



EP Series
Rack-mounted Type
Lithium Battery
User Manual

Version 1.8



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EverExceed Corporation

Address: Floor 19A, Kechuang Building, Hengchangrong High Tech. Park, Dezheng Road, Shiyan, Bao'an District, Shenzhen, China

Website: www.everexceed.com

Email: marketing@everexceed.com

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Safety and Warning

The Rack-mounted EP 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

EverExceed LiFePO4 batteries are perfect choice for your home energy storage system and SME (Small Medium Enterprise). The ultra-modern design brought to you by our highly qualified research and development team provides an ultra-long service life and extreme reliability in energy storage. Based on our batteries technical features of excellent performance on higher temperature, higher capacity range, lighter weight and pollution free operation, our LiFePO4 battery is widely popular by users with a rapid development stance. It is the first choice for the high requirement energy storage battery solution.

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 >6000 cycles @80% 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, RS232 and CAN communication output;
- ◆ 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

- ◆ Smart home ESS (Energy Storage System)
- ◆ Solar energy storage
- ◆ Wind energy storage
- ◆ Instant power supply system (IPS)

Parameter and Dimension

Cell and Battery Pack Voltages

Lithium Iron Phosphate (LiFePO ₄) 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	36V
48.0V – 15 cells in series	48V
51.2V – 16 cells in series	48V

Parameter of Battery:

Model	EP-24100	EP-24200	EP-4850	EP-48100	EP-48150	EP-48200	EP-48280	EP-48314
Cell in series	8 cells in series		15 cells in series					
Nominal voltage	25.6 V		48 VDC					
Rated capacity	100Ah	200Ah	50Ah	100Ah	150Ah	200Ah	280Ah	314Ah
Rated reserved energy	2560Wh	5120Wh	2400Wh	4800Wh	7200Wh	9600Wh	13440Wh	15072Wh
Standard charging current	20A	40A	10A	20A	30A	40A	56A	63A
Maximum charging current	100A	100A	50A	100A	100A	100A(150A Optional)	100A(150A Optional)	100A(150A Optional)
Maximum charging voltage	28.8 V		54 VDC					
Standard discharging current	20A	40A	10A	20A	30A	40A	56A	63A
Maximum continuous discharging current	100A	100A	50A	100A	100A	100A(200A Optional)	100A(200A Optional)	100A(200A Optional)
Cut-off voltage of discharging	21.6 V		40.5 VDC					
Charging temperature range	0℃～50℃							
Discharging temperature range	-20℃～60℃							
Storage temperature	-20℃～60℃							
Dimension(mm) (W×D×H)	483*400*155	483*480*155	483*400*133	483*480*155	483*500*222	483*680*225	483*720*227	483*720*227
Weight	27.0±1kg	43.0±1kg	27.5±1kg	43.0±1kg	59.5±2kg	79.0±2kg	105kg±5kg	108kg±5kg

Parameter of Battery:

Model	EP-4850	EP-48100	EP-48150	EP-48200	EP-48280	EP-48314
Cell in series	16 cells in series					
Nominal voltage	51.2 VDC					
Rated capacity	50Ah	100Ah	150Ah	200Ah	280Ah	314Ah
Rated reserved energy	2560Wh	5120Wh	7680Wh	10240Wh	14336Wh	16076Wh
Standard charging current	10A	20A	30A	40A	56A	63A
Maximum charging current	50A	100A	100A	100A(150A Optional)	100A(150A Optional)	100A(150A Optional)
Maximum charging voltage	57.6 VDC					
Standard discharging current	10A	20A	30A	40A	56A	63A
Maximum continuous discharging current	50A	100A	100A	100A(200A Optional)	100A(200A Optional)	100A(200A Optional)
Cut-off voltage of discharging	43.2 VDC					
Charging temperature range	0°C~50°C					
Discharging temperature range	-20°C~60°C					
Storage temperature	-20°C~60°C					
Dimension(mm) (W×L×H)	483*400*133	483*480*155	483*500*222	483*680*225m	483*720*227	483*720*227
Weight	29.0±1kg	45.5±1kg	62.5±2kg	84.0±2kg	111kg±5kg	114kg±5kg

Layout

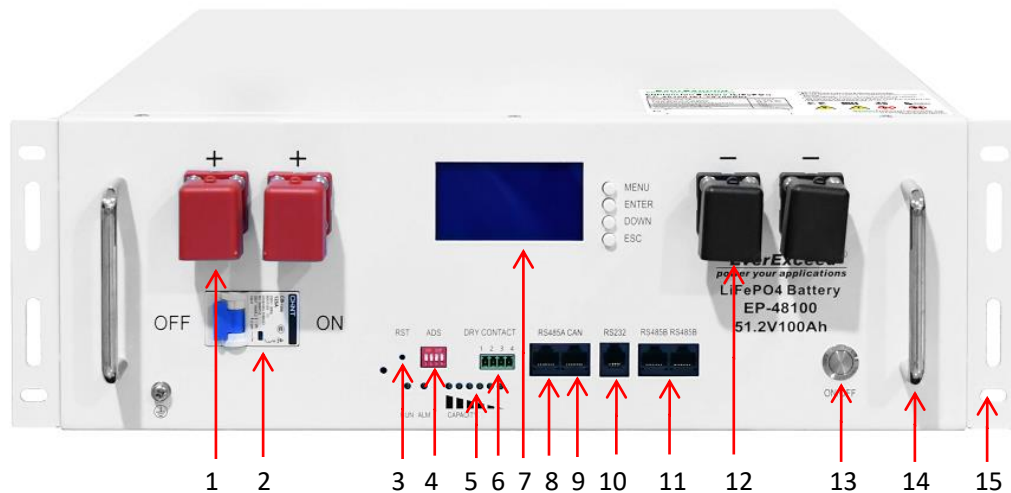


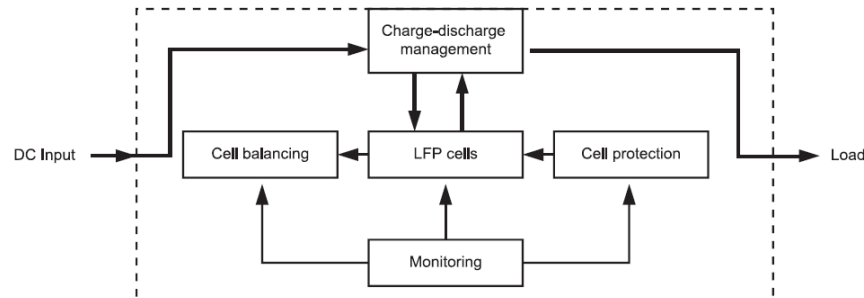
Table - Instruction for Layout of Front Panel:

No.	Description	Functions	Detailed Information
1	Positive Terminal	Positive Output	Type F-M6 x 2pcs
2	MCB	Micro circuit breaker	Physical isolation
3	RST	Reset button	Press RESET button when abnormality occurs to assure stability of battery performance. Wake up battery. Close battery.
4	ADS Dip switch	Address communication of	ADS are applicable to modules connected in parallel. ADS consist of four binary bits. Detailed information is shown in Annex 2.
5	SOC	Indicators for capacity	SOC is short for state of charge. There are six green LED lights in front panel indicating SOC. Each SOC LED light represents 16.66% of rated capacity. Detailed information is shown in Annexed Table
6	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.
7	LCD	Display battery information	
8	RS485A	communication port	RS485 and inverter connection port

9	CAN-bus	communication port	CAN-bus and inverter connection port
10	RS232	communication port	RS232 communication port
11	RS485B	communication port	RS485 parallel communication interface
12	Negative Terminal	Negative Output	Type F-M6 x 2pcs
13	Switch		ON/OFF BMS
14	Handle	Handle	The handle is used to push and pull the battery easily from battery cabinet. Not recommend use handle to handing the battery.
15	Side mounting	Wall-hanging installation	The side mounting is used to wall-hanging installation battery. Also use the ear to handle the battery.

Working Principle

The Rack-mounted EP 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)
Fire protection function	Support Aerosol-Fire-Extinguisher module optional
Parallel function	Regular model support 15 batteries in parallel.

Rack-mounted EP Series battery working principle:

In the daytime, PV charge the battery and power the load. When PV is not enough to take the load, battery will help to take the load. In the evening, battery will take the load, after battery empty, inverter will change grid to take the load and charge battery together. When grid power failure, lithium battery will take the load, to ensure uninterrupted power supply as power system.

Battery Management System (BMS)

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

- This device has excellent electromagnetic compatibility. BMS used for battery modules of Rack-mounted EP 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.

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:



Installation of Battery Modules

Battery modules of EP 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 EP 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. Communication connection

- If there is only one battery module in operation, communication between battery module and computer can available through RS232 or 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 3S-6S and then release it, the BMS board is activated, and the LED indicator lights start from the "RUN" 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 lowest battery indicator for 0.5 seconds in sequence.

When the BMS is in the active or dormant state, press the button 6S-10S and release it, the BMS board is reset, and all the LED lights are on for 1.5 seconds at the same time.

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 60 seconds.
- b) Release the button after pressing the button 3S-6S.
- c) The minimum cell voltage is lower than the sleep setting voltage, and the duration reaches the sleep delay time (at the same time, no communication and no charge and discharge current and no protection and no equalization are satisfied).
- d) Standby time over 24 hours (no communication, no charge and discharge, no utility power).
- e) 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 3S-6S and release the button.
- c) RS232 communication is activated (dormancy due to over-discharge, this method cannot wake up the motherboard).

Battery Charging Settings

Charging Parameter of Battery:

Model	EP-24100	EP-24200	EP-4850	EP-48100	EP-48150	EP-48200	EP-48280	EP-48314
Standard charging current	20A	40A	10A	20A	30A	40A	56A	63A
Maximum charging current	100A	100A	50A	100A	100A	100A(150A Optional)	100A(150A Optional)	100A(150A Optional)
Boost/ Equalization charging voltage	28.8 VDC		54 VDC					
Float charging voltage	28.8 VDC		54 VDC					
Recommend charge method	CC-CV							
Condition to float charge	0.05C							
Low temperature alarm in charging	3°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. If the battery connected more than 2 in parallel, the maximum charging current is recommended to be considered at 80%.

Charging Parameter of Battery:

Model	EP-4850	EP-48100	EP-48150	EP-48200	EP-48280	EP-48314
Standard charging current	10A	20A	30A	40A	56A	63A
Maximum charging current	50A	100A	100A	100A(150A Optional)	100A(150A Optional)	100A(150A Optional)
Boost/ Equalization charging voltage	57.6 VDC					
Float charging voltage	57.6 VDC					
Recommend charge method	CC-CV					
Condition to float charge	0.05C					
Low temperature alarm in charging	3°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. If the battery connected more than 2 in parallel, the maximum charging current is recommended to be considered at 80%.

Battery Discharging Settings

Discharging Parameter of Battery:

Model	EP-24100	EP-24200	EP-4850	EP-48100	EP-48150	EP-48200	EP-48280	EP-48314
Standard discharging current	20A	40A	10A	20A	30A	40A	56A	63A
Maximum discharging current	100A	100A	50A	100A	100A	100A(200A Optional)	100A(200A Optional)	100A(200A Optional)
Cut-off voltage of discharging	21.6 VDC		40.5 VDC					
Low temperature alarm in discharging	-15°C							
Low temperature protection in discharging	-20°C							
High temperature alarm in discharging	50°C							
High temperature protection in discharging	60°C							

Note:

1. If the battery connected more than 2 in parallel, the maximum discharging current is recommended to be considered at 80%.

Discharging Parameter of Battery:

Model	EP-4850	EP-48100	EP-48150	EP-48200	EP-48280	EP-48314
Standard discharging current	10A	20A	30A	40A	56A	63A
Maximum discharging current	50A	100A	100A	100A(200A Optional)	100A(200A Optional)	100A(200A Optional)
Cut-off voltage of discharging	43.2 VDC					
Low temperature alarm in discharging	-15°C					
Low temperature protection in discharging	-20°C					
High temperature alarm in discharging	50°C					
High temperature protection in discharging	60°C					

Note:

1. If the battery connected more than 2 in parallel, the maximum discharging current is recommended to be considered at 80%.

Battery Storage

Recommend storage temperature range: 0°C to 30°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 to 50%-80%SOC
30°C-40°C	Every 3 months	

Storage battery over 30°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:

							
RUN	ALM	SOC					

SOC: State of charge

ALM: Alarm

RUN: Work status

2. SOC LED Indicators Description:

Status	Charge						Discharge					
SOC	L6●	L5●	L4●	L3●	L2●	L1●	L6●	L5●	L4●	L3●	L2●	L1●
0~16.6%	○	○	○	○	○	Flash2	○	○	○	○	○	●
16.6~33.2%	○	○	○	○	Flash2	●	○	○	○	○	●	●
33.2~49.8%	○	○	○	Flash2	●	●	○	○	○	●	●	●
49.8~66.4%	○	○	Flash2	●	●	●	○	○	●	●	●	●
66.4~83.0%	○	Flash2	●	●	●	●	○	●	●	●	●	●
83.0~100%	Flash2	●	●	●	●	●	●	●	●	●	●	●

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

3. RUN Indicators Description:

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

System state	Abnormal event	ON /O FF	RUN	ALM	SOC						Remark
		●	●	●	●	●	●	●	●		
Shutdown		○	○	○	○	○	○	○	○	○	All off
Standby	Normal	●	Flash1	○	Display according to battery level						Standby state
	Alarm	●	Flash1	Flash3	Display according to battery level						Cell low voltage
Charge	Normal	●	●	○	Display according to battery level						
	Alarm	●	●	Flash3	The highest indication LED flash2						
	Over voltage protection	●	●	○	●	●	●	●	●	●	If no mains supply, LED as standby
	Temperature Over current Fault protection	●	○	●	○	○	○	○	○	○	Stop charging

Discharge	Normal	●	Flash3	○	Display according to battery level						
	Alarm	●	Flash3	Flash3							
	Under voltage protection	●	○	○	○	○	○	○	○	○	Stop discharging
	Temperature Over current Short circuit Fault protection	●	○	●	○	○	○	○	○	○	Stop discharging
Fault		○	○	●	○	○	○	○	○	○	Stop charging and discharging

Flashing instructions

Flash	●	○
Flash1	0.25S	3.75S
Flash2	0.5S	0.5S
Flash3	0.5S	1.5S

LED function can be set by monitor software, the default if on.

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

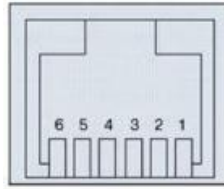
Instruction of ADS for Parallel Communication:

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 0001	Pack 9 1001	Pack 10 0101	Pack 11 1101
			
Pack 12 0011	Pack 13 1011	Pack 14 0111	Pack 15 1111
			

Annex3- Communication

1. RS232 Communication Port Definition

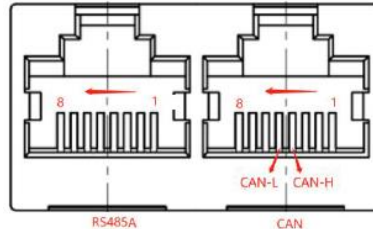


6P6C vertical RJ11 port

RS232 Terminal Port	Definition
PIN 1,2,6	NC
PIN 3	TX
PIN 4	RX
PIN 5	GND

BMS can communicate with the host computer through the RS232 interface, so that various information of the battery can be monitored through the host computer, including battery voltage, current, temperature, status and battery production information, etc. The default baud rate is 9600bps.

2. RS485A and CAN-bus Communication Port Definition



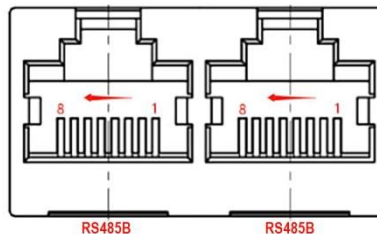
8P8C vertical RJ45 port

PIN definition:

RS485A Terminal Port	Definition	CAN Terminal Port	Definition
Pin 1,8	RS485_B	Pin 1,3,6,7,8	NC
Pin 2,7	RS485_A	Pin 4	CANH
Pin 3,6	GND	Pin 5	CANL
Pin 4,5	NC	Pin 2	GND

CAN communication, the default communication rate is 250K.

3. RS485B Communication Port Definition



8P8C vertical RJ45 port

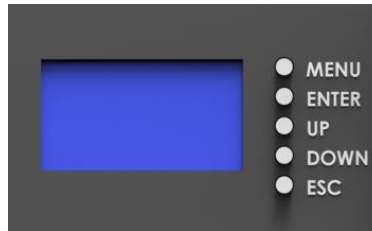
RS485 Terminal Port	Definition	RS485 Terminal Port	Definition
Pin 1,8	RS485_B	Pin 1,8	RS485_B
Pin 2,7	RS485_A	Pin 2,7	RS485_A
Pin 3,6	GND	Pin 3,6	GND
Pin 4,5	NC	Pin 4,5	NC

With dual RS485 interface, you can view the information of PACK, the default baud rate is 9600bps. To communicate with the monitoring device through RS485, the monitoring device acts as the host and polls data according to the address.

Annex4- LCD Menu Instruction

1. LCD Function

1) Reference of real figure



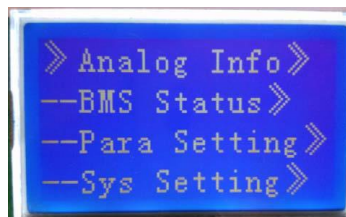
2) Display rendering



2. Interface introduction

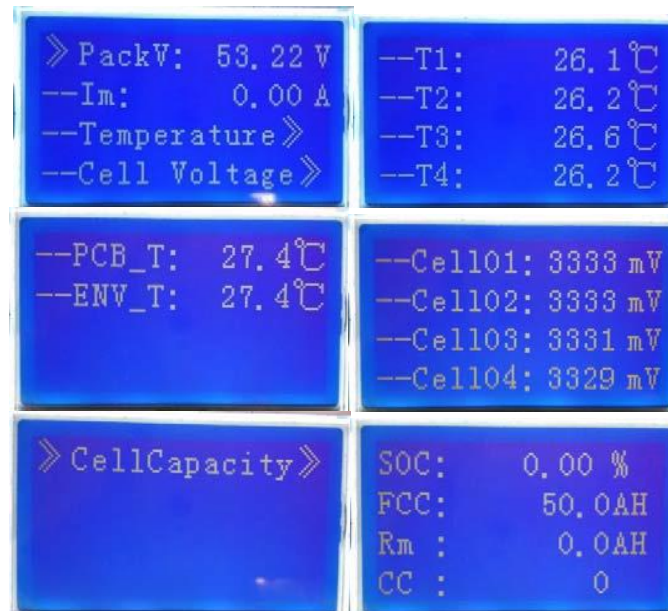
1) Main menu page

Electricity/dormancy activated, will show the welcome screen, and press the MENU button to enter the main menu page. As shown in the figure below:



2) Battery parameters collection page

When the cursor ">>" is point to "Battery Parameters Acquisition", press ENTER key will enter into the page of "Battery Parameters Acquisition", As shown in the figure below:

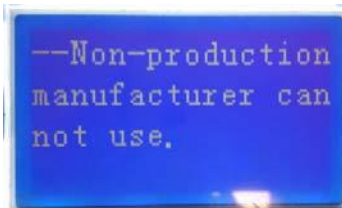


3) Battery status page

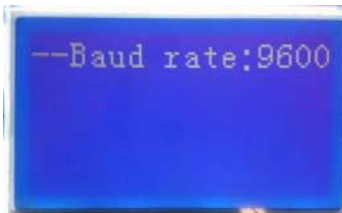
When the cursor ">>" is point to "Battery Status", press ENTER key will enter into the page of "Battery Status", As shown in the figure below:



4) Parameter Settings: Screen cannot set parameters



5) System Settings Page Baud Rate: 9600



3. Key description

- 1) SW1----NEMU, SW2----ENTER, SW3----UP, SW4----DOWN, SW5----ESC.
- 2) Each item is ">>" or "--" as a beginning among them ">>" shows the current cursor position press UP or DOWN key can move the cursor position with ">>" end of the project the content of the said project has not shown, press ENTER key can enter the corresponding page.
- 3) Press ESC key can be returned at the next higher level directory in any position, press NEMU key can return to the main menu page.
- 4) In a dormant state, press any key, can activate the screen.

4. Dormancy/shutdown

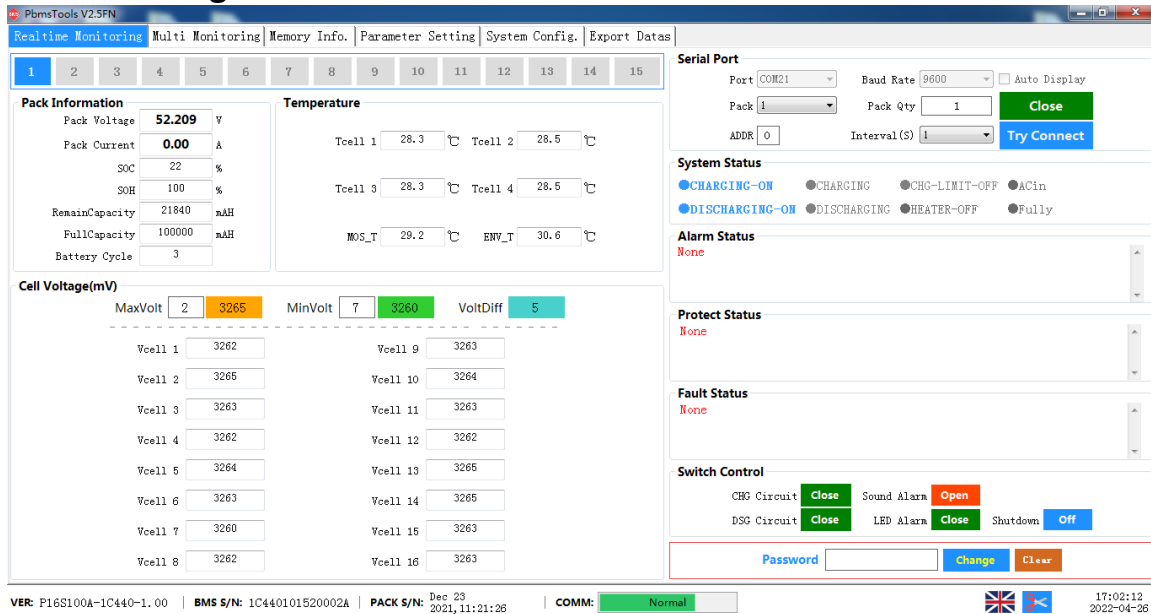
Under normal operation condition, with no keystrokes 1 minute later, system will enter a state of dormancy/shutdown. Shutdown/dormancy state press any key screen can be activated.

Annex5- Monitoring Software Instruction

Monitoring software interface introduction

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

1. Real time monitoring



Description of main controls:

1.1 Serial Port

Port: Select the drop-down item to select the serial port to communicate.

Baud Rate: Select the drop-down item to select the baud rate of communication.

Pack: Select the drop-down item to select the read pack. When select FF, the "Auto Display" check box becomes available. Check it to use the rotation function. Uncheck it to cancel the rotation function.(Parallel communication is only possible when using the RS485 host computer and the RS485 communication connection)

Pack Qty: The total number of Packs read by the host computer from the BMS board.

ADDR: The currently read BMS address value.

Interval: Optional item. The interval time for the host computer to read data from the BMS board.

Open: Open or close the serial port.

Try Connect: Search for available serial ports and open.

1.2 System Status

When a system state occurs, the text is blue. When greyed out, it didn't happen.

1.3 Switch Control

When the button is red, the feature processing is off, and when it is green, it is on.

Password: Some setting functions require an administrator password to be used. When the password is entered correctly, the input box will turn green, and you have obtained administrator privileges.



Flag Icon: Display the flag icon of the current language country, click to switch the language.

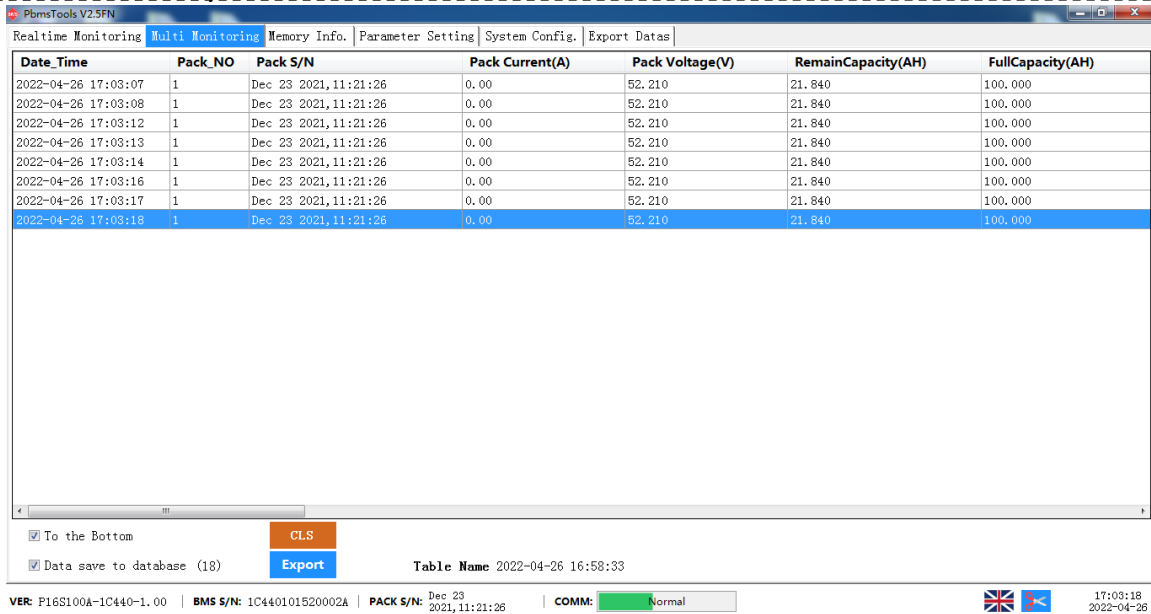


Screenshot Function: Click to enter the screenshot state, and use the mouse to draw the screenshot area to copy/save the screenshot.

2. Multi monitoring

Click the main interface tab [Multi monitoring] to enter the interface.

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Date_Time	Pack_NO	Pack S/N	Pack Current(A)	Pack Voltage(V)	RemainCapacity(AH)	FullCapacity(AH)
2022-04-26 17:03:07	1	Dec 23 2021,11:21:26	0.00	52.210	21.840	100.000
2022-04-26 17:03:08	1	Dec 23 2021,11:21:26	0.00	52.210	21.840	100.000
2022-04-26 17:03:12	1	Dec 23 2021,11:21:26	0.00	52.210	21.840	100.000
2022-04-26 17:03:13	1	Dec 23 2021,11:21:26	0.00	52.210	21.840	100.000
2022-04-26 17:03:14	1	Dec 23 2021,11:21:26	0.00	52.210	21.840	100.000
2022-04-26 17:03:16	1	Dec 23 2021,11:21:26	0.00	52.210	21.840	100.000
2022-04-26 17:03:17	1	Dec 23 2021,11:21:26	0.00	52.210	21.840	100.000
2022-04-26 17:03:18	1	Dec 23 2021,11:21:26	0.00	52.210	21.840	100.000

VER: P16S100A-1C440-1.00 | BMS S/N: 1C440101520002A | PACK S/N: Dec 23 2021,11:21:26 | COMM: Normal

17:03:18
2022-04-26

Description of main controls:

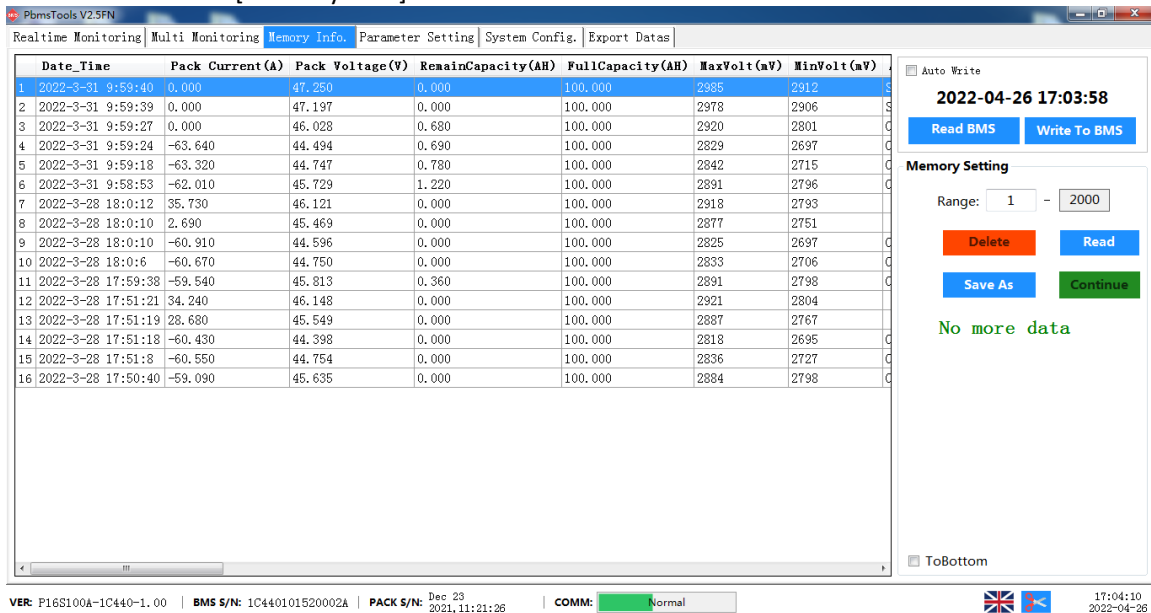
Check **Data save to database**, the data area can display the real-time monitoring data.

CLS: Click to clear the real-time data on the interface.

Export: Click to export real-time data.

3. Memory Info.

Click the main interface tab [Memory Info.] to enter the interface.



Date_Time	Pack Current(A)	Pack Voltage(V)	RemainCapacity(AH)	FullCapacity(AH)	MaxVolt(mV)	MinVolt(mV)
1 2022-3-31 9:59:40	0.000	47.250	0.000	100.000	2985	2912
2 2022-3-31 9:59:39	0.000	47.197	0.000	100.000	2978	2906
3 2022-3-31 9:59:27	0.000	46.028	0.680	100.000	2920	2801
4 2022-3-31 9:59:24	-63.640	44.494	0.690	100.000	2829	2697
5 2022-3-31 9:59:18	-63.320	44.747	0.780	100.000	2842	2715
6 2022-3-31 9:58:53	-62.010	45.729	1.220	100.000	2891	2796
7 2022-3-28 18:0:12	35.730	46.121	0.000	100.000	2918	2793
8 2022-3-28 18:0:10	2.690	45.469	0.000	100.000	2877	2751
9 2022-3-28 18:0:10	-60.910	44.596	0.000	100.000	2825	2697
10 2022-3-28 18:0:6	-60.670	44.750	0.000	100.000	2833	2706
11 2022-3-28 17:59:38	-59.540	45.813	0.360	100.000	2891	2798
12 2022-3-28 17:51:21	34.240	46.148	0.000	100.000	2921	2804
13 2022-3-28 17:51:19	28.680	45.549	0.000	100.000	2887	2767
14 2022-3-28 17:51:18	-60.430	44.398	0.000	100.000	2818	2695
15 2022-3-28 17:51:8	-60.550	44.754	0.000	100.000	2836	2727
16 2022-3-28 17:50:40	-59.090	45.635	0.000	100.000	2884	2798

VER: P16S100A-1C440-1.00 | BMS S/N: 1C440101520002A | PACK S/N: Dec 23 2021,11:21:26 | COMM: Normal

17:04:10
2022-04-26

Description of main controls:

Read BMS: Click to read BMS time.

Write to BMS: Click to write BMS time.

Delete: Click to delete the storage record of the BMS board

Read: Click to read storage records.

Save as: Click to save the records on the interface to the local.

Pause: While reading, click "Pause" to read, and click again to continue reading.

Note: When reading, when the prompt "No more data" indicates that the reading has been completed.

4. Parameter Setting

Click the main interface tab [Parameter Setting] to enter the interface.

VER: P16S100A-1C440-1.00 | BMS S/N: 1C440101520002A | PACK S/N: Dec 23 2021, 11:21:26 | COMM: Normal

Description of main controls:

Read All: Click to read all parameters of the interface.

CLS: Click to clear data on the interface.

Write All: Click to rewrite the BMS parameters. This operation requires administrator privileges.

Reset Setting: Click to restore all parameters to default parameters. The default parameters come from the parameters preset in the BMS. This operation requires administrator privileges.

Import: Click to read the data in the local file into this interface. Note: The data is only read to the interface, not yet written to the BMS. If you need to write, please perform the write operation.

Export: Click to save interface data locally.

5. System Config.

Click the main interface tab [System Config.] to enter the interface.

VER: P16S100A-1C440-1.00 | BMS S/N: 1C440101520002A | PACK S/N: Dec 23 2021, 11:21:26 | COMM: Normal

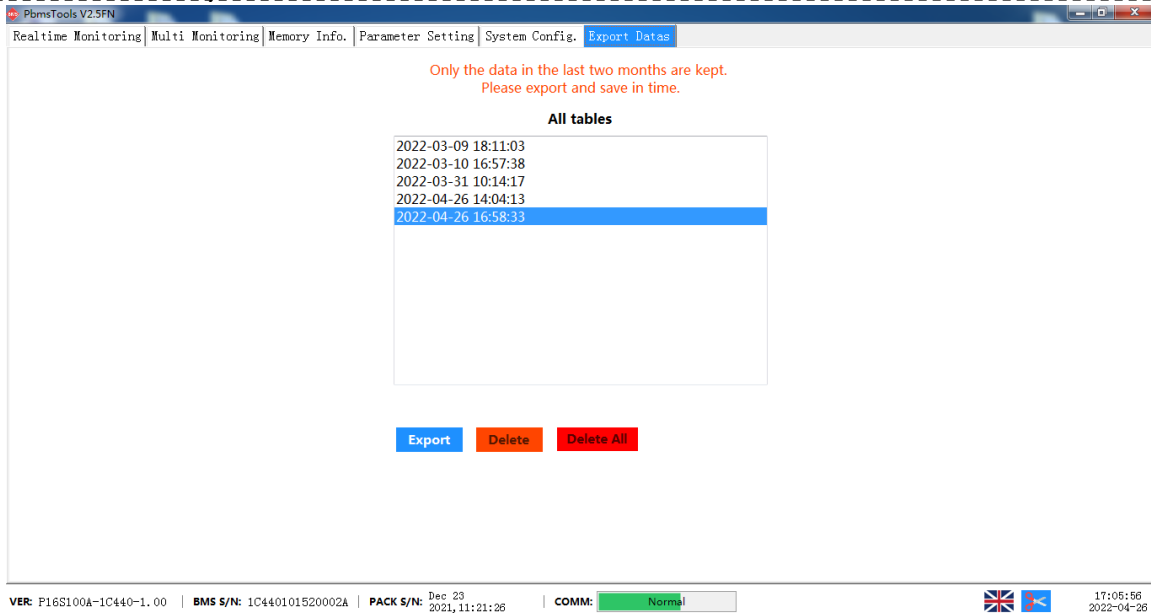
The default parameters come from the parameters preset in the BMS. Some functional operations require administrator privileges. Modification is not recommended.

6. Export Datas

Click the main interface tab [Export Datas] to enter the interface.

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After checking "Data save to database" on the [Multi Monitoring] interface, the recorded data can be exported on this page. The table is named after the start time point of the recording. The data can be stored for a maximum of two months, and the expired data will be automatically cleared.

Description of main controls:

Export: Click to save interface data locally.

"Delete" and **"Delete All"** require administrator privileges.

How to run monitoring software

1. Connect the communication line

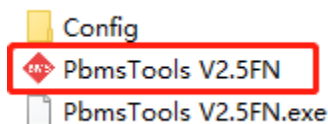
Use the RS232 to USB communication cable; connect the battery RS232 port with the computer USB port.



Cable type: RJ11-DB9, DB9-USB

2. Open the monitoring software

Double click the icon to run the monitoring software.



2019/12/17 9:08
2020/3/2 15:59
2019/12/23 14:57

3. Communicate with serial port

Click the **"Try Connect"** button to search the serial port to try to connect, or manually select the serial port and click the **"Open"** button link.

Annex6- Fire Protection Function Introduction

Battery module support installs Aerosol Fire Extinguisher.

1. Fire extinguishing device



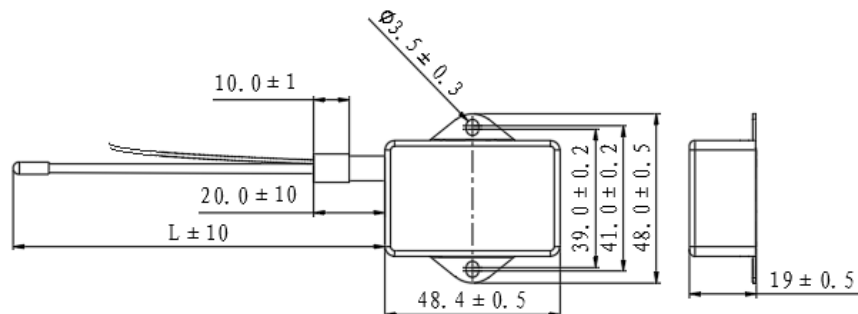
2. Working principle

- 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.