All Travel Energies.
NEW YORK

K100G215C

All-In-One Energy Storage System

Technical Specification

Contents

1. Product description

The system is composed of 15pcs of 51.2V280AH modules, A high-voltage control box and a 100KW inverter (bidirectional inverter) module. It adopts and outdoor cabinet structure and has an IP54 protection level. It can meet the configuration requirements of 100kW/215kWh energy storage, and realize functions such as energy time shifting, peak shaving and valley filling, and power quality improvement. The cabinet integrates a balanced BMS system, fire protection system, air conditioning system, etc., and can be used in industrial and commercial energy storage systems.

Figure 1-1 Product appearance

2. Product comply with standards

GB/T 2423.1	Basic environmental test procedures for electrical and electronic products Test A: Low temperature test method
GB/T 2423.2	Basic environmental test procedures for electrical and electronic products Test B:High temperature test method
GB/T 2423.3	Environmental testing for electrical and electronic products Part II Test methods Test Cab: Constant damp heat for equipment
GB/T2423.8-1995	Environmental testing for electrical and electronic products - Part 2: Test method Test Ed: Free fall
GB/T 2423.10-2008	Environmental testing for electrical and electronic products - Part 2: Test methods Test Fc: Vibration
GB/T 3859.1	Provisions on Basic Requirements for Semiconductor Converters
GB/T 3859.2	Application Guidelines for Semiconductor Converters
GB/T3859.3-1993	Semiconductor Converter Transformers and Reactors
GB/T 34120-2017	Technical specifications for energy storage converters of electrochemical energy storage systems
GB/T 34133-2017	Energy storage converter testing technical regulations
GB/T 36547-2018	Technical regulations for connecting electrochemical energy storage system to power grid
GB/T 36548-2018	Test specification for electrochemical energy storage system connected to grid
GB 51048-2014	Code for Design of Electrochemical Energy Storage Power Station
DL/T 537	Guidelines for selection of high pressure/low pressure pre-installed boost inverter cabin pressure
GB/T 17467-2020	High voltage/low voltage prefabricated substation
GB/T11022-2020	Common Technical Requirements for High Voltage AC Switchgear and Controlgear Standards
NB/T 31016	Technical conditions of battery energy storage power control system
NB/T 33014-2014	Operation control of electrochemical energy storage system connected to distribution network
NB/T 33015-2014	Technical regulations for connecting electrochemical energy storage system to distribution network
NB/T 33016-2014	Test procedure for electrochemical energy storage system connected to distribution network
NB/T 42089-2016	Technical specification for power conversion system of electrochemical energy storage power station
NB/T 42090-2016	Technical specification for monitoring system of electrochemical energy

	Storage power station
GB/T 12325	Power quality supply voltage deviation
GB/T 12326	Power quality voltage fluctuations and flicker
GB/T 13422	Electrical test methods for semiconductor power converters
GB 7251.1	Low-voltage switchgear and controlgear assemblies - Part 1: General principles
GB/T 14549	Power quality utility grid harmonics
GB/T 15543	Power quality three-phase voltage unbalance
GB/T 15945	Power quality power system frequency deviation
GB/Z 17625.3	The electromagnetic compatibility limit is generated in the low-voltage power supply system for equipment with a rated current greater than 16A
GB/T 17626.2	Limitation of voltage fluctuations and flicker
GB/T 17626.3	Electromagnetic compatibility test and measurement technology Electrostatic discharge immunity test
GB/T 17626.4	Electromagnetic compatibility test and measurement technology Radio frequency electromagnetic field radiation immunity test
GB/T 17626.5	Electromagnetic compatibility test and measurement technique Electrical fast transient burst immunity test Electromagnetic compatibility test and measurement technology Surge (Shock) immunity test
GB/T 17626.6	Electromagnetic compatibility test and measurement techniques Immunity to conducted disturbances induced by radio frequency fields
GB/T 17626.11	Electromagnetic compatibility testing and measurement techniques voltage dips, short interruptions and voltage variations immunity test
GB 17799.4	Common criteria for electromagnetic compatibility emissions standards in industrial environments
GB/T 19582.1	Industrial automation network specification based on Modbus protocol Part 1 Modbus application protocol

3. System introduction

3.1 System topology diagram

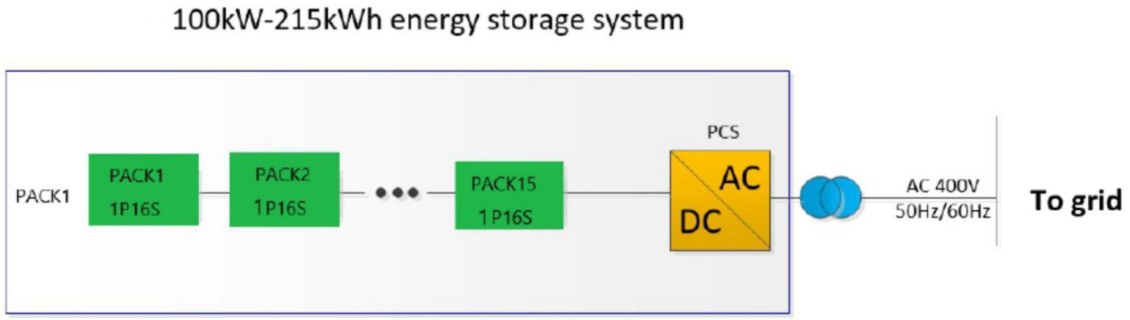


Figure 3-1 System Topology Diagram

Table 3-1 System parameters

NO.	Items	Specification
System parameters		
1	Nominal capacity	215kWh
2	Nominal output power	100kW
3	MAX charging and discharging current	160A
4	Design life	20 years
5	Degree of protection	IP54
6	Application environment	outdoor
7	Dimension（W*H*D）	1600*2154*1350mm
8	Weight	≈3000kg
9	Fire protection system	Aerosol + Pack + Level immersion + Active warning
10	Certified	Confirms to UN38.3 / IEC62619 / CE standard
DC parameters		
11	DC maximum current	192A
12	Nominal DC power	100kW
13	Voltage regulation accuracy	≤±2%
14	Steady current accuracy	≤±5%
15	Pressure limiting characteristics	Possess
16	Current limiting feature	Possess

AC parameters（on-grid）		
17	Nominal voltage	400V
18	Nominal output current	145A
19	AC access method	3+N+PE
20	Isolation method	Without
21	Grid voltage range	400V(-20%～+15%)
22	Grid frequency range	50Hz/60Hz±2.5Hz
23	Total Harmonic Distortion Rate of Current	≤3%(full of load)
24	Power factor	-0.99～+0.99
25	DC component of current	≤0.5%
26	On and off-grid switching time	＜100ms
AC parameters（off-grid）		
27	AC off-grid voltage	400V
28	AC voltage range	400V±3%
29	AC off-grid frequency	50Hz/60Hz
30	Off-grid output THDU	≤3%(linear load)
31	Unbalanced load capacity	100%

3.2 product component

Table 3-2 Main component configuration list

NO.	Components	Specification	Unit	Quantity	Remark
1	Battery module	51.2V 280Ah	pcs	15	
2	High voltage box	/	pcs	1	
3	Energy storage converter	100kW	pcs	1	
4	Battery cluster	768V 280Ah	set	1	215kWh capacity per cluster
5	EMS	/	pcs	1	
6	Outdoor cabinet	/	pcs	1	
7	Firefighting	/	set	1	Including emergency alarm system and fire protection system
8	Air conditioner	/	pcs	1	Refrigeration capacity 3000W
9	Illumination	/	set	1	
10	Accessories	/	set	1	

- **Energy storage converter**

This product is a modular converter product specially designed for distributed energy storage systems, with a rated power of 100kW. It is the core power conversion unit in the energy storage device. It can be used with various types of batteries to meet the needs of different application scenarios, and the installation and use are flexible.

- **215kWh air-cooled battery cluster**

Integrate high-quality and high-cycle LFP cells, and the cycle number is >6000 times under 0.5C discharge. At the same time, it has a dual protection BMS, with a single-point failure diagnosis coverage rate of ≥99%, and a potential failure diagnosis coverage rate of ≥90%, ensuring that the high-voltage circuit can be disconnected in time under abnormal conditions.

- **EMS**

It supports functions such as data collection, protocol conversion, energy management, lightweight edge computing, and screen display. Combined with Topband lithium battery cloud management platform, functions such as power statistics, revenue calculation, intelligent operation and maintenance, alarm analysis, and refined management can be completed. It can be perfectly applied to scenarios such as comprehensive management of Taiwan areas, industrial and commercial energy storage, integration of storage and charging, and wind-solar-storage micro-grid.

- **Firefighting/Air conditioner**

The distributed energy storage system integrates the measurement and automatic protection of temperature and humidity, and also has functions such as monitoring, fire protection, and auxiliary power supply, making unified management more convenient.

- **Outdoor cabinet**

As the carrier and platform of the distributed energy storage system, the outdoor cabinet ensures the adaptability of the energy storage system to various complex environments. Designed according to IP54 protection level, it can be used normally in complex outdoor environments. The structure is flexible in deployment and convenient in operation and maintenance. The strength of the cabinet is designed according to the analysis of dynamic and static loads. It is equipped with an independent heat dissipation air duct and a heat insulation layer design to ensure the heat preservation and heat dissipation performance of the device.

3.3 Product features

- With a standard capacity design of 215kWh, it can be flexibly expanded in parallel to meet various capacity demands.
- With CAN communication, RS485 communication, Ethernet communication interface, to meet different customer needs.
- The PCS adopts a series product, and there is no battery parallel design, which effectively improves the overall system life.
- Dual power supply to meet the load black start.
- Perfect thermal management and automatic fire extinguishing system, online battery equalization technology and control strategy to ensure battery life and improve system reliability.
- A set of equipment can solve peak load shaving, backup power supply, transformer dynamic capacity increase, improve power quality, and solve power flow problems.

4、Product introduction

4.1 Conditions of use

4.1.1 Normal use environment conditions

- Ambient temperature: normal working environment temperature -20℃～+55℃, storage temperature -25℃～+55℃.
- Ambient air pressure: Working environment air pressure 79.5kPa～106kPa.
- Altitude: 3000 m without derating. When the altitude exceeds 3000 m and the working environment temperature exceeds the maximum limit, it meets the GB/T 3859.2-1993 standard.
- Relative humidity: 0% to 95%, non-condensing.
- Working position: vertical installation, the maximum slope is not more than 5°.
- The place of use should have facilities to prevent wind, sand, rain and snow; no corrosive gas; no explosive gas environment.
- Vibration requirements: strong vibration and impact are not allowed.

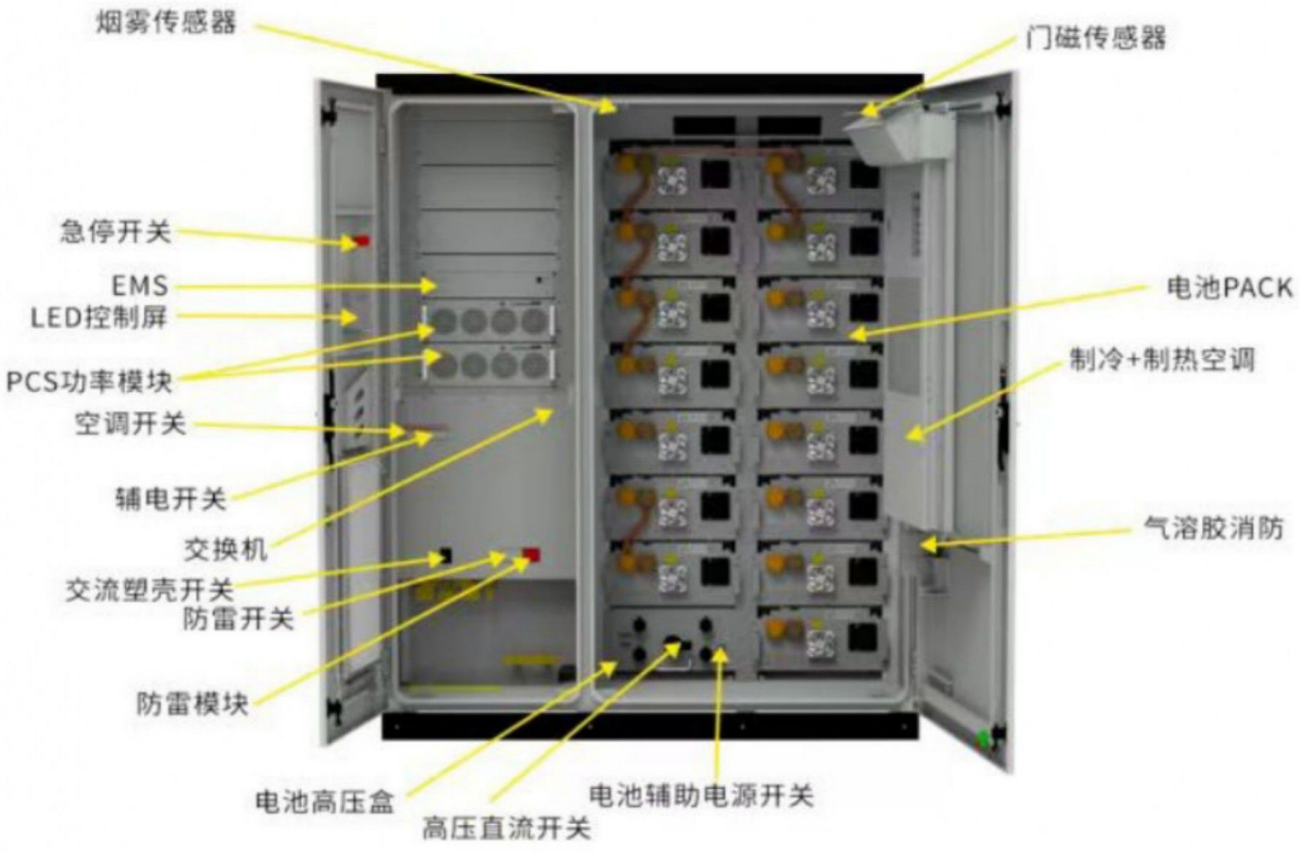
Note: Other special occasions and environmental conditions can be customized.

4.1.2 Normal use electrical condition

- The distributed energy storage system is allowed to operate in a normal way under the following grid conditions.
- The harmonic voltage of the public grid does not exceed the limit specified in GB/T 14549.
- Three-phase voltage unbalance does not exceed the limit specified in GB/T 15543.
- Grid frequency deviation does not exceed the limit specified in GB/T 15945.
- The voltage deviation should be within the range of -10% to +15%.

4.2 Structural appearance

This system mainly includes energy storage converters, battery clusters, EMS systems, power distribution systems, fire protection, air conditioning and other equipment. The product shape is shown in the figure below:



4.3 EMS introduction

The EMS system supports the integrated design of data acquisition, protocol conversion, energy management, lightweight edge computing and screen display. Combined with the cloud management platform, functions such as power statistics, revenue calculation, intelligent operation and maintenance, alarm analysis, and refined management can be completed. Application scenarios: comprehensive management of Taiwan area, industrial and commercial energy storage, integration of storage and charging, wind-solar-storage micro-grid.

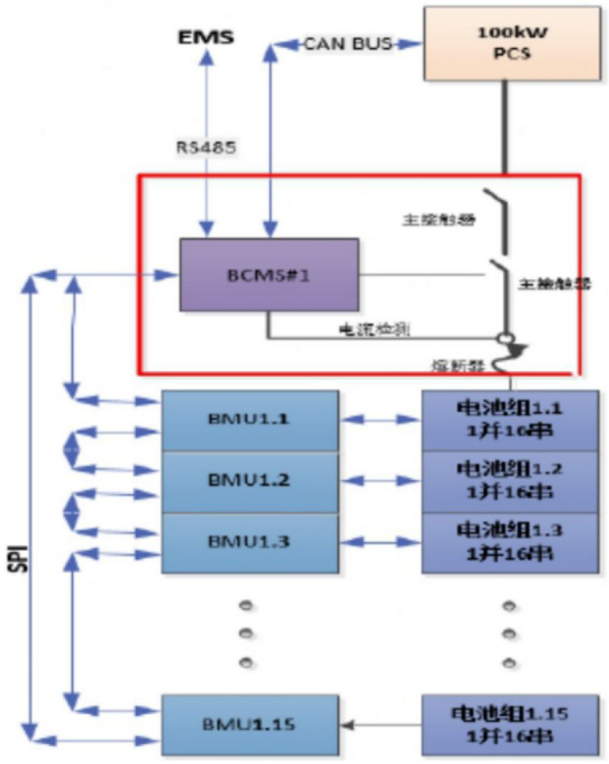
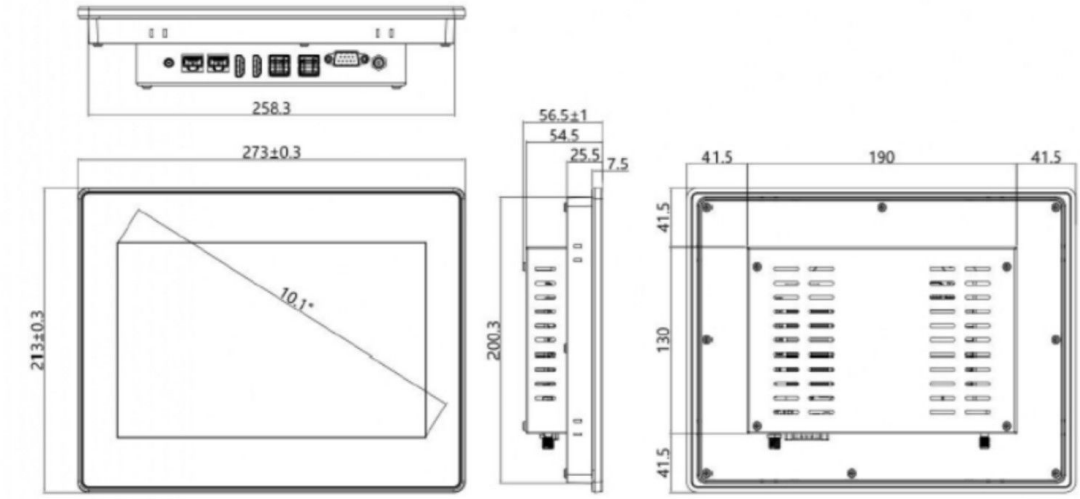


Figure 4-2 System communication architecture diagram

Table 4-1 EMS parameters

Module	Item	Parameters
I/O interface	USB * 4, RJ45 * 2, RS232 * 1, SMA antenna interface * 1, HDMI * 2, power supply * 1	
Display	Size	10.1 inches
	Resolution	1024*600
	Form	4-wire industrial resistor touch screen
	Luminance	350cd/m^2
Material	Installation method	Embedded
	Dimensions (W*H*T)	273*213*54.5mm
	Weight	1560g
Characteristic	Operating temperature	-10℃～60℃
	Storage temperature	-20℃～70℃
	Ambient humidity	10~90%RH,non-condensing
	IP degree of protection	IP65



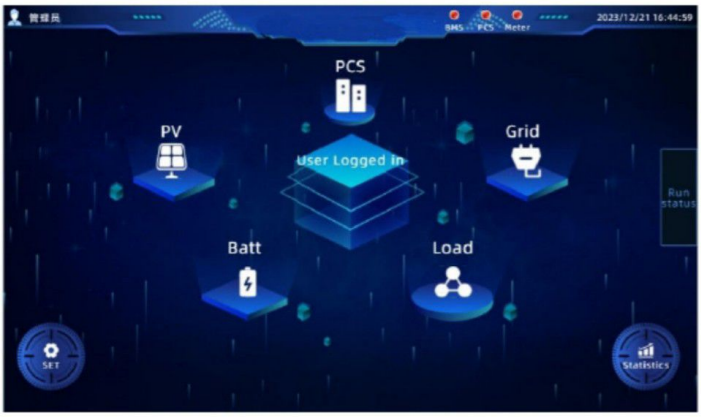


Figure 4-3 Display screen

4.4 Cabinet Introduction

During the design and manufacturing process of this system, the influence of all possible environmental conditions on the operation of the equipment is fully considered, and a number of corresponding measures are taken to ensure the safe and stable operation of the equipment in the project location. The overall protection level of the cabinet is IP54.

This system has good anti-salt spray, anti-humidity, anti-corrosion, fire-proof, anti-strong rainfall, waterproof, anti-typhoon, dust-proof (air inlet), shock-proof, anti-theft, anti-ultraviolet and other functions to ensure that the cabinet will not be damaged by salt spray. , Anti-humidity, anti-corrosion, fire prevention, anti-heavy rainfall, waterproof, anti-typhoon, dust-proof (anti-wind and sand), anti-shock and other factors fail.

Dust-proof

The air inlet and outlet of the cabinet and the air inlet of the equipment are equipped with standard ventilation filters that can be easily replaced. At the same time, it can effectively prevent dust from entering the interior of the energy storage cabinet when encountering strong wind and sand blowing.

The air vent of the cabinet should be equipped with a windproof elbow to improve the waterproof and sandproof ability, and a stainless steel insect net should be installed at the bottom of the elbow. It does not affect the dustproof effect under the condition of satisfying the heat dissipation.

Moisture-proof

The cabinet is equipped with a moisture-removing device, which will automatically detect the humidity inside the cabinet. When the humidity is ≥ 85%, the dehumidification device will be activated, and when the humidity reaches or ≤ 75%, the device will stop working, which can avoid condensation of internal components.

Heat preservation

The inner wall of the cabinet is thickened and heat-insulated around and inside the top. Equipped with cold/warm industrial air conditioner, it can heat the battery room at low temperature and cool the battery room at high temperature. The PCS equipment room adopts forced air cooling to dissipate heat, and is equipped with heating equipment to heat the equipment room at a low temperature. In a low temperature environment, the energy storage system needs to supply power normally to ensure the normal operation of the auxiliary heating system and maintain a constant temperature in the cabinet.

Anti-seismic

The anti-seismic function ensures that the mechanical strength of the energy storage cabinet and its internal equipment meets the requirements under transportation and earthquake conditions, and there will be no deformation, abnormal function, and operation failure after vibration.

Life

The design life of the energy storage box is 25 years, of which, the anti-corrosion function guarantees that the mechanical the strength and corrosion degree meet the requirements of actual use, and the protection level is not less than IP54 (GB4208-2008).