GCE High voltage battery management system

Product Specification

Operation Manual

Version Record

Version No.	Content Revised	Revision Dated	Revised by
1.0	1.First Edition	2021-8-25	YTQ

1. Application scenarios

◎ Battery Energy Storage System(BESS)
◎ Off-grid energy storage
◎ Data Center
◎ Grid frequency modulation energy storage
◎ Track power / traction
◎ LFP UPS power supply

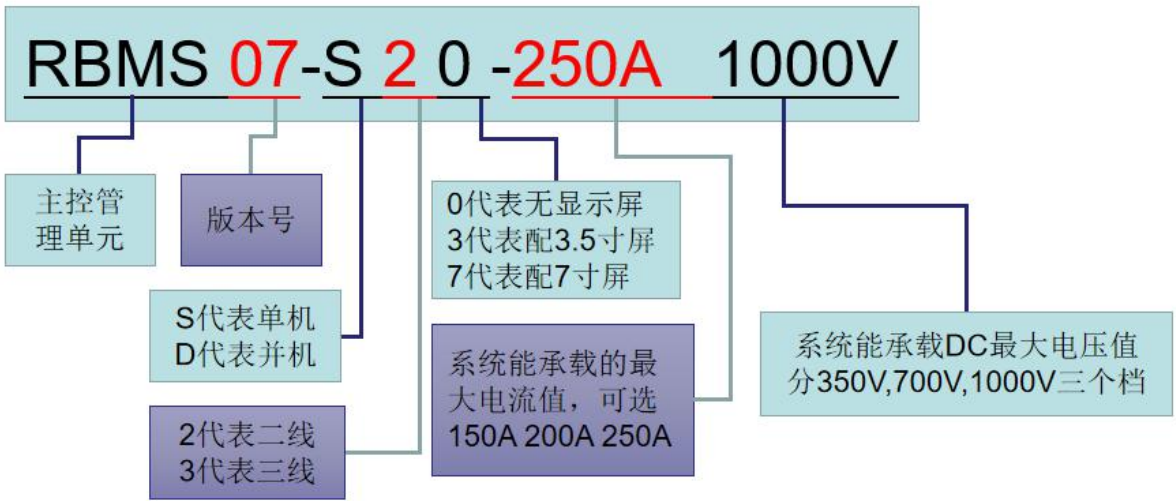
2. Product system overview

This main control system (RBMS) is a battery management system overall solution developed for large-scale high-voltage battery energy storage systems and UPS applications. It adopts a multi-level distributed architecture and a modular design concept. It is highly configurable, compatible and expandable. It is easy to assemble, debug and maintain. It is suitable for DC voltage 1000V (taking lithium iron phosphate as an example: minimum voltage 2.5V, rated Various lithium battery energy storage systems with a voltage of 3.2V and a maximum voltage of 3.6V, that is, up to 277 single cells can be connected in series. This system can be configured as a two-level architecture (BMU+RBMS) to form a single-cluster lithium battery system according to different customer needs, and is suitable for occasions from 10KWh to 100KWh. It can also be combined with industrial computer and battery stack management software to make multi-cluster battery systems in parallel to form a three-level architecture (BMU+RBMS+SBMS) to form a battery stack, which is suitable for

50KWh-2MWh occasions. It can also cooperate with servers and power station battery management system software to make multiple battery stacks parallel again to form a four-level architecture (BMU+RBMS+SBMS+BBMS), which is suitable for occasions from 2MWh to 1000MWh.

The company's products have complete and reliable operation and protection strategies, which effectively extend the service life of the battery pack. Comes with a variety of communication interfaces, which can be directly or indirectly connected with third-party energy management systems.

3. Product model naming rules



Example: RBMS07 D37-250A 700V represents that the GCE series BMS supports parallel, three-wire system, with a 7-inch display, and supports a maximum current of 250A and a voltage of 700V.

Note: 350V file corresponds to operating voltage: 120-350VDC; 700V file corresponds to operating voltage: 300-700VDC; 1000V file corresponds to operating voltage: 500-1000VDC

4. Product Features

※ Advanced battery management system---The highly integrated battery management system can realize seamless monitoring.

※ Perfect self-checking and running status checking function, with HMI display screen, system running information is clear at a glance.

※ Complete and reliable system control and protection strategies, comprehensively guarantee battery safety, and escort to extend the life of battery packs.

※ Modular design, configurable and expandable---multiple energy storage units can be flexibly combined and expanded into a larger energy storage system.

※ Abundant communication interfaces---multiple RS485, CAN, Ethernet, dry contact input and output interfaces, supporting communication with most PCS and monitoring servers on the market.

※ The communication interface protocol is flexible---the factory comes with the company's communication protocol, and it can also be adapted to the PCS of different manufacturers according to customer needs.

※ The built-in large-capacity memory chip can store a large amount of key operating data, and an SD card can be added to realize battery historical data storage

※ Automatic circulation control and automatic parallel/offline control can easily realize the parallel connection of battery packs.

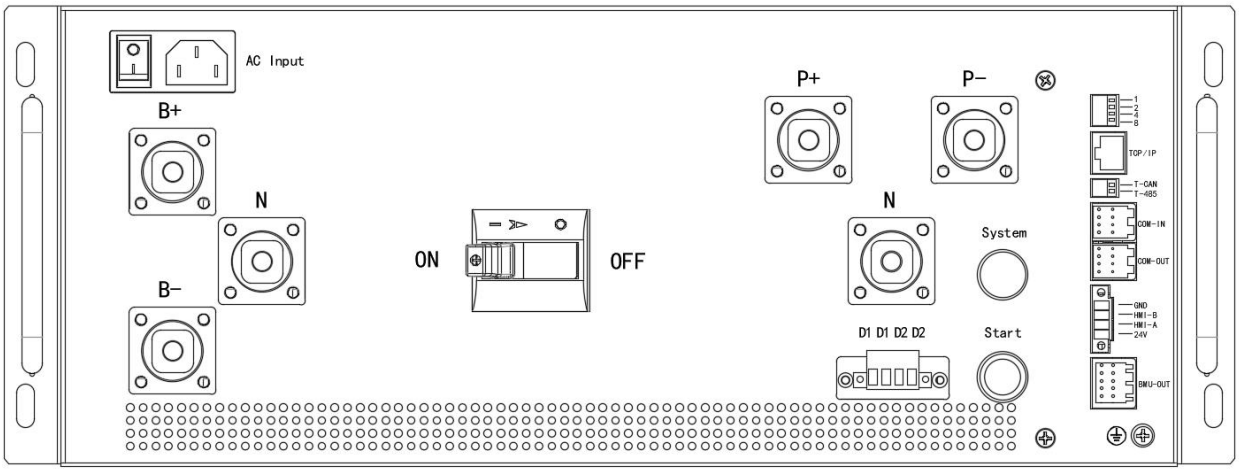
5. RBMS main technical parameters

Basic Parameters	Max. current.	150A.200A.250A（Optional）
	Highest Voltage	350V.700V.1000V（Optional）
	Power consumption	≤25W
	Current sampling accuracy	1%FSR
	Insulation withstand voltage	2800VDC ＜1mA 1min
	Protection level	IP20
	Dimension（W*H*D）	482*180*500（mm）
	New Weight	~22Kg
Communication Port	Communication port with BMU	CAN
	Communication port with UPS	RS485/CAN

	Communication port with SBMS	RS485/CAN
	Communication with monitoring software	Ethernet
Basic Function	Battery charge&discharge Management.	available
	Battery Temperature Management	available
	IAP Upgrade	available
	System protection parameter setting	available
	Short circuit protection	available（25KA 20ms）
	Pre-charge function	available
	Parallel circulation control	available
	Event record	Available(5000)
	System with mid-line	Available(Optional)
	Dual power supply	Available(Battery + municipal power supply, municipal power in priority)
Optional function	Insulation detection	Applicable to voltage minimum 300V systems (optional)
	HMI display	3.5 inches, 7 inches optional (external) (optional)
	Stand-alone or parallel function	Set up before leaving the factory
	Dry contact	Maximum 2 dry contact outputs (optional)
Others	Appearance, Color	RAL9005 Black sand grain
	Installation method	Suitable for standard 19-inch cabinet installation
	Incoming and outgoing line mode	Front side in and front side out.
	Operating ambient temperature	-20℃~60℃
	Operating ambient humidity	5%~75%RH
	Comply with National standards	GB/T 16935.1 GB/T 17626.2 GB/T 17626.5
	Safety Certification	Comply with CE certification standards

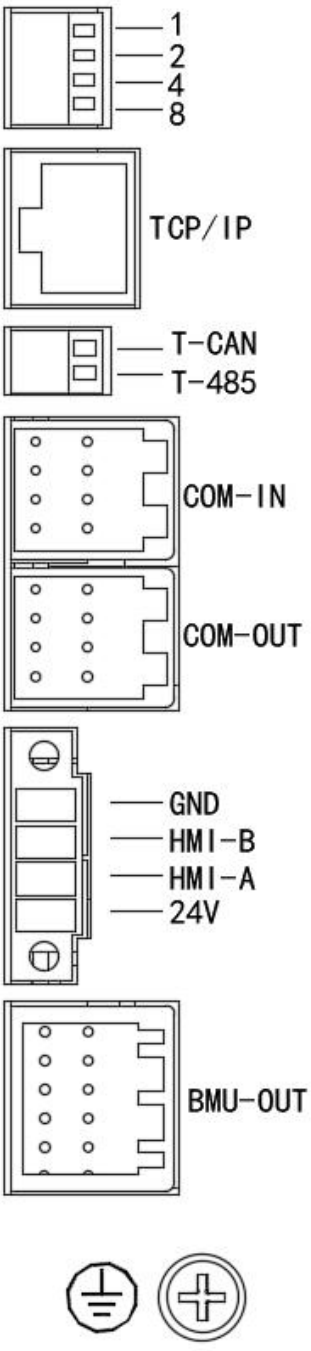
6.RBMS Dimension

7. RBMS 接口说明



No.	Name	Explain	Precautions
1	B+ N B-	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 * 20, torque 8-10N * m
2	P+ N P-	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 * 20, torque 8-10N * m
3	AC Input	The municipal power supply input port must be taken from the UPS output side	85~264VAC 1A max
4	ON OFF	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	Two dry contact output reserved	Not yet open for use
6	Start	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	Status	System status indicator	System normal: Green Alarm: yellow light Self test failure and protection status: red light Charging: green light flashes

			Discharge: red light flashing Self checking: red and green flashing alternately Pre-charging: yellow flashing

Illustration	Silkscreen logo	Explain	Precautions
	1 2 4 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
	TCP/IP	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
	T-CAN T-485	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.)
	COM-IN COM-OUT	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
	GND HMI-B HMI-A 24V	1. For external display connection 2. For SBMS power supplying connection	Please connect the display screen according to the silk screen sequence

	BMU-OUT	Communication interface with BMU	Communication with BMU
		RBMs Cabinet ground point	It must be reliably grounded and the grounding resistance is less than 1 Ohm

8. Precautions for use

1) There is high voltage inside the energy storage system. It is strictly forbidden to open the case for disassembly, assembly and maintenance without the company or its authorized technicians, otherwise the electric shock will be released and the warranty rights will be lost.

2) It is strictly prohibited for any wire or connector in the BMS to overlap the positive and negative poles of the battery, otherwise there may be a danger of short circuit and damage the circuit board.

3) it is strictly prohibited to be close to the water source or fire source to avoid the fire of the battery due to short circuit or overheating.

4)after the secondary protection is triggered, 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 because it is too late to emit heat.

5) If you need to cold start the UPS/PCS from the battery, you must first close the battery switch on the UPS/PCS side before starting the battery. If you start the battery first, and then close the battery switch on the UPS/PCS side, since the DC side of the UPS/PCS side generally has a large capacitance, the instantaneous capacitance is equivalent to a short circuit. At this time, the current charged by the battery to the capacitor will be much higher than that of the RBMS machine. The rated value of the contactor is very easy to cause ablation and adhesion of the contactor's contact. The contact resistance of the contactor's contact increases and heats up or the contact cannot be disconnected, which triggers the secondary protection

9. Safety precautions

1) The tools used by installation and commissioning personnel must have insulation protection.

2) During installation, debugging and maintenance, you must wear insulated rubber gloves, goggles and insulated rubber boots as appropriate to avoid safety accidents as much as possible.

3) If the metal of the wire ends during the installation, debugging and maintenance process falls into the battery room, be sure to use an insulated tool to take it out, and do not leave the sundries.

4) When maintenance is required, the main circuit breaker of the RBMS must be disconnected, and the connection between the battery pack and the PCS DC bus must be cut off.

5) According to different project requirements, the parameters such as the charge and discharge

current and charge and discharge voltage of the battery management system have been set during the initial installation and commissioning. The parameters must not be changed without authorization, otherwise the battery life may be shortened, and the battery may be affected more seriously. Cause serious harm and cause safety accidents.

6) In case of fire around the energy storage cabinet, please use dry powder fire extinguisher or fire sand to extinguish the fire. Using liquid to extinguish fire may cause electric shock.

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

8) Try to avoid long-term use in the following working environment:

◎Places that exceed the temperature or humidity range specified in the specification

◎Places subject to strong vibration or susceptible to impact

◎Places exposed to direct sunlight or close to heat sources

◎Places with dust, strong corrosive substances, flammable and explosive materials, and high salt spray

Statement:

The technical specifications of this product are for reference only when selecting models. The company has the final right to interpret this product specification and has the right to revise this specification. Product specifications are subject to change without notice.