

F506 Distributed Energy Storage System Product Specifications

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Distributed Energy Storage System

1.1 Overview

The distributed energy storage system is composed of industrial and commercial energy storage cabinet and intelligent combiner cabinet. A single industrial and commercial energy storage cabinet mainly consists of 21 battery modules, 1 high-voltage box, 1 PCS (Power Conversion System), 1 industrial air conditioner, 1 fire protection system and the cabinet, etc. The intelligent combiner cabinet mainly consists of the main busbar switch, energy management system (EMU), environmental monitoring unit, metering device and the cabinet, etc. A set of distributed energy storage system can be composed of up to 8 industrial and commercial energy storage integrated cabinets and 1 intelligent combiner cabinet at most.

1.2 Function

- ▶ **Communication function:** The battery module communicates with the BCMS via CAN communication, and the industrial and commercial energy storage integrated cabinet communicates with the intelligent combiner box via Ethernet. The intelligent combiner box defaults to using Ethernet for external communication;
- ▶ **Metering function:** can measure the charging and discharging amount of the energy storage system at peak, flat and valley levels;
- ▶ **Display function:** Provides a friendly human-machine interface, including but not limited to real-time data monitoring, historical data query, equipment control, parameter settings and other display screens;
- ▶ **Management function:** It can collect and send data to the industrial and commercial energy storage integrated device, formulate control strategies through the charging and discharging of energy storage achieve peak shaving and valley filling and demand management;
- ▶ **Data collection:** collect battery cell voltage, temperature, balancing current, module total voltage, etc.;
- ▶ **Calculation function:** calculate important characteristic information such as temperature, voltage, current, etc. in the battery module;

- ▶ Equalization function: supports multiple equalization modes such as disable, automatic equalization, manual control equalization and specified equalization;
- ▶ Fan control: supports control module fan;
- ▶ Protection function: abnormal alarm of battery cell voltage collection, disconnection protection, over-temperature protection, low-temperature protection, over-voltage protection, under-voltage protection, short circuit protection;
- ▶ Parameter configuration: Support CAN communication to set battery related parameters;
- ▶ Storage function: The battery module can store electrical energy and battery-related parameters.

1.3 Parameter

surface1.3-1Industrial and commercial energy storage integrated cabinet specifications

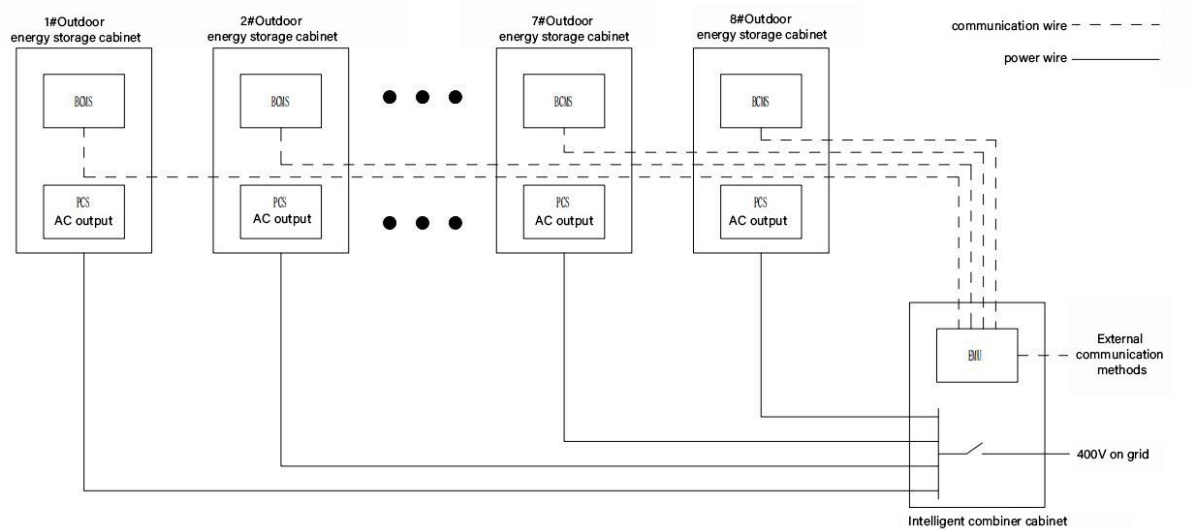
Serial number	Parameter name	Specification	Remark
AC side parameters			
1	Grid voltage	400V,3W+N+PE	
2	Rated AC power	125kW	
3	Rated AC current	180A	
4	Maximum AC current	200A	
5	Rated grid frequency	50/60Hz	
6	Power factor adjustable range	-1~+1	
7	THDi(rated power)	<2%	
DC side parameters			
8	Battery Type	LFP	
9	Battery level	506KWH	
10	DC rated voltage	806V	
11	DC voltage range	693~894.6V	
12	Rated charge and discharge rate	0.25C	
13	DC maximum current	186A	
System Parameters			
14	Isolation method	Non-isolated	
15	Dimensions (W*H*D)	1550mm*2400mm*1360mm	
16	Weight	3800kg	
17	System life	8000 times @25℃,0.25CP, 90%DOD,EOL≥70%	
18	Communication interface	RS485,CAN,LAN	
19	Operating temperature	-20℃ ~ 50℃	
20	Altitude	≤3500m	Overtake 2000m Derating
21	Battery temperature control method	Industrial air conditioning	
22	Fire protection system	Non-pressurized perfluorohexanone + gas/smoke/Temperature detection	
23	IP Protection level	IP55	PCS cabinet IP55

surface1.3-2 Cabinet Specifications

Serial number	Parameter name	Specification	Remark
AC side parameters			
1	Grid voltage	400V,3W+N+PE	
2	Rated current	1600A	
3	Rated grid frequency	50/60Hz	
4	Communication interface	RS485,CAN,LAN	Standard external Ethernet communication
5	weight	<300kg	
6	Operating temperature	-20℃ ~ 50℃	
7	Altitude	4000m	
8	Dimensions (width*height*depth)	700mm *2400mm *700mm	Overtake 2000m Derating
9	IPProtection level	IP55	

1.4Product Topology

The topology diagram of the distributed energy storage system is shown in the figure1.4-1As shown:



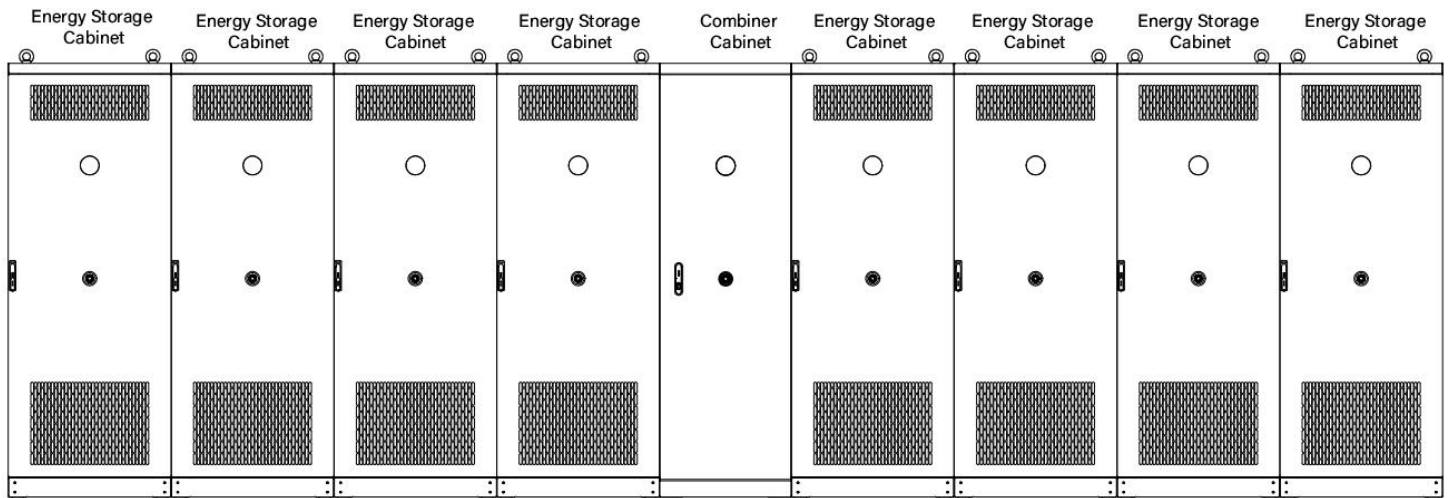
picture1.4-1Energy storage system topology diagram

surface1.4-1Configuration Scheme

power/kW	Nominal energy/kWh	Duration/h	Number of cabinets	Remark
125	506	4	1pc industrial and commercial energy storage cabinet+1 pc combiner cabinet	0.25C
250	1012	4	2pc industrial and commercial energy storage cabinet+1 pc combiner cabinet	0.25C
375	1518	4	3pc industrial and commercial energy storage cabinet+1 pc combiner cabinet	0.25C
500	2024	4	4pc industrial and commercial energy storage cabinet+1 pc combiner cabinet	0.25C
625	2530	4	5pc industrial and commercial energy storage cabinet+1 pc combiner cabinet	0.25C
750	3036	4	6pc industrial and commercial energy storage cabinet+1 pc combiner cabinet	0.25C
875	3542	4	7pc industrial and commercial energy storage cabinet+1 pc combiner cabinet	0.25C
1000	4048	4	8pc industrial and commercial energy storage cabinet+1 pc combiner cabinet	0.25C

1.5 Appearance

The appearance is illustrated by a distributed energy storage system composed of 8 commercial and industrial energy storage integrated cabinets and 1 combiner cabinet, as shown in Figure 1.5-1:



picture1.5-1Energy storage system appearance diagram

Core components

2.1 Industrial and commercial energy storage cabinet

The industrial and commercial energy storage cabinet is mainly composed of battery modules, PCS, high-voltage box, fire protection system, air conditioning, etc.

2.1.1Battery module (Pack)

- ▶ Long-life battery, with a cycle life over 8,000 times;
- ▶ Precise temperature control design, built-in air duct design, intelligent constant temperature control;
- ▶ The shell material is all fiber-reinforced plastic material, A1 non-combustible fireproof grade, excellent insulation performance;
- ▶ Intelligent operation and monitoring, advanced fault warning.

Performance parameters	
Product Model	HT314P4F2P12A
Battery specifications	3.2V 314Ah LFP
Battery series-parallel connection	2P12S(2 parallel 12string)
energy	24.1152 kWh
Rated voltage	38.4Vdc
weight	150 kg
Temperature control method	Intelligent air cooling
size/(D*W*H)	985*469*238 mm
Rendering	

2.1.2 Bidirectional inverter (PCS)

- ▶ Active and reactive power are adjusted independently to improve power quality
- ▶ Three-level topology, maximum conversion efficiency > 98.5%;
- ▶ Supports multi-machine parallel connection to meet different configuration scenarios
- ▶ High dynamic response, full load switching response as low as 10ms;
- ▶ Accept grid dispatch;

Performance parameters	
Product Model	EPCS125
DC side parameters	
Maximum output power	138 kW
DC voltage range	680~950 Vdc(three-phase four-wire)
DC maximum current	203A
Rated grid voltage	400V
Maximum efficiency	> 98.5%
AC side parameters	
Rated Power	125 kW
Grid voltage	400V+N+PE
frequency	50/60Hz
Rated current	180A
weight	65 kg
Protection level	IP20
size/(D*W*H)	520*790*232 mm
Rendering	

2.1.3 Battery Management System (BCMS)

- ▶ Communication function: communicate with energy management system, BMU, PCS and other components;
- ▶ Calculation function: calculate the SOC, SOH, charge and discharge capacity in the battery system, count the extreme value information of cluster monomers, etc.
- ▶ Collection function: collect battery system voltage, current, insulation resistance to ground, etc.;
- ▶ Control function: control the opening and closing of the battery system;
- ▶ Alarm protection: battery system abnormality alarm and protection;
- ▶ Balancing function: Active balancing to ensure the consistency of battery cells in the battery system;
- ▶ Temperature control strategy: intelligent temperature control;
- ▶ Storage function: real-time recording of important logs, events, collected data, etc.

Performance parameters	
Product Model	HT-BCMS-V1
Working power supply	18~30Vdc
Maximum Power	20W
Communication interface	CAN*2/ETH*2/RS485*4
Communication Protocol	defaultCAN2.0B,Mod bus-TCP/IP
Communication baud rate	250kbps(CAN)/100Mbps(LAN)/9600bps (485)
Dry contact input	7road,0~12V
Wet contact output	30V/2A,1road
Dry contact output	24V/2A,5A
Wet contact output	0~1500V (±0.2%FS)
Battery cluster voltage acquisition	0~400A (±0.5%FS) *2
Battery cluster current acquisition	0~65535kΩ (±5%RD±10kΩ)
Insulation resistance to ground	- 20~65℃
Operating temperature	5%~95%
size/ (W*D*H)	408*180*53 mm
Rendering	

2.2 Intelligent combiner cabinet

The intelligent combiner cabinet is mainly composed of an energy management unit (EMU), a metering unit and an environmental monitoring unit.

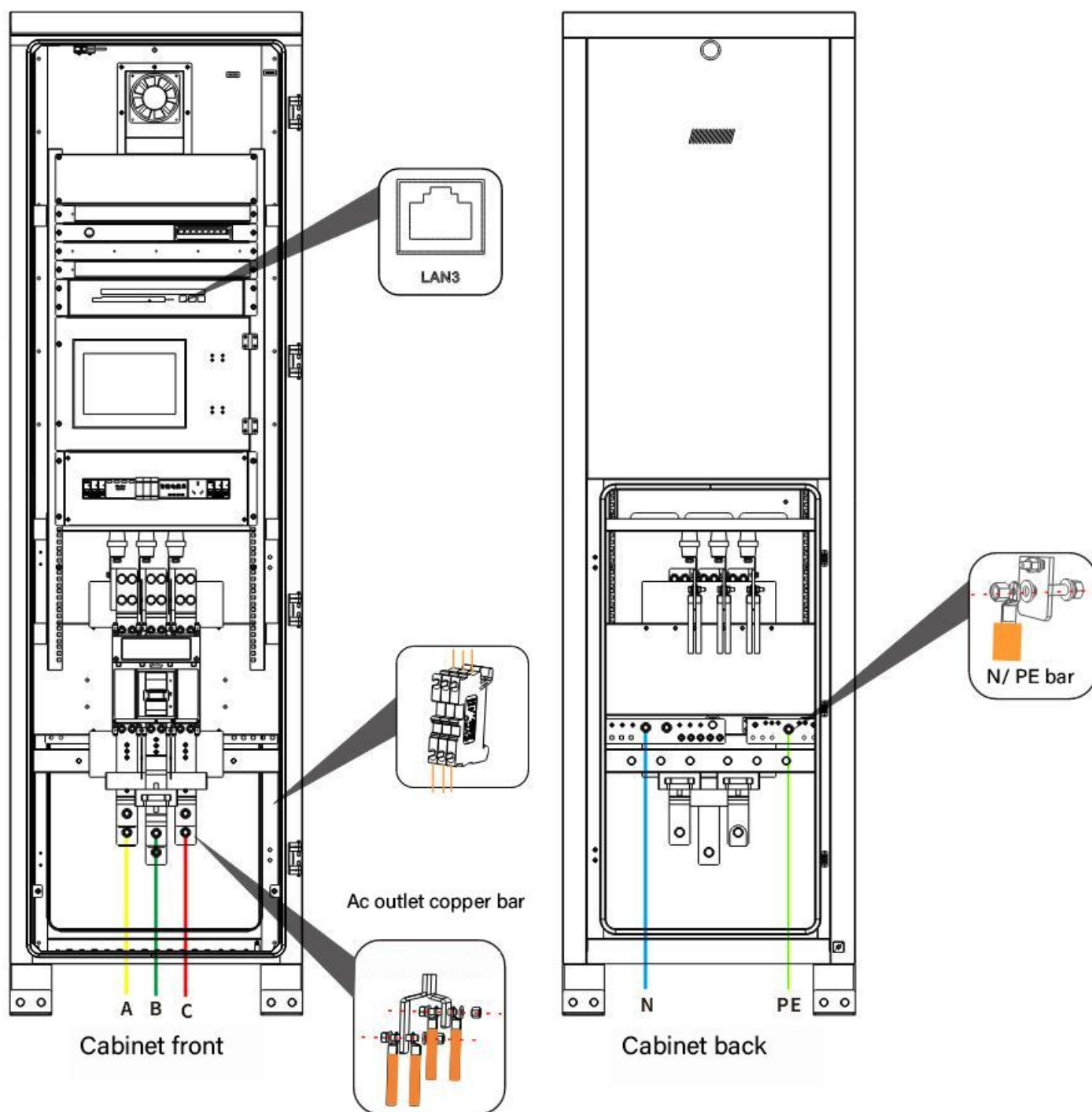
2.2.1 Energy Management Unit (EMU)

- ▶ Communication function: Ethernet communication is used with industrial and commercial energy storage devices, and Ethernet communication is supported externally;
- ▶ Metering function: Measuring the charge and discharge of the energy storage system at peak, flat and valley levels;
- ▶ Display function: Provides a friendly human-machine interface, including but not limited to real-time data monitoring, historical data query, equipment control, parameter settings and other interfaces;
- ▶ Management function: It can collect and send data to the industrial and commercial energy storage integrated device, formulate control strategies through the charging and discharging of energy storage. Achieve peak shaving and valley filling and demand management;
- ▶ Scheduling function: acceptable scheduling;
- ▶ Control function: Fault can be controlled to disconnect from the power grid;
- ▶ Remote monitoring: Supports Ethernet to transmit data back to the remote server.

Performance parameters	
Product Model	HT-BAMS-V1
Working power supply	18~30V
Maximum Power	25W
Communication interface	CAN*2/ETH*2/RS485*3
Communication Protocol	defaultModbus-TCP
Communication baud rate	250kbps (CAN) /100Mbps (LAN) /9600bps (485) /19200bps (485)
Dry contact input	14road,0~12V
Dry contact output	30V/2A,1road
Wet contact output	24V/2A,5road
Battery cluster voltage acquisition	0~1500V (±0.2%FS)
Battery cluster current acquisition	0~400A (±0.5%FS) *2
Insulation resistance to ground	0~65535kΩ (±5%RD±10kΩ)
Operating temperature	- 20~65℃
Operating humidity	5%~95%RH
size/(W*D*H)	482.6*215.8*86.5mm
Rendering	

Core components

The external interface of the energy storage system is shown in the figure2.2-1As shown:



picture2.2-1External interface diagram

surface2.2-1 External interface description table

Serial number	name	illustrate
1	A,B,C,N,PE	The connection points for the A phase, B phase, C phase, neutral line and ground line of the smart combiner cabinet's mains power supply are provided. The terminal blocks for the A/B/C/N/PE end points are of size $\phi 12$
2	4A,4B,GT	External electricity meter485Communication reserved contacts
3	LAN3	Ethernet communication reserved contacts