

## Company Profile

**Haitai Solar** is a high-tech enterprise focus on Renewable Energies, established in 2006 and successful made its IPO in Aug 2022 (Stock Code 835985.BJ). Its business scope covers six divisions: Photovoltaic modules, Utility Scale Power Plant, Energy Storage System, Mounting System, Wind Energy and Hydrogen Energy.

Haitai Digital company is a 100% subsidiary of Haitai solar, we can offer reliable, flexible and cost-effective energy storage solutions for various application scenarios.

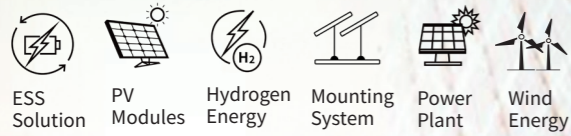
Establishment

**2006**

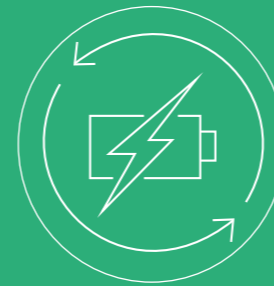
Headquarters

**TangShan, China**

Main Business



ESS Solution



 **Haitai Solar**

Stock Code: 835985.BJ

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 **SOLARMOVIL**

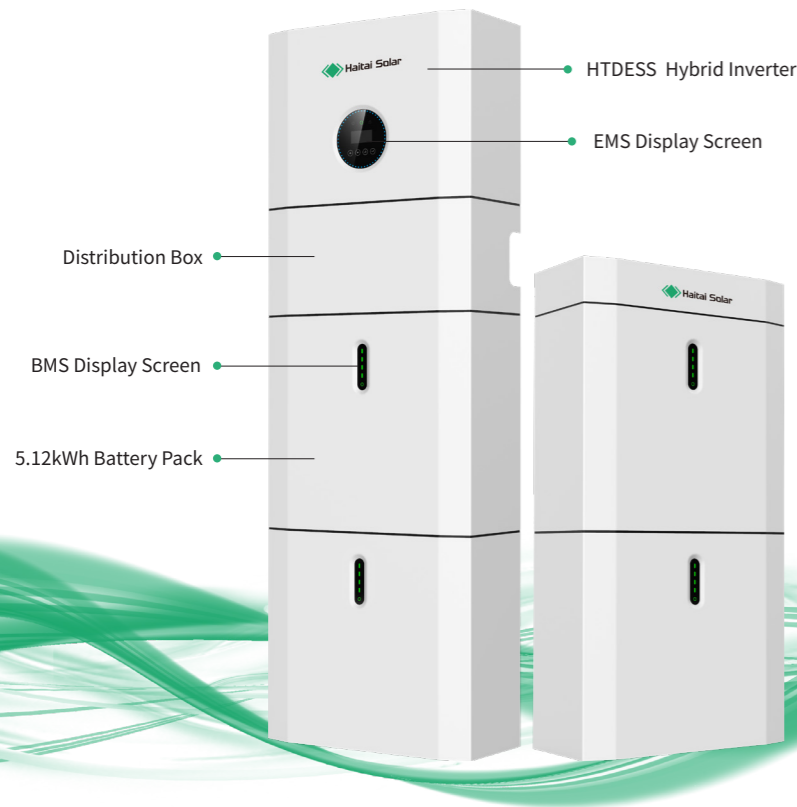


## BLUE CRYSTAL 1.0

**HTDESS H5-10**

All-in-One Residential Energy Storage System

Tangshan Haitai Digital Energy Technology Co., Ltd



## Features: All-in-One Residential Energy Storage System



### Safe:

- LFP (LiFePO4) battery, 10000 Cycles ,stable and safe.
- Three levels safety design (Module, Pack, System).
- IP65 protection class ,Outdoor installation, far away from living room.



### Smart:

- Modular design, easy to be expanded or decreased module amount .
- Plug & Play, One person can install it within 30 minutes.
- Space saving, only 0.15sqm area is occupied.



### Saving:

- Store low cost electricity generated by solar PV to meet household power load.
- Peak shifting function can help to cut utility bills.



### Sapiential:

- Monitoring the Ess through global cloud platform and mobile App.
- Clear display for system working status.

Battery Specifications	PACK5.1	PACK10.2	PACK20.4
<b>Electrical</b>			
Energy Capacity	5.12kWh	10.24kWh	20.48kWh
Battery type	LFP (LiFePO4)		
Depth of Discharge (DoD)	90%		
Rated voltage	51.2V		
Operating Voltage Range	44.8~56.5Vdc		
<b>Operation</b>			
Maximum Charging Current	50A (0.5C)	100A (0.5C)	100A (0.5C)
Maximum Discharging Current	80A (0.8C)	100A (0.5C)	100A (0.5C)
Operating temperature range	-10°C ~+50°C		
Storage temperature range	-20°C ~+50°C		
Humidity	0% ~ 90%		
<b>BMS</b>			
Modules Connection	Max.4 batteries in parallel		
Monitoring Parameters	System voltage, current, cell voltage,cell temperature, PCBA temperature measurement		
Communication	CAN and RS-485 compatible		
Ventilation type	Passive and Active Cooling		
<b>Physical</b>			
Weight (Kg)	58	116	232
Dimension (W×H×D)mm	540×530×240	540×1020×240	2× (540×1020×240)
IP Protection	IP65		
Warranty	5 Year Product Warranty, 10 Year Performance Warranty		
<b>Certificate</b>			
Safety(Cell)	IEC 62619、UL 1973、UN 38.3		

Model	3680D	5000D	6000D
<b>PV terminal</b>			
Vmax. PV	580Vd.c.		
Rated Voltage	400Vd.c.		
MPPT Voltage Range	80~550Vd.c.		
MPPT Range (full load)	165~520Vd.c.	210~520Vd.c.	250~520Vd.c.
MPPT Tracker / Strings	2		
Max. continuous PV input current	15Ad.c. ×2		
Isc PV	18Ad.c. ×2		
Max. back feed current	0Ad.c.		
Max. continuous PV input power	4800W	6500W	7500W
<b>Battery terminal</b>			
Battery type	Lithium		
Voltage range	40~60Vd.c.		
Rated voltage	48Vd.c.		
Maximum charge/discharge current	50Ad.c./80Ad.c.	100Ad.c./100Ad.c.	
Maximum charge/discharge power	3000W/4000W	4600W/5000W	

<b>Grid terminal parameter</b>	
Rated voltage	230Va.c.
Rated frequency	50Hz/60Hz
Rated input Current	31Aa.c.
Maximum continuous input current	32Aa.c.
Maximum continuous input power	7360VA
Rated output Current	16Aa.c.    22Aa.c.    25Aa.c.
Maximum continuous output current	16Aa.c.    22Aa.c.    25Aa.c.
Power factor (Cos phi), adjustable	0.8 leading ~ 0.8 lagging (0.95 leading ~ 0.95 lagging for Germany)
Maximum continuous output power	3680W    5000W    6000W
Max. output fault current	102Apeak
Grid port inrush current	less than 22Apeak
Grid port overcurrent protection	40A
<b>Backup load terminal parameter</b>	
Rated voltage	230Va.c.
Rated frequency	50Hz
Rated output Current	16Aa.c.    20Aa.c.
Maximum continuous output current	16Aa.c.    20Aa.c.
Rated frequency	50/60Hz (Fluctuation range±0.2%)
Rated continuous output power	3680W    4600W
Maximum output apparent power	4000VA    5000VA
Max. output fault current	99Apeak
Backup load overcurrent protection	32A
<b>General parameters</b>	
Temperature	-25° C to +60° C, derating above 45° C
Protective class	Class I
Overvoltage Category	II(DC side), III(AC side)
Ingress protection	IP65
Altitude	≤ 2000m
Dimension (W×H×D)mm	540×590×240
Weight (Kg)	32
Relative Humidity	0~95% (No condensation)
Topology	High Frequency Isolation
Cooling	Natural Convection
Display	LCD/APP
Communication Interface	RS485/CAN2.0/WIFI
Max. Conversion Efficiency (From Battery)	94.0%
Max. Conversion Efficiency (From PV)	97.6%
Euro Efficiency	97.0%
MPPT Efficiency	99.5%
Protection Function	Short Circuit Protection, AC Leakage Fault Protection, Grounding Fault Protection, Anti-islanding Protection, Overload Protection、Surge Protection、DC Polarity Protection
<b>Certification&amp; Standard</b>	
Grid Regulation	AS/NZS 4777.2, VDE-AR-N4105, VDE0126-1-1
Safety Regulation	IEC/EN 62109-1&2, IEC62040-1
EMC	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN61000-4-16, EN61000-4-18, EN61000-4-29

\*1. Nominal AC output power is 4999W for Australia and 4600W for Germany and South Africa.  
\*2. Maximum output current is 21.7A for Australia and 20A for Germany and South Africa.

# Haitai **HAI DUN**

HTDESS-ESD1126-025C2700



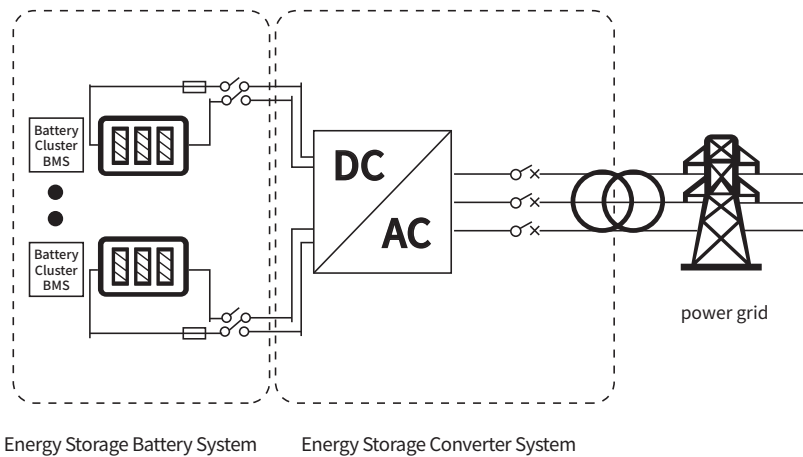
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## Product Features

- High quality LFP batteries, long cycling lifetime (> 6000 times).
- Intelligent BMS enables 3-level monitoring (Pack, Rack, System), guarantee high performance and security.
- Large storage capacity, high conversion efficiency, comprehensive efficiency > 85%.
- Prefabricated container can be applied in various scenarios, also reduce installation costs.
- Modular design, flexible to adapt to various kinds of voltage platforms and systems with various capacities.
- multi-level protection strategy and fault isolation measures to ensure safety and stability of energy storage system.
- Equipped with fire protection, thermal management system, monitoring system, leakage protection and other devices to ensure safety of the ESS.
- Easy to operate and maintain, light workload, low maintenance cost.



**ESS Diagrams**

**ELECTRICAL PARAMETERS**

Cell Capacity	100Ah
Usable Energy	2703.36kWh
Operating Voltage	880~1284.8Vdc
Rated Voltage	1126.4Vdc
Max Charge Rate	0.5C @25°C
Max Discharge Rate	0.5C @25°C
Max Charge Power	1351.68kW(0.5C)

**ENVIRONMENTAL PARAMETERS**

Operating Temperature Range	-20° C-55°C
Operating Humidity Range	0~95%
Enclosure Protection Rating	IP54
Cooling	Air-conditioning
Fire Fighting System	HFC-227ea/Perfluorinated hexanone
Altitude	<2000m <sup>a</sup>

**PHYSICAL PARAMETERS**

(W×D×H)/Dimensions	6058mm×2438mm×2896mm
Weight	≤ 32t
Number of Racks	6

**COMMUNICATIONS AND SAFETY**

Communications	CAN、RS485、Ethernet
Certification	GB/T36276、UL1973、UL9540A、UN38.3、IEC62619、IEC62477、IEC61000、IEC60730AnnexH、IEC62933

a: When the altitude is greater than 2000m, the system output is derated



# Haitai **HAI DUN**

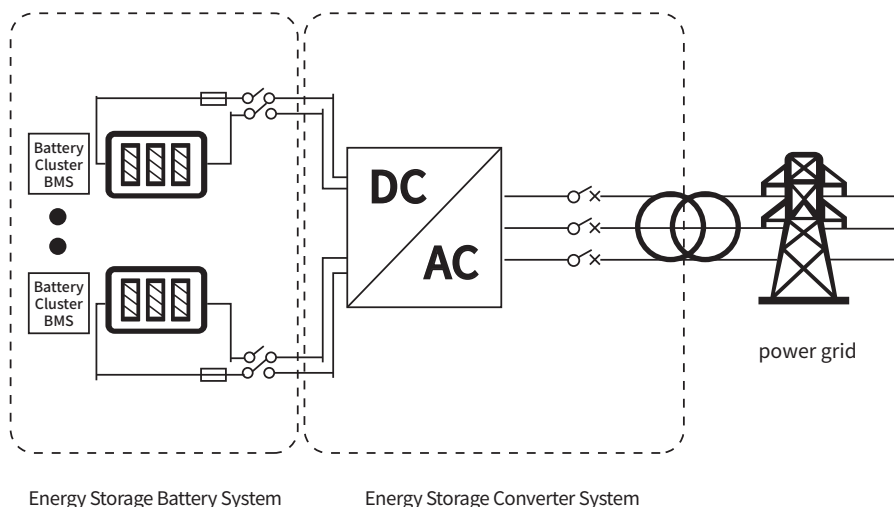
HTDESS1500-750/1863  
HTDESS1500-1725/3727



## Product Features

- High quality LFP batteries, long cycling lifetime(> 6000 times).
- Intelligent BMS enables 3-level monitoring (Pack, Rack, System), guarantee high performance and security
- Large storage capacity, high conversion efficiency, comprehensive efficiency > 85%.
- Prefabricated container can be applied in various scenarios, also reduce installation costs.
- Modular design, flexible to adapt to various kinds of voltage platforms and systems with various capacities.
- multi-level protection strategy and fault isolation measures to ensure safety and stability of energy storage system.
- Equipped with fire protection, thermal management system, monitoring system, leakage protection and other devices to ensure safety of the ESS.
- Easy to operate and maintain ,light workload, low maintenance cost.

## ESS Diagrams



2H System		
Product Model	HTDESS1500-750/1863	HTDESS1500-1725/3727
Battery Capacity (kWh)	1863.7	3727.4
Cell Specification	3.2V/280Ah (0.5P)	
Module Specification	1P8S	
Number of Modules (pcs)	260	520
Number of Racks (pcs)	5	10
Number of Cells (pcs)	2080	4160
Rated Voltage (V)	1331.2	
Voltage Range (V)	1164.8~1497.6	
Rated Current (A)	704.3	1408.5
Voltage Accuracy (FSR)	1%	
Current Accuracy (FSR)	1%	
Temperature Accuracy (°C )	2	
SOC Accuracy	5%	
AC System		
PCS Rated Power (kW)	750	1725
Output Voltage (V)	1725	
Group	Dy11	
Grid Voltage Range (V)	690±15%	690±15%
Rated Current (A)	782.5	1565
Rated Frequency (Hz)	50	
THD	小于 3%	
Transformer Mode	Dry / Oil-immersed transformer	
Other Parameters		
Dimension (L * W * H /mm)	6058*2438*2896	12192*2438*2896
Gross weight (t)	< 30	< 50
Cooling mode	Forced air cooling	
AC Model	Wall-mounted, 2×20kW	Wall-mounted, 4×20kW
Fire supervision system	FM-200 (HFC) , Pipeline type	
Communication Protocols	Ethernet、CAN	
Wireless communication	2G、4G	
Cycle life	>6000 次 (@25°C, EOL80%)	
Protection class	IP54	
Operating temperature	-25~+50°C	
Operating Humidity	0~95%, no condensation	
Altitude	≤ 2000 米	

Note: The product dimensions and parameters may change with product updates and without any notice, please refer to the latest product information

# Haitai **Blue Shield**

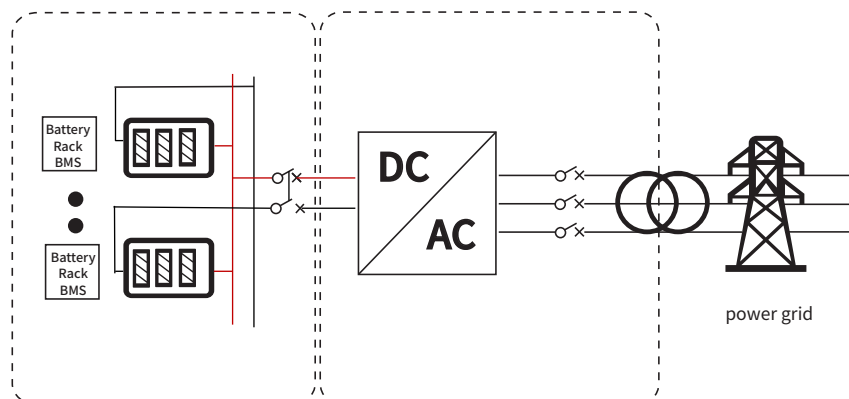
Containerized Energy Storage System  
HTDESS-1725/3440-LC



## Product Features

- The intelligent BMS system provides three-level monitoring of the energy storage system, ensuring high efficiency and safety.
- High-quality lithium iron phosphate (LFP) batteries, with a long cycle life (>6000 cycles).
- Large storage capacity and high conversion efficiency (comprehensive efficiency >85%).
- This prefabricated container system can be quickly applied to various applications to minimize deployment costs.
- Modular design makes it possible to build energy storage systems with various voltages and capacities.
- Comprehensive and multi-level battery protection strategies and fault isolation measures ensure safe and stable operations of this system.
- With fire protection, thermal management system, access control, monitoring, leakage protection and other features, this system runs safely and stably.
- Intelligent liquid cooling temperature control system with 20% less energy consumption than industry standards
- Easy operation and maintenance and low maintenance costs.

## ESS Diagrams



Energy Storage Battery System

Energy Storage Converter System



DC System	
Model	HTDESS1725/3440-LC
Battery Capacity	3440kWh
Cell Specifications	3.2V/280Ah(0.5P)
Pack Specifications	1P48S
Rated Voltage	1228.8V
Voltage Range	1075.2~1382.4V
Rated Current	1400A
Voltage Accuracy (FSR)	1%
Current Accuracy (FSR)	1%
Temperature Accuracy	2°C
SOC Accuracy	5%
AC System	
Rated Power	1725kW
Output Voltage	690V
Voltage Range	690V±15%
AC Rated Current	1443A
Power Factor	> 0.99 (at rated power)
Rated Frequency	50/60Hz
Frequency Range	-5 ~ 5 Hz
THD	< 3%
Transformer Parameters	
Rated Power	2000kVA
Voltage Transformation Ratio	0.69kV / 10 kV~ 35 kV
Transformer Form	Dry transformation/Oil transformation
Other	
Battery Container Size	6058*2438*2896 mm
Gross Weight	< 36 tons
Converter Container Size	6058*2438*2896 mm
Battery Cooling Method	Intelligent liquid cooling
Converter Cooling Method	Temperature controlled forced air cooling
Fire Fighting	Gas fire protection, combustible gas detection+exhaust, water firefighting optional
Cycle Life	>6000 cycles (@25°C ,EOL 80%)
Protection Grade	IP54 for the whole system and IP65 for key components
Allowed temperature range	-25 ~ +50 °C
Allowed humidity range	0 ~ 95%, No condensation
Maximum operating altitude	4000 m (>2000m derate)

Note: \* Performance of this system will derate for applications with altitude higher than 2000 meters. Above information is subject to our updates.



# Haitai BLUE STAR 1.0

## Commercial and industrial Energy Storage System

HTDESS1000-100/232

### Product Introduction

Haitai Digital Energy's commercial and industrial energy storage system integrates intelligent liquid cooling pack, highly precise battery management system (BMS), smart energy management system (EMS), PCS and fire protection system, etc. Energy capacity and power of this system can reach up to 232 kWh and 100 kW respectively. Modular design enables this system flexible scalability for various applications. The system can improve power supply quality with its voltage regulation, three-phase unbalance control and harmonious wave control features. With its load tracking, backup power supply and peak shaving features, this energy storage system can help businesses reduce electricity bills effectively, increase green energy consumption and maintain safe and stable system operations.

### Features



#### Excellent safety

Pack-level Fire Protection  
Water firefighting interface  
Multi-level fuse protection



#### Excellent adaptability

Applicable for all kinds of loads and AC power generating equipment



#### Highly intelligent

Intelligent control  
Smart protection



#### Emergency backup power

Automatic on and off grid operation switching  
Continuous power supply for external loads



#### Rapid commissioning

Flexible commissioning for rapid deployment  
Remote monitoring  
Easy maintenance



#### Flexible expansion

Rapid expansion in various ways  
Connectivity with 380V and 10kV power grid



#### Increase electrical energy

Reactive power compensation  
Optimize power supply quality



#### Reduce costs

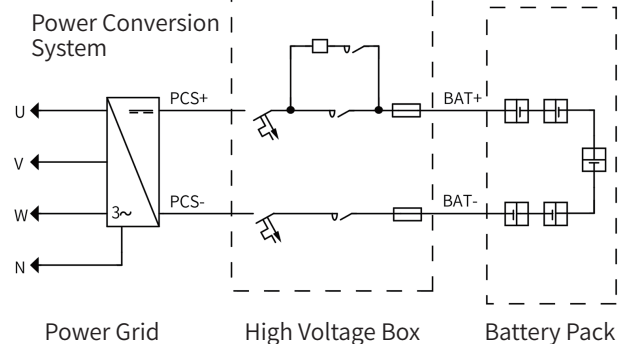
Peak shaving and valley filling  
Applicable for peak/valley arbitrage



#### Green electricity consumption

Increase proportion of on-site green energy consumption

### System circuit diagram



AC Parameters (grid connection)	
Rated power(kW)	100
Maximum output power(kW)	110
Rated grid voltage(V)	380
Permissible grid voltage	-15%~10%
Rated grid frequency (Hz)	50/60
Allowed grid frequency fluctuations (Hz)	±5
Power factor	-1 (leading)~1 (lagging)
THDI	<3% (Rated output power)
Access method	Three phase three wire/three phase four wire
Full power charge discharge conversion time(ms)	<25
AC Parameters (off grid)	
Rated output voltage(V)	380
Rated output power(kW)	100
Rated output frequency (Hz)	50/60
THDU	<3% (Linear Load)
Overload capacity	1.1 times long-term (45 °C), 1.2 times 1min
Battery Parameters	
Cell type	LFP 3.2V/280Ah
Battery pack configuration	1P52S/46kWh
Battery system configuration	1P260S
Battery voltage range(V)	728~936
Battery system capacity(kWh)	232
temperature detection	Cell+copper bar
System Efficiency	
Maximum efficiency of converter (%)	99.05
System efficiency (%)	>88
Charge discharge rate	≤0.5C
Protect	
DC IN	Load switch+fuse
Converter AC protection	Circuit breaker
AC output protection	Circuit breaker
Overvoltage protection	DC Type II / AC Type II
Fire Protection System	Aerosol/perfluorohexane/water firefighting optional
General	
Size (W * D*H) mm	1402*1299*2221
Weight (kg)	2500
Incoming method	Down in and down out
Ambient temperature (°C)	-35~60(>50°C derating)
Ambient humidity(%)	0~100
Working altitude (M)	5000 (> 2000 derating )
Protection grade	IP54
Cooling method	Liquid cooling
Communication	
Communication interface	RS485/Ethernet
Communication protocol	IEC61850/MODBUS-RTU/MODBUS-TCP

\*\*Any changes to the data contained in this specification shall be subject to the actual product without prior notice.





# BLUE STAR 1.0

HTDESS-F233

## Commercial & industrial Energy Storage System



### Product Introduction

Haitai Digital Energy's commercial & industrial energy storage system integrates intelligent liquid cooling pack, highly precise battery management system (BMS), smart energy management system (EMS), PCS and fire protection system, etc. Energy capacity and power of this system can reach up to 233 kWh and 100 kW respectively. Modular design enables this system flexible scalability for various applications. The system can improve power supply quality with its voltage regulation, three-phase unbalance control and harmonious wave control features. With its load tracking, backup power supply and peak shaving features, this energy storage system can help businesses reduce electricity bills effectively, increase green energy consumption and maintain safe and stable system operations.

### Product Features

- High efficiency liquid cooling technology, battery cell temperature difference  $\leq 3^{\circ}\text{C}$ .
- Intelligent monitoring system, integrated management of BMS and EMS. more intelligent and safe.
- All-in-one design, cabinet transportation, plug-in and ready to use.
- Built-in independent fire protection system.
- System Certifications: EN IEC 61000-6-2:2019、 EN IEC 61000-6-4: 2019、 IEC 62477-1: 2012/AMD1: 2016、 EN 62477-1: 2012/A1: 2017、 VDE-AR-N 4105: 2018-11、 DIN VDE V 0124-100 (VDE V 0124-100) : 2020-06、 EN 50549-1: 2019;
- Battery Certifications: UL1973、 UL9540A、 IEC61629、 UN38.3、 GB/T36276-2018、 ROHS、 MSDS;
- Module Certifications: UL9540A、 IEC61629、 UN38.3、 FCC、 EMC、 EN62477-1、 IEC60529.

**Model**

AC(Grid tied)	
Mode	Load shifting,Peak-Valley arbitrage benefit,limited power supporting
Rated Power	100 KW
Rated Voltage	230/400 Vac,3P+N+PE
Max.Continuous Input Current	158 A
Frequency	50 Hz
Power factor	0.8CAP~0.8 IND
THDI	<5%

**Battery Side**

Cell Capacity	233 KWh
Cell Type	LiFePO4
Cycle Life	≥ 6000 Cycles (0.5P,25°C, 80%EOL, 90%DOD)
Rated Voltage	832 V
Voltage Range	650V~949 V
Charge/Discharge Efficiency	≥95%
Max.Charging/Discharging Power	165 A

**Basic Parameters**

AC/DC Start Function	≤10 ms
Protection Function	Over/under voltage,Over current,Over/low temperature,SOC too high/low Low insulation impedance,Short circuit protection,etc
Operating Temperature	-30°C~+60°C (> 45°C derating)
Cooling	Air Cooling+Liquid Cooling
Max.Altitude	3000 m
Fire Protection	Aerosol+C6F12O(Optional) fire extinguisher
Max.Efficiency	92%(Auxiliary power is not included)
IP Level	IP54(Battery IP67)
Noise	< 70dB @ 25°C
Communication	RS485、CAN、Ethernet、Modbus、TCP/RTU
Dimensions(WxDxH)	1000mmx1400mmx2350mm
Weight	2500 kg

\*Above information is subject to our updates.