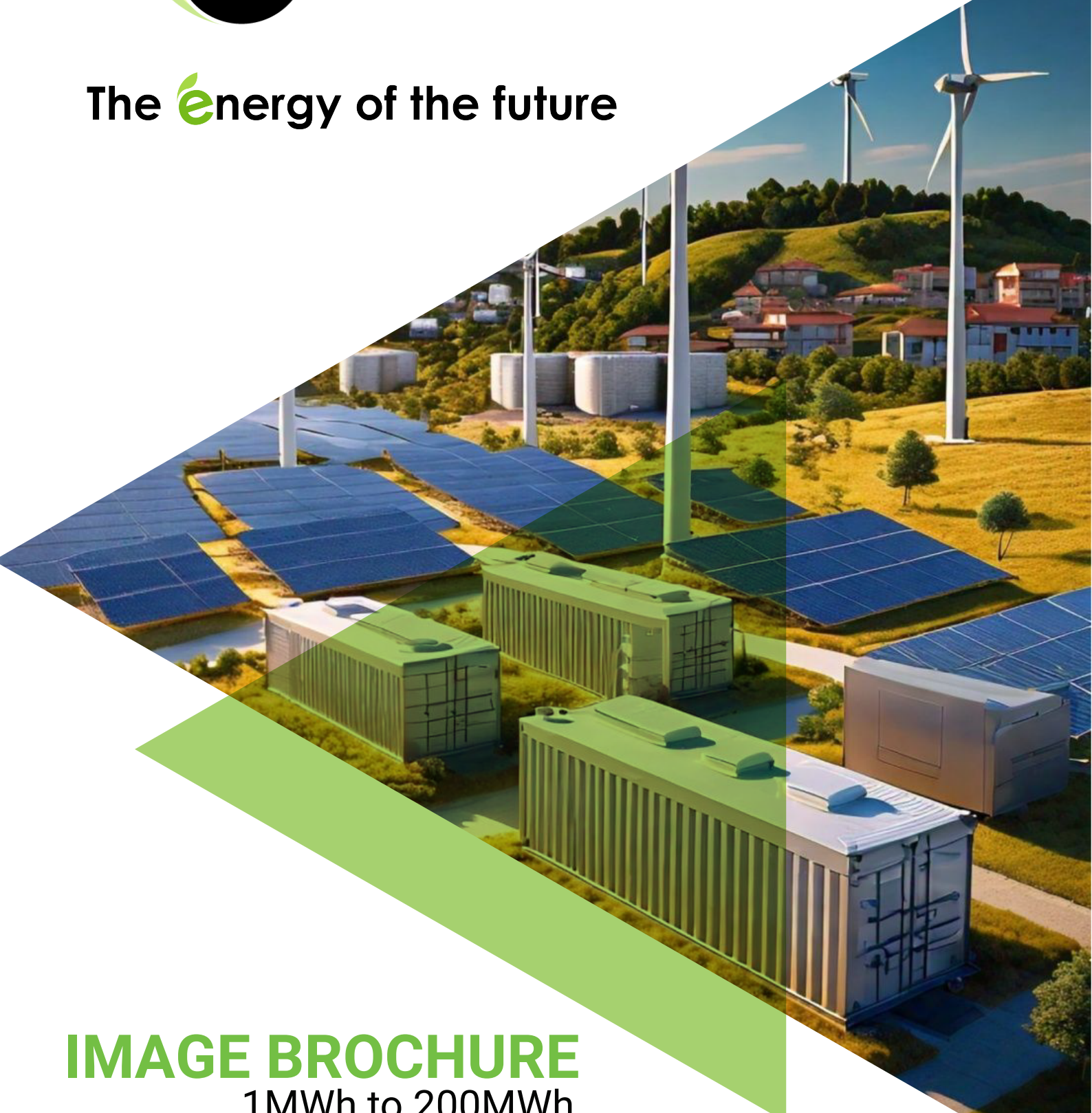




2024-25



The **e**nergy of the future



# IMAGE BROCHURE

1MWh to 200MWh

We believe in sustainability while delivering our services.



Team Work



Research



Implementation



# OUR TEAM & TECHNICAL EXPERTS

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## **AAZIB KHAN** Managing Director

A strategic thinker, visionary professional with 24+ years of rich experience for multiple business fields. Expert in Renewable Energy, Energy Storage Solution, Battery Packs, Electric Vehicles, Solar / PV, Distribution Industry, Consumer Electronics, Consumer Durables, Home Appliances across UK, EU, Africa, Middle East, GCC, South Asia and North African territories.

## **LUO XIN** Sales Director, ESS

Luo is a motivated battery technology expert, worked within the motive power battery solutions industry for over 10 years. He is a true professional that's not afraid to get his hands dirty to help with an install and give the best possible service to our clients. Luox has worked with the worlds leading battery and cell suppliers and is best placed to find the most suitable application for your needs.

## **AREED ALEX** Sales Director, BP

Areed is a mechanical engineer who has worked in the high voltage electrical and metallurgical distribution industry for over 25 years. Alex is also a city & Guilds accredited installation and commissioning engineer for EV charging solutions and can advise on electrical designs for EV charging. Areed is also a member of the REA which comes under DIT and his expertise are verified and authentic when comes to Energy storage or Lithium Ions.

## **MRS. M. ZULFIQAR** Coordinator

Pro-active personnel having multiple Admin experiences in the organizational atmosphere. Co-ordination is the unification, integration, synchronization of the efforts of group members so as to provide unity of action in the pursuit of common goals. It is a hidden force that binds all the other functions of management and Mrs Iram is the expert in our team.



THE BATTERY OF THE FUTURE

# Introduction

ECO ESS offers highly efficient Energy Storage Solution (ESS) in the UK, EU, African markets and in surroundings which would contribute substantial value to the economy and society. Our Multi-Megawatt containerised solutions are 15/25-year systems and priced to beat all.

The ideal solution for ALL renewable energy projects of a storage nature. WE ALSO TAILOR SOLUTIONS TO SUIT YOUR SCHEME.

ECO ESS has identified the potential for fast-moving products which should lead to saving energy, reduce electricity bills/cost, and CO<sub>2</sub> emission and pull towards mass job creations and growth into the national and international markets.

ECO ESS would supply and provide a complete support package to their potential partners and keep a presence on-line and off-line through various distribution models for a B2B business, with the aim of achieving quicker growth.

We support our customers on their individual journeys toward decarbonization with customized needs of their ESS. We push the transition to a more sustainable energy world. Our products, solutions, and services cover nearly the entire energy value chain. We have Know-how, innovative technologies. We turn ideas into reality. From R&D to designing, from manufacturing to deliveries, from installation to warranty are ECO ESS prime tasks – you feel free and relax by assigning us your job which would be in technical and innovative hands i.e., ECO ESS Ltd UK

## VISION

We are committed to utilize and sustain green energy sources to play our role for the global cause of CO<sub>2</sub> emission-free world.

## MISSION

Lead the world in employing innovative energy and engineering solutions to sustainably manage the Earth's resources and to meet society's needs.



# ECO Power - D20 BESS

Function Safe, Certification Proof, and Efficiency Based System Portfolio



# ECO Power - D20 BESS



ECO Power-D20, a product developed by ECO ESS, is a prefabricated large-scale energy storage system, which is tailor-made for renewable energy power plants and national grid-related applications. It consists of sets of standard D138 battery strings and is equipped with fire protection and electrical units complying with international related standards. An environmental control system is also built in the container, which increases the service life of the battery system. Intelligent battery management technologies are leveraged to improve the safety of the system in its lifespan.

## Areas of Application

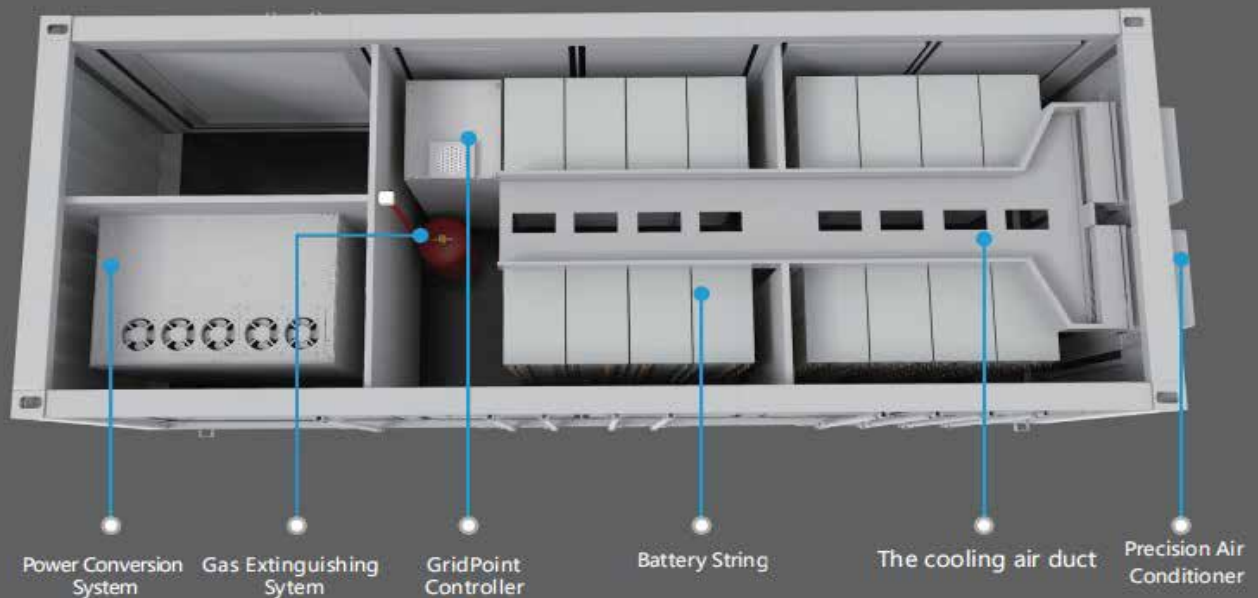
Frequency regulation  
Renewable energy load arbitration  
Utility and Large C&



## Product features

- Supports on-grid/off-grid operation.
- High-rate discharge capability and stable discharge curves.
- Enables access from third-party SCADA
- Full integration of the physical layer, network layer, and application layer, to ensure the stable and reliable operation of the system.
- Enables cloud-based dispatch and promotes economic operation.
- Enables active/passive balancing.
- IP54 and high adaptability to the environment.
- RTU based control technologies, to ensure all subsystems compatibility and to reduce the probability of a single point of failure.
- Adopts a modular design that is easy to update, expand and maintain, reducing the time needed for maintenance.

# System Configuration



## Technical Specifications-Data Sheet

String QTY	Nominal capacity (kWh)	Rated voltage (V)	Discharge cut-off voltage (V)	Charge cut-off voltage (V)	Weight (kg)
5	691.2	768	672	852	20,710
6	829.4	768	672	852	22,140
7	967.7	768	672	852	23,570
8	1,106	768	672	852	25,000

## Key Components



### Battery String-D138



- 0.5C Charge/Discharge;
- The power supply can be a single battery string or parallel battery strings;
- Easy configuration and maintenance;

Item	Data
Battery module	D138-15P9
Pack QTY	15 (6~15 Configurable)
Nominal capacity	138kWh ( 55~138kWh)
Discharge cutoff- Rated- Charge cutoff voltage	672V~768V~852V
Cell	3.2V/90Ah
String measuring voltage range	100~1,000V
String voltage detection accuracy	±0.5%
String voltage sampling period	100 ms
String measuring current range	±300A
String current detection accuracy	1%
String temperature detection accuracy	±3°C
SOC calculation accuracy	< 7%
Input insulation resistance	≥10MΩ, 1,000V DC
Communication	Ethernet、 CAN、 RS485
System cycle life	>5,000 cycles@0.5C, 25°C
Dimensions (W*D*H)	800*750*2,050mm
Weight	1,350 kg

### GridPoint Controller



Item	Data
Dimensions (L*W*H)	600*750*2,050mm
Protection Level	IP20
Operating temperature range	0°C~40°C
Humidity	0~95% (non-condensing)
Memery	64M RAM 128M
Power Consumption	<100W
HMI	15• •LCD touch screen
Backup Time	30 minutes (optional)
Grid control application	Time shifting, peak shaving, renewables moving average
Offgrid control application	Backup power, PV/DG/EV/ESS integrated micro-grid contro



## Power Conversion System



- Single-stage three-level modularization;
- Multi-branch input to reduce battery series and parallels connection;
- With STS on/off-grid seamless switching can be realized;

Item	Data
Battery voltage range	600~900V
DC max current	873A
AC output voltage	380V (±10% configurable)
AC output current	760A (short term overload 836A max)
Nominal AC output power	500kW
AC max power	550kW
Output THDu	≤2%
AC frequency	50/60Hz
AC PF	Actual: 0.1~1 leading or lagging
Overload capability	105%~115% 10min; 115%~125% 1min; 125%~150% 200ms;
Cooling	Forced air cooling
Noise	70dB
Max elevation	3,000m/10,000feet (> 2,000m/6,500 feet derating)
Operating ambient temperature	-20°C~50°C (De-rating over 45°C)
Dimension (W*H*D)	1,100×2,160×800mm
Weight	600kg
Installation	Floor standing
Peak efficiency	98.2%
Protection	OTP, AC OVP/UVP, OFP/UFP, EPO, AC Phase Reverse, Fan/Relay Failure, OLP, GFDI, Anti-islanding
Configurable protection limits	Upper/Lower AC Voltage/Frequency limit, Battery EOD voltage.
AC connection	3-Phase 3-Wire
Communication	RS485,CAN,Ethernet
Isolation	Non-isolation
Certifications	CE LVD , IEC62477, CE EMC, IEC61000, G59



# System Technical Specifications



DET Power- D 20	Item	Specification
DC Data	Cell type	Prismatic LFP
	Cell brand	EVE
	Cell life cycle	5,000cycles@ 0.5C,25°C
	Cell spec	3.2V/90Ah
	String configuration	2P240S
	Number of strings	5~8
	String rated energy capacity	138kWh
	DC rated energy capacity	1,106kWh
	Rated voltage	768V
	Voltage range	672V~852V
	BMS communication interface	RS485, Ethernet
	BMS communication protocol	Modbus RTU, Modbus TCP
	AC Data	Rated AC power
Maximum AC power		550kW
Rated AC voltage		400V
Grid incoming voltage range		340V~460V
AC PF		0.1~1 leading or lagging
Power factor correction		1 leading~1 lagging
Nominal grid frequency		50/60±2.5Hz
Isolation method		3 Phase 4 Line Transformer
General Data	Dimension w/o clearances (L*W*H)	6,058*2,438*2,591mm
	Weight of the whole system	<25MT
	Degree of protection	IP54
	Operating temperature range	-20~40°C
	Relative humidity	0~95% (non-condensing)
	Max working altitude	3,000m/9,842ft
	Cooling concept of DC hatch	HAVC
	Cooling concept of PCS hatch	Forced air cooling
	Fire extinguisher system	HFC bottle group
	Communication interfaces	RS485, Ethernet, GPRS
	Communication protocols	Modbus RTU, Modbus TCP



# An Overview

## New Product Plan



The product was a new energy storage system based on lithium-ion battery designed/made by our company. In our plan, the 1MWh represented a basic unit. Moreover, the system could increase the capacity by parallel operation on the outputting DC side or AC side.

This energy storage system was an integrated industrial energy storage products which integrates lithium iron phosphate battery system, battery management system, thermal management system, fire protection system, grounding lightning protection system and power distribution system.

This products choosed lithium iron phosphate square battery that passed the relevant national inspection certification.

The energy and the charge-discharge power of single energy storage system was 1MWh and 250KW, respectively. Specifically, the system could be divided into six 580V288Ah clusters that used in parallel, and the total power of the subsystem is 1MWh.

The subsystem was equipped with 40-foot container, including built-in battery system and PCS system

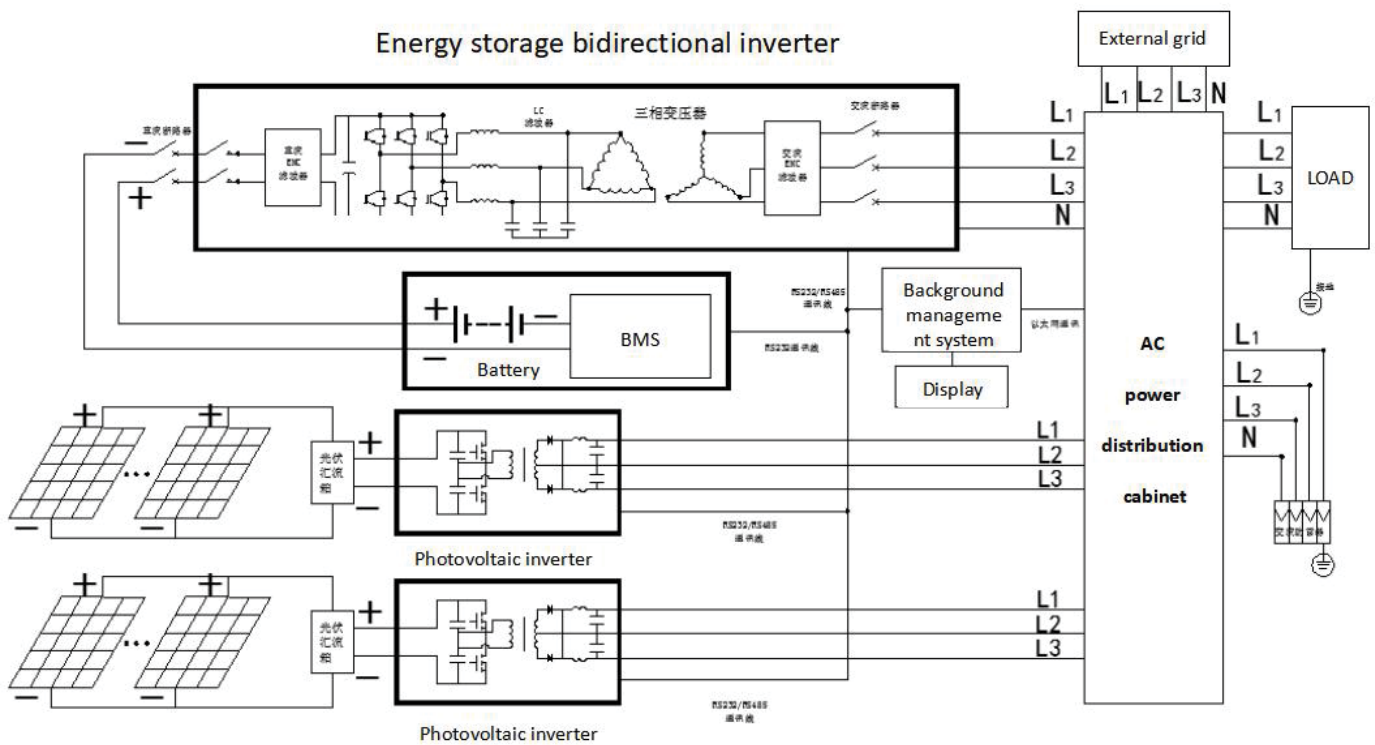
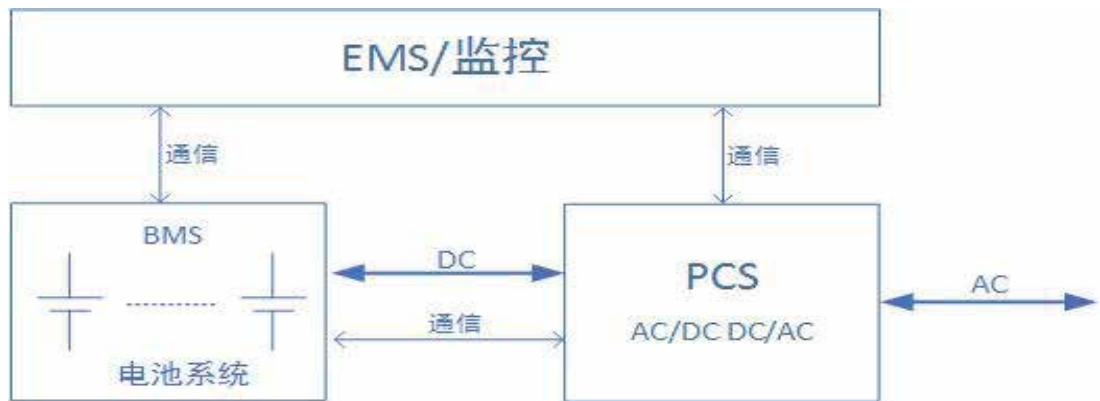




# An Overview

## Electrical Principle

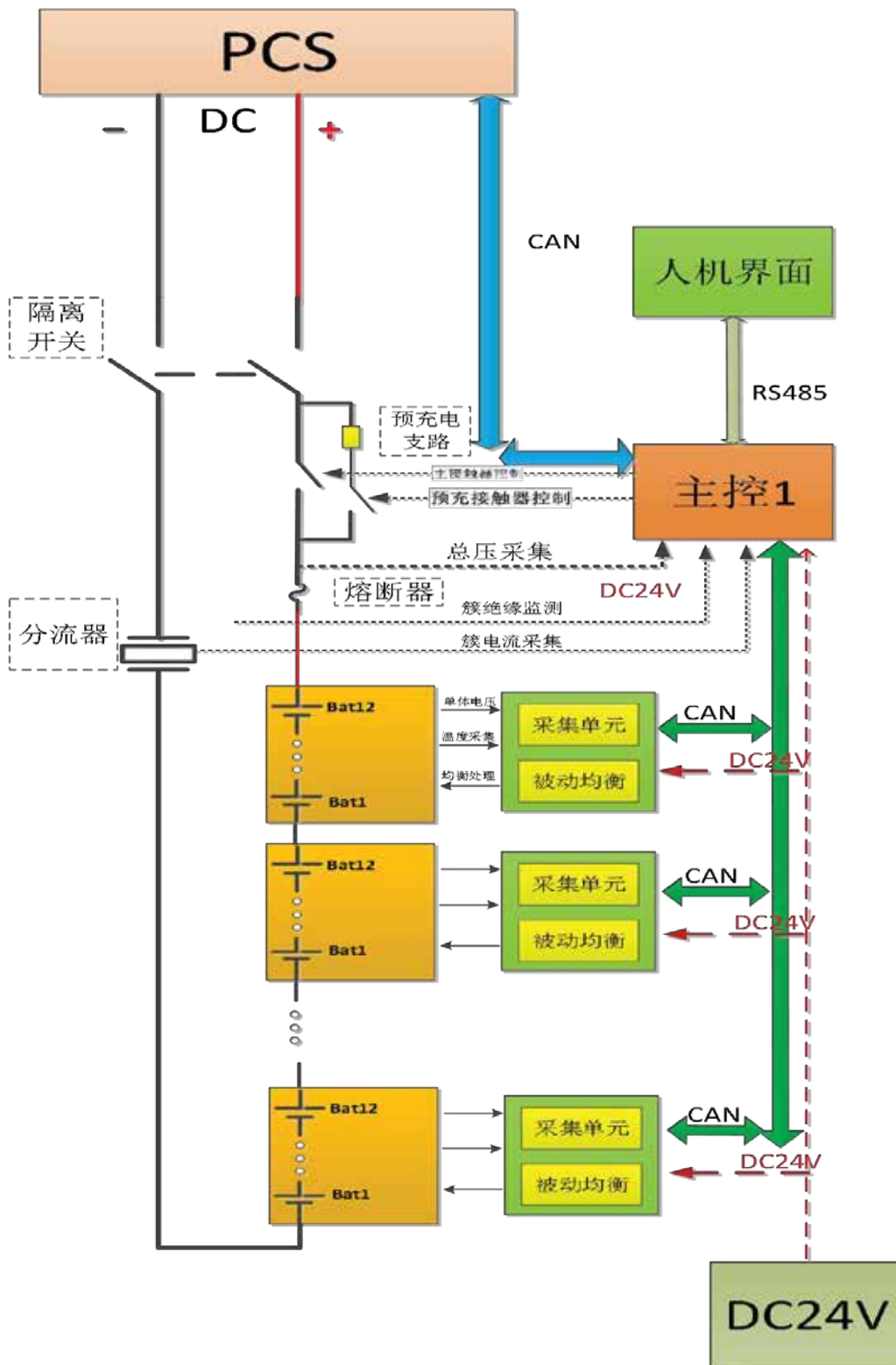
This product was a megawatt energy storage system that contained battery system (including BMS), bidirectional PCS, EMS, etc





# An Overview

## Electrical Principle

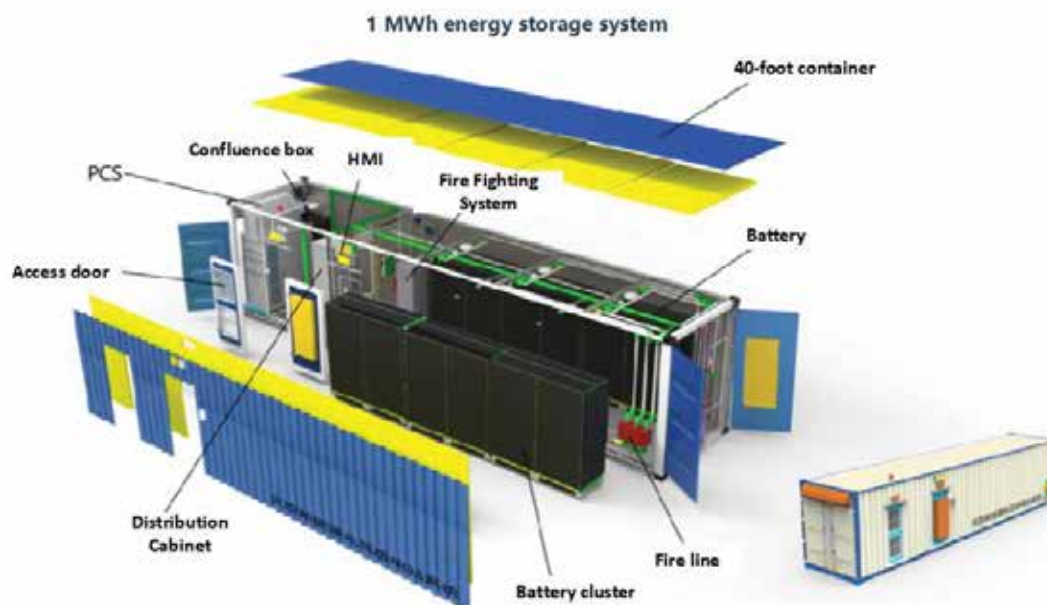




## Specification Parameters

NO.	Project	Parameter	Remarks
1	System rated voltage	580V	3.2V, 181S
2	System rated capacity	1724Ah	72Ah*24P
3	System power	1MWh	
4	Parallel mode	Subsystem output AC side	
5	System charging power	≤250KW	Adjustable according to configuration
6	System discharge power	≤250KW	Adjustable according to configuration
7	System operating voltage range	452.5~660V	2.5~3.65V Adjustable
8	System battery cluster number	6 clusters	
9	Recommended SOC use range	10%~90%	
10	PCS	250KW	
11	System monitoring	BMS	
12	Energy management	EMS	
13	Thermal management requirements	air conditioning	
14	Fire extinguishing system	Heptafluoropropane	
15	monitoring system	Have	
16	Weight	20T	
17	Size	12192*2438*2896mm	40-foot container high cabinet
18	range of working temperature	-20°C ~ 55°C Discharge temperature	environment temperature ≤85%RH

## D-1 Schematic diagram of 1MWh energy storage system



Schematic diagram of 1MWh lithium ion battery energy system



## D-2 Product Composition



Battery module



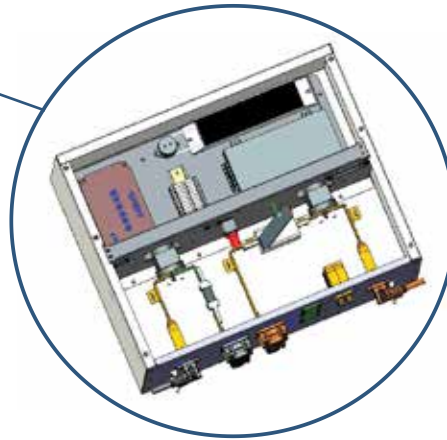
Battery box unit



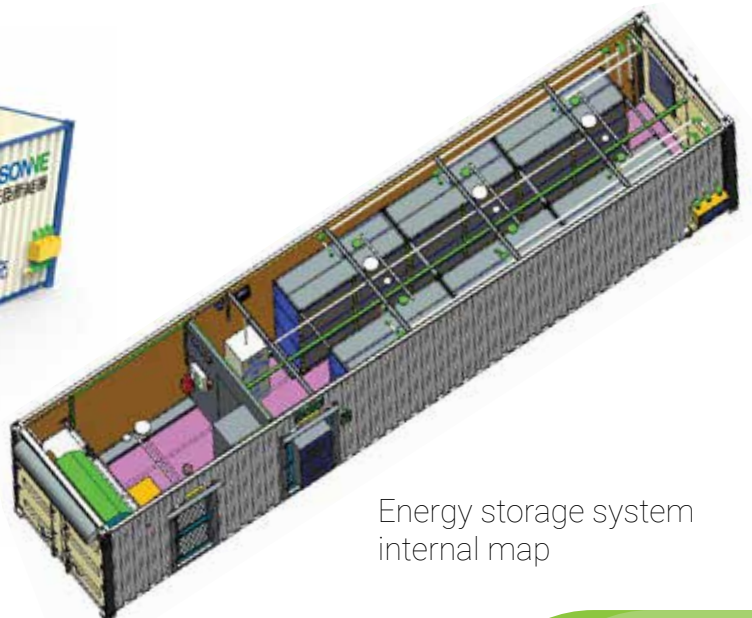
Battery cabinet



Battery cluster



Energy storage system appearance



Energy storage system internal map

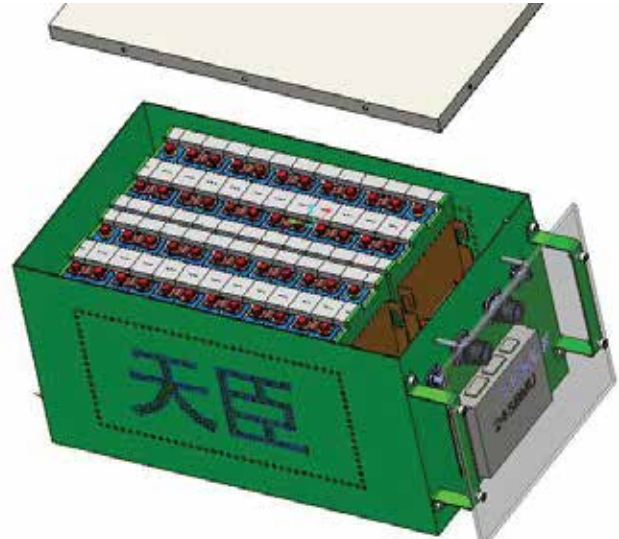


## D-3 24-string battery module box introduction

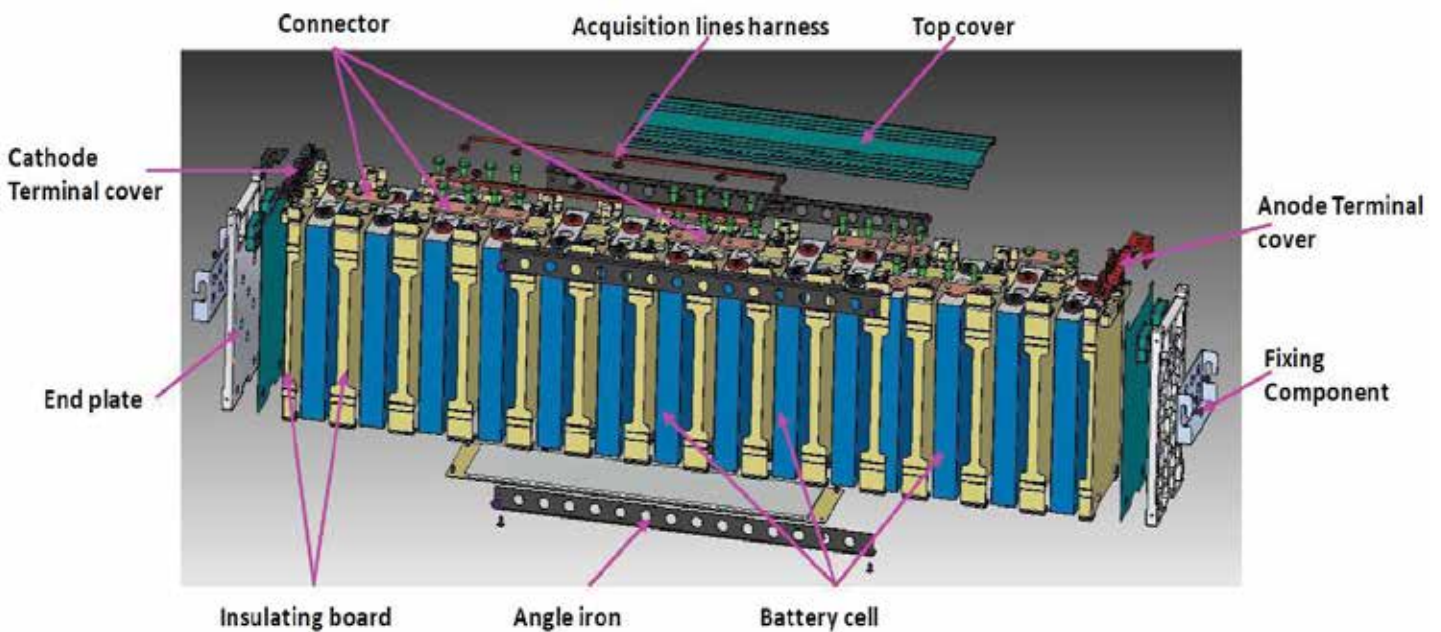
24S module battery box



24S battery pack internal diagram



## D135FA Pre-fabricated Battery Pack



12S battery module

Power:	2.765KWh
Rated voltage:	38.4V
Rated Capacity:	72Ah
Weight:	23.9Kg
Energy Density:	115.7Wh/Kg



## D-4 Battery and module parameter table

L135F72		Item	Data
		Battery Cell	L135F72
		Chemistry	LEP
		Dimension (mm)	29 x 135 x 221
		Normal capacity (Ah)	72
		Normal Voltage (V)	3.2
		Weight (KG)	1.75
		Energy density (Wh/Kg)	132
		Power Density (W/L)	2000
		Packaging material	Aluminum
D135FA		Item	Data
		Battery Moduel	D135FA
		Typical Example	(1P12S)
		Dimension (mm)	390 x 142 x 241
		Normal capacity (Ah)	72
		Normal Voltage (V)	DC38V
		Weight (KG)	24.7
		Energy density (Wh/Kg)	112
		Power Density (W/kg@10s)	1300
	Thermal resistivity(K/W)	$1.2 \times 10^{-2}$	





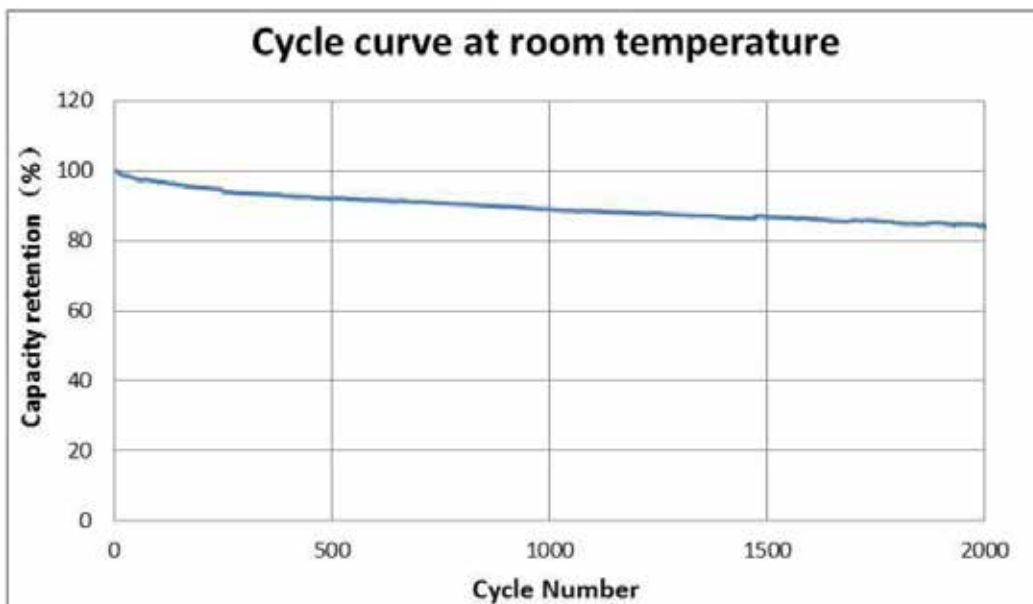
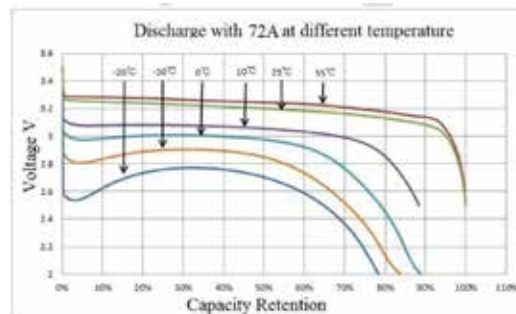
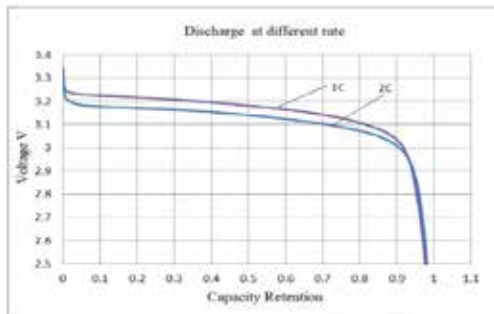
## D-5 Battery technical parameters

Maximum pulse charging current and duration allowed under different SOC and temperature conditions

SOC	Battery temperature				
	$\leq -5^{\circ}\text{C}$	$-5\sim 0^{\circ}\text{C}$	$0\sim 10^{\circ}\text{C}$	$10\sim 23^{\circ}\text{C}$	$23\sim 50^{\circ}\text{C}$
> 90%	Not allowed	Not allowed	Not allowed	1C/5s	1C/10s
> 80%	Not allowed	Not allowed	1C/s	1C/10s	1.5C/10s
> 70%	Not allowed	1C/5s	1C/10s	1.5C/10s	2C/10s
< 70%	Not allowed	1C/10s	1.5C/10s	2C/10s	2C/10s

Charge current limit at different temperatures

Battery temperature range	$< 0^{\circ}\text{C}$	$0\text{-}5^{\circ}\text{C}$	$5\text{-}10^{\circ}\text{C}$	$10\text{-}45^{\circ}\text{C}$	$> 45^{\circ}\text{C}$
Allow maximum charging current	0	0.1C	0.5C	1.0C	0

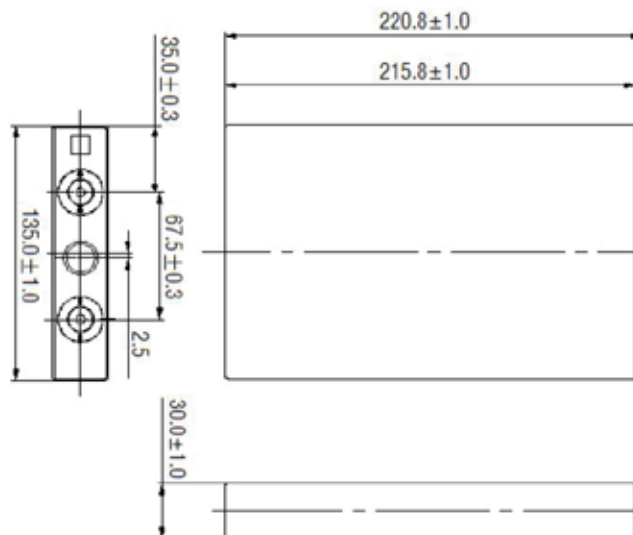




## D-6 Battery parameters and battery pack weight

Project	Parameter	Remarks
Rated Capacity	72Ah (1C discharge)	
Rated voltage	3.2V	
Battery internal resistance	0.1~0.5mΩ	30%SOC
Discharge termination voltage	2.5V±0.05V	
Charge upper limit voltage	3.65V±0.05V	
Standard charging current	0.2C	
Fast charging current	1C	
Standard discharge current	1C	
Fast discharge current	2C	≤3Min
Battery weight	1.78±0.1Kg	
Cycle life	2000次≥80% 0.5C charge @1C discharge	Room temperature
Battery size	L135mm*W30*H220.8mm	
Temperature	Charging temperature: 0 ~ 45°C	
	Discharge temperature: -20 ~ 55°C	
Storage temperature	Within 1 month: -20 ~ 45°C	
	Within 6 months: -20 ~ 25°C	
Storage humidity	< 70%RH	

## BATTERY SIZE CHART



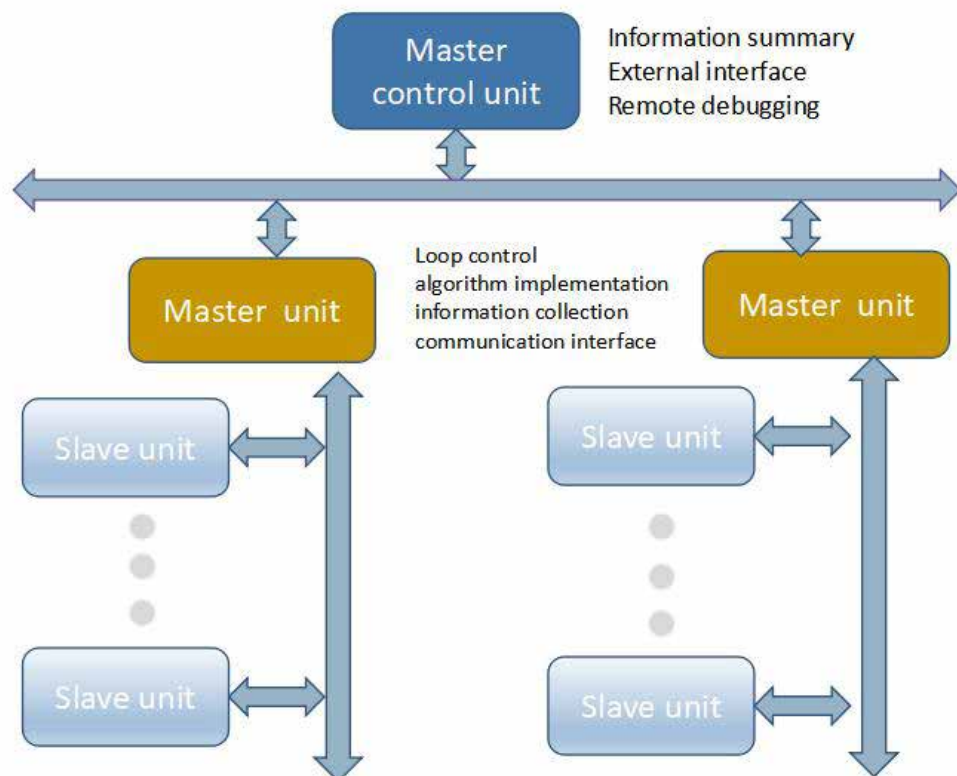


## E-1 Introduction of energy storage battery BMS management System

As the core component of the battery system, the Battery Management System (BMS) is the bridge between the battery pack and the external equipment, which determines the utilization of the battery. Its performance is critical to the cost and safety of the energy storage system. important. The BMS collects, processes, and stores important information during the operation of the battery pack in real time, and exchanges information with external devices to provide real-time alarm and protection during battery pack operation. BMS generally adopts multi-level distributed architecture design. According to different energy storage systems, two-level or three level architecture schemes are adopted respectively. The system consists of master control, master control and slave control unit.

The XNS1 series power battery management system is the latest generation of energy storage battery management system independently developed by the company according to the application characteristics of the energy storage system. The system is mainly composed of the main control unit (three-level architecture) (XNS1\_BTU), the main control unit (XNS1\_BCU), and the slave system. The control unit (XNS1\_BMU) and the corresponding wiring harness are composed. The system has the characteristics of wide function coverage, small size, strong anti-interference performance, safety and reliability.

# BMS SYSTEM SCHEMATIC

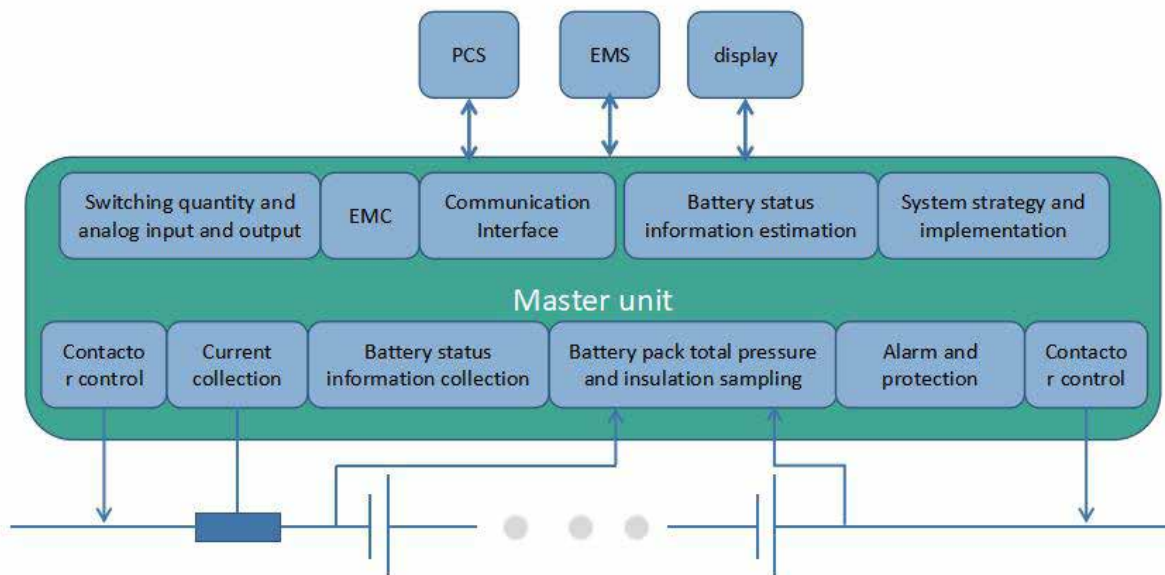




## E-2 Introduction of BMS main control unit

The main control unit is the control core of the battery management system. It communicates with the slave control unit to detect the voltage and temperature of the battery cell, and detects the external characteristic parameters such as the total voltage of the battery pack, the charge and discharge current, and the insulation resistance to the ground. According to the appropriate algorithm, the internal state of the battery (capacity, SOC, SOH, etc.) is estimated and monitored. On this basis, the charge and discharge management, thermal management, insulation detection, unit balance management and fault alarm of the battery pack are realized; Data exchange with devices such as PCS, EMS, and human-machine interface can be realized through the communication bus

# CONTROL SYSTEM APPLICATION DIAGRAM





## E-2 Introduction of BMS main control unit

# MAIN CONTROL UNIT INTERFACE & PARAMETERS

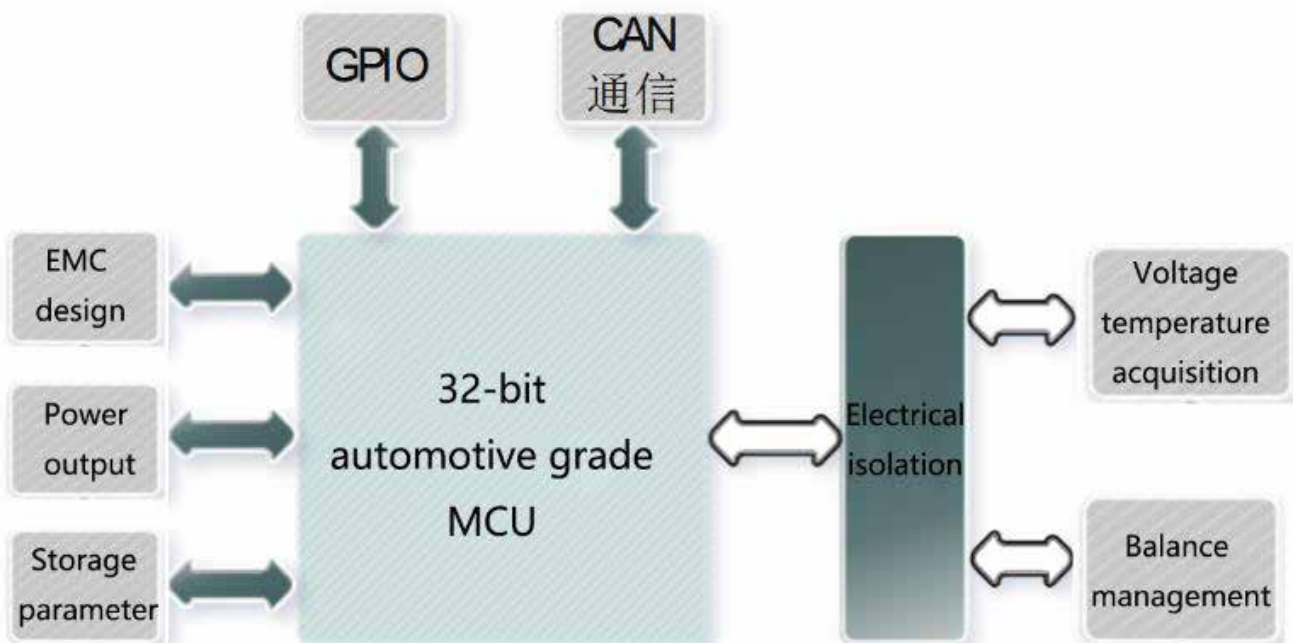
Name	Quantity	parameter	Minimum	typical	maximum	Description
Auxiliary power	2	Voltage	7.5V	24V	36V	From AC/DC or battery
		Current		0.4/0.2A		
Total voltage sampling	1	Voltage	0V	400V	900V	Total pressure, precharge When the voltage is 20~800V
		Precision		±1%FS	±1%FS	
Charge and discharge current sampling	1	Current	-500	0A	+500A	According to the shunt, Hall sensor model When charging and discharging >30A When charging and discharging 30A
		Precision		±1%FS	±1%FS	
				±300mA	±300mA	
Insulation resistance	1	Alarm error		±10%	±10%	
Digital input and output	6					Can be used for high voltage interlocks and address assignments, etc.
Analog input	7					For temperature, etc.
High side switch output	6	Voltage and current	-	1A	1.5A	V <sub>max</sub> =36V
CAN port	4					Four way
High voltage relay status detection	3					
RS485 port	1					Optional welding



## E-3 Introduction to BMS slave unit

The slave control unit is an important part of the energy storage battery management system (BMS), which plays a decisive role in the safety application and life extension of the energy storage battery pack in groups. The slave unit realizes real-time monitoring of the battery status by accurately collecting the voltage and temperature of each unit battery. The module has reliable data communication function, and communication with the battery management system main control unit or other necessary equipment can be realized during system operation. The design uses high-reliability automotive-grade control chips and utilizes the latest acquisition technology, which has high acquisition accuracy and provides a good physical basis for SOC estimation. Based on an in-depth study of the complex electromagnetic environment that may exist in the use of products, the electromagnetic compatibility design of the product is fully considered at the initial stage of design, using multiple power isolation schemes and high redundancy design, and undergoing rigorous EMC testing. High and low temperature testing, vibration and other tests ensure reliable operation of the product.

# SLAVE UNIT SYSTEM BLOCK DIAGRAM





# MAIN SLAVE UNIT

## TECHNICAL PARAMETERS

The main technical parameters		Minimum value	Typical value	Maximum	unit	Remarks
Low voltage power supply	Voltage	7.5	24	32	V	
	Current		0.15 /0.08		A	Increased output with dry contact by 50Ma/25mA
Use environment	temperature	-25		85	°C	
	Relative humidity	5		95	%	
	altitude			2000	m	
Insulation and withstand voltage	Insulation resistance	5			MW	Voltage sampling terminal and housing and digital interface
	Withstand voltage	50Hz 1500Vac between the voltage sampling end and the shell and digital interface, no breakdown for 1 minute, no flashover				
Single cell voltage	voltage range		3.3	5.0	V	
	Sampling accuracy	±5			mV	2V~5V,-25°C~65°C
Temperature sampling	temperature range	-40		140	°C	
	Sampling points		4 per 12 strings			Another unit internal sampling point
	Sampling accuracy		1	2	°C	
Power MOS output	Withstand voltage			30	V	
	Drive current			1	A	Short time 3A
Power consumption	Machine		0.72		W	



## F PCS selection and technical introduction



# 250KW TWO-WAY ENERGY STORAGE CONVERTER

Model	YLSES-400A250NT
AC side parameter	
AC access method	Three-phase four-wire (with isolation transformer)
rated power	250kW
Maximum capacity	275kVA
Rated grid voltage	400V
Voltage operating range	400+10%(Can be set)
Rated current	361Aac
Output overload capability	The AC side current should be able to operate continuously at 110% of rated current; at 120% of rated current, the continuous running time should be no less than 10 minutes. (ambient temperature 25 ° C)
Rated grid frequency	50Hz
Frequency Range	47.5—52.5 (Can be set)
Total current waveform distortion rate (THD)	<3% (rated power)
Power factor	0.9 (Advance) -0.9 (Lag)
DC side (battery) parameters	
rated power	250kW
Maximum stable operating power	250kW
DC voltage range	500V—800V
Maximum long-term running current	437A
Voltage regulation accuracy	±1%
Steady flow accuracy	±2%





## G Smart power station grid monitoring/Internet of Things technology

### Concept

Internet of Things refers to the connection and interaction of information between any time, anywhere, anyone, or anything. The Energy Internet of Things is the specific manifestation and application of the Internet of Things in the power industry; it is not only the transformation of technology, but also the improvement of management thinking and the innovation of management concepts. The Energy IoT connects power users and their equipment, grid companies and their equipment, power generation companies and their equipment, suppliers and their equipment, as well as people and things, to generate shared data for users, power grids, power generation, suppliers and governments. Provide socialized services; use the power grid as a hub, play a platform and share role, create greater opportunities for the development of the whole industry and more market entities, and provide value services. Energy Internet of Things can create a smart energy integrated service platform.

### Drainage

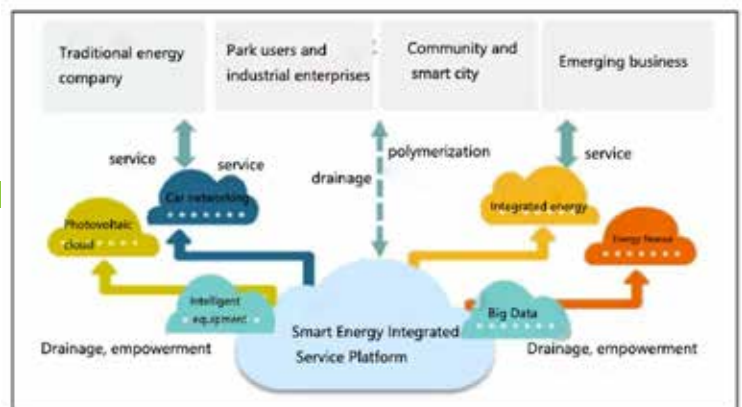
Based on grid services, it will build a comprehensive intelligent service platform covering the government, end users, and upstream and downstream of the industry chain, providing services such as information docking, supply and demand matching, and transaction matching, and will guide users for emerging businesses;

### Empowerment

Strengthen equipment monitoring, grid interaction, settlement management, customer service, empowering the grid and emerging business entities.

Energy Internet of Things can build an energy ecosystem Establish a mechanism Build a standard system that supports the entire industry chain and supports the interconnection of equipment and services; Promote transformation: integrate upstream and downstream industrial chains, restructure external ecology, stimulate industrial growth, and build an energy IoT ecosystem

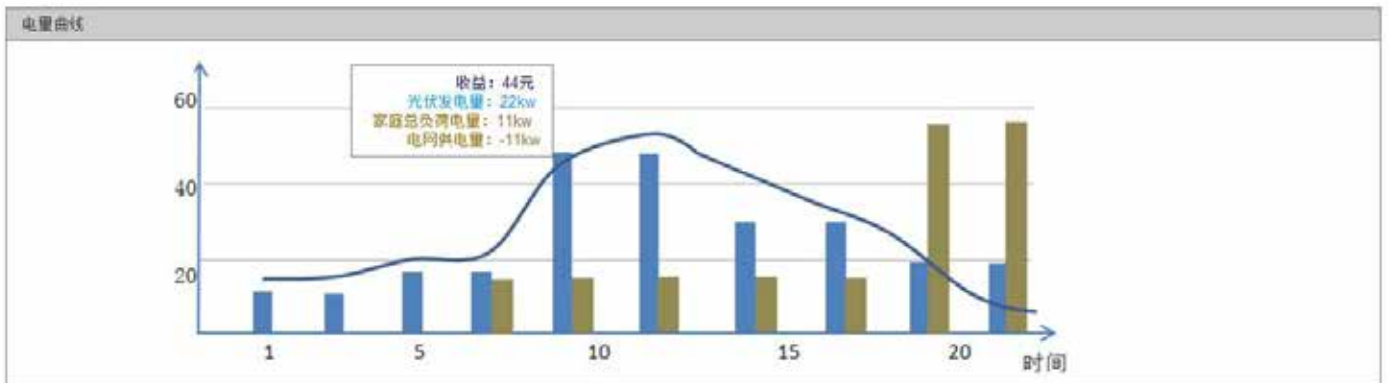
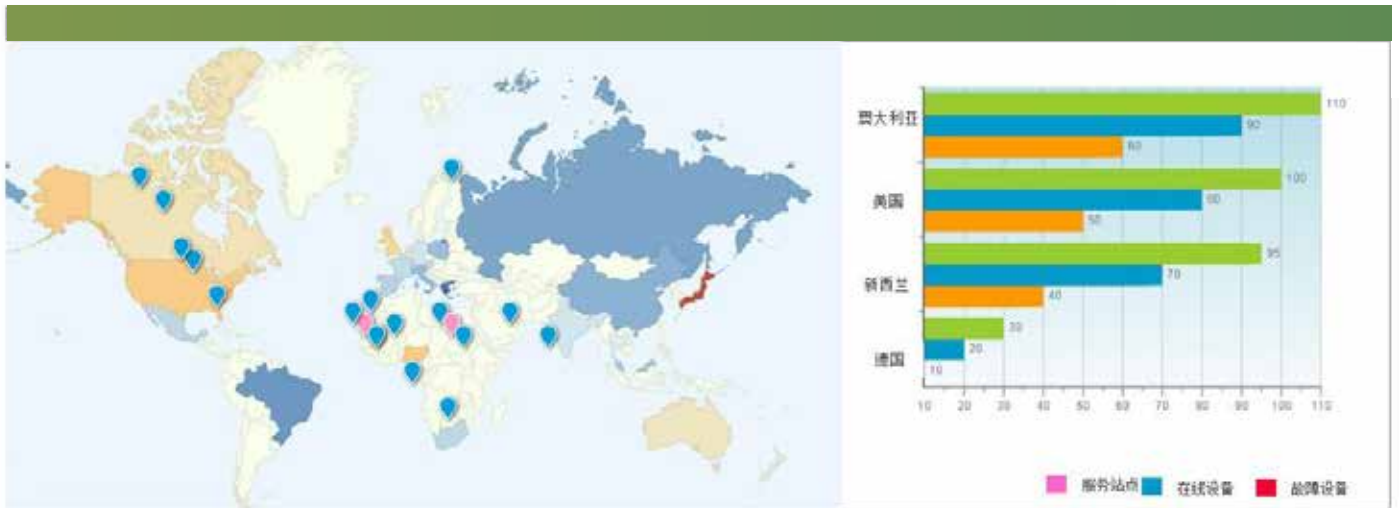
## SMART ENERGY INTEGRATED SERVICE PLATFORM





## Monitoring

电站概况		电力概况			节能概况		收益概况				
累计数量	1000个	当前总负荷	200V	今日最大负荷	230V	二氧化碳排放量	12354.50KG	入网累计收益	1000元	今日入网收益	14221元
新增数量	15个	累计储能电量	150kwh	今日储能电量	15kwh	二氧化碳排放量	12354.50KG	峰谷差价累计节省费用	1235元	今日峰谷差价节省费用	121元
故障数量	1个	累计电网供电量	100kwh	今日电网供电量	23kwh	节约标准煤	329.86T	总收益	1321元	今日总收益	132221元
		累计发电量	900kwh	今日发电量	25kwh	节约纯净水	4546.57T				



# G SMART POWER STATION

## GRID MONITORING/INTERNET OF THINGS TECHNOLOGY



### information security

Accurate positioning of all hardware devices included in the Energy Internet;  
Securely encrypt all information and deliver it instantly;  
Provide a platform for multi-dimensional and multi-industry cooperation in industrial ecology;



### Energy allocation

Through the analysis of the transmission data, effectively assess the distribution of energy consumption between regions or regions, and immediately issue instructions to the distributed generation system or the energy storage system to effectively solve the problem of random generation of distributed generation



### Environmental protection

Through accurate traceability, solve a large number of power battery decommissioning and recycling problems, and improve resource utilization efficiency;  
Battery vital signs can be monitored in real time and used effectively in the circulatory system



THE BATTERY OF THE FUTURE

# LTO ENERGY STORAGE SYSTEM

3MW / 1MWH

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# LTO ENERGY STORAGE SYSTEM

## 3MW / 1MWH



### Specification

Rated Energy Capacity (MWh)	1MWh	Nominal Voltage	836V
Battery Combination	380S40P	DC Voltage Range	646V~1045V
Capacity	1320Ah	Conversion Efficiency	95%
Depth of Discharge (DOD)	100%	Self Discharge Rate	<1% Per Month

### Battery Function

Battery Management Function	Battery Management Function
Battery Cooling Function	Battery Warning Function

### Other Features

Design Life Span	25Years	Seismic Grade	> level 7 or USB UBC Seismic Zone 4
Emissions (Gas or Liquid)	No	IP Level	IP54
Operating Temperature	-40~65 °C for Battery System	Lightning Protection Level	Grounding
Cooling System	Yes	Lightning Protection Level	Grounding

### Size and Weight

Main Container Size(mm)	12192*2438*2896	Weight of Battery Cabinet	34000Kg/Set
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# LTO ENERGY STORAGE SYSTEM

## 3MW / 1MWH



Battery Specification	Nominal Value
-----------------------	---------------

Nominal Capacity (Ah)	33
Rated Voltage (V)	2.21
Voltage Range (V)	1.7-2.75
Weight (KG)	1.22
Working Temperature (°C)	-50 to

Module Specification	Nominal Value
----------------------	---------------

Nominal Capacity (Ah)	132
Rated Voltage (V)	2.21
Voltage Range (V)	1.7-2.75
Weight (KG)	5.1
Working Temperature (°C)	-50 to 65

Pack Specification	Nominal Value
--------------------	---------------

Combination	20S4P
Nominal Capacity (Ah)	132
Rated Voltage (V)	44
Voltage Range (V)	34-55
Weight (KG)	123
Size (mm)	997×355×374
Working Temperature (°C)	-50 to 65

Rack Specification	Nominal Value
--------------------	---------------

Combination	380S4P
Nominal Capacity (Ah)	132
Rated Voltage (V)	836
Voltage Range (V)	646-1045
Weight (KG)	2800
Size (mm)	1687.6*984*2390
Working Temperature (°C)	-50 to 65



THE BATTERY OF THE FUTURE

# ECO ENERGY STORAGE

SYSTEM & CONFIGURATION

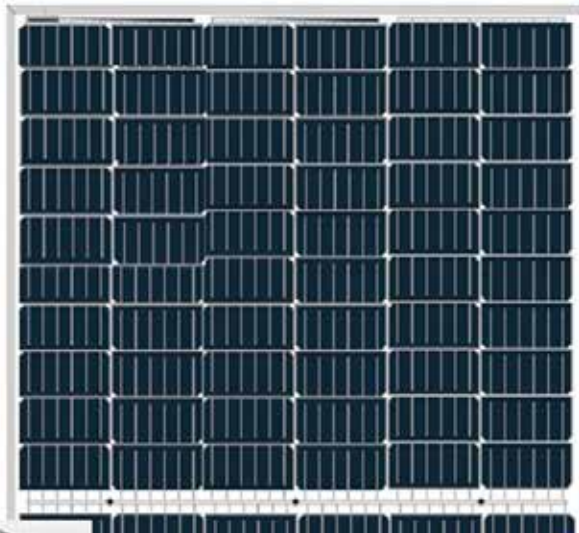
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# ECO ENERGY STORAGE SYSTEM & CONFIGURATION



3.6 KW Hybrid



### Solar Panels

- Mono/Poly Standard/Half Cell Panels
- High Efficiency with PERC panels Available
- 25 years warranty with 80% power output
- PID Resistant, High salt and ammonia resistance



### Inverter

- LCD Screen for setting
- Dual MPPT
- High Efficiency 97.6%
- IP65 Ingress Protection
- Remote Monitor by APP on phone



## 3 KW system configuration

Item	Description	Quantity
<b>Solar Panels 4.32 KWp</b>	4.32 KWp Solar panel, Longi Mono Half Cell/LR4-60HPH/360W/380W etc. Optional, 360Wp *12pcs=4.32KWp	12 pcs
<b>Inverter with MPPT charge controller: 3.6 KW</b>	3.6 KW Off-Grid/Hybrid Inverter; Model: ESP-EU3.6K, Rated AC output 3600W, 50/60Hz 120/240Vac, 230Vac, 97.6% Efficiency, Dual MPPT	1 pc
<b>Lithium-ion Battery: 5KWh</b>	5 KWh Battery, voltage:48V Capacity:100Ah Lithium-ion LiFePO4 (LFP) Batteries with BMS, 5KWh *n optional	1 set
<b>DC Combiner Box</b>	1 input 1 output (Switches, Breaker, SPD, Thunder Protector)	1 pc
<b>Cables and Connectors</b>	PV Cable; 4mm <sup>2</sup> /6mm <sup>2</sup> /10mm <sup>2</sup> etc. MC-4 Connector 10 pairs; MC-4; 30A/1000Vdc	1 set
<b>Installation Mounting Structure/Brackets</b>	Aluminum/Galvanized/steel/plastic; Customized, Whole set mounting structure for solar panel for 16pcs solar modules	1 set
<b>Technical Specification, Installation Manual, Quotation/Packing List</b>		1 set

## 5 KW system configuration

Item	Description	Quantity
<b>Solar Panels: 5.76 KWp</b>	5.76 KWp Solar panel, Longi Mono Half Cell/LR4-60HPH/ 360W/380W etc. Optional, 360Wp *16pcs=5.76KWp	16 pcs
<b>Inverter with MPPT charge controller: 5KW</b>	5KW Off-Grid/Hybrid Inverter; Model: ESP-EU5K, Rated AC output 5000W, 50/60Hz 120/240Vac, 230Vac, 97.6% Efficiency, Dual MPPT	1 pc
<b>Lithium-ion Battery: 10KWh</b>	10KWh Battery, voltage:48V Capacity:200Ah Lithium-ion LiFePO4 (LFP) Batteries with BMS, 10KWh *n or 7.5KWh *n optional	1 set
<b>DC Combiner Box</b>	1 input 1 output (Switches, Breaker, SPD, Thunder Protector)	1 pc





<b>Cables and Connectors</b>	PV Cable; 4mm <sup>2</sup> /6mm <sup>2</sup> /10mm <sup>2</sup> etc. MC-4 Connector 10 pairs; MC-4; 30A/1000Vdc	1 set
<b>Installation Mounting Structure/Brackets</b>	Aluminum/Galvanized/steel/plastic; Customized, Whole set mounting structure for solar panel for 16pcs solar modules	1 set
<b>Technical Specification, Installation Manual, Quotation/Packing List</b>		1 set

## 8 KW system configuration

Item	Description	Quantity
<b>Solar Panels: 9.36 KWp</b>	9.36 KWp Solar panel, Longi Mono Half Cell/LR4-60HPH/ 360W/380W etc. Optional, 360Wp *26pcs=9.36KWp	26 pcs
<b>Inverter with MPPT charge controller: 8KW</b>	8KW Off-Grid/Hybrid Inverter; Model: ESP-EU8K, Rated AC output 8000W, 50/60Hz 120/240Vac, 230Vac, 97.6% Efficiency, Dual MPPT	1 pc
<b>Lithium-ion Battery: 10KWh</b>	10KWh Battery, voltage:48V Capacity:200Ah Lithium-ion LiFePO <sub>4</sub> (LFP) Batteries with BMS, 10KWh *n or 15KWh *n optional	1 set
<b>DC Combiner Box</b>	1 input 1output (Switches, Breaker, SPD, Thunder Protector)	1 pc
<b>Cables and Connectors</b>	PV Cable; 4mm <sup>2</sup> /6mm <sup>2</sup> /10mm <sup>2</sup> etc. MC-4 Connector 10 pairs; MC-4; 30A/1000Vdc	1 set
<b>Installation Mounting Structure/Brackets</b>	Aluminum/Galvanized/steel/plastic; Customized, Whole set mounting structure for solar panel for 16pcs solar modules	1 set
<b>Technical Specification, Installation Manual, Quotation/Packing List</b>		1 set



THE BATTERY OF THE FUTURE

# LITHIUM BATTERY

54173210-8S1P-25.6V200A



# LITHIUM BATTERY

## 54173210-8S1P-25.6V200A

### Battery Specification

No	Items	Characteristics
1	Nominal capacity	200Ah
2	Mix. capacity	195Ah
3	Nominal energy	5120Wh
4	Combination structure of battery	54173210-8S1P
5	Nominal voltage	25.6V
6	End of discharge voltage	21.6V
7	Standard charge voltage	29.2±0.2V
8	Float charge voltage	27.6V
9	Standard charge current	40A
10	Recommended charge current	≤100A
11	Allowed Max. charge current	100A
12	Standard charge current	80A
13	Recommended charge current	≤150A
14	Allowed Max. charge current	150A
15	Peak current	300A,10Sec
16	Internal Resistance	≤50mΩ
17	Weight	Approx. 41.0kg±5%
18	Ex-factory capacity	Approx.50% SOC
19	Discharge temperature	-20℃~60℃
20	Charge temperature	0℃~45℃
21	Storage environment ≤1Month	-20~+60℃、5~75%RH
22	Storage environment ≤6Month	-10~+45℃、5~75%RH
23	Storage environment Recommend environment	15~+35℃、5~75%RH

### Electrical Characteristics & Test Condition

No	Items	Standard
1	Normal capacity	≥200Ah
2	Internal Impedance	≤50mΩ
3	Short circuit protection	Auto cutoff load when short circuit
4	Discharge temperature Characteristic	-20℃/25℃ ≥45%
5		-10℃/25℃ ≥70%
6		0℃/25℃ ≥85%
7		25℃/25℃ ≥100%
8		55℃/25℃ ≥95%
9	Discharge performance in normal temperature	Discharge capacity
		0.2C ≥100%
		1C ≥95%
	2C ≥85%	
10	Capacity retention rate	Capacity retention ≥90%
		Capacity recovery ≥95%
11	Cycle life@DOD100%	≥2000 cycles

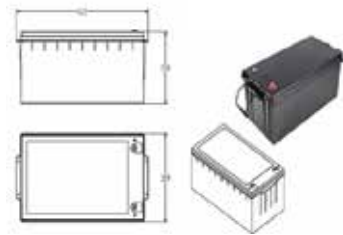
### Warning & Tips

Please read and follow the handling instructions before use. Improper use may cause heat, fire, rupture, damage or capacity deterioration of the battery. ECO ESS LTD. Describes is not responsible for any accidents caused by the usage without following our handling instructions.

### Circuit Protection

No	Items	Content
1	Over charge	Over-charge protection for each cell
		Over-charge protection for battery
		Over-charge protection delay time
		Over-charge release method
2	Over charge current	Charge over current protection
		Charge over current protection delay time
		Charge over current release
3	Over discharge	Over-discharge protection for each cell
		Over-discharge protection for battery
		Over-discharge protection delay time
		Over-discharge release method
4	Over discharge current	Discharge over current protection
		Discharge over current protection delay time
		Discharge over current release
5	Temperature	Charging high temperature protection
		Charge Over-temperature release method
		Charging low temperature protection
		Discharge over temperature protection
		Discharge Over-temperature release method
		Discharge low temperature protection
		PCB temperature protection
		PCB Over-temperature release method
	temperature protection delay time	
6	Cell balance	Balance Start Voltage
		Balance current
7	Short circuit protection	Short Circuit Protection Current
		Protection condition
		Protection delay
		Short circuit protection release

### Product dimension(mm)



Remarks:

- 1) The shell defaults to black ordinary ABS plastic, which can be customized;
- 2) The positive terminal glue is dark red, and the negative terminal glue is black or blue;
- 3) The positive and negative terminals are M8, with M8 combination screws. (The plug-in spring cable is not equipped by default, and the cable can be customized)

### Warranty

Subject to the warranty agreement.



THE BATTERY OF THE FUTURE

25.6V200AH IS LITHIUM IRON PHOSPHATE BATTERY MODULE WHICH DESIGNED FOR ENERGY STORAGE POWER SUPPLY SYSTEM APPLICATION.

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**LITHIUM-ION BATTERY PRODUCT**  
25.6V 200 AH 5120WH

# BATTERY PACK SPECIFICATION

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## 1. Overview

ENERSHARE25.6V200Ah is Lithium iron phosphate battery module which designed for energy storage power supply system application. This battery module integrated with intelligent BMS inside, has big advantages on safety, cycle life, energy density, temperature range and environmental protection. This product specification describes the type, size, structure, electrochemistry performance, service life, and BMS characteristics. This specification only applies to the battery module supplied by ENERSHARE

## 2. Advantages

The battery module consists of single LFP cells, wire, BMS and container.

- Packed with high performance LFP single cell, long life, safety and wide temperature range
- High energy density, small size, light weight, no pollution
- Packing with single cell container, fire retardant wire and laser welding, stable and safe
- Built-in BMS, with battery voltage, current, temperature and health management
- LED indicate the battery SOC and operating status
- LCD Screen display the battery voltage, current, temp.,SOC detail information
- Support communicate with solar inverter bu CAN or RS485
- Update software by RS485 port
- Flexible customization of dimensions
- More than 15 years design life
- Stable performance, maintenance-free

## 3. Product photo

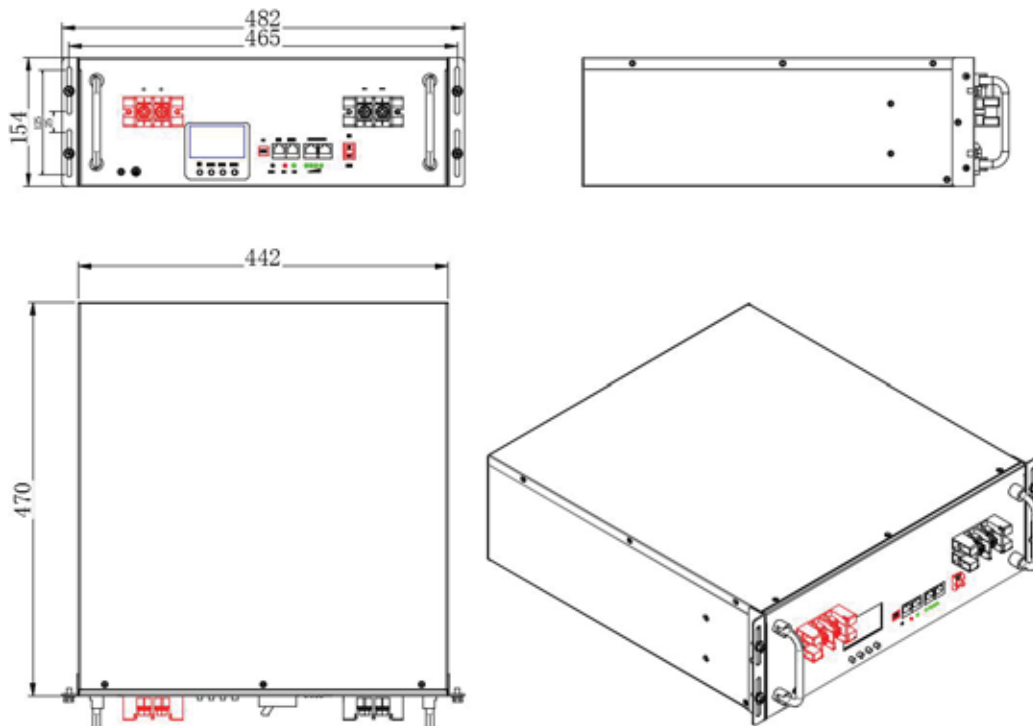




## 4. Battery module specification

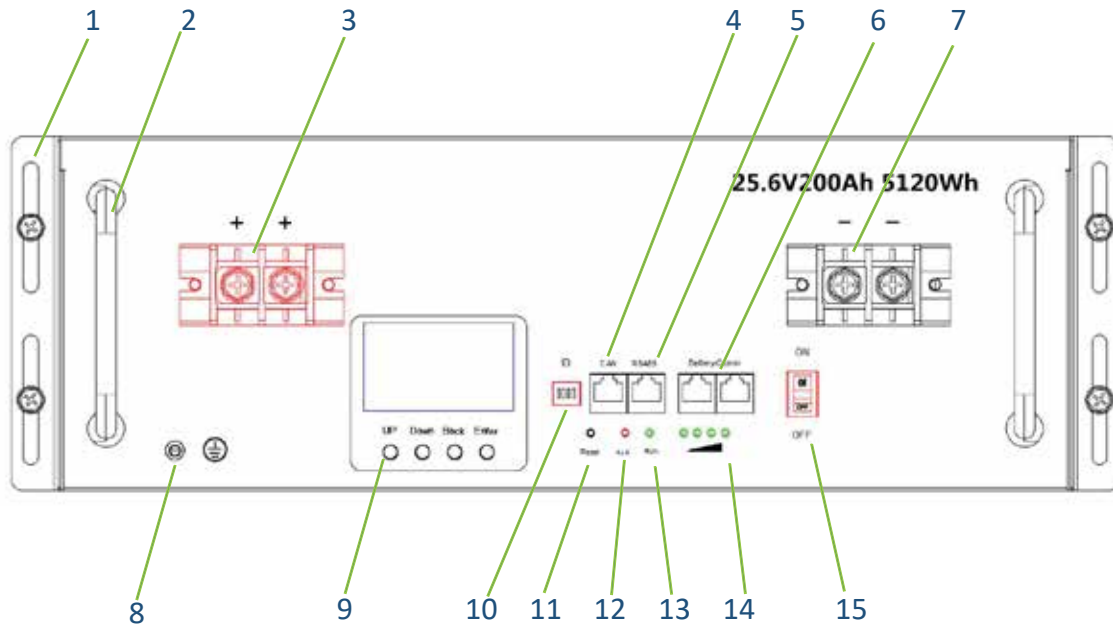
	Item	Specification	Conditions
Nominal	Voltage	25.6V	25°C, 0.2C
	Capacity	200Ah	
Module weight		48.0kg	±0.5kg
Dimensions(W*D*H), mm		442*470*154 (3.5U)	±2mm
Operating parameters	Charging Voltage	28.0V~28.8V	Recommended 30A
	Discharging Voltage	20.8V	
	Charging current	Max constant charge: 100A	
	Discharging current	Max constant discharge: 100A	
Temperature	Charge range	0°C~45°C	
	Discharge range	-20°C~55°C	
	Storage range	-20°C~55°C	
BMS	Built-in BMS	Voltage, current, temperature management & cell balance	RS485, CAN communication
Service life	Design life	>15years	25°C
	Cycle life	>6000 times, 0.5C, 80%DOD	

## 5. Dimension Drawing





## 6. Panel Description



No.	Item	Description	Remarks
1	Rack mount ear	For battery pack mounting	
2	Handle	Handle for carrier	
3	Battery +	Terminal M8 screw	Positive
4	CAN	Communication port with inverter	
5	RS485	Communication port with inverter	
6	Battery comm	Internal communication between packs	Parallel application
7	Battery -	Terminal M8 screw	Negative
8	GND	GND Connection for safety	
9	LCD	LCD Screen display battery detail data	
10	ID	Battery address	Definition in manual
11	Reset	Emergency Reset	
12	ALM	Alarm LED display	
13	RUN	Run LED display	
14	SOC	Capacity remaining display	
15	ON/OFF Switch	ON/OFF battery by software	



## 7. BMS specification

BMS provides complete management and protection for the battery.

- Voltage warning and protection for module and each single cell.
- Current warning and protection, and the maximum operating current can be customized.
- Temperature warning and protection, 4 sensors for battery pack and 1 sensor for BMS.
- Battery module SOC and SOH calculation, display the accurate battery status.
- Communicate with inverter or PC monitor, report the battery data.
- Pre-charge/discharge logic, make sure safety use in whole process.
- Switch-off mode, sleep mode, and operating mode, different mode for different condition.

### BMS parameters.

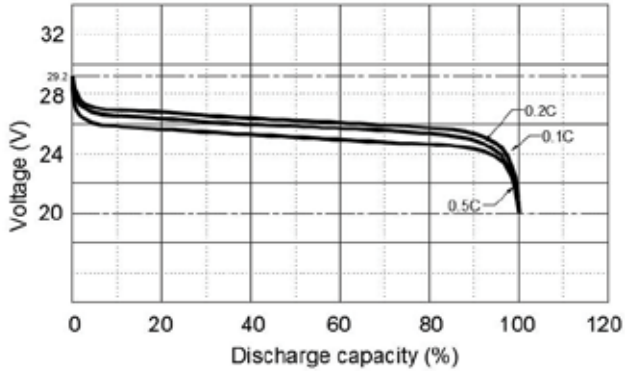
Item		Parameters		Condition
Charge	Cell voltage protection	3.9V	Delay 1s	Recovery at 3.45V
	Module voltage protection	30.0V	Delay 1s	Recovery at 28.8V
	Over charging current 1	>102A	Delay 10s	
	Over charging current 2	≥120A	Delay 3s	
	Temperature protection	<-5°C or >70°C	Delay 1s	Recover when >5°C or <60°C
Discharge	Cell voltage protection	2.3V	Delay 1s	Recovery at 3.1V
	Module voltage protection	20.8V	Delay 1s	Recovery at 22.4V
	Over discharging current 1	> 102A	Delay 10s	Recovery in 60s
	Over discharging current 2	> 150A	Delay 3s	Recovery in 60s
	Short circuit	>250A	< 0.1mS	
	Temperature protection	<-20°C or >75°C	Delay 1s	Recover when >-10°C or <65°C
BMS	PCB Temp protection	>105°C	Delay 1s	Recover when <90°C
	Cell balance	100mA	Passive balance	Cell voltage difference > 40mV
	Temperature accuracy	3%	Cycle measurement	Measuring range -40~100°C
	Voltage accuracy	0.5%	Cycle measurement	For cells and module
	Current accuracy	3%	Cycle measurement	Measuring range -200~+200
	SOC	5%		Integral calculation
	Power consumption with different condition	<300uA	Switch-off mode	Storage & transportation
		<300uA	Sleep mode	Protection & stand-by
		<14mA	Operating mode	Charging & discharging
Communication ports	RS485,CAN		Protocol can be customized	



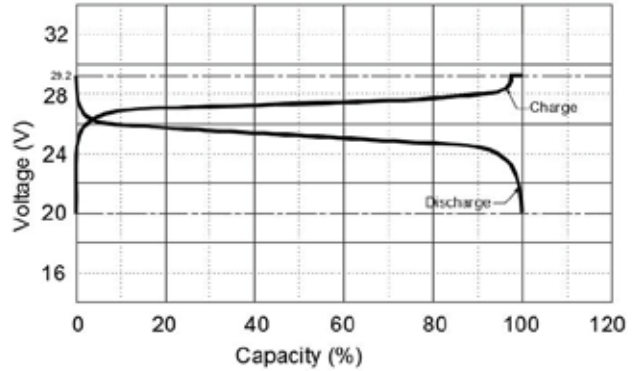


## 8. Battery module performance Curve

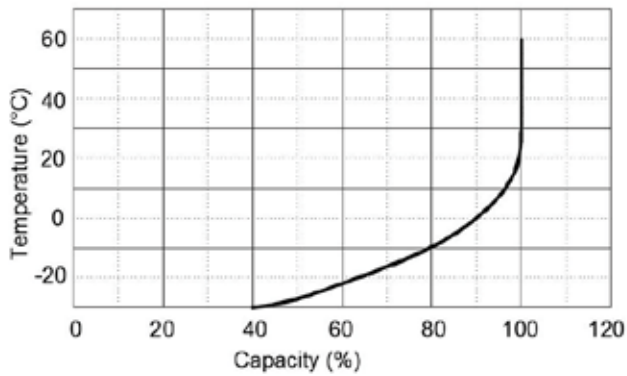
Discharge performance with different rate @ 25°C



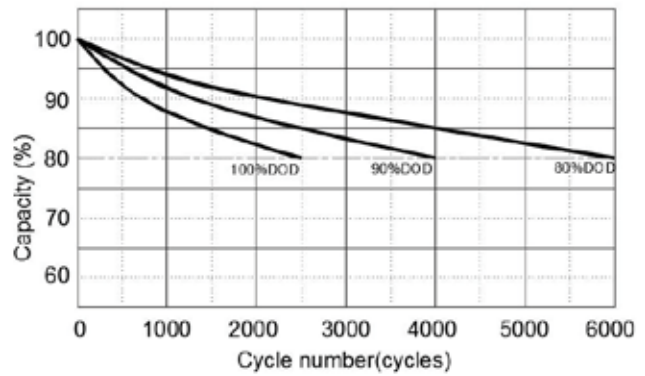
Charge & Discharge curve with 0.5C @ 25°C



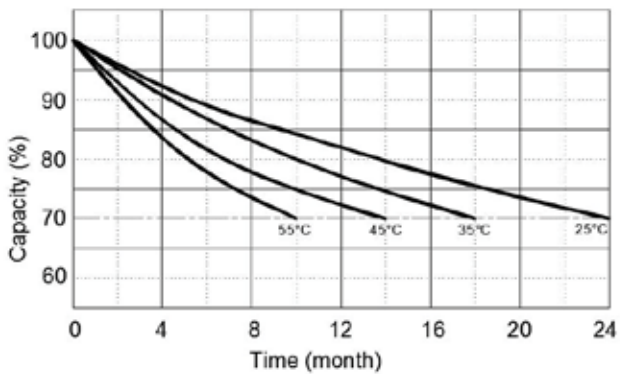
Discharge capacity with different temperature @ 0.5C



Cycle life with DOD @ 0.5C, 25°C



Self-discharge @ different temperature





## THE BATTERY OF THE FUTURE

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