



Introduction to Haitai Digital Energy





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01

Company Profile

1.1 Group Overview



2006

Haitai Solar was founded in 2006

7

7 business sectors

100+

States/regions covered by business

500

Global top 500 new-energy enterprise

2000+

Total employees all over the world

18

With a history of over 10 years

Haitai Solar (835985.BJ) is a China-based comprehensive new-energy enterprise with overseas market layout

Founded in 2006, Haitai Solar has run business of 7 sectors, i.e. PV modules, PV power stations, PV mounts, energy storage, hydrogen energy, wind energy and PV cells. First engaged in the manufacturing of solar PV modules, Haitai Solar was successful listed in Beijing Stock Exchange on August 8, 2022, realizing leapfrog development. The Company has also made certain progress in other new energy fields such as PV power station, PV mount and energy storage. In particular, the Company has integrated R&D, production of PV mount and energy storage.

Under the background of energy structure reform and "Carbon Peaking and Carbon Neutrality" goals, the Company will continuously create values with high quality products and supply efficient products based on technological innovation. This approach aims to provide global customers with efficient, eco-friendly green energy products, contributing to the supply of low-carbon, clean green energy for society.



PV modules

Tangshan Haitai Solar Technology Co., Ltd.
Founded in 2006, listed in Beijing Stock
Exchange in 2022



PV mount

Tangshan Haitai Intelligent
Equipment Co., Ltd.
Founded in 2021



Hydrogen energy

Tangshan Haitai Hydrogen Energy
Technology Co., Ltd.
Founded in 2021



PV cells

Haitai Solar (Tianchang) Technology Co., Ltd.
Founded in 2023



PV power station

Tangshan Haitai Electric Power
Engineering Co., Ltd.
Founded in 2017



Energy storage

Tangshan Haitai Digital Energy
Technology Co., Ltd.
Founded in 2021



Wind energy

Tangshan Haitai Wind Energy
Technology Co., Ltd.
Founded in 2022



Battery swapping

Shenzhen Haitai Power
Technology Co., Ltd
Founded in 2023

1.2 Milestones

2006



Haitai Solar was founded

2008

- Mature R&D strength and technology
- Entered PV industry completely

2011

- The first 125MW component production line put in use
- Established "Haitai Solar Energy Battery R&D Center" along with Institute of Electrical Engineering, Chinese Academy of Sciences

2013

- Included in the admission list of PV manufacturing of MIIT
- Passed the acceptance by Hebei Engineering Laboratory
- Established cooperation with SHARP and BYD, to explore Japan market completely

2016

- Established its production base in Vietnam
- Acquired the "Pacemaker" power attenuation certificate for the first year

2023

- Provincial reliability laboratory put into use
- The third-party demonstration base was founded

2022

- Listed in Beijing Stock Exchange
- Entered the field of wind energy
- Entered the field of TOPCon component formally
- The 6th batch of green supply chain

2021

- Entered the field of PV mount, energy storage and hydrogen energy
- Manufacturing Industry Single Champion Enterprise in Hebei Province

2020

- Tier 1 component manufacturer

2017

- Entered the field of PV power station

1.3 Overview of Digital Energy



The Company's energy storage business sector was founded in 2021. It is the supplier of global energy storage integrated products and system solutions of the Company. Full-auto, intelligent and efficient lithium battery module and PACK production line with single-line output up to 2GWh.



Haitai Digital Energy's products include
Containerized Energy Storage System (1-10MWh)
Industrial and commercial energy storage (215kWh, 233kWh, 256kWh, 372kWh)
Residential Energy storage (single-phase 3-6kW, 3-phase 8-15kW, 5-30kWh)



Product Advantages

Long lifespan, high safety, high efficiency/intelligence and digitalization/multi-level protection of software and hardware/modular design, facilitating capacity expansion, installation, operation and maintenance.



Production Advantages

Full-auto production equipment such as full-auto KUKA robot, high-accuracy OCV/IR and EOL test device, advanced plasma cleaner, lossless laser welding machine, full-auto production line, intelligent AGV robot, high-feedback charging/discharging test device; strictly control 256 quality control points, such as insulation, differential pressure, gluing welding detection, box airtightness test and capacity test of cell, module and PACK, in order to guarantee the product quality.



Service Advantages

Provide one-to-one, customized and professional system solutions, O&M management plans for customers, including on-grid and off-grid micro-grid, user end, grid end and power supply end.



02

Core Products

Haitai - Blue Shield

Liquid Cooled Energy Storage Battery Container System



- ◆ Multi-dimensional and multi-layer battery protection strategies and fault isolation measures ensure the safety and stability of energy storage system
- ◆ Simple and convenient O&M and small workload Low maintenance cost
- ◆ Equipment such as firefighting equipment, thermal management system, door access, monitoring and liquid leakage protection equipment are introduced to ensure the safe and stable running of battery integration system
- ◆ Large battery capacity High conversion efficiency of energy storage system Comprehensive efficiency > 85%
- ◆ High-quality LFP batteries with a long cycle life > 6,000 cycles
- ◆ Pre-installed container energy storage system can apply to various scenarios quickly Lower installation costs
- ◆ Intelligent BMS system 3-level monitoring for energy storage system Ensure high efficiency and safety
- ◆ Modular structure design Form various voltage platforms flexibly Various capacity grade systems

Technical Parameters of Liquid Cooled Energy Storage Battery Container System

Liquid-cooled energy storage system	
Model	HTDESS 1725/3420-LC
Cell capacity	3421kWh
Cell Specifications	3.2V/300Ah (0.5P)
Pack specification	1P44S
Rated voltage	1267.2V
Voltage range	1108.8~1425.6V
Rated current	1350A
Voltage accuracy (FSR)	1%
Current accuracy (FSR)	1%
Temperature accuracy	2°C
SOC accuracy	5%

Technical Parameters of Liquid Cooled Energy Storage Battery Container System

Liquid-cooled energy storage system	
Model	HTDESS 1725/3420-LC
AC system	
Rated power	1725kW
Output voltage	690V
Voltage range	690V±15%
Rated current	1443A
Power factor	> 0.99 (rated power)
Rated frequency	50/60Hz
Frequency	-5 ~ 5 Hz
THD	Below 3%
Transformer Parameters	
Rated power	2000kVA
Voltage transformation ratio	0.69kV /10~ 35 kV
Transformer model	Dry transformer/oil transformer

Technical Parameters of Liquid Cooled Energy Storage Battery Container System

Liquid-cooled energy storage system	
Model	HTDESS 1725/3420-LC
Other Parameters	
Cell container dimensions (mm)	6058×2438×2896
Gross weight(t)	<36
Converter container dimensions (mm)	6058×2438×2896 mm
Cell cooling mode	Intelligent liquid cooling
Converter cooling mode: Temperature control and forced air cooling	Temperature control and forced air cooling
Firefighting	Gas firefighting, combustible gas detection + exhaust air, water firefighting (optional)
Cycle life	>6000 times (@25°C, EOL80%)
Protection grade	Whole equipment: IP54; key equipment: IP65
Allowed temperature range	-25~+50°C
Allowed humidity range	0 to 95% non-condensing
Max. altitude of running	≤ 4,000*m

Note: *The equipment should enter derating operation at altitude above 2,000m

For changes in product dimensions and parameters, please refer to the latest materials; no further notice will be given

Haitai - Blue Star

Industrial and commercial energy storage system

Application scenarios



*Base station

5G communication base station

Backup cell, charging at high battery level or discharging at low battery level



*Power transmission and distribution

Auxiliary services

Delay the demand for capacity expansion of grid



*Island off-grid energy storage

Microgrid

Energy storage in area without electricity



*Renewable energy power generation

Peak load and frequency regulation

Smooth the intermittent energy sources

Increase the new energy consumption



*Industrial and domestic electricity

Peak-load shifting

Level loads and restrain demands

Improve power supply safety and quality of electric energy



PCS: 100kW/110kW/125kW

Energy storage battery: 215kWh/ 233kWh/256kWh/372kWh

Product Introduction

- ◆ Haitai digital energy industry & commerce energy storage system is integrated with liquid-cooled battery PACK, high-accuracy BMS (battery management system), intelligent EMS (energy management system), PCS and fire prevention system, etc.
- ◆ Flexible application in different scenarios based on modular design.
- ◆ The system can improve the energy quality of power grid, such as voltage deviation, 3-phase imbalance and harmonic wave.
- ◆ Fitted with functions such as load tracking, standby power supply and peak regulation
- ◆ The system can help industry & commerce owners reduce the electricity expense, increase the green electricity consumption, and maintain the safe and stable running of system.

Main advantages

- ◆ Efficient liquid cooling technology, cell temperature difference <math><3^{\circ}\text{C}</math>
- ◆ Intelligent monitoring system, integrating BMS and EMS intelligent safety system
- ◆ All-in-one, easy transport, plug and play
- ◆ Built-in independent firefighting system

Technical Parameters of Industrial and Commercial Energy Storage

AC side (on-grid)	
Application scenarios	Peak-load shifting, energy time shifting
Rated power	125kW
Access mode	400Vac,3P+PE
Max. continuous input current	180A
Rated grid frequency	50/60Hz
Power factor	0.8CAP~0.8IND
THDI	<3%
DC side	
Rated Energy	256kWh
Cell type	Lithium iron phosphate LFP3.2V 280AH
Cycle count	≥6600 times (0.5C,25°C, 80%EOL, 90%DOD)
Rated voltage	915.2V
Voltage range	686.4V~1043.9V
Charge/discharge efficiency	≥90%
Charging/ discharging current	128A(0.5C)

Technical Parameters of Industrial and Commercial Energy Storage

Basic parameters	
AC/DC switch time	≤10ms
Protection function	Over/under voltage, over current, high/low temperature, high/low SOC, insulation detection and short-circuit protection
Operating Temperature	−30°C~+50°C(>45°C derated)
Cooling method	Air cooling (PCS), liquid cooling (cell)
Height above sea level, max.	2000m
Firefighting Method	Aerosol + Perfluoro (optional) fire extinguishing agent
Max. conversion efficiency	92 (excluding auxiliary power consumption)
Protection grade	IP55 (battery pack IP67)
Noise	<70dB@25°C
Communication	RS485, CAN, Ethernet, ModbusTCP/RTU
Dimensions (W*D*H) mm	1030x1320x2480mm
Weight	2700 kg

Outdoor cabinet energy storage system

Product Highlights

- ◆ Support flexible expansion of PV power generation capacity;
- ◆ Support access of load, battery, grid, diesel generator and PV at the same time;
- ◆ Integrated with EMS functions, to ensure high safety and stability;
- ◆ Support prediction of battery capacity and discharging time;
- ◆ Built-in isolated transformer, with strong adaption to loads.



Outdoor Cabinet Type Integrated Optical Storage System

Model	ESSA0030B-0055	HTDESS0050B-0055	HTDESS0050B-0100	HTDESS0100B-0215
Rated power (kW)	30	50	50	100
Rated voltage (V)	400			
Rated current (A)	43	72	72	144
Voltage range (V)	320V-460V			
Rated frequency	50/60Hz			
Frequency range	45-55/55-65Hz			
THDi (on-grid)	<3%			
THDu (off-grid)	≤1% linear, ≤5% nonlinear			
Power factor	1 (0.8 lead ~ 0.8 lag)			
Overload capacity	110% long-term			
AC output	3W+N+PE			
Isolation transformer	100/400	200/400	200/400	270/400
On-grid/off-grid switching	Supported			

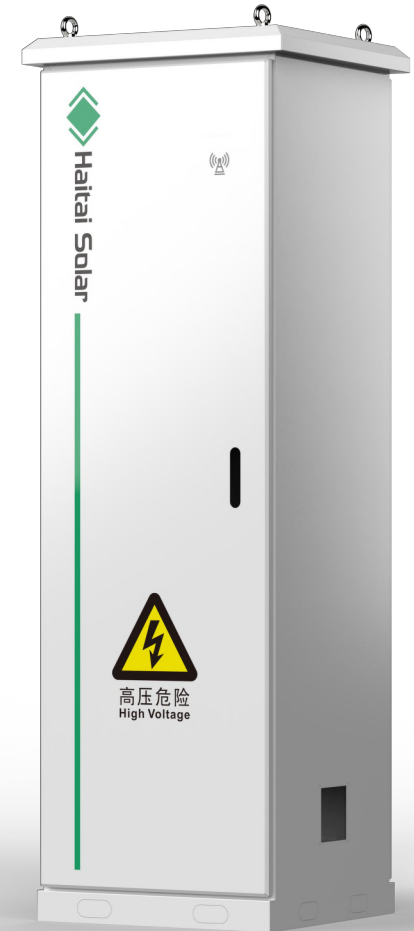
Outdoor Cabinet Type Integrated Optical Storage System

Model	ESSA0030B-0055	HTDESS0050B-0055	HTDESS0050B-0100	HTDESS0100B-0215
PV				
Max. PV input voltage (V)	1000			
Max. PV power (kW)	60/120	60/120	60/120	120/180/240
MPTT working voltage range (V)	250-850			
MPPT full load voltage range (V)	450-850			
Voltage increase/decrease mode	Supported			

Communication power supply system

The new energy mixed power supply system of communication base station can be configured with different power supply system devices according to the requirements of base station

- ◆ PV MPPT controller and mains supply rectifier are provided with modular installation, supported PV ranges from 5kW to 30kW; mains supply rectifier supports 5-15kW capacity expansion.
- ◆ It can manage multiple energies at the same, such as solar energy, wind energy, mains supply, fuel oil generator and battery.
- ◆ The product supports multiple protections such as overvoltage, overcurrent, overheat, undervoltage and short-circuit.
- ◆ Integrated with battery management function, with protection against reverse connection, overcharging and over-discharging of battery.
- ◆ Support RS232, RS485, CAN and other communication interfaces.
- ◆ Outdoor IP54 protection grade, multiple safety controls and lightning prevention design, adaptive to severe environment such as high altitude and ultra-low temperature.



Communication power supply system

Parameters of control cabinet	
Input voltage of PV controller	60Vdc~150Vdc
Output voltage and current of PV controller	48Vdc/50A
Install quantity of PV controller	3-10PCS
Input voltage of rectifier module	90Vac to 300Vac
Output voltage and current of rectifier module	48Vdc/50A
Install quantity of rectifier module	3-6PCS
Protection grade	IP54
Cooling method	Natural air cooling
Dimensions	600×600×2000
Power cabinet parameters	
Battery module capacity	51.2V100AH
Battery module dimensions	3U
Cell type	Lithium iron phosphate
Parallel operation quantity	<10 PCS
Cooling method	AC



Residential Energy storage

Product Introduction

- ◆ 1.The single-phase hybrid inverter is 3-6kW,three-phase hybrid inverter is 6-15kW. Supports multi-inverter parallel connection. The input terminal supports 1.5 times component expansion. The PV string is 16A, which supports 182 / 210 high-power photovoltaic module access.
- ◆ 2.Support 5-30 kWh battery, using PACK installation, free combination, to meet the individual requirement;
- ◆ 3.Zero-time switching between on-grid/off-grid of grid and battery, to guarantee the power consumption.

Main advantages

Friendly and flexible

- ◆ Support parallel connection of multiple machines;
- ◆ Compatible with multiple batteries, such as lead acid and lithium ion batteries;

Safe and reliable

- ◆ Compatible with anti-reverse flow function;
- ◆ Protection against battery reverse connection;

Intelligent Management

- ◆ Household smart energy management terminal ;
- ◆ Power dispatching and response management node at demand side;
- ◆ Management node of distributed virtual power station;

Economical and efficient

- ◆ Max. efficiency $\geq 97.5\%$;
- ◆ Small volume, wide applications, save the installation space;

3-6kW HTDESS S 3.0K-6.0K G2
Single-phase mixed inverter



6-15kW HTDESS T6.0K -15k G1
3-phase mixed inverter



Technical Parameters of Household Single-phase Energy Storage Inverter

Model parameters	HTDESS S3.0K G2	HTDESS S4.0K G2	HTDESS S5.0K G2	HTDESS S6.0K G2
DC input				
Max. input power (kW)	4.5	6	7.5	9
Starting voltage (V)	100			
Max. PV voltage (V)	550			
MPPT voltage range/rated voltage (V)	80~500/360			
Max. input current (A)	16			
Number of MPPT circuits	2			
Parallel output				
Rated power (kW)	3	4	5	6
Max. output power (kVA)	3.3	4.4	5	6.6
Rated voltage/range (V)	230 /176~270			
Frequency (Hz)	50 /60			
Power factor	1 (0.8 lead ~ 0.8 lag)			
Harmonic current	<3%			
Grid connection type	L+N+PE			

Technical Parameters of Household Single-phase Energy Storage Inverter

Model parameters	HTDESS S3.0K G2	HTDESS S4.0K G2	HTDESS S5.0K G2	HTDESS S6.0K G2
Cell				
Rated voltage/range (V)	51.2/40~58			
Max. charging voltage (V)	58			
Max. charging/discharging current (A)	60/60	80/80	100/100	120/120
Communication Method	CAN/RS485			
Battery type	Lithium battery/lead acid battery			
Off-grid output				
Rated power (kW)	3	4	5	6
Rated voltage (V)	220/230V			
Max. current (A)	14.3	19.1	21.7	28.7
Rated frequency (Hz)	50/60			
Switching time (ms)	<10ms			
Harmonic voltage	<2%			
Overload capacity	110%,60S/120%,30S/150%,10S			

Technical Parameters of Household Single-phase Energy Storage Inverter

Model parameters	HTDESS S3.0K G2	HTDESS S4.0K G2	HTDESS S5.0K G2	HTDESS S6.0K G2
General data				
Charge/discharge efficiency	96%			
Max. efficiency	98%			
European efficiency	97%			
MPPT efficiency	99.90%			
Protection grade	IP65			
Noise (dB)	<35			
Operating temperature (°C)	-25~60			
Cooling method	Natural cooling			
RA Temp.	0 ~95% (no condensation)			
Altitude	4,000m(>2,000 derating)			
Dimensions W × D × H(mm)	451×200×474			
Weight (kg)	18			
Isolation mode	No isolation transformer			
Self-consuming (W)	<3			
Display and communication				
Display	LCD LED			
Interface:RS485/Wifi/4G/CAN/DRM	RS485/Wifi/4G/CAN/DRM Opt			

Technical Parameters of Household 3-phase Energy Storage Inverter

Model parameters	HTDESS T6.0K G1	HTDESS T8.0K G1	HTDESS S10K G1	HTDESS T12K G1	HTDESS T15K G1
DC input					
Max. input power (kW)	9	12	15	18	22.5
Starting voltage (V)	200				
Max. PV voltage (V)	1000				
MPPT voltage range/rated voltage (V)	180~850/600				
Max. input current (A)	16				25
Number of MPPT circuits	2				
Parallel output					
Rated power (kW)	6	8	10	12	15
Max. output power (kVA)	6.6	8.8	11	13.2	16.5
Rated voltage/range (V)	380 、 400 / 340~460				
Frequency (Hz)	50 /60				
Power factor	1 (0.8 lead ~ 0.8 lag)				
Harmonic current	<3%				
Grid connection type	3W+N+PE				

Technical Parameters of Household 3-phase Energy Storage Inverter

Model parameters	HTDESS T6.0K G1	HTDESS T8.0K G1	HTDESS S10K G1	HTDESS T12K G1	HTDESS T15K G1
Cell					
Rated voltage/range (V)	360/125-550				
Max. charging voltage (V)	600				
Max. charging/discharging current (A)	50				
Communication Method	CAN				
Battery type	Lithium battery/lead acid battery				
Off-grid output					
Rated power (kW)	6	8	10	12	15
Rated voltage (V)	380/400V				
Max. current (A)	9.5	12.7	15.9	21.7	28.7
Rated frequency (Hz)	50/60				
Switching time (ms)	<10ms				
Harmonic voltage	<2%				
Overload capacity	110%,60S/120%,30S/150%,10S				

Technical Parameters of Household 3-phase Energy Storage Inverter

Model parameters	HTDESS T6.0K G1	HTDESS T8.0K G1	HTDESS S10K G1	HTDESS T12K G1	HTDESS T15K G1
General data					
Charge/discharge efficiency	98%	97.50%	97.50%	97.50%	97.80%
Max. efficiency	98%	97.90%	98.20%	98.20%	98.50%
European efficiency	97%	97.50%	97.50%	97.60%	97.80%
MPPT efficiency	99.90%				
Protection grade	IP65				
Noise (dB)	<35				
Operating temperature (°C)	-25~60				
Cooling method	Natural cooling				
RA Temp.	0 ~95% (no condensation)				
Altitude	4,000m(>2,000 derating)				
Dimensions W × D × H(mm)	596×566×220				
Weight (kg)	30	31	31	33	34
Isolation mode	No isolation transformer				
Self-consuming (W)	<3				
Display and communication					
HIMI	LCD/APP				
BMS	CAN				
EMS/Meter	RS485/RS485				
Supported communication interface	WIFI/GPRS				

Residential Energy Storage Battery Pack

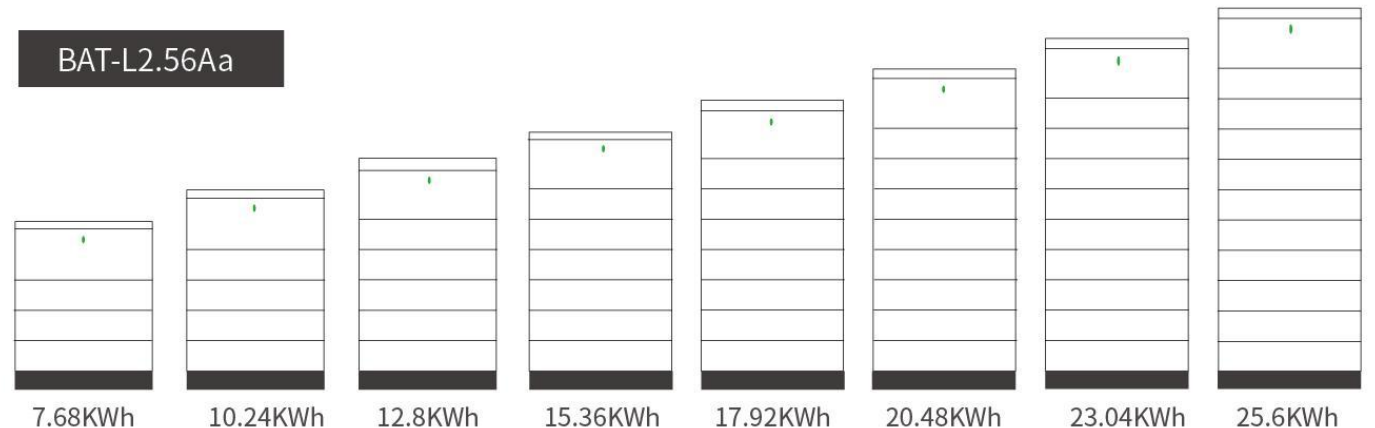
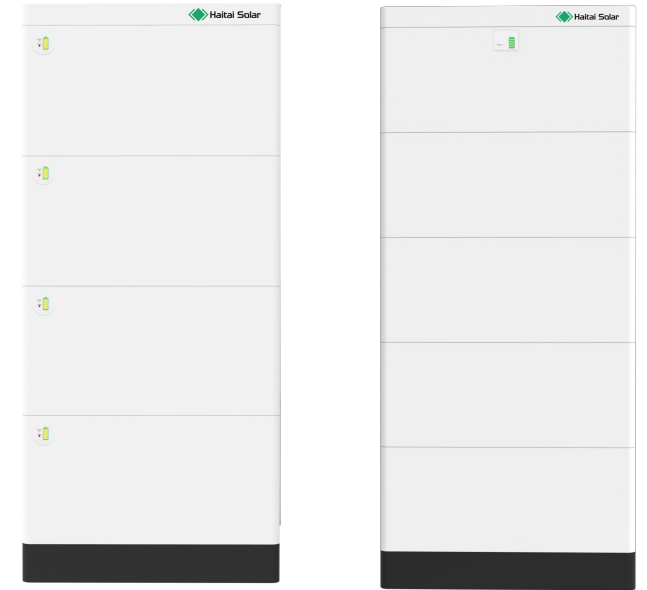
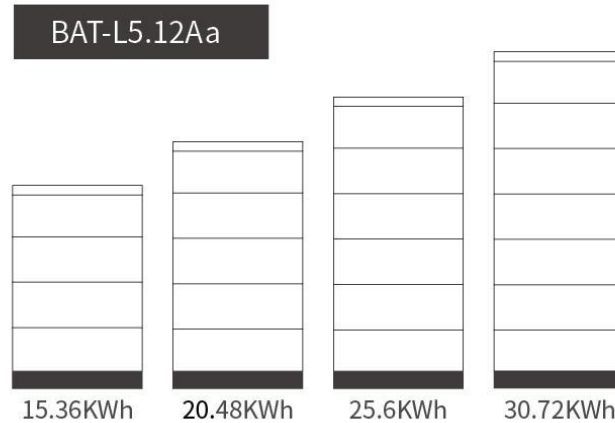
HTDESS 2.56kWh 51.2V/50AH module
HTDESS 5.12kWh 51.2V/100AH module

Product Introduction

- ◆ The two modular batteries of 2.56kWh and 5.12kW have small and lightweight single modules. The battery combination can be customized easily through simple installation steps, to satisfy your demands of energy storage.
- ◆ The entire system can be intelligent and flexible through reliable BMS system and high-performance balancing technology, to provide you a discharging platform of higher stability.

Main advantages

- ◆ Higher conversion efficiency
- ◆ Reduce reliance on grid
- ◆ Better adaption to large-load applications
- ◆ Higher flexibility
- ◆ Lower cost, larger system
- ◆ Faster charging and discharging
- ◆ Energy saving



Technical Parameters of Low-voltage Stacked Battery Pack

Model	HTDESS LP 2.56 D1	HTDESS LP 5.12 D1
Rated voltage (Vdc)	51.2	51.2
Rated capacity (Wh)	2560	5120
Working voltage range (Vdc)	44.8-56.16	44.8-56.16
Charging voltage (Vdc)	58.4	58.4
Rated charging/discharging current (A)	25	50
Max. charging/discharging current (A)	50	100
Peak current (A)	100@3sec	200@3sec
Number of units in parallel	<10pcs	<6pcs
Cycle life	6000@80% DOD,25°C/0.5C	
Structure		
Dimensions (mm)	600×210×180	600×210×300
Weight (kg)	29	50.5
Protection grade	IP65	
Type of mounting	Stacking type	
Work environment		
Charging temperature °C	0~55	
Discharging temperature °C	-20~60	
Latitude	<2500	
Relative temperature (RH)	5~95% (no condensation)	
Communication		
communication interface	RS485	
Display	LED indicator shows the remaining power	

Technical Parameters of High-voltage Stacked Battery Pack

Model	HTDESS HP 2.56 D1	HTDESS HP 5.12 D1
Rated voltage (Vdc)	51.2	51.2
Rated capacity (Wh)	2560	5120
Working voltage range (Vdc)	129.6-516.6	129.6-350.4
Charging voltage (Vdc)	58.4	58.4
Rated charging/discharging current (A)	25	50
Max. charging/discharging current (A)	50	100
Peak current (A)	100@3sec	200@3sec
Number of units in parallel	<10pcs	<6pcs
Cycle life	6000@80% DOD,25°C/0.5C	
Structure		
High-voltage box dimensions (mm)/weight (kg)	600×210×250/14	610×225×250/15
Battery cabinet dimensions (mm)/weight (kg)	600×210×160/27	610×225×250/52
Pedestal (mm)/weight (kg)	610×225×90/5	610×225×90/5.5
Top cover T (mm)/weight (kg)	600×210×50/2.5	610×225×50/3
Protection grade	IP65	
Type of mounting	Stacking type	
Work environment		
Charging temperature °C	0~55	
Discharging temperature °C	-20~60	
Latitude M	<2500	
Relative temperature (RH)	5~95%(W/O condensing)	
Communication		
communication interface	RS485 CAN	
Display	LED indicator shows the remaining power	

Thank you

THANK YOU FOR WATCHING

Tangshan Haitai Digital Energy Technology Co., Ltd.

