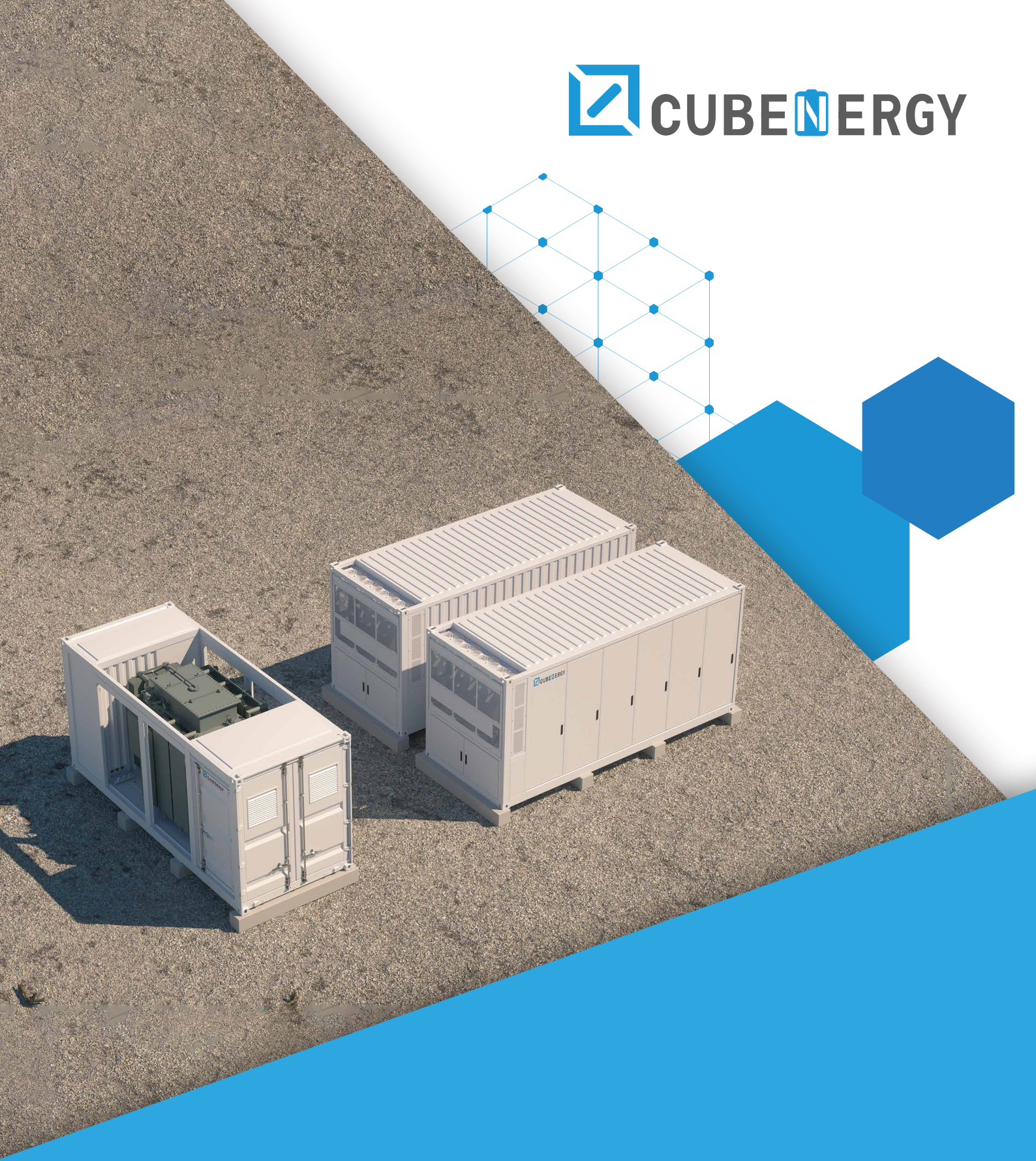
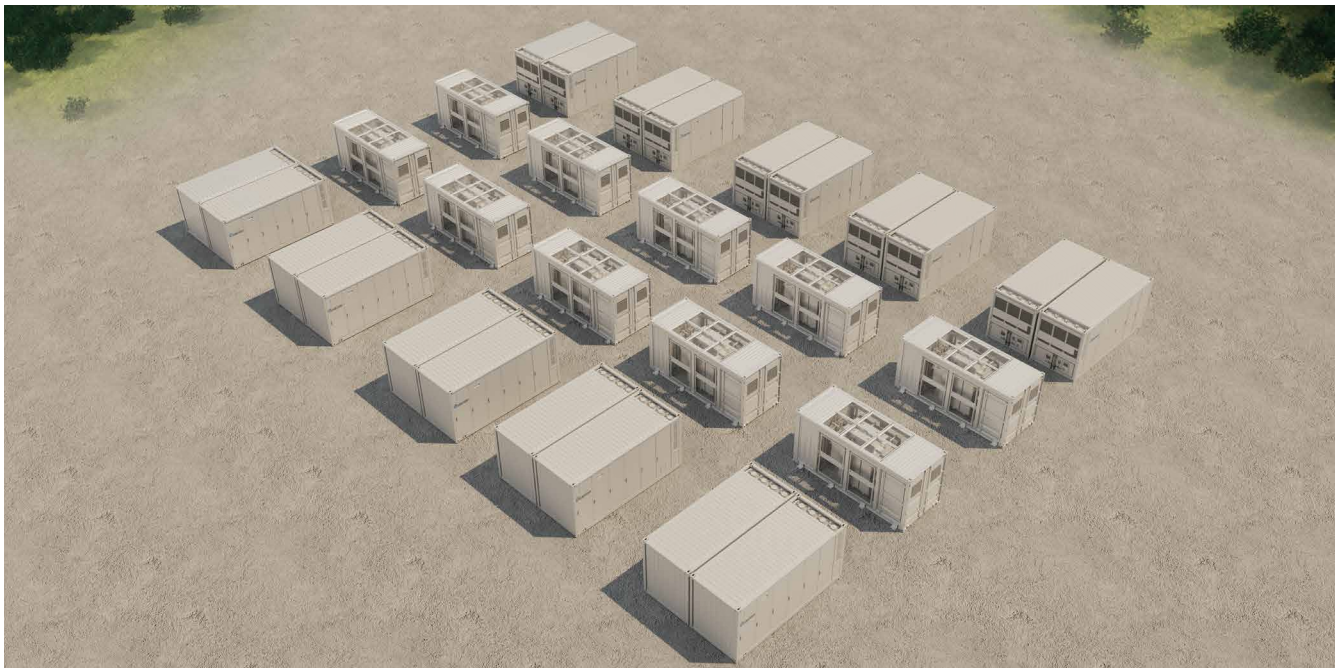
CUBENERGY



PowerCombo-20C2H2500K

Resilient, Reliable, and Quick Delivery Liquid Cooling Energy Station

PowerCombo-20C2H2500K(AC Block)



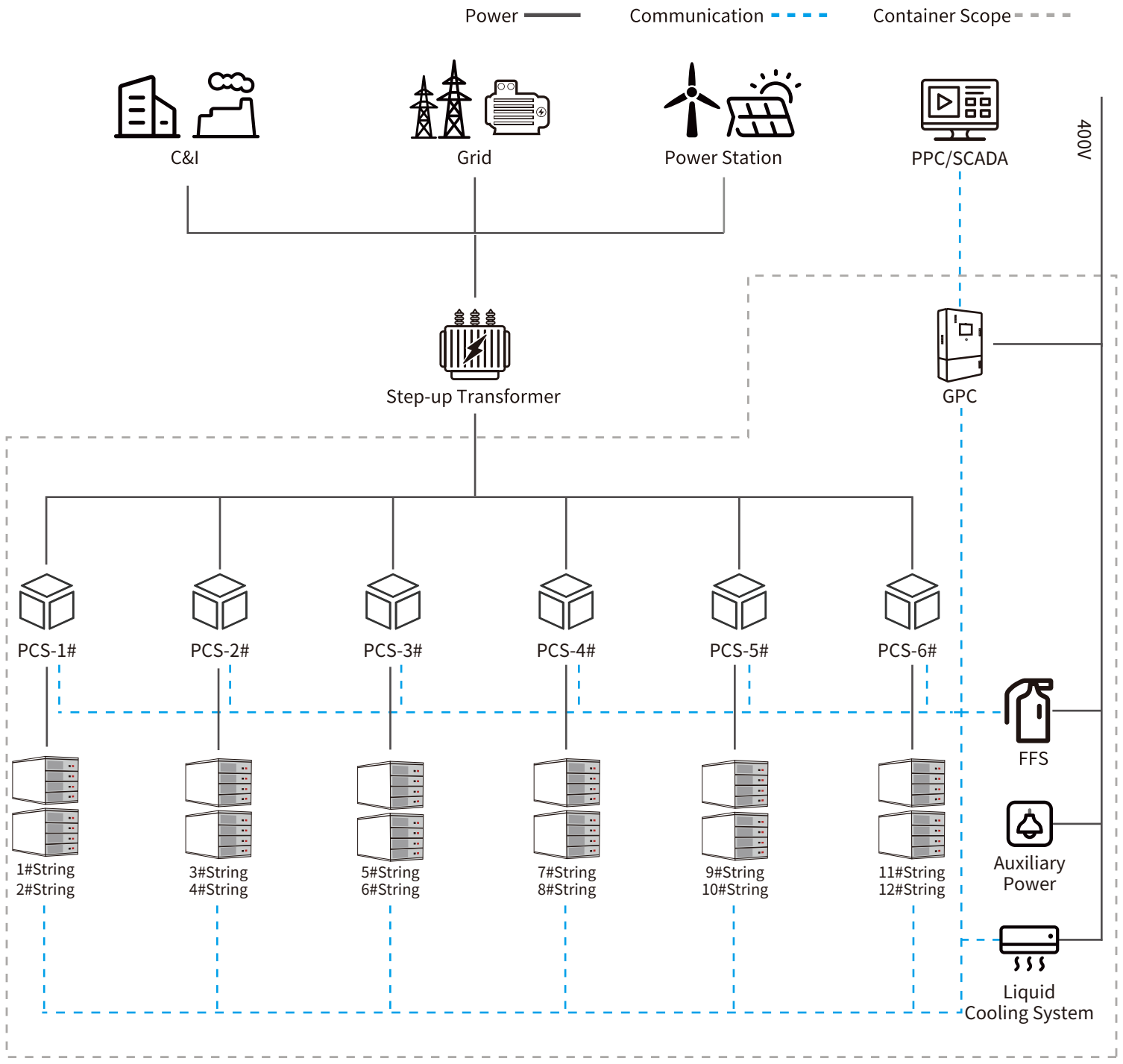
PowerCombo, a high-performance, all-in-one, containerized battery energy storage system developed by Cubenergy, provides users with the intelligent and reliable solution to optimize energy efficiency and resilience. As the leading BESS product, PowerCombo is certificated by UL1973, UL9540A, UL9540, IEC62619, CE , UN38.3, complied with IEC62933, IEC63056, NFPA855, provides secure, reliable and safe power supply.

PowerCombo-20C2H2500K, with capacity of 2500kW/5,015kWh@20ft, is ideal for mostly utility applications, such as renewable energy arbitrage and stand alone grid stabilization. The integrated and easy-to-install BESS can be easily connected and matched with the equipment, while the advanced PCS and cloud-based operation platforms bring superior interaction experience for users.

Application

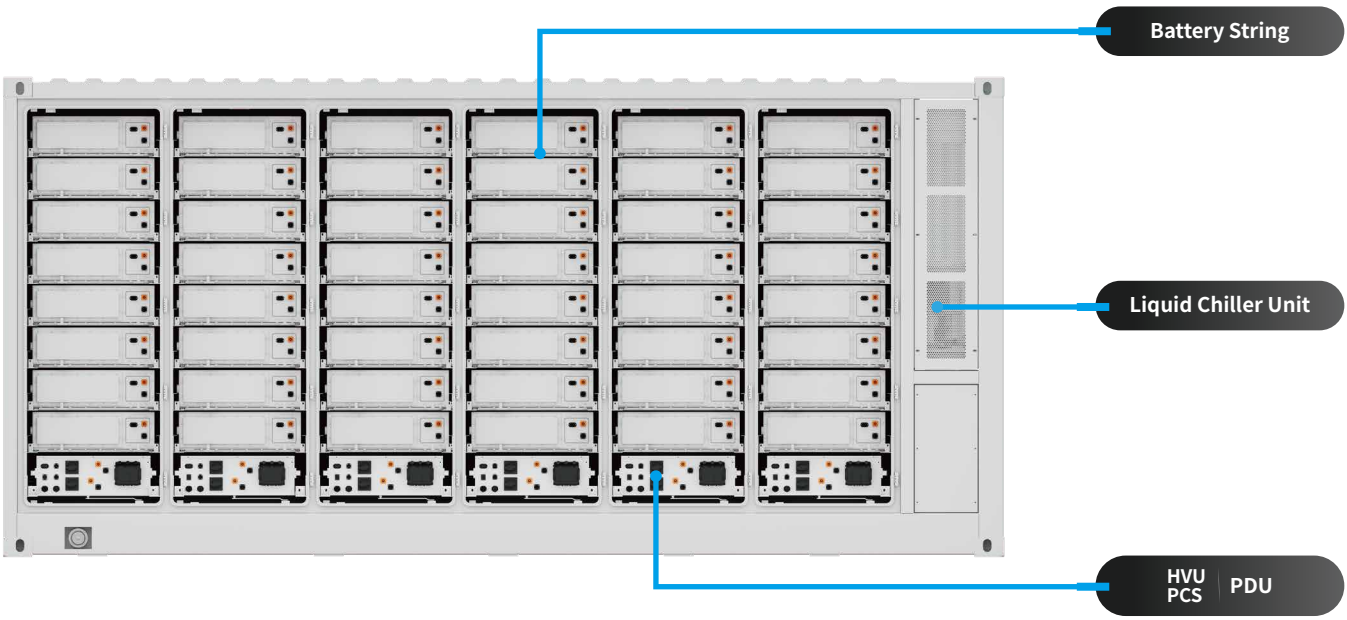
- Smooth,time-shifting renewable energy export.
- Dynamic grid support (voltage & frequency regulation).
- Peak shaving and demand management.
- Microgrid stabilization with fast response.
- Utility-scale grid-forming ability.

System Topology



More Energy	AC Block	Plug&Play	Safe & Reliable
Pack-level Optimization String-level Optimization	AC/DC All-in-one Simple Layout, High Density	Perfect integration Quick Commissioning	Fire Code Compliance Multi-level prevention

Product Layout



Product Model Definition

20C2H2500K-12LS417-4LP104

Container Size	Minimum Discharge Hour	AC Power	Quantity of Battery String	Code of Battery String	Quantity of Pack per String	104kWh/Pack

Product Configuration

Product Model	Battery String Type	String Qty	Nominal Power	Nominal Capacity	DC Voltage Range	PCS Grid-connected Voltage	Dimensions (WDH mm)
20C2H2500K	LS417	12	2,580kW	5,015kWh	1,164.8V~1,476.8V	690V	6,058x2,438x2,896mm

System Technical Specifications

Item	20C2H2500K
DC Data	
Battery chemistry	Lithium Iron Phosphate (LFP)
Cell life cycle	8,000 cycles with 70% retention @ 0.5C 25°C
Cell spec	3.2V/314Ah
Each String configuration	1P416S
Number of strings	12
DC rated energy capacity	5,015kWh
Rated voltage	1,331.2V
Voltage range	1,164.8V~1,476.8V
AC Data	Standard Output
Rated AC Power	2580kW
Maximum AC power	2,838kW
Rated voltage	690V
Grid-connected voltage range	586.5~759V (Adjustable)
Rated AC current	2,158A
Output THDi	<3% (Rated full load)
AC PF	-1~+1
AC output	3W+PE
General Data	
Dimension w/o clearances (L*W*H)	6,058x2,438x2,896mm
Weight of the whole system	⩽44t
Degree of protection	IP54
Operating temperature range	-30~50°C
Relative humidity	0~95% (non-condensing)
Working altitude	<2,000m/6,562 feet (non-derating)
Temperature control method	Liquid Cooling for Battery Pack and PCS
Fire fighting system	Safety Extinguishing Agent(PFAS Free Aerosol), UL/CE Listed Fire Control Panel, Pre-install fire sprinkler
Peak Auxiliary load	63kW, 400V 3P4W, 50/60Hz
Communication interfaces/protocol	Ethernet/ModbusTCP/IP
Certificates and Compliance	UL9540, IEC62933, UN3536, CE MARK by TÜV Rheinland

☐ Key Components

- 0.5C Charge/Discharge;
- High Density and Safety Stack Design;
- Easy configuration and maintenance.

Battery String

Item	LS417×2
Battery module configuration	1P416SX2P
Pack QTY	8
Rated capacity	417.5kWh×2
Rated voltage	1331.2V
DC voltage range	1164.8~1476.8V
Pack Configuration	332.8V/314Ah@1P104S
Communication	Ethernet, CAN, RS485
Dimensions (W*D*H)	926*2,260*2,250mm
Weight	5,229kg
Certifications	UL9540A, IEC62619, UN38.3

- Single-stage three-level modularization;
- High-efficiency liquid cooling;
- Long lifespan, low failure rate.

Power Conversion System

Item	CBAC-430-HA-M
DC voltage range	1,000~1,500V
Maximum DC current	480A
Rated AC power	430kW
Rated AC voltage	690V, 3W+PE
Grid-connected voltage range	586.5~759V(Adjustable)
Rated(MAX)AC current	360A(396A)
Grid frequency	50Hz/60Hz
AC PF	-1~+1
Degree of protection	IP66
Grid Code Compliance	EN50549 -1, -2, -10, VDE 4110/4120/4130, TF3.3.1 Rev5, SJV 2024, EI0-16，NTS 2.1, G99

Next-Gen Control

GridPoint Controller (GPC)

an advanced one-stop BESS control and status information and management center.

Power interface
AC220V/DC24V

Communication
Modubus TCP

SPAC BMS

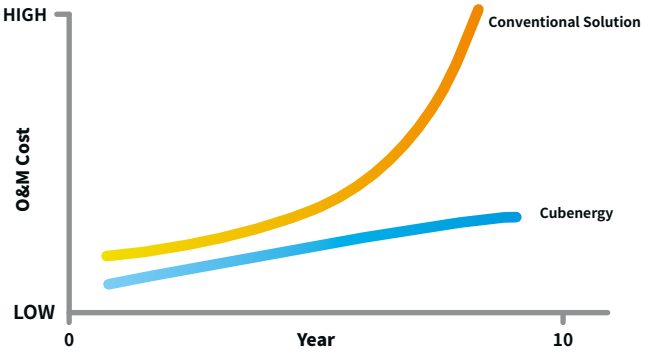
Cubenergy' s controlling evolution since 2016

SPAC BMS delivers intelligent battery management through real-time cell voltage balancing. This proprietary technology minimizes energy loss caused by cell imbalances, increasing balance efficiency and extending battery cycle life. By ensuring uniform charge/discharge distribution across all cells, SPAC BMS maximizes usable capacity while maintaining stringent safety protocols—critical for large-scale BESS applications requiring long-term reliability.

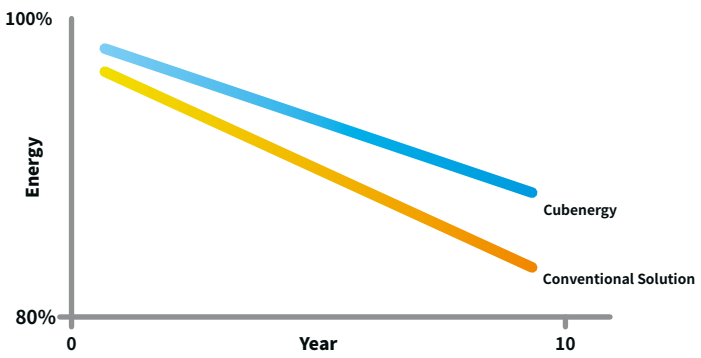
Functions

1. Monitor and protect safety of battery cell
2. Monitor and protect safety of electric system
3. Calculate and manage charging and discharging status
4. Calibrate and manage available energy
5. Optimize balance and manage cell consistency

Advantages



Maintenance Cost



Performance

☐ Grid Forming*

Cubenergy' s BESS is equipped with advanced technologies for grid voltage support and frequency regulation. It employs Virtual Synchronous Generator (VSG) control to emulate the external characteristics of synchronous generators. This delivers essential inertia, damping, and dynamic grid support, ensuring robust and stable power system operation.

Superior Grid Compliance

Maximized ROI

Enhanced Grid Resilience

Functions

- **Inertia and Damping Control**

  Inertia Emulation: The inverter simulates inertia using a virtual inertia time constant, allowing it to release or absorb energy during grid frequency or voltage changes, helping to slow down system fluctuations.

  Damping Control: A virtual damping factor is applied to suppress oscillations and improve the dynamic stability of the grid.

- **Autonomous Frequency/Voltage Regulation**

  Frequency Control: Dynamically adjusts active power based on frequency deviation (parameter kf: 0-200).

  Voltage Control: Dynamically regulates reactive power based on voltage deviation (parameter kv: 0-100).

- **Multi-Scenario Adaptability**

  Islanded Operation: Maintains voltage/frequency independently during grid outages for critical load supply.

  Weak Grid Support: Stabilizes voltage/frequency in high-renewable penetration scenarios.

  Renewables Coordination: Optimizes operation with wind/PV through power sharing.

Advantages

- **Enhanced Grid Stability**

  Compensates for the lack of inertia in renewable energy sources (PV/wind), mitigates intermittent power fluctuations from PV/wind generation, improves grid absorption capacity and suppresses frequency deviations.

- **Flexible Operation Capability**

  Supports both grid-connected and islanded modes, maintaining voltage/frequency in microgrids, and participates in grid frequency/voltage regulation in grid-tied application.

- **Multi-unit Cooperative Control**

  Enables precise power allocation among parallel inverters via virtual impedance and adaptive algorithms, solving uneven power distribution issues in traditional droop control.

- **Power Quality Optimization**

  Reduces current THD (Total Harmonic Distortion) to solve voltage imbalance issues caused by PV inverter grid integration.

*Seamless PQ Mode (Fixed Power Output) and GFM Mode (VSG Mode) Switching for Multi-Scenario Operation.

NOTES

Product dimensions and physical appearance in this brochure are nominal and are provided for the convenience of our customers. Cubenergy reserves the right to make changes from time to time, without prior notification, which may change the dimensions and physical appearance shown.

We therefore recommend you to consult with a Cubenergy sales representative before your purchase.

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