

## Specification For Approval

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## 1、 PRODUCT INTRODUCTION

### 1.1、 INTRODUCTION TO BATTERY SYSTEM



RV128200V2-Pro lithium iron battery system is a 12.8v200ah battery module product produced by ATG epower. (hereinafter referred to as ATG). The product is mainly developed and applied to RV, whose good electrical performance and universal interface design can be widely used in electric yachts, communication base stations, energy storage and standby and outdoor portable power supply. The product has the characteristics of high capacity, light weight, good environmental protection, high energy density and long service life. It is the preferred substitute for lead-acid battery.



Product appearance drawing

## 1.2、 Characteristics of battery system

1.2.1 The internal battery module of the battery system adopts lithium-ion cell, which has high safety, high energy density and excellent high-temperature cycle performance.

1.2.2 The battery system is composed of high-performance power management module (BMS) to monitor and control the battery module, which has the protection functions of over discharge, over charge, over-current, short circuit, reverse connection and over temperature, making the battery safe and reliable.

1.2.3 RJ45 standard interface is adopted for battery system communication, CAN bus cascade connection is adopted for battery expansion, and RS485 bus connection is adopted for external EMS or PCS.

1.2.4 During the charging process of the battery system, BMS monitors the charging and discharging current and status in real time, and manages the floating charge and automatic equalization of the battery.

1.2.5 Protection power-off function



When the battery voltage is lower than the alarm value, the alarm information can be transmitted through RS485 or special software monitoring system. When the voltage is too low, the discharge circuit will be automatically cut off.

1.2.6 The battery system supports series parallel expansion. The capacity of the battery system can be expanded in parallel, and the voltage of the system can be increased in series. It can support 4 modules in series or 8 modules in parallel at most.

1.2.7 The battery system includes key switch and LCD display panel. The key switch can switch the battery system, When the battery system is on, the working status information of the battery module, such as battery voltage, current, SOC and fault status information, can be displayed in real time.

1.2.8 The battery system has parallel function, which makes the battery more widely used and have longer standby time and stronger output capacity.

1.2.9 The battery system has intelligent heating function and intelligent control of charging and low-temperature heating, which makes the battery system not limited by region;

1.2.10 The battery fast fuse is independently designed and installed , which makes the maintenance more convenient and friendly.

1.2.11 The battery adopts the similar power interface of lead-acid battery, the power connection and installation is reliable and interchangeable with lead-acid battery. It is the best substitute for lead-acid battery.

### 1.3、Basic performance of battery system

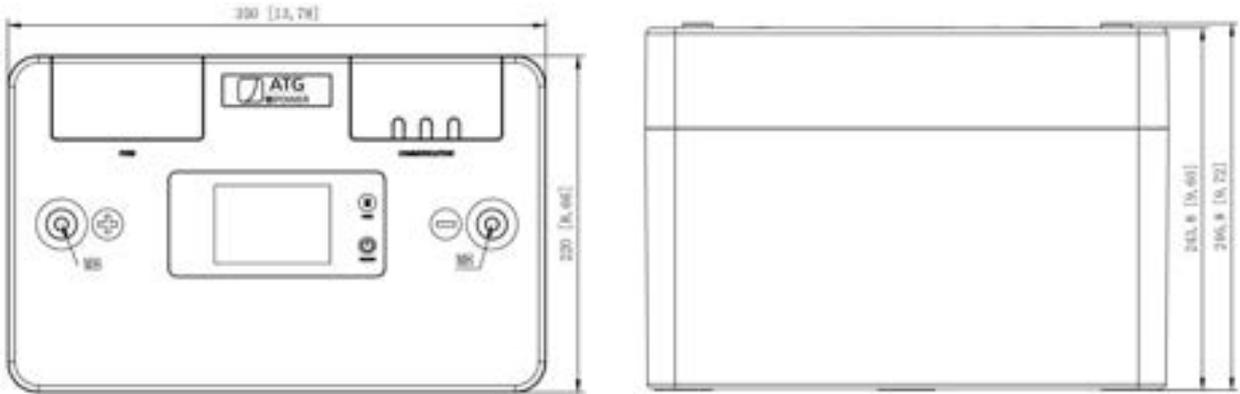
No	Item	Parameter
1	Rated voltage	12.8V
2	Rated capacity	100Ah
3	Charging voltage	14.6V
4	Minimum discharge voltage	12V
5	Rated discharge current	100A



6	Peak discharge current	200A(5S)
7	Rated charging current	50A
8	Maximum charging current	100A
9	Charging temperature range	-20~50℃
10	Discharge temperature range	-20~55℃
11	Dimensions	330mm*185mm*225.5mm
12	Weight	14kg
13	Waterproof grade	IP20
14	communication interface	Internal communication CAN, External communication RS485
15	Maximum series or parallel	series: 4PCS; parallel: 8PCS
16	Storage temperature	-20~45℃ (Within 3 months) -20~25℃ (More than 3 months)
14	Storage humidity	45%RH---85%RH
15	Cooling system	Natural cooling
16	heating system	During charging, when the temperature is lower than 0℃, the heating function starts automatically.
17	certification	UN38.3、MSDS

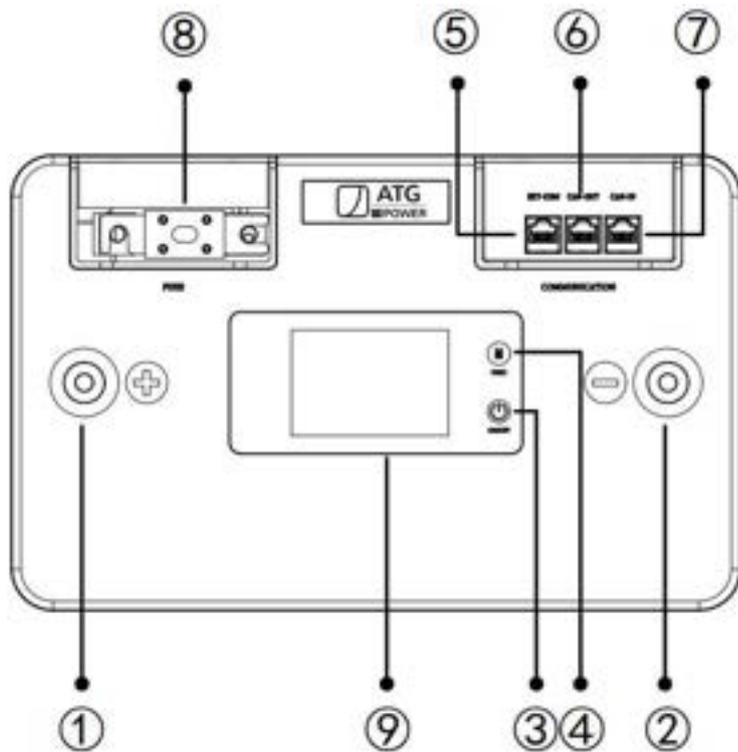
## 2、 Product appearance and interface

### 2.1 Battery appearance size



Dimension (L*W*H) (mm)	350mm*220mm*243.8 mm (Height of Terminal 3mm)
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## 2.2 Battery interface



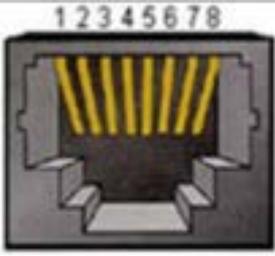
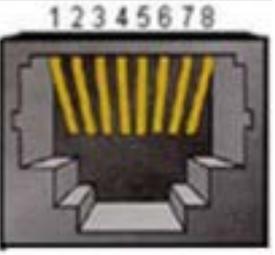
- ① Positive    ② Negative    ③ ON/OFF    ④ LCD FUNCTION  
 ⑤ EXT-COM    ⑥ CAN-OUT    ⑦ CAN-IN    ⑧ FUSE  
 ⑨ LCD Display

No	Interface description	Identification	Interface type	Function
1	Positive	+	M8 Screw	Battery positive output



2	Negative	-	M8 Screw	Battery negative output
3	Switch	ON/OFF	Biased switch	Battery power on or activation switch
4	FUNC	FUNC	Biased switch	LCD display information switching
5	External communication	EXT-COM	Standard RJ45	Support RS485
6	CAN output	CAN-OUT	Standard RJ45	Communication between series and parallel batteries
7	CAN input	CAN-IN	Standard RJ45	Communication between series and parallel batteries
8	FUSE	FUSE	NA	For battery fuse maintenance and replacement
9	LCD Display	NA	NA	Monitor battery status and display battery status information

## 2.3 Battery interface definition

 <p>EXT-COM</p>	RS485—RJ45				
	Socket definition				
	RJ45 No	2, 3, 4	5, 6, 7	1, 8	
Definition	SWCLK	SWDIO	GND		
 <p>CAN-OUT/CAN-IN</p>	CAN—RJ45				
	Socket definition				
	RJ45 No	4	5	2, 7	8
Definition	CANH	CANL	GND	Address signal	

## 3、 Product functions and control parameters

### 3.1 Protection function

RV128200V2 - Pro has the functions of total voltage overvoltage, undervoltage, module monomer overvoltage, undervoltage, charge and discharge high, low temperature, overcurrent and short circuit protection.

### 3.2 ON/ OFF function



When the battery system is turned off, press the ON / OFF switch on the right side of the LCD, and the battery system will be automatically activated and enter the normal operation state for charging and discharging.

When the battery system is in the startup state, press the wake-up ON / OFF switch on the right side of the LCD, and the battery system enters the shutdown state. In the shutdown state, the power consumption of the battery system is the lowest and the system enters the sleep without power consumption.

When the static total voltage of the battery system is lower than 11.2V and greater than or equal to 8V, or the minimum unit voltage is lower than 2.8V and greater than or equal to 2.0V (this value is preset by the system), the system is in a low power consumption state and can be directly awakened by charging.

When the unit voltage is not lower than 1.5V, if the battery system is in the non charging state, the battery system will automatically enter the non power consumption sleep. At this time, press the on / off switch, and the battery system can be activated to allow charging.

When the static total voltage of the battery system is lower than 6V or the minimum unit voltage is lower than 1.5V, the battery system cannot be started again and needs professional maintenance.

### **3.3 Heating and charging function**

When the battery system detects that the external charging power supply is connected, the system will automatically evaluate whether the battery temperature is within the charging temperature range of the battery. If the battery temperature is lower than 0 °C, the battery system will automatically enter the heating mode. When the charging temperature is higher than 0 °C, the system will automatically enter the charging mode.

### **3.4 System communication function**



RV128200v2-Pro battery system can maintain communication with upper computer software through CAN protocol and other power supply equipment through RS485.

When communicating with the upper computer, the software has a friendly upper computer interface, which can monitor all parameters of the battery system in real time through the upper computer, including battery status, single voltage, total voltage, battery module temperature, ambient temperature, total battery current, total capacity, remaining time of charge and discharge, alarm and protection information, etc.

### 3.5 Charge equalization function

RV128200V2-Pro battery system adopts resistance bypass for cell equalization. During charging, when the maximum unit voltage of the battery pack reaches the set equilibrium starting voltage value, and the voltage difference between the minimum voltage and the maximum voltage of the battery pack is greater than the set value, the cell equalization function is turned on. During equalizing startup, the system reduces the charging current of the high-voltage cell, and the reduced current is the equalizing current set by the management system. When the charging stops or the voltage difference of the cell is less than the set value, the equalization stops

### 3.6 Storage function

RV128200V2-Pro battery system has storage function, which can record the occurrence time of protection, alarm and fault recovery respectively. The recorded contents include fault category and monomer voltage, total voltage, charge / discharge capacity, charge / discharge current, temperature, etc. You can set the recording time by selecting memory cards with different capacities.

### 3.7 Control parameters

No	Item	Default	Set range	
	Battery pack overvoltage	Alarm value	14.2V	12V~Protection value
		Alarm release value	13.8V	12V~Alarm value
		Protection value	14.6V	Alarm value~14.8V

1		Recovery value	13.8V	12V~Protection value
2	Single cell overvoltage	Alarm value	3.55V	3.0V~Protection value
		Alarm release value	3.45V	3.0V~Alarm value
		Protection value	3.65V	Alarm value~3.7V
		Recovery value	3.45V	3.0V~Protection value
3	Battery pack undervoltage	Alarm value	12V	12V~Protection value
		Alarm release value	12.4V	12.4V~Alarm value
		Protection value	11.2V	11.2V~Alarm value
		Recovery value	12.4V	Protection value ~12.4V
4	Single cell undervoltage	Alarm value	3V	3.0V~Protection value
		Alarm release value	3.1V	3.1V~Alarm value
		Protection value	2.8V	2.8V~Alarm value
		Recovery value	3.1V	Alarm value~Alarm release value
5	Charging temperature too high	Alarm value	45°C	30°C~Protection value
		Alarm release value	43°C	30°C~Alarm value
		Protection value	50°C	Alarm value~60°C
		Recovery value	48°C	30°C~Protection value
6	Discharge temperature too high	Alarm value	50°C	30°C~Protection value
		Alarm release	48°C	30°C~Alarm value
		Protection value	55°C	Alarm value~60°C
		Recovery value	53°C	30°C~Protection value
7	Charge and discharge temperature protection	Alarm value	-10°C	-40°C~Protection value
		Alarm release	-5°C	Alarm value~10°C
		Protection value	-20°C	-40°C~Alarm value
		Recovery value	-17°C	Protection value~10°C
8	Charging overcurrent protection	Alarm value	60A	1A~Protection value
		Alarm release	55A	1A~Alarm value
		Protection value	100A	Alarm value~100A
		Protection value	55A	1A~Protection value
9	Discharge overcurrent	Alarm value	110A	1A~Protection value
		Alarm release	105A	1A~Alarm value
		Protection value	200A	Alarm value~150A



	protection	Recovery value	105A	1A~Protection value
10	Short circuit protection	Protection value	800A	Settable
		Recovery conditions	If the short-circuit load is removed, the protection is released. Or charge and release the protection.	

## 4、 Working mode

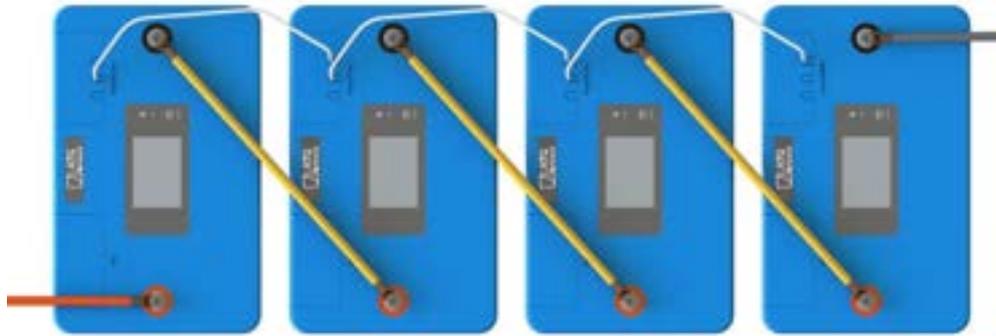
### 4.1 Stand-alone mode

A single battery system can be used independently, and the ext-com interface of the battery system can provide relevant information such as battery status to external power supply or other equipment;

### 4.2 Multi machine series operation

Up to 4 battery systems can be connected in series. The positive and negative poles of each battery system are connected in series, and the total voltage of the system is 51.2v. Each battery system CAN-OUT is cascaded with the CAN-IN of the next battery system, and the connected battery system is connected in this way. The EXT-COM interface of the first battery system can be connected with external power supply or other equipment.

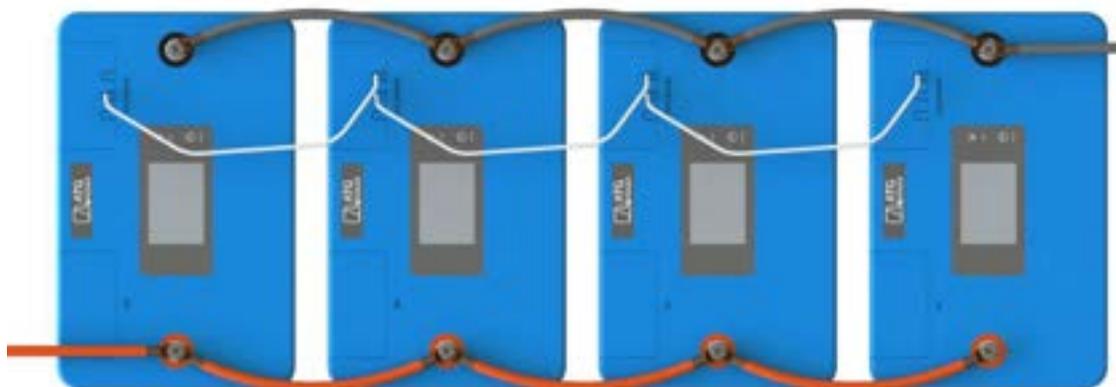
Press the ON/OFF switch from the first battery system to automatically detect and adaptively configure the system。



### 4.3 Multi machine parallel operation

The standard configuration allows 8 battery systems to be connected in parallel. The positive and negative poles of each battery system are connected in parallel, and the total voltage of the system is 12.8v. Each battery system CAN-OUT is cascaded with the CAN-IN of the next battery system. The EXT-COM interface of the first battery system can be connected with external power supply or other equipment when the battery system is connected in this way.

Press the ON/OFF switch from the first battery system to automatically detect and adaptively configure the system



## 5 、 Precautions for system installation



☆Before installing and operating the battery for the first time, please read this manual carefully and check whether the battery accessories are complete.

☆ Battery short circuit must be avoided at any time in case of heavy losses.

☆When operating the battery, it is not allowed to wear metal items such as rings, bracelets and watches;

☆When operating the battery, please use tools with insulated handles. Do not place tools or metal objects on the battery.

☆When connecting the battery, it is normal for small sparks to appear at the joint, which will not harm people and equipment.

☆When installing for the first time after long-term inventory, it is recommended to supplement power before use.

☆Do not remove the chassis screws and upper cover without the presence of professional technicians.

☆It is not allowed to use different nominal capacity and different types of battery packs in parallel.

☆When multiple battery packs are connected in parallel, please ensure that each battery pack has the same capacity to ensure that each battery can be charged and discharged in step in the actual use process, so as to ensure that the battery can be charged and discharged with the best performance.

☆Please install and use the battery according to the normal operating procedures. If the battery failure is caused by illegal operation, the manufacturer will not be responsible.

## **6、 Battery system maintenance**

6.1 Regularly check whether the service environment of lithium iron battery meets the requirements. It is recommended that the service environment temperature of the battery



be between 15 °C and 30 °C. The charging and discharging performance of the battery in this section is the best, and the installation position of the battery should be far away from the heat source.

6.2 The battery has entered the shutdown state when leaving the factory and needs to be charged and activated before use. When storing for a long time, you can use the manual key to shut down, so as to reduce the standby power consumption of the battery.

6.3 The standard configuration supported by RV128200V2-Pro battery system allows 8 batteries to be used in parallel and up to 4 batteries in series. The number of batteries used in series and parallel connection is limited, and unlimited series and parallel connection is not allowed. If necessary, please consult the manufacturer and supplier.

6.4 For the installation of outdoor integrated cabinet, the place with shade and ventilation shall be selected to avoid exposure to the sun, so as to prevent the battery products from high temperature protection due to long-term sunshine (the battery cannot be charged and discharged after the ambient temperature exceeds 60 °C).

6.5 When storing and using battery products, pay attention to dust prevention and avoid rain. In order to prevent fire, it is forbidden to directly submerge the battery into water, use or put the battery next to high temperature and high heat source.

6.6 It is forbidden to mix batteries of different capacities, types and manufacturers.

6.7 Check whether the charging of lithium iron battery is normal. In case of one of the following situations, it is necessary to supplement power in time:

(1) Battery over discharge to protection.

(2) The battery is often under charged.

(3) The battery has been out of service for more than three months.

6.8 Regularly check whether the battery terminals, connecting wires and indicator lights are normal.



6.9 Regularly check the consistency of the battery cell voltage through the upper computer. Under the floating charge state, the battery cell voltage should be more than 3.3V It is recommended to check it at least half a year.

6.10 It is forbidden to connect the power supply and load that do not meet the grade of iron lithium battery at both ends of the battery.

## **7、 Handling of special conditions of products**

7.1 Battery is not charged for a long time.

Please supplement electric energy in time. If you can't charge for a long time, please shut down and supplement electric energy in time. Pay attention to the power supply time that the battery system can support.

7.2 Catastrophic accident

Catastrophic accidents include equipment failures caused by lightning, flood, earthquake, fire and other disasters. Please stop using it immediately to avoid greater potential safety hazards.