群控能源
GROUP CONTROL ENERGY

4U 产品规格书

4U RBMS SPECIFICATION

产品名称：高压簇电池管理系统

Product Name：High Voltage Rack Battery Management System

版本编号：VER2.0

Version：VER2.0

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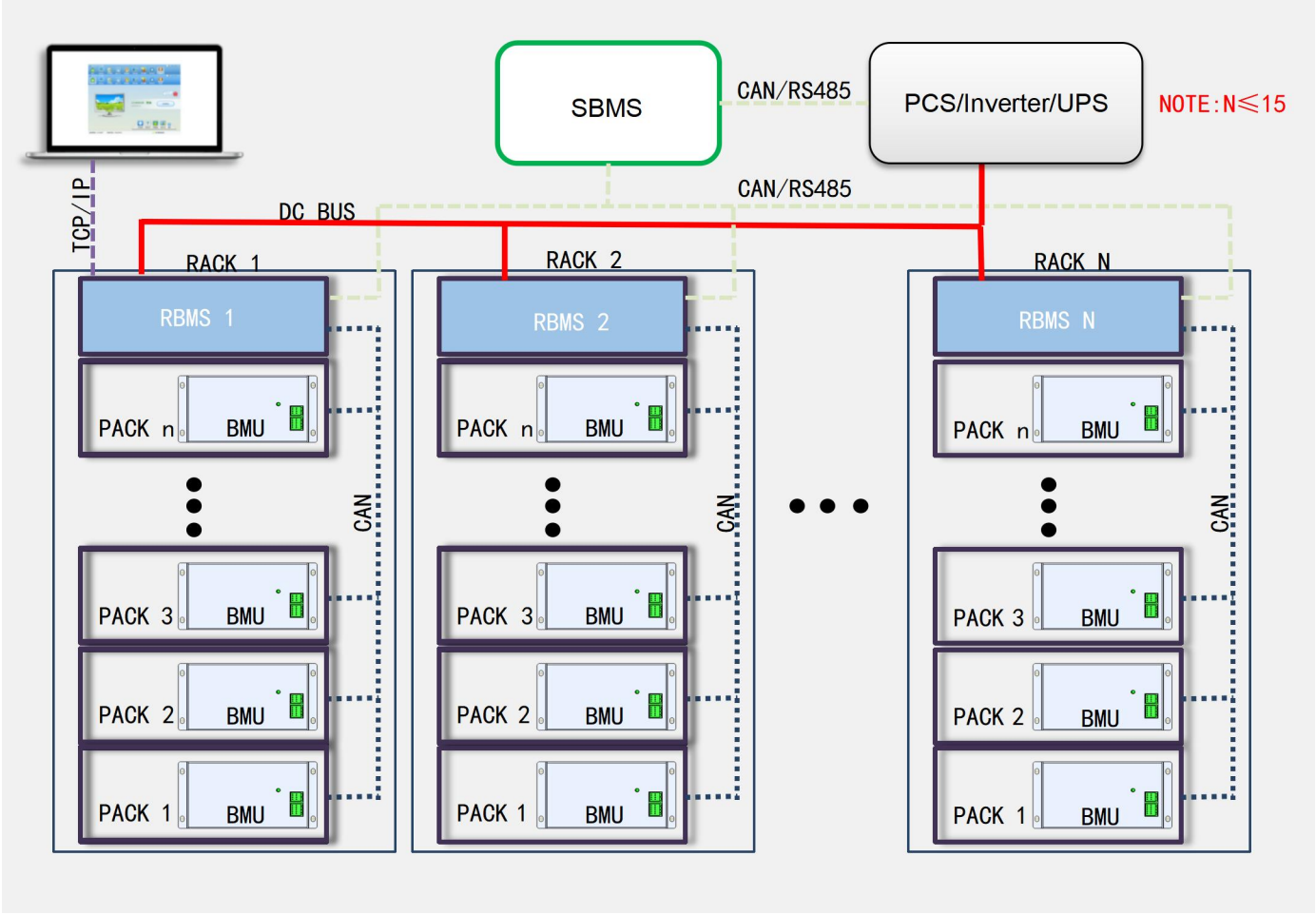
1. 应用场景 - Application

- 光伏电站储能
- 孤岛离网储能
- 工商业/家庭储能
- 微电网应用
- UPS 电源
- 电力系统 220V 直流电源

- PV power plant storage
- Island off-grid energy storage
- Industrial and commercial/household energy storage
- Micro-grid applications
- UPS power supply
- Power System 220V DC power supply

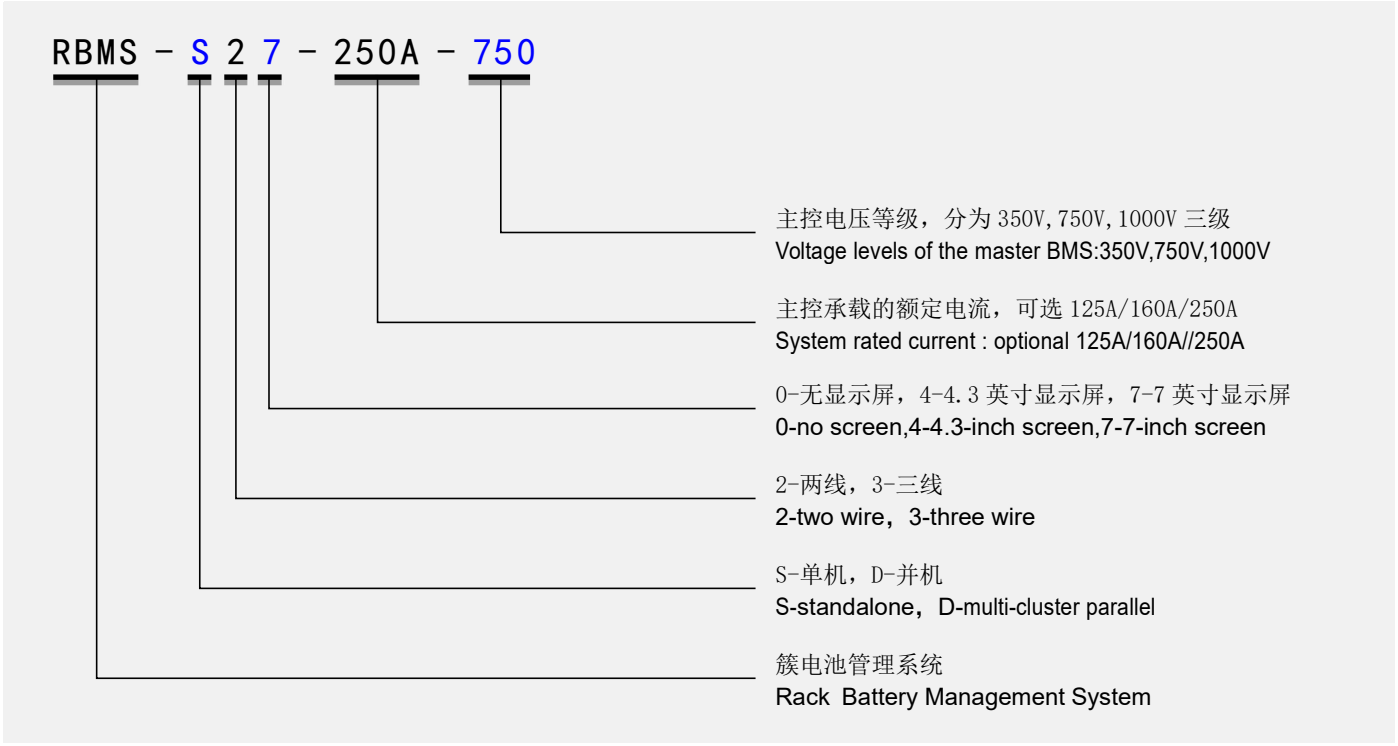
2. 三级架构拓扑图 - Topology of three-level architecture



注:单机模式为二级架构（BMU+RBMS）；并机模式为三级架构（BMU+RBMS+SBMS）。

Note: The standalone mode is a secondary architecture (BMU+RBMS); The multi-cluster parallel mode is a three-level architecture (BMU+RBMS+SBMS).

3. 命名规则 - Product Naming Rules



例：RBMS-D37-250A-750 代表高压系列 BMS 主控支持并机，三线系统，配 7 寸显示屏，主控电压等级为 750V，支持额定电流 250A。

RBMS 有三种电压等级：350 代表操作电压区间 120-350VDC；750 代表操作电压区间 260-750VDC；1000 代表操作电压区间 500-1000VDC。

关于系统实际额定电压计算方法：

例如系统为10个16串磷酸铁锂电池模组串联组成（10S16S），按照单体标称3.2V计算额定电压即为10*16*3.2=512V；8个15串磷酸铁锂电池模组串联组成（8S15S），额定电压即为8*15*3.2=384V。

Example: RBMS-D37-250A-750 represents high voltage master BMS with parallel function and 7-inch screen,three-wire system,the voltage level of master BMS is 750V.It supports rated current 250A .

There are 3 voltage levels for 4U RBMS: 350 represents the operating voltage range of 120-350VDC; 750 represents the operating voltage range of 260-750VDC; 1000 represents the operating voltage range of 500-1000VDC.

Calculation method of actual rated voltage of the system:Take the nominal 3.2V lithium iron phosphate battery as an example, when the system consists of 10 pcs of 16S battery modules in series (10S16S), the rated voltage will be 10*16*3.2=512V; when the system consists of 8 pcs of 15S battery modules connected in series (8S15S), and the rated voltage will be 8*15*3.2=384V.

4. 产品特性 - Product Features

图/ Figure1 RBMS 外形图-Dimensions of RBMS

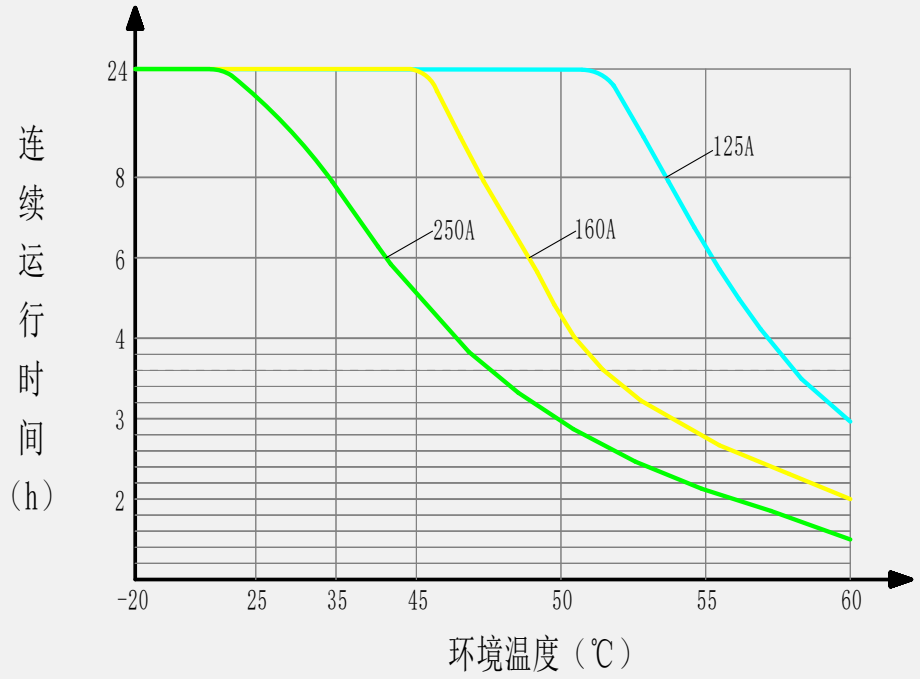
- **高级电池管理系统** -- 高度集成化的电池管理系统可实现无缝监控。
- 完善的自检与运行状态检测功能，搭配 HMI 显示屏，系统运行信息一目了然。
- 完善可靠的系统控制和保护策略，全面保障电池安全，为延长电池组的寿命保驾护航。
- **模块化设计，可配置，可扩展** -- 多个储能单元灵活组合可扩展为较大的储能系统，最大可支持 256 节（铅碳电池为 400 节）电池串联。
- **通信接口丰富** -- 多路 RS485、CAN、以太网、干接点输入输出等接口，支持与市面上绝大多数 PCS/Inverter/UPS、监控服务器通信。
- **通信接口协议灵活** -- 出厂自带本公司通信协议，也可根据客户需求来适配不同厂家的 PCS/ Inverter/UPS。
- **有容乃大** -- 内置大容量存储芯片可存储大量关键运行数据，更可加装 SD 卡实现电芯历史数据存储。
- 自动环流控制及自动并机\脱机控制，可轻松实现电池组的并联。

- **Advanced battery management system** -- highly integrated battery management system can realize seamless monitoring.
- Perfect self inspection and operation status detection function, combined with HMI display screen, the system operation information is clear at a glance.
- Perfect and reliable system control and protection strategies to fully ensure the safety of the battery and escort the extension of the service life of the battery pack.
- **Modular design, configurable and expandable** -- multiple energy storage units can be flexibly combined and expanded into a larger energy storage system,it Supports up to 256 (400 for lead-carbon batteries) batteries in series.
- **Rich communication interfaces** -- RS485, CAN, Ethernet, dry contact input and output interfaces, supporting communication with most PCS/Inverter/UPS and monitoring servers on the market.
- **Flexible communication interface protocol** -- the factory comes with the company's communication protocol, and PCS/Inverter/UPS of different manufacturers can also be adapted according to customer needs.
- **Great capacity data memory** -- the built-in high-capacity memory chip can store a large number of key operation data, and SD card can be added to store the historical data of the cell.
- Automatic circulation control and automatic parallel / offline control can easily realize the parallel connection of battery packs.

5. 主要技术参数 - BMS Main technical parameters

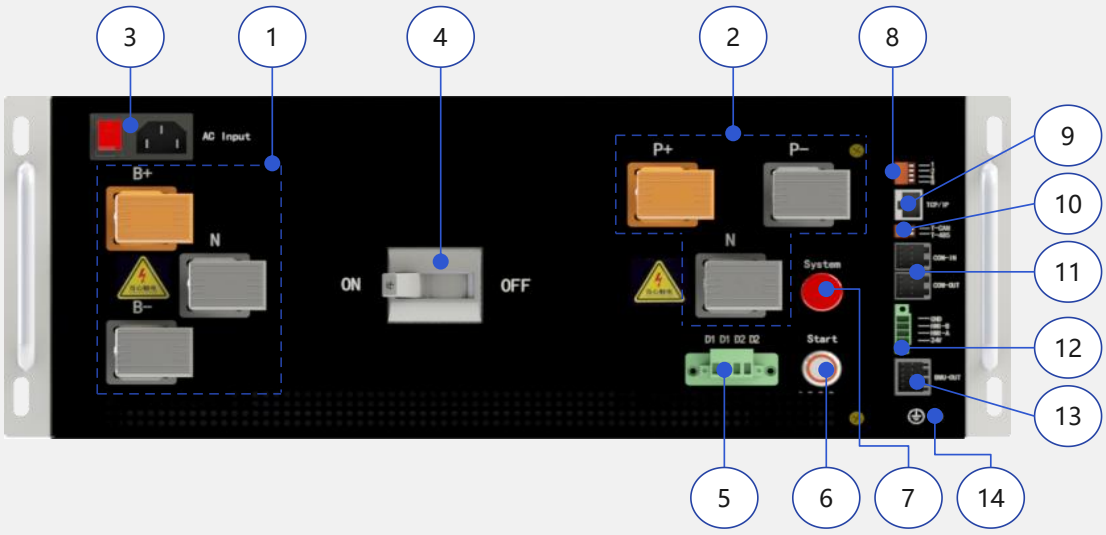
基本参数		Basic Parameters
额定电流	125A，160A, 250A（可选/ Optional）	Rated Current
最高电压	350V，750V，1000V 根据额定电压匹配使用 Use according to rated voltage match	Max voltage
功耗	≤25W（三线）(Three wire systems / Center tap) ≤15W（两线）(Two wire systems)	Power consumption
电流采样精度	1%FSR	Current sampling accuracy
绝缘耐压	2800VDC ＜1mA 1min	Insulation withstand voltage
防护等级	IP20	Ingress protection
尺寸（W*H*D）	482*180*500（mm）	Size（W*H*D)
净重	～22Kg	Net Weight
通信接口		**Communication Port**
与 BMU 通信口	CAN	Communication port with BMU
与 PCS/Inverter/UPS 通信口	RS485/CAN	Communication port with PCS/Inverter/UPS
与 SBMS 通信口	RS485/CAN	Communication port with SBMS
与监控软件通信	以太网/Ethernet	Communication with monitoring software
基本功能		**Basic Function**
电池充放电管理	支持 Available	Battery charge&discharge Management
电池温度管理	支持 Available	Battery Temperature Management
IAP 升级	支持 Available	IAP Upgrade
系统保护参数设置	支持 Available	System protection parameter setting
短路保护	支持 Available（1000V 25KA 20ms）	Short circuit protection
预充功能	支持 Available	Pre-charge function
并机环流控制	支持 Available	Parallel circulation control
事件记录	支持 Available 5000	Event record
带中线系统（三线）	支持（可选） Available(Optional)	System with center tap
干接点	最多 2 路干接点输出/ Maximum 2 dry contact outputs	Dry contact
双路供电	支持（电池+市电供电，市电优先） Available (Battery + municipal power supply, municipal power in priority)	Dual power supply
其他参数		**Other**
外观颜色	RAL9005 黑砂纹 RAL9005 Black	Appearance, Color
安装方式	适用于标准 19 英寸机柜安装 Suitable for installation in standard 19-inch racks	Installation method
进出线方式	前进前出 Front side in and front side out	Incoming and outgoing line mode
操作温度	-20℃～45℃（45℃以上降容使用，见图 2） For use with reduced capacity above 50°C(Figure 2)	Operating temperature
使用环境湿度	5%～75%RH	Operating ambient humidity
符合国家标准	GB/T 16935.1 GB/T 17626.2 GB/T 17626.5	Comply with National standards
安规认证	CE:IEC62477-1 EN61000-6-2/4	Safety Certification
选配功能		**Functions Optional**

绝缘检测	适用最低 300V 以上系统 Applicable to system voltage ≧300V	Insulation detection
HMI 显示屏	4.3 英寸，7 英寸可选（外挂） 4.3 inches, 7 inches optional (external) (optional)	HMI display
单机或并机功能	出厂前设置完成/Set up before leaving the factory	Stand-alone or parallel function



图/ Figure2 4U RBMS 环温与运行时间曲线图-Curve of Environmental Temperature and Operating Time

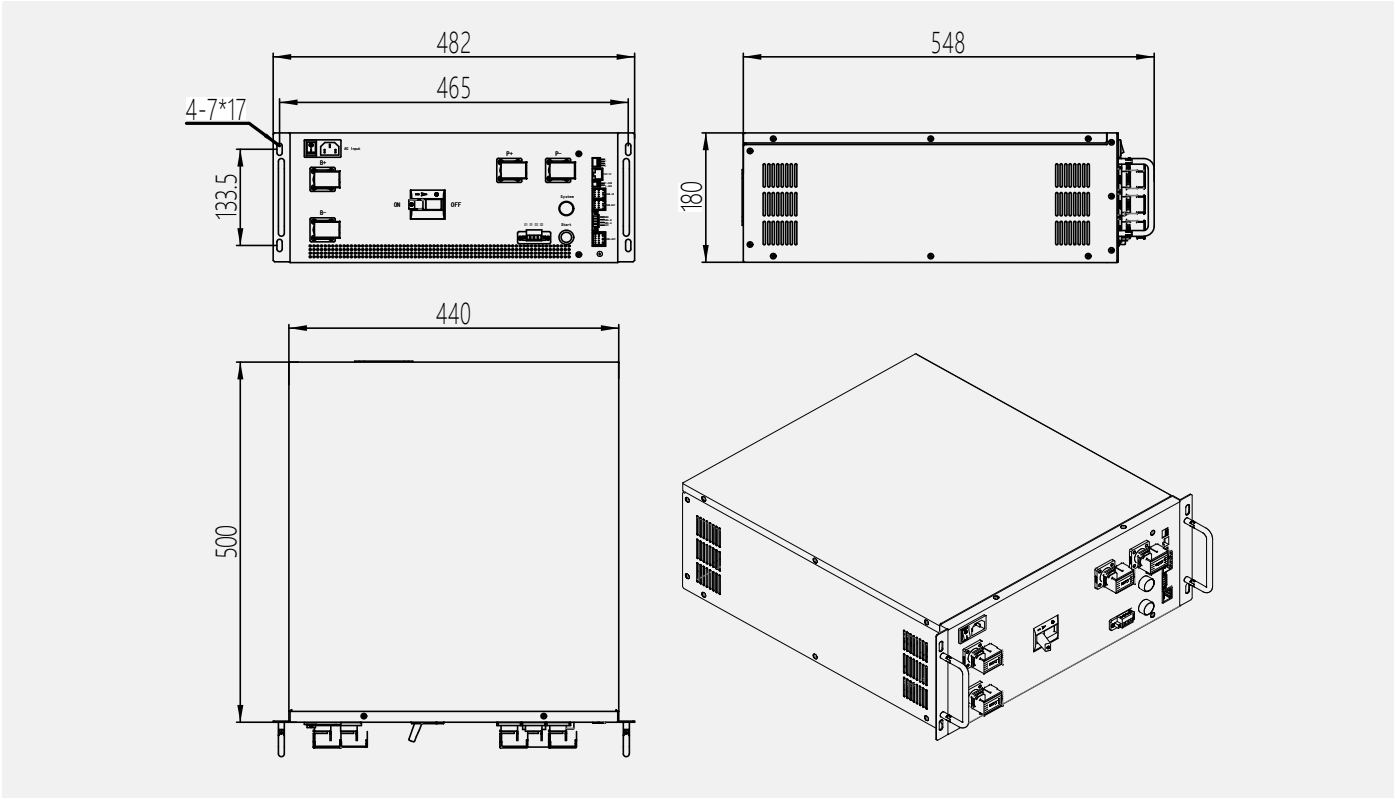
6. 接口说明 - Interface description



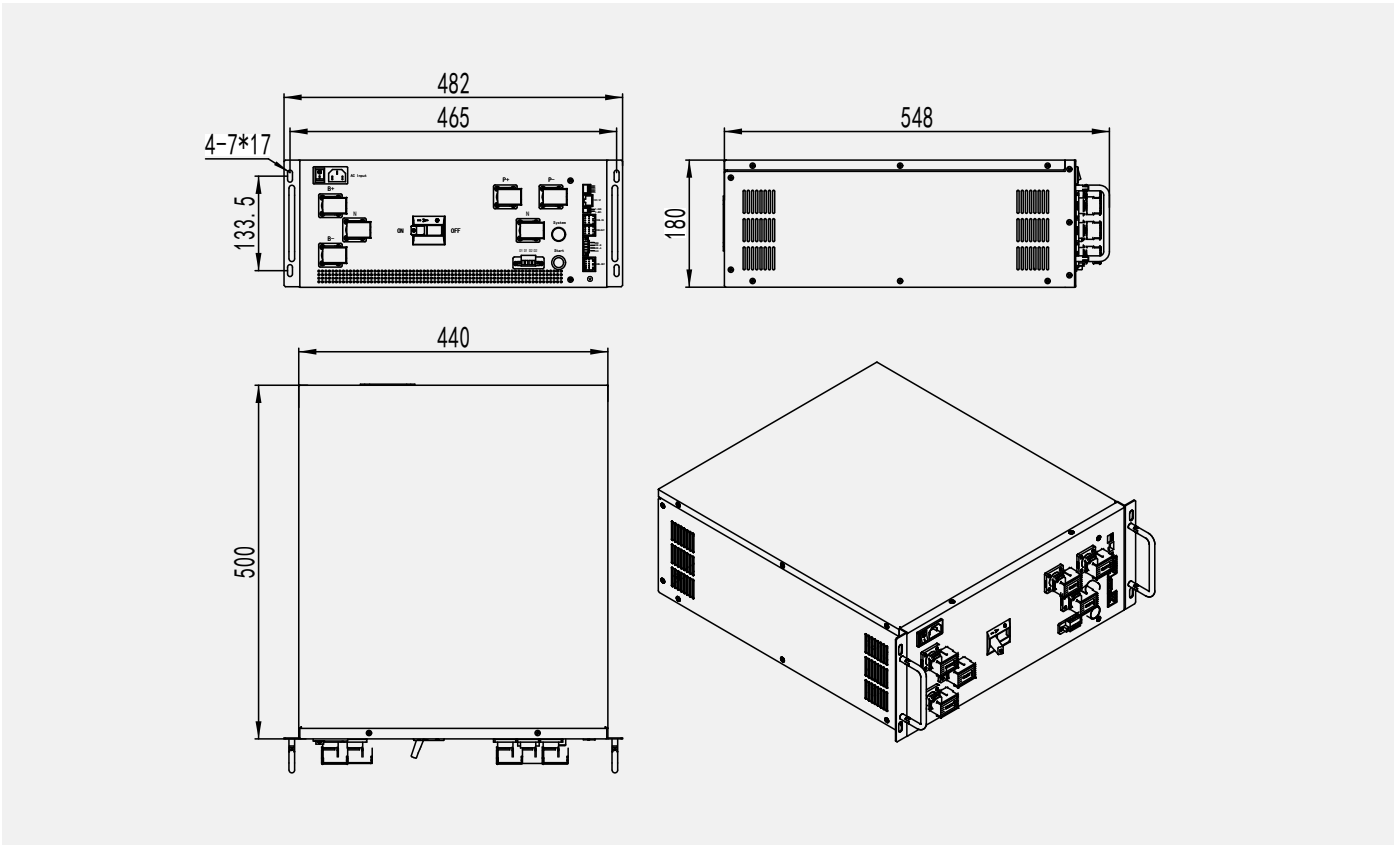
NO.	名称/ Name	说明/ Explain	注意事项/ Precautions
1	B+ N B-	与电池侧总正，总负连接的功率端口：无中线系统 N 线不接.推荐连接螺栓 M8*16，扭力 8-12N·m； 70mm ²(2/0 AWG) 以上电缆	The power port connected to the battery's total positive and total negative: for the systems without mid-line, do not connect the N line Recommended connecting bolt M8 * 16, torque 8-12N. m Use at least 70mm ²(2/0 AWG) Copper cables of and above
2	P+ N P-	与充电设备(UPS)或直流母线连接的功率端口：无中线系统 N 线不接 推荐连接螺栓 M8*16，扭力 8-12N·m； 70mm²(2/0 AWG) 以上电缆	Power port connected to charging equipment (UPS) or DC bus: for the systems without mid-line, do not connect the N line. Recommended connecting bolt M8 * 16, torque 8-12N. m Use at least 75mm ²(2/0 AWG) Copper cables of and above
3	AC Input	市电供电输入口，必须取自 UPS 输出侧 85~264VAC 1A max 1.0mm ²(18AWG) 电子线	The municipal power supply input port must be taken from the UPS output side 85~264VAC 1A max 1.0mm ²(18AWG) 电子线
4	ON OFF	ON:断路器闭合；OFF:断路器断开 当断路器手柄在中间位置为脱扣状态，需先拨到 OFF，才能再闭合	ON: the Circuit Breaker is closed; OFF: the Circuit Breaker is disconnected When the handle of the Circuit Breaker is in the tripping state in the middle position, it needs to be turned to off before it can be closed
5	D1 D1 D2 D2	两路干接点输出(常开触点) 禁充，禁放干接点输出	Two dry contact output （NO） Dry contact signals for prohibiting charging and prohibiting discharging
6	Start	直流启动按钮：通过电池侧取电启动 RBMS 系统 系统接入电池，断路器合闸后按下待灯亮表示系统开机	DC start button: start the RBMS system by taking power from the battery side. The system is connected to the battery. After the circuit breaker is closed, press and wait for the light to light up,indicating that the system is powered on.
7	System	系统状态指示灯 系统正常:绿灯常亮 系统告警:黄灯常亮 自检失败和保护状态:红灯常亮 充电:绿灯闪烁 放电:红灯闪烁 正在自检:红绿交替闪烁 正在预充:黄灯闪烁	System status indicator System normal: Green Light always bright Alarm: Yellow light always bright Self test failure and protection status: Red light always bright Charging: green light flashing Discharge: red light flashing Self checking: red and green light flashing alternately Pre-charging: yellow light flashing

8	1 2 4 8	ID 分配：多台 RBMS 并机使用时通过设置拨码开关分配 ID。必须从 1 开始。 拨码开关共 4 位，最多支持 15 台 RBMS 并机 1 ON: ID+1 2 ON: ID+2 3 ON: ID+4 4 ON: ID+8	ID allocation: when multiple RBMS are used in parallel, the ID is allocated by setting the dial switch. You must start with 1. The dial switch has 4 bits in total and supports up to 15 RBMS parallel machines 1 ON: ID+1 2 ON: ID+2 3 ON: ID+4 4 ON: ID+8
9	TCP/IP	可通过网线连接 PC 连接 RBMS 上位机系统软件 网线标准 CAT5 及以上，可用交叉线或者直连线,线序可按标准的 TIA-586A 或者 TIA-568B	RBMS upper computer system software can be connected to PC through network cable The network cable standard is CAT5 or above, and can be connected by cross line or straight line. The line sequence can be according to the standard TIA-586A or TIA-568B
10	T-CAN T-485	CAN 和 485 通讯时终端匹配电阻设置 设置说明：（120R）,ON 为有效 并机应用时只需设置最后一台;单机应用时根据现场情况(干扰、通信距离等)灵活使用	Terminal matching Resistance setting during can and 485 communication Setting Description: (120r), on is valid For parallel application, only the last one needs to be set; In single machine application, it can be used flexibly according to the site conditions (interference, communication distance,etc.)
11	COM-IN COM-OUT	RBMS 外部通讯口： 并机应用时：与 SBMS 通信 单机应用时：与 UPS/PCS 外部设备通信 必须使用随机配置的双绞屏蔽线束，线序定义见线束上线标	RBMS external communication port: In parallel application: communicate with SBMS In stand-alone Application: communicate with UPS / PCS external equipment Must use randomly configured twisted pair shielded wire harness, the wire sequence definition see the wire mark on the wire harness
12	GND HMI-B HMI-A 24V	1. 接外挂显示屏用 2. 给 SBMS 供电用 接显示屏时请按照丝印线序接线	For external display connection For SBMS power supplying connection Please connect the display screen according to the silk screen sequence
13	BMU-OUT	与 BMU 通信接口 与 BMU 级联通讯	Communication interface with BMU Cascade communication with BMU
14		RBMS 机箱接地点 必须可靠接地，且接地电阻小于 1Ω	RBMS Case grounding point It must be reliably grounded and the grounding resistance is less than 1 Ω

7. 外形尺寸 - RBMS Dimension



RBMS 外形尺寸(两线) / Outer Dimension of 4U 250A 2-Wires(Regular) model



RBMS 外形尺寸(三线) / Outer Dimension of 4U 250A 3-Wires(Center tap) model

8. 安全注意事项 - Safety Accessory

1) 储能系统内部有高压，非本公司或本公司授权的技术人员，严禁擅自打开机箱进行拆卸和维护，否则有触电的危险，同时失去保修权利。

2) 触发二级保护后断路器由 BMS 控制断开后，必须将系统下电排除故障，并至少间隔 1 分钟以后方可重新上电开机，否则可能会导致断路器分励线圈热量来不及散发而损坏。

3) 如需要由电池来冷启动 PCS/Inverter/UPS，必须先将 PCS/Inverter/UPS 侧的电池开关闭合后再启动电池。如果先启动电池，再闭合 PCS/Inverter/UPS 侧的电池开关，由于 PCS/Inverter/UPS 侧直流侧一般具有大电容，闭合瞬间电容相当于短路，此时电池给电容充电的电流会远高于 RBMS 机器内部的接触器额定值，极易造成接触器触点出现烧蚀、粘连，接触器触点接触电阻增大发热烧毁或者触点无法断开从而触发二级保护。

4) 安装及调试人员所使用的工具须有绝缘防护。

5) 需要维护时，必须将 RBMS 的主断路器断开，切断电池组与 PCS 直流总线的连接。

6) 根据项目需求的不同，电池管理系统的充放电电流和充放电电压等参数在初次安装调试时已设定，不得擅自更改参数，否则可能会缩短电池寿命，更严重的可能会对电池造成严重危害产生安全事故。

7) 如遇储能柜周围起火，请务必使用干粉灭火器或者消防沙进行灭火。若使用液体灭火可能导致电击。

1) There is a high voltage inside the energy storage system. It is strictly prohibited to open the chassis for disassembly and maintenance without authorization unless the company or the technicians authorized by the company, otherwise there is a risk of electric shock and the warranty right will be lost.

2) After triggering the secondary protection, the circuit breaker is controlled by BMS. After disconnection, the system must be powered off to eliminate the fault, and can be powered on and started again after an interval of at least 1 minute, otherwise it may cause damage to the shunt coil of the circuit breaker in time to dissipate heat.

3) If the PCS/Inverter/UPS needs to be cold started by the battery, the battery switch on the PCS/Inverter/UPS side must be closed before starting the battery. If the battery is started first and then the battery switch on the PCS/Inverter/UPS side is closed, the DC side of the PCS/Inverter/UPS side generally has a large capacitance, and the capacitance at the moment of closing is equivalent to a short circuit. At this time, the current charged by the battery to the capacitor will be much higher than the rated value of the contactor inside the RBMS machine, which is very easy to cause ablation and adhesion of the contactor contacts, The contact resistance of the contactor contact increases, heats and burns, or the contact cannot be disconnected, thus triggering the secondary protection.

4) The tools used by installation and commissioning personnel must be insulated.

5) When maintenance is required, the main circuit breaker of RBMS must be disconnected to disconnect the battery pack from PCs DC bus.

6) According to the different needs of the project, the charging and discharging current, charging and discharging voltage and other parameters of the battery management system have been set during the initial installation and commissioning. Do not change the parameters without authorization, otherwise the battery life may be shortened, and more serious may cause serious harm to the battery and safety accidents.

7) In case of fire around the energy storage cabinet, be sure to use dry powder fire extinguisher or fire sand to extinguish the fire. Electric

8） 如长期不使用系统，请务必断开电池柜的主断路器。

9） 尽量避免长期在下列工作环境中使用：

◎ 超过规格书规定的温度或湿度范围的场所

◎ 有强烈震动或易受撞击的场所

◎ 阳光直射或靠近热源的场所

◎ 有粉尘、强腐蚀性物质、易燃易爆物、高烟雾场所

shock may result if liquid fire extinguishing is used.

8) If the system is not used for a long time, be sure to disconnect the main circuit breaker of the battery cabinet.

9) Try to avoid long-term use in the following working environments:

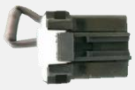
◎ Places exceeding the temperature or humidity range specified in the specification

◎ Places with strong vibration or vulnerable to impact

◎ Places with direct sunlight or close to heat source

◎ Places with dust, strong corrosive substances, inflammables and explosives and high salt fog

9. 外部配件 - Accessory list

图例 - legend	名称 - Name	规格 - Specifications	数量 - PCS
	功率端子护套 Power Terminal sheath	黑色 Black	2（两线/2 wires model） 4（三线/center-tap model）
	功率端子护套 Power Terminal sheath	橙色 Orange	2
	外部通信线 External Communication cable	6 芯屏蔽-2 米 6 core shield - 2m	1
	AC 插座（可接线） AC socket（wireable）	250V 10A	1
	干接点接线端子 Dry contact terminal	5.08-4Pin	1
	终端匹配电阻 Terminating resistor	120R	1
	显示屏接线端子 Display terminal	3.81-4Pin	1

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