF	ON	ON	PACK 12	0011
ON	OFF	ON	ON	PACK 13	1011
OFF	ON	ON	ON	PACK 14	0111
ON	ON	ON	ON	PACK 15	1111

Instruction of ADS for Parallel Communication:

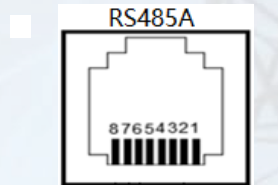
Note: Counting of ADS must begin from 1000, without interruption, or parallel communication cannot be available.

Default 0000 	Pack 1 1000 	Pack 2 0100 	Pack 3 1100 
Pack 4 0010 	Pack 5 1010 	Pack 6 0110 	Pack 7 1110 
Pack 8 0010 	Pack 9 1001 	Pack 10 0101 	Pack 11 1101 
Pack 12 0011 	Pack 13 1011 	Pack 14 0111 	Pack 15 1111 

Annex3- Communication Protocol for RS485

RS485 port in front panel for communication between battery and PC, also for communication between batteries modules connected in parallel.

1. RS485 communication port interface definition:



8P8C vertical RJ45 port

PIN definition:

Pin	Definition
3、6	RS485A-B
2、7	RS485A-A
8	GND
4	RS485B-B
5	RS485B-A
1	NC

2. RS485 communication interface description

2.1 RS485A: External communication interface (for communicate with the host, like PC or rectifier etc.), baud rate is 9600, supports MODBUS protocol and EverExceed 1363 protocol.

2.2 RS485B: Battery parallel interface, baud rate is 57600, supports EverExceed 1363 protocol.

Annex4- LCD Menu Instruction

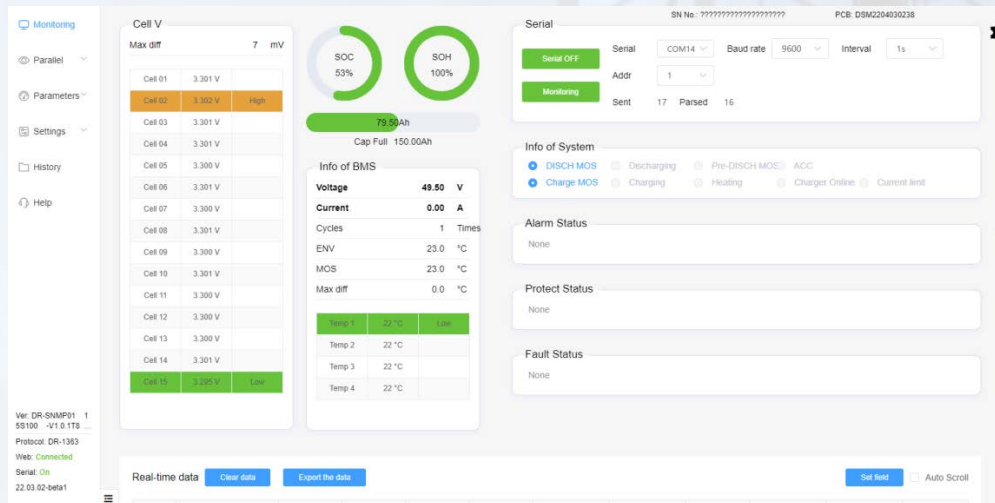
*****LCD is optional function

Annex5- Monitoring Software Instruction

1. Monitoring software interface introduction

EverExceed provides powerful monitoring software for the battery; you can see all the running information of the battery.

1.1 Main interface



1.2 Real time data and parallel data

Real-time data

No	time	Total volt...	Total cur...	SOC(%)	SOH(%)	Full capacity...	The remain...	The num...	Env TEMP(°C)	MOS TEMP(°C)	Alert status	PROT state	Cell Num
1	2022-04-14 17:17:27	50.95	45.08	100.30	100	150.00	130.00	0.0	35.0	42.0			15
2	2022-04-14 17:17:31	50.95	45.08	100.30	100	150.00	130.00	0.0	35.0	41.0			15
3	2022-04-14 17:17:33	50.95	45.09	100.30	100	150.00	130.00	0.0	34.0	42.0			15
4	2022-04-14 17:17:33	50.95	45.09	100.30	100	150.00	130.00	0.0	34.0	42.0			15
5	2022-04-14 17:17:36	50.95	45.09	100.30	100	150.00	130.00	0.0	34.0	41.0			15
6	2022-04-14 17:17:37	50.95	45.09	100.30	100	150.00	130.00	0.0	34.0	41.0			15
7	2022-04-14 17:17:38	50.95	45.09	100.30	100	150.00	130.00	0.0	34.0	41.0			15

Parallel data

No	time	PACK	Total volt...	Total cur...	SOC(%)	SOH(%)	Full capacity...	The remain...	The num...	Env TEMP(°C)	MOS TEMP(°C)	Alert status	PROT state	Cell Num
1	2022-04-14 17:15:06	1	50.97	45.09	100.30	100	150.00	130.00	0.0	34.0	34.0			15
2	2022-04-14 17:15:07	2	50.97	44.94	100.30	100	150.00	130.00	0.0	35.0	35.0			15
3	2022-04-14 17:15:08	3	50.97	44.94	100.30	100	150.00	130.00	0.0	35.0	35.0			15
4	2022-04-14 17:15:08	4	50.96	45.30	100.30	100	150.00	130.00	0.0	35.0	35.0			15
5	2022-04-14 17:15:40	1	50.97	45.09	100.30	100	150.00	130.00	0.0	34.0	35.0			15
6	2022-04-14 17:15:41	2	50.97	44.94	100.30	100	150.00	130.00	0.0	35.0	35.0			15

1.3 Parameter setting

Cell voltage

Over DISCH PROT	Over DISCH Alarm	Current	Over C Alarm	Over C PROT
Action	2500	2750	33	3600
Release	3050	2900	3500	3340
Delay	1000	1000	1000	1000

Overall voltage

Over DISCH PROT	Over DISCH Alarm	Current	Over C Alarm	Over C PROT
Action	37.5	41	49.50	54
Release	48	46	52	59.2
Delay	1000	1000	1000	1000

Charging TEMP

Low PROT	Low Alarm	Current	High Alarm	High PROT
Action	9	2	50	60
Release	5	5	47	55
Delay	3000	4000	4000	8000

DISCH TEMP

Low PROT	Low Alarm	Current	High Alarm	High PROT
Action	-20	2	50	65
Release	-15	5	47	60

Current 1

Over C 1 PROT	Over C 1 Alarm	Current	Over C 1 Alarm	Over C 1 PROT
Action	130	125	0.00	125
Release	100	123	125	130
Delay	1000	1000	1000	1000

Current 2

Over C 2 PROT	Over C 2 Alarm	Current	Over C 2 Alarm	Over C 2 PROT
Action	150	0.00	140	140
Release	600	300		

Voltage diff

Current	Over Alarm	Over PROT
Action	600	800
Release	0.000	500
Delay		5000

MOS TEMP

Current	Over High Temp Alarm	Over High Temp PROT
Action	24.0	90
Release		87

1.4 History

Monitoring

Root Data

Clear Page

Export Data

Interval(min)

Set

Yes

SN: 00000000000000000000

PCB: 00000000000000000000

Auto Stop

Graphs

Parameters

Settings

History

Help

No	PACK	Time	EventRecord	Total volt...	Total cur...	SOC(%)	SOH(%)	Full capac...	Env TEMP...	MOS TEM...	Cell Num	battery01	battery02	battery03	battery04	battery05
1	1	2022-04-13 14:36:09	系统启动	49.50	0.00	53.00	100.00	150	30.00	35.00	15	3.304	3.300	3.304	3.304	3.303
2	1	2022-04-09 14:38:42	进入充电	49.50	0.00	53.30	100.00	150	30.00	35.00	15	3.305	3.311	3.306	3.305	3.304
3	1	2022-04-09 14:33:33	系统启动	49.50	0.00	66.00	100.00	120	30.00	35.00	15	3.305	3.311	3.306	3.305	3.305
4	1	2022-04-09 09:47:33	退出充电	50.30	0.00	67.30	100.00	120	30.00	42.00	15	3.305	3.300	3.307	3.303	3.304
5	1	2022-04-09 00:11:14	进入充电	46.40	14.30	0.10	100.00	120	34.00	35.00	15	3.181	3.000	3.115	3.122	3.122
6	1	2022-04-09 00:11:09	退出充电	46.30	0.00	0.10	100.00	120	34.00	35.00	15	3.104	3.290	3.107	3.114	3.115
7	1	2022-04-09 00:09:00	系统启动/恢复	46.10	3.90	0.00	100.00	120	34.00	35.00	15	3.096	3.254	3.099	3.106	3.107
8	1	2022-04-09 00:08:59	进入充电	46.10	4.80	0.00	100.00	120	34.00	35.00	15	3.096	3.254	3.099	3.106	3.107
9	1	2022-04-09 00:08:50	退出充电	44.60	0.00	0.00	100.00	130	35.00	43.00	15	2.996	3.053	3.095	3.030	3.029
10	1	2022-04-08 23:38:27	系统启动/恢复	44.30	-50.40	3.00	100.00	150	35.00	43.00	15	2.970	2.400	2.901	3.003	3.001
11	1	2022-04-08 20:45:52	进入充电	51.10	-25.40	99.90	100.00	150	35.00	35.00	15	3.374	3.373	3.400	3.409	3.396
12	1	2022-04-08 20:45:52	系统启动/恢复	51.10	-25.40	99.90	100.00	150	35.00	35.00	15	3.374	3.373	3.400	3.409	3.396
13	1	2022-04-08 20:15:12	退出充电	52.50	0.00	100.00	100.00	130	35.00	35.00	15	3.440	3.404	3.414	3.409	3.706
14	1	2022-04-08 20:15:08	系统启动/恢复	52.60	19.00	100.00	100.00	130	35.00	35.00	15	3.436	3.406	3.436	3.479	3.805
15	1	2022-04-08 20:14:40	进入充电	51.60	3.80	100.00	100.00	130	35.00	35.00	15	3.410	3.408	3.428	3.530	3.410
16	1	2022-04-08 20:04:14	退出充电	51.60	0.00	100.00	100.00	130	35.00	35.00	15	3.427	3.469	3.427	3.494	3.554

View: 00-000000-1

15708-4718-175

Processed On: 1962

Plus Connected

total: 00

22:03:10:beta1

1.5 Language setting

Monitoring
Parallel
Parameters
Settings
History
Help

语言 language

PassWord

Verify

Phone

Document

Link

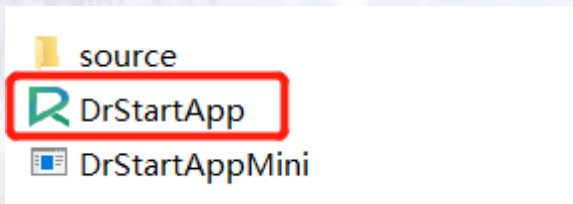
2. How to run monitoring software

Use the RS485 to USB communication cable; connect the No 1 battery RS485 port with the computer USB port.

Note: When multiple batteries are connected in parallel, be sure to set the ADS according to the Annex2, and the batteries have connected through RS485 communication.

2.1 Open the monitoring software

Double click the icon



2.2 Setting

COM setting: choose the right COM port

Baud rate: 9600

Click "Serial ON"

Click "Monitor"

Telecom Series Lithium Battery User Manual

Serial

Serial ON

Serial

COM14

Baud rate

9600

Interval

1s

Addr

1

Monitor

Sent

135

Parsed

135

Info of System

DISCH MOS

Discharging

Pre-DISCH MOS

ACC

Charge MOS

Charging

Heating

Charger Online

Current limit

Alarm Status

None

Protect Status

None

Fault Status

None

Annex6- SNMP Remote Monitoring Instruction

SNMP remote monitoring is optional function;

EverExceed EV series lithium battery support SNMP remote monitoring function.

The SNMP function supports remote monitoring in LAN. SNMP supports online remote monitoring of the operation data of each battery, assists the owner to understand the battery status in real time, conducts remote diagnosis, reduces operation and maintenance costs.

1. SNMP monitoring software interface introduction

1.1 Main interface

The screenshot shows the 'Battery Management Monitoring' dashboard. It includes a 'Statistics Battery Overview' section with tabs for Pack All, Pack 1, Pack 2, Pack 3, Pack 4, Pack 5, and Pack 6. The 'Pack All' tab is selected, displaying a table of battery packs. The table has columns for Pack Volt, Batt Curr, SOC, Full Cap, Cycle, and individual cell voltages (Cell 1 to Cell 11). The table shows 6 entries, with the first entry having a Pack Volt of 49.42, Batt Curr of 0.00, SOC of 53, Full Cap of 150, and Cycle of 3.

	Pack Volt	Batt Curr	SOC	Full Cap	Cycle	Cell 1	Cell 2	Cell 3	Cell 4	Cell 5	Cell 6	Cell 7	Cell 8	Cell 9	Cell 10	Cell 11	C
1	49.42	0.00	53	150	3	3.295 V	3.294 V	3.295 V	3.295 V	3.294 V	3.294 V	3.295 V	3.295 V	3.295 V	3.295 V	3.296 V	3.2
2	49.44	0.00	53	150	3	3.297 V	3.296 V	3.296 V	3.296 V	3.296 V	3.296 V	3.297 V	3.297 V	3.296 V	3.296 V	3.296 V	3.2
3	49.40	0.00	53	150	5	3.294 V	3.294 V	3.295 V	3.293 V	3.294 V	3.295 V	3.294 V	3.293 V	3.293 V	3.294 V	3.294 V	3.2
4	49.45	0.00	53	150	4	3.297 V	3.297 V	3.297 V	3.297 V	3.297 V	3.297 V	3.298 V	3.298 V	3.297 V	3.297 V	3.297 V	3.2
5	49.46	0.00	53	150	6	3.297 V	3.297 V	3.298 V	3.297 V	3.298 V	3.298 V	3.298 V	3.298 V	3.298 V	3.297 V	3.299 V	3.2
6	49.44	0.00	53	150	1	3.297 V	3.297 V	3.297 V	3.296 V	3.296 V	3.296 V	3.296 V	3.297 V	3.297 V	3.296 V	3.296 V	3.2

1.2 Battery detail data interface

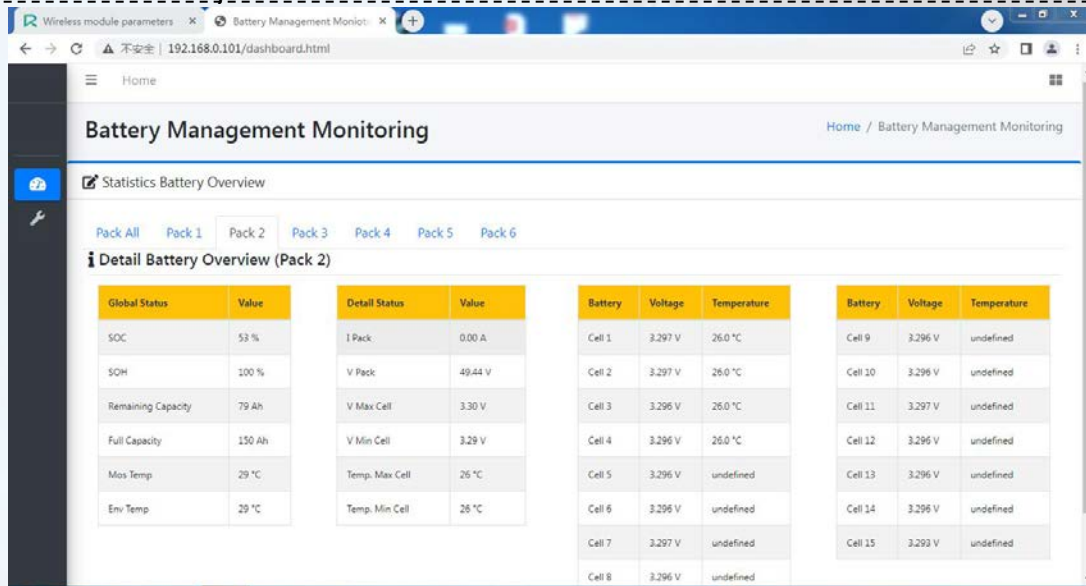
The screenshot shows the 'Detail Battery Overview (Pack 1)' section. It includes a 'Global Status' table, a 'Detail Status' table, and two tables for individual cell voltages and temperatures. The 'Global Status' table shows SOC at 53%, SOH at 100%, Remaining Capacity at 79 Ah, Full Capacity at 150 Ah, Mos Temp at 29 °C, and Env Temp at 29 °C. The 'Detail Status' table shows I Pack at 0.00 A, V Pack at 49.42 V, V Max Cell at 3.30 V, V Min Cell at 3.29 V, Temp. Max Cell at 26 °C, and Temp. Min Cell at 25 °C. The individual cell tables show voltage and temperature for each cell, with temperatures ranging from 25.0 °C to 26.0 °C.

Global Status	Value
SOC	53 %
SOH	100 %
Remaining Capacity	79 Ah
Full Capacity	150 Ah
Mos Temp	29 °C
Env Temp	29 °C

Detail Status	Value
I Pack	0.00 A
V Pack	49.42 V
V Max Cell	3.30 V
V Min Cell	3.29 V
Temp. Max Cell	26 °C
Temp. Min Cell	25 °C

Battery	Voltage	Temperature
Cell 1	3.296 V	26.0 °C
Cell 2	3.295 V	26.0 °C
Cell 3	3.295 V	26.0 °C
Cell 4	3.294 V	25.0 °C
Cell 5	3.295 V	undefined
Cell 6	3.295 V	undefined
Cell 7	3.294 V	undefined
Cell 8	3.295 V	undefined

Battery	Voltage	Temperature
Cell 9	3.296 V	undefined
Cell 10	3.295 V	undefined
Cell 11	3.295 V	undefined
Cell 12	3.295 V	undefined
Cell 13	3.295 V	undefined
Cell 14	3.296 V	undefined
Cell 15	3.291 V	undefined



2. How to run the SNMP monitoring software:

2.1 If batteries are connected in parallel, be sure to set the ADS according to the Annex2, and the batteries have connected through RS485 communication.

2.2 Set the sixth binary of ADS of No.1 battery in ON.

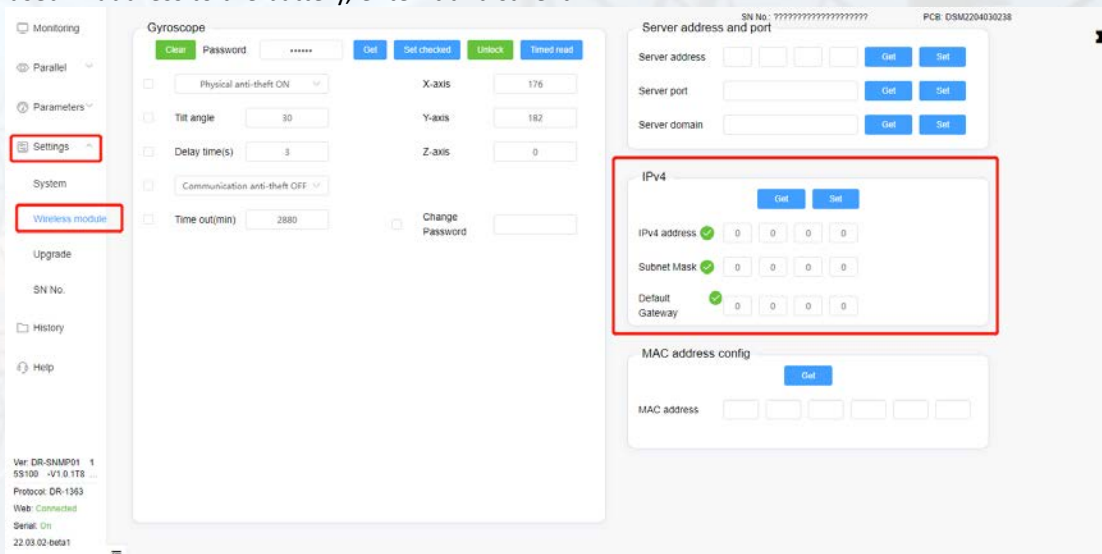


2.3 Connect the battery to computer, and open the monitoring software. For details, see Annex5.

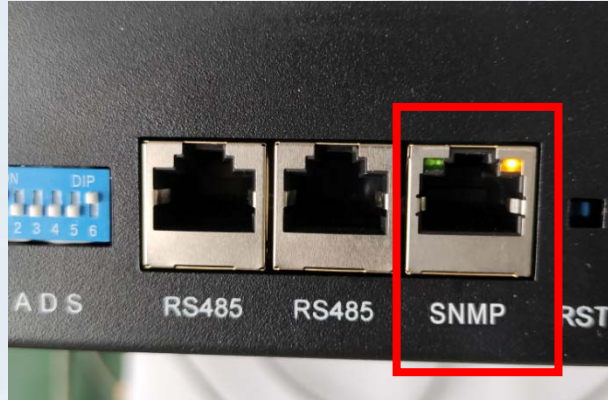
2.4 Click "Setting" → "wireless module" → "IPv4"

a. Click "Get"

b. Assign an unused IP address to the battery, enter it and save it.

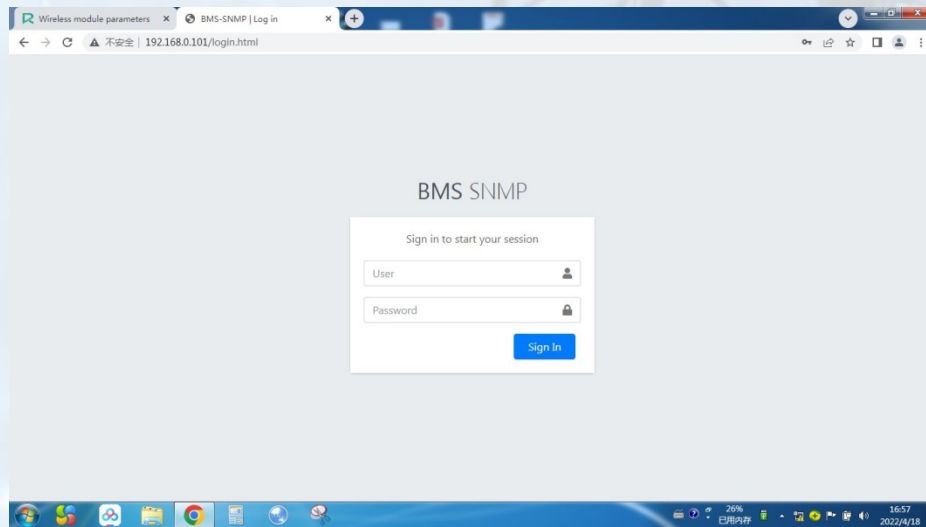


2.5 Connect the battery to the router through the battery's SNMP communication port with a straight-through network cable.

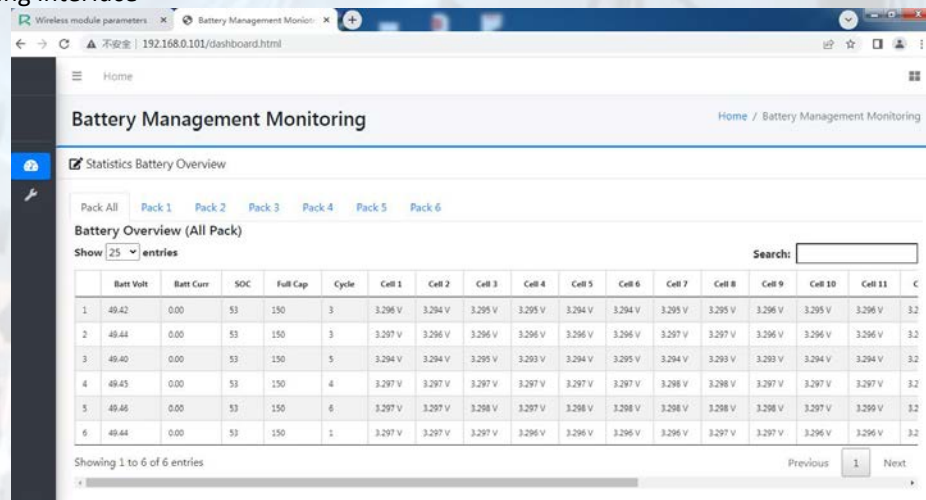


2.6 Open a browser and enter the IP address of the battery.

2.7 Log in



2.8 Open the monitoring interface



Annex7- Gyroscope Anti-theft Function Instruction

EverExceed have developed advanced gyroscope anti-theft feature for lithium batteries, Solve the pain point of battery theft for user.

Notice: After the battery is installed and the gyroscope function is turned on, it needs to be charged to activate the function at first time.

1. Operation introduction

After battery installation, start the Anti-theft Function, when the battery is working normally and the gyroscope is in the horizontal position, the gyroscope alarm will not be triggered.

When the battery is stolen and the angle difference between the gyroscope and the horizontal plane is greater than 30° (can be set in software), the gyroscope anti-theft function will be triggered. The gyroscope will send a signal to the BMS, and the BMS will lock the battery so that the battery cannot be discharged, even if the gyroscope is removed, the BMS also will still be locked and unable to discharge.

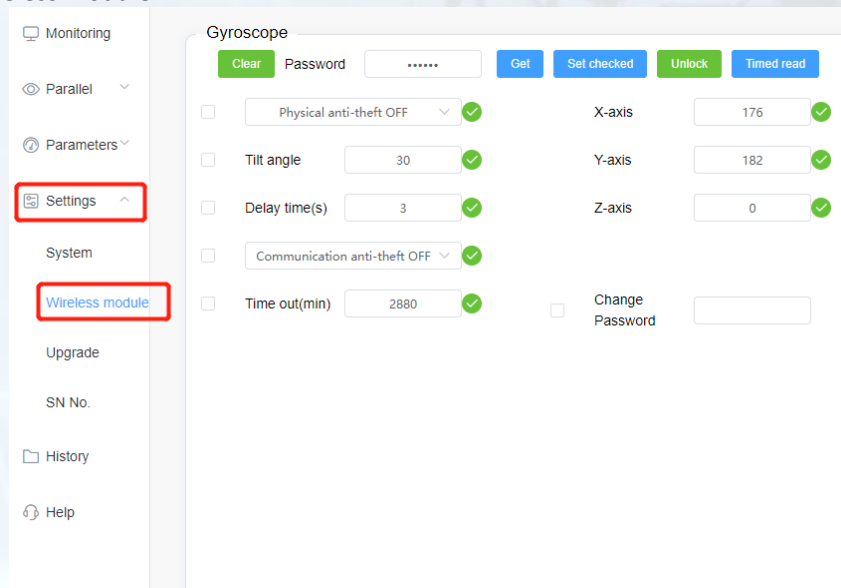
Only the owner can use the software to unlock the battery.

2. Turn ON the “Gyroscope anti-theft function.”

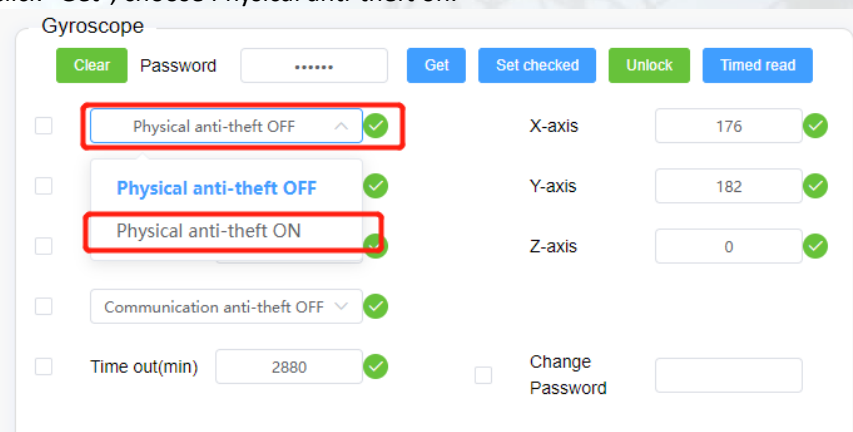
2.1 Connect the battery to the computer.

2.2 Open the monitoring software.

2.3 Click “Setting” → “wireless module”



2.4 Enter password, and click “Get”, choose Physical anti-theft on.



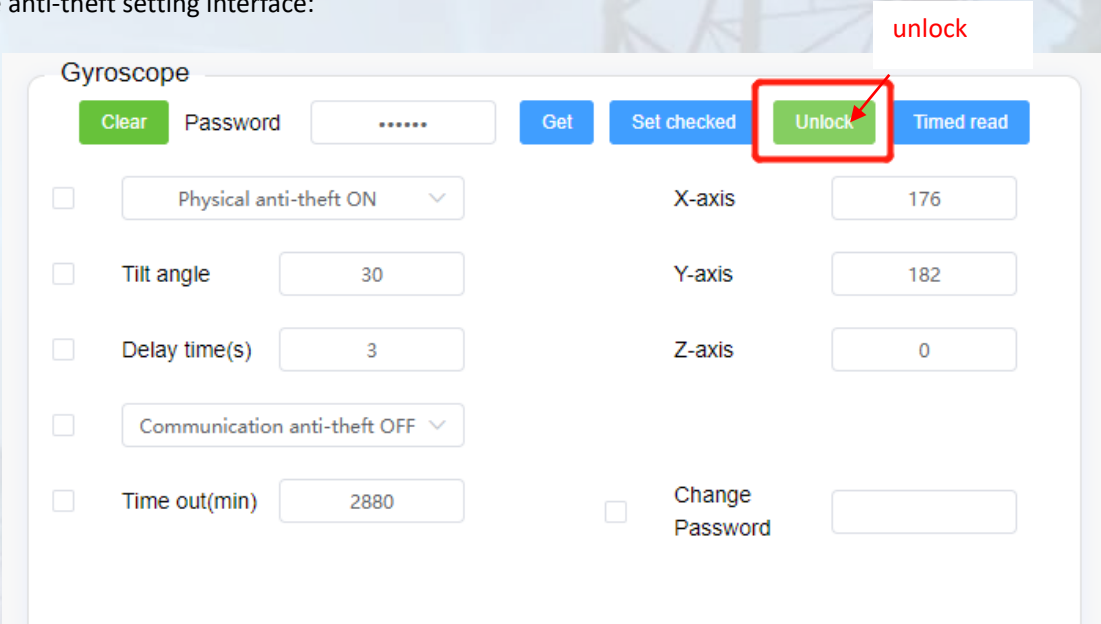
2.5 Click “Set checked”. Gyroscope anti-theft function has been power on.

3. How to unlock after the anti-theft function is triggered

3.1 Place the battery pack horizontally (the gyroscope is also in a horizontal position at this time).

3.2 Connect the battery pack to the computer and open the BMS monitoring software. Enter the password in the BMS monitoring software, click the “unlock” button, and the battery pack will resume normal charging and discharging.

3.3 Gyroscope anti-theft setting interface:



The screenshot shows the 'Gyroscope' settings window. At the top right, there is a red 'unlock' button. Below it, a row of buttons includes 'Clear' (green), 'Password' (text input with dots), 'Get' (blue), 'Set checked' (blue), 'Unlock' (green, highlighted with a red box and a red arrow), and 'Timed read' (blue). The main area contains several settings, each with a checkbox and a value field:

Setting	Value
Physical anti-theft ON	X-axis: 176
Tilt angle	Y-axis: 182
Delay time(s)	Z-axis: 0
Communication anti-theft OFF	
Time out(min)	2880
Change Password	

Annex8- GPS Anti-theft Function Instruction

1. Introduction

EverExceed Lithium battery GPS module has independent back-ground, can simultaneously carry on the real-time positioning and able to monitor battery parameters. It also has the anti theft mobile alarm function. It can recognize the remote monitoring and the positioning of the anti-theft function of the battery.

If the battery is moved, GPS can monitor the location and movement trajectory of the battery in real time, helping the owner to quickly retrieve the battery.

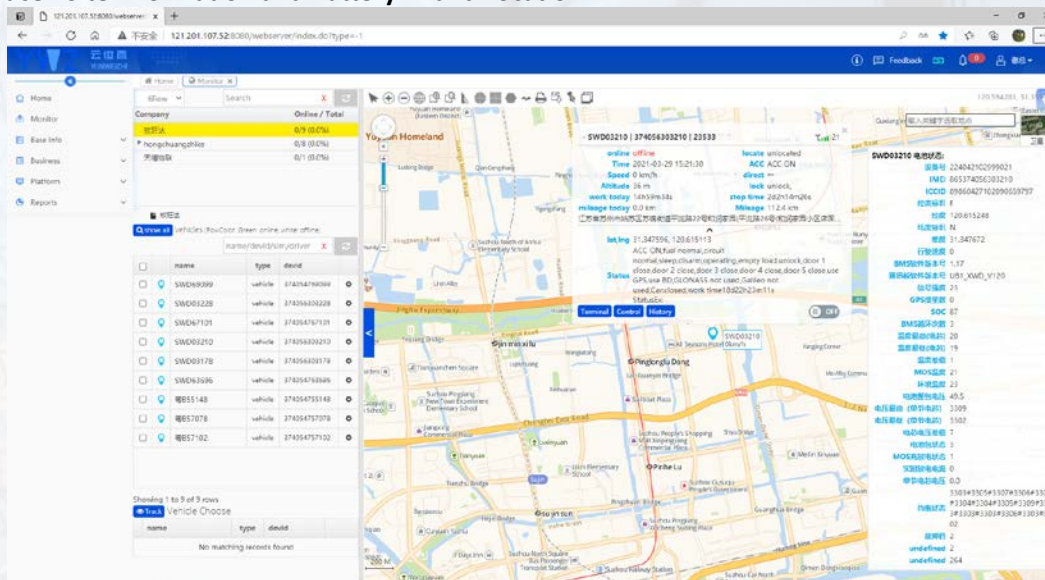
When the battery is in normal working state, the GPS is in low power consumption mode. When the battery is moved, the GPS will sense and wake up, and immediately send a message to the monitoring platform to notify the battery information.

1.1 Hardware

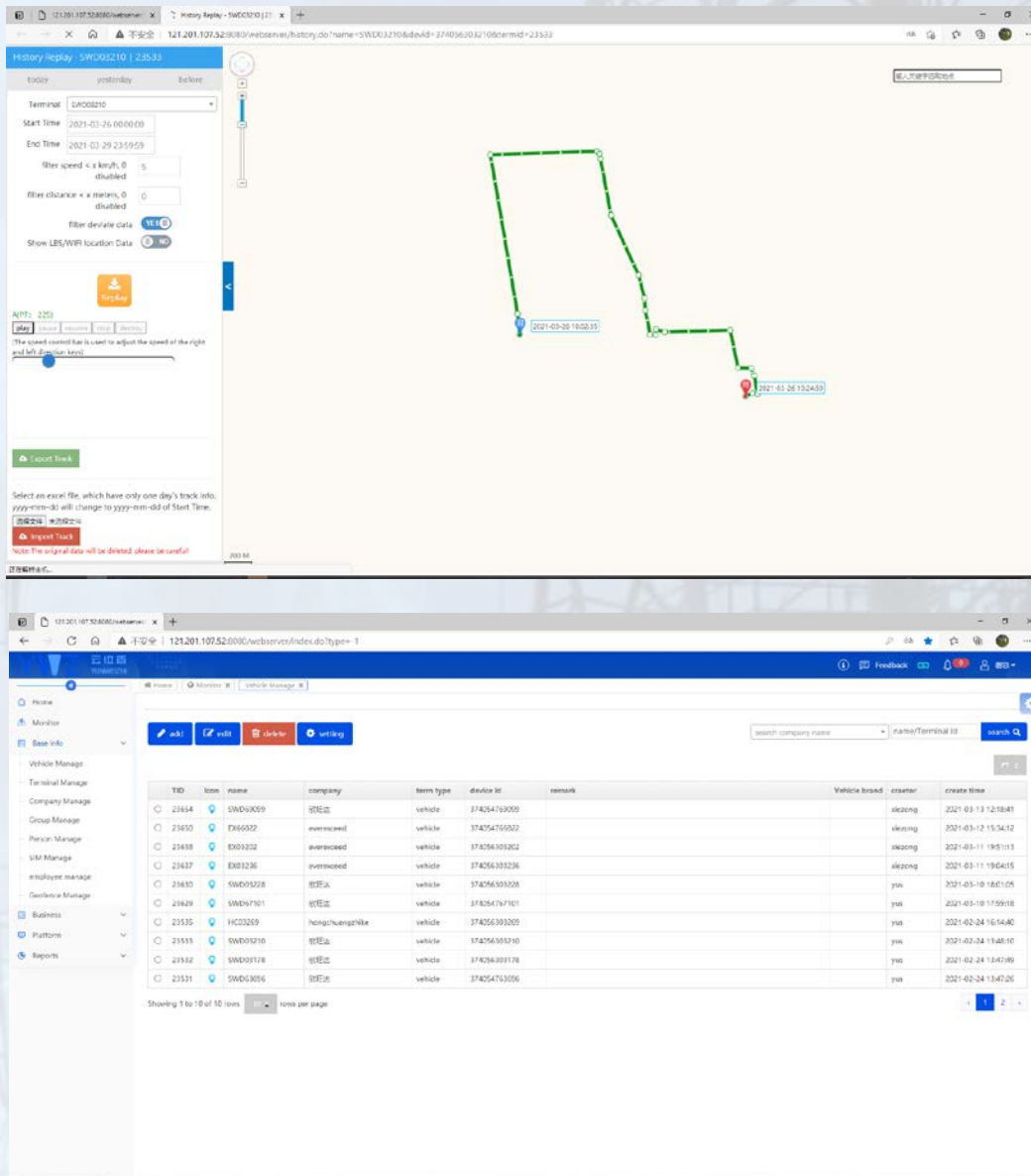


1.2 Monitoring software interface

1.2.1 Main interface - Site Information and Battery ID and Location



1.2.2 Tracking interface - Movement trajectory and final position of the battery



3. Installation and Setup

See GPS installation manual for details.

Annex9- Fire Protection Function Introduction

Fire protection function is optional function

Battery module support installs Aerosol Fire Extinguisher.

1. Fire extinguishing device



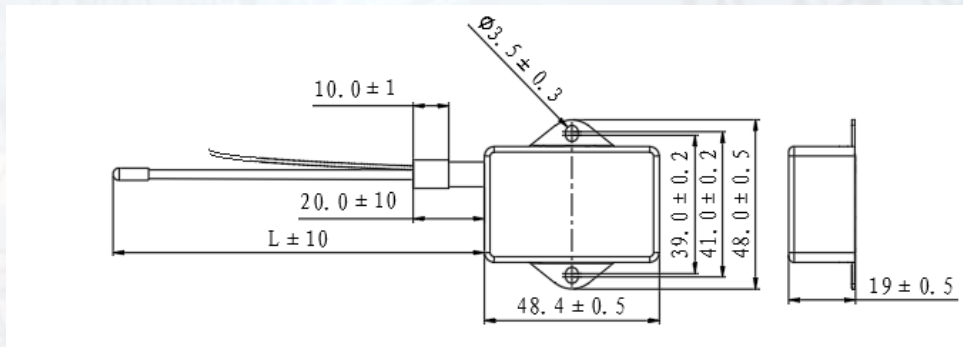
2. Working principle

- 2.1 When a fire occurs, the fire extinguishing device ignites the thermal wire after receiving an open flame.
- 2.2 The thermal wire burns to activate the aerosol generating agent in the fire extinguishing device
- 2.3 The aerosol generating agent release the heat through the redox reaction to decomposes the chemical coolant.
- 2.4 So that the aerosol generating agent and the coolant can jointly participate in the fire extinguishing.

3. Technical parameter

Item	parameter
Model	QRR0.01GW/S
Start method	Hot start
Hot start temperature	$\geq 170^{\circ}\text{C}$
Working environment temperature	$-50^{\circ}\text{C} \sim +90^{\circ}\text{C}$
Ejection delay time	$\leq 1\text{S}$
Fire extinguishing density	$33\text{g}/\text{m}^3$
Weight	$65 \pm 10\text{g}$
Feedback signal	Passive switch signal

4. Structural dimensions



5. Safety warning

- 5.1 Non-professionals are not allowed to disassemble it without authorization.
- 5.2 After spraying, do not touch the shell until it cools to prevent burns.