AlphaESS
your smart energy

ENERGY STORAGE SOLUTIONS

Residential | Commercial | Industrial | Utility

AlphaESS Europe GmbH

europe@alpha-ess.de

www.alphaess.de

Horizon Tower 17.OG, Alfred-Herrhausen-Allee 3-5, 65760 Eschborn, Germany

AlphaESS
your smart energy

C&I AND UTILITY ENERGY STORAGE SOLUTION

MAKE CLEAN **ENERGY**

ACCESSIBLE TO 100 MILLION

PEOPLE IN 10 YEARS

CONTENTS

1 ABOUT ALPHAESS

Founded in 2012, AlphaESS is now one of the world-leading energy storage solution and service providers. The company specialises in delivering pre-eminent fit-for-purpose product solutions covering the full power range from small portable power stations all the way up to large utility-scale solutions. With 40+ subsidiaries in the globe, AlphaESS provides local services and supports 200,000+ systems actively running in 130+ countries.

13+
Years since Establishment

250+
Patents in the ESS Field

200,000+
Systems Installed Globally

130+
Countries & Regions

TOP 1

2022-2023 TOP 1 Australia Market Share
from SunWiz

TOP 5

2023 H1 TOP 5 Residential ESS Provider in Germany
from EUPD Research

TOP 6

2021 TOP 6 Supplier of Global Residential Storage Systems
from IHS Markit

NPS 92,3% NET PROMOTER SCORE
The Most Recommended Brand in Germany

TIER 1 Bloomberg NEW ENERGY FINANCE
Tier 1 Energy Storage Manufacturer by BloombergNEF 2025

iF & Reddot & G-Mark Design Awards

EUPD RESEARCH TOP BRAND PV STORAGE GERMANY 2024 / 2022 / 2023
EUPD RESEARCH TOP BRAND PV INVERTERS GERMANY 2024 / 2022
TOP BRAND PV (STORAGE & INVERTERS)

GLOBAL SERVICE NETWORK

4 **Production Sites**

China: Nantong (Tongzhou), Qidong, Ulanqab

Malaysia: Penang

4 **R&D Centres**

Nantong (Tongzhou), Suzhou, Nanjing, Tianjin

40 **Subsidiaries**

China: Suzhou, Beijing, Tianjin, Shenzhen, Chengdu, and Nanjing.

Global: European countries, including Germany, Benelux, Italy, and the UK; Oceanian countries like Australia and New Zealand; the United States; Asian countries like Japan, Republic of Korea and Malaysia.

Note: The data shows the company's global presence as of the end of 2024.

2 THE STORY OF "STORION & ASTER"

C&I AND UTILITY-SCALE SOLUTIONS

2024 1.5 GWh and LSES DEPLOYED WORLDWIDE

Since the launch of our Commercial and Industrial solutions, AlphaESS has installed over 1.5 GWh of C&I systems worldwide by 2024. Most of these deployments are located in regions with limited access to reliable power infrastructure, bringing dependable and sustainable clean energy to millions of people.

2018 INTERNATIONAL RECOGNITION

Our rural electrification project in Myanmar was selected by the Intersolar Europe committee as one of the 10 finalists for the Outstanding Projects Award.

2017 MILESTONE PROJECT OVER 1 MWH

AlphaESS completed its first large C&I project in Cambodia, installing a 500kW/1.26MWh energy storage container. This milestone project provides stable and cheap electricity to a local pharmaceutical factory and its workers.

2015 THE FIRST C&I PROJECT

The first STORION series for commercial applications were delivered to six petrol stations (20kW/60kWh × 6) in remote areas of Indonesia where power outages were frequent.

2013 THE ORIGIN OF THE NAME

STORage + Lithium-**ION** = **STORION**

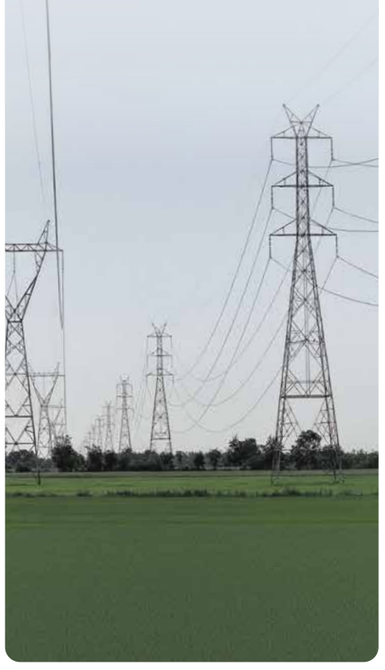
TODAY

With over a decade of evolution, AlphaESS now offers multiple product series for commercial and industrial energy storage applications — including the STORION and ASTER families. These solutions are widely applied in rural electrification, power resilience, and diverse C&I scenarios. Today, our portfolio covers inverter power ranging from 30 kW to 500 kW and storage capacity from 64.5 kWh to 5 MWh, providing customers with flexible, scalable, and reliable clean energy solutions.

APPLICATIONS

GRID SIDE

Peak-Shifting
and Stabilising Grids



RURAL ELECTRIFICATION

Lighting up Villages,
Powering up Lives

COMMERCIAL OFFICE BUILDINGS

Energy Resilience for
Business Excellence

SMALL FACTORIES

Fuelling Industries,
Energising Growth

ISLANDS

Island Energy Independence,
Harnessing Power from Nature

MINING SITES

Unearth the Power,
Illuminate the Depths

3
PRODUCT INTRODUCTION

ASTER TB250/TB500

250 - 500 kW | 705 kWh – 1410 kWh

STORION-LC 836

836 kWh per cabinet, up to 5.016 MWh

ASTER 5000

5015.9 kWh / 4597.9 kWh / 4179.9 kWh / 3761.9 kWh

Large-Scale Solution Highlights

RELIABILITY & QUALITY

- **NFPA 69-Compliant** Explosion Protection Design
- **100% Factory Acceptance Tested** — Over 40 Tests on Functionality, Performance, and Capacity

PCS COMPATIBILITY

NR DELTA

SINEXCEL

HOPEWIND

GLOBAL COMPLIANCE

- Certified to Global Energy Storage Standards, Easily Scalable
- Ideal for C&I and Utility-Scale Projects

IEC UL CE NFPA

SERVICE LEVEL AGREEMENT

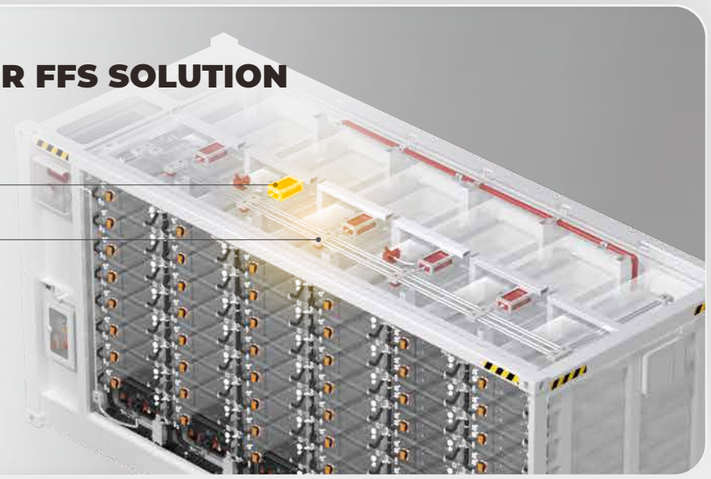
Optional:

LTSA (Long-Term Service Agreement)

After-Sales Certification Training

ACTIVE DEHUMIDIFICATION

AEROSOL + SPRINKLER FFS SOLUTION



ASTER TB250/TB500

250 - 500 kW | 705 kWh – 1410 kWh

- **Integrated AC/DC design with built-in PCS, transformer**
- **Supports AC 400V and AC 800V output for enhanced system compatibility**
- **No internal DC wiring is required, and the AC output connects directly to the load, PV system, and power grid**
- **All outgoing connections are routed through side outlets, simplifying on-site installation and reducing construction effort**
- **Noise reduction option available (< 75dB)**

Aster TB250/TB500 is an AlphaESS liquid-cooled energy storage solution designed for large-scale commercial and industrial applications. Each container integrates EMS, PCS, transformer, liquid-cooling unit, fire suppression devices, and other essential components. Customers can select different power configurations to suit their specific application requirements.

Easy to Install

AC/DC integrated design with pre-assembled equipment and batteries; only external wiring is required for first-time installation.

Flexible Configuration

A single 500 kVA PCS is backward-compatible, with transformer options for AC 400V or AC 800V.

Battery capacity ranges from 705 kWh to 1,410 kWh.

Safety

Active temperature monitoring and control at 23 ± 2°C

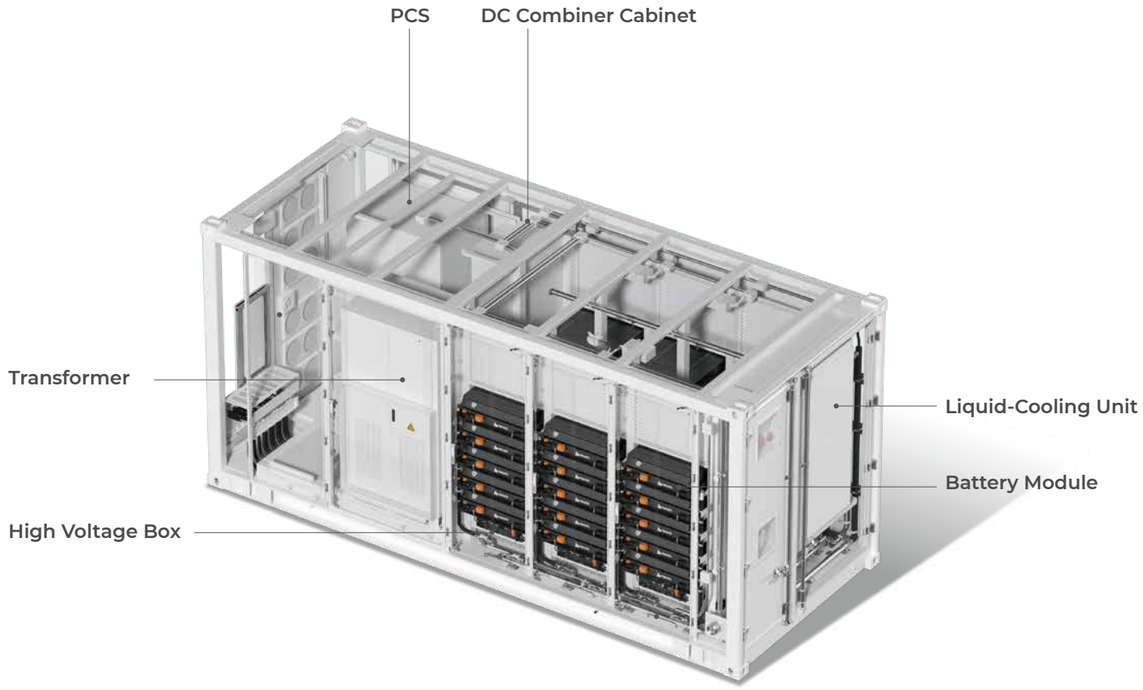
Smoke and temperature detection with automatic alarm system

Expandable Capacity

The pure grid-connected solution supports up to 6 systems in parallel, with a maximum power of 3 MW and a maximum battery capacity of 8.46 MWh.

SOLUTIONS

AC-Coupled



Inverter Power	250 - 500 kW
Battery Capacity	705 kWh per Cabinet, up to 1410 kWh
Rated Power	0.5 P
Dimensions (W × D × H)	6,058 × 2,438 × 2,896 mm
Expandability	Scalable

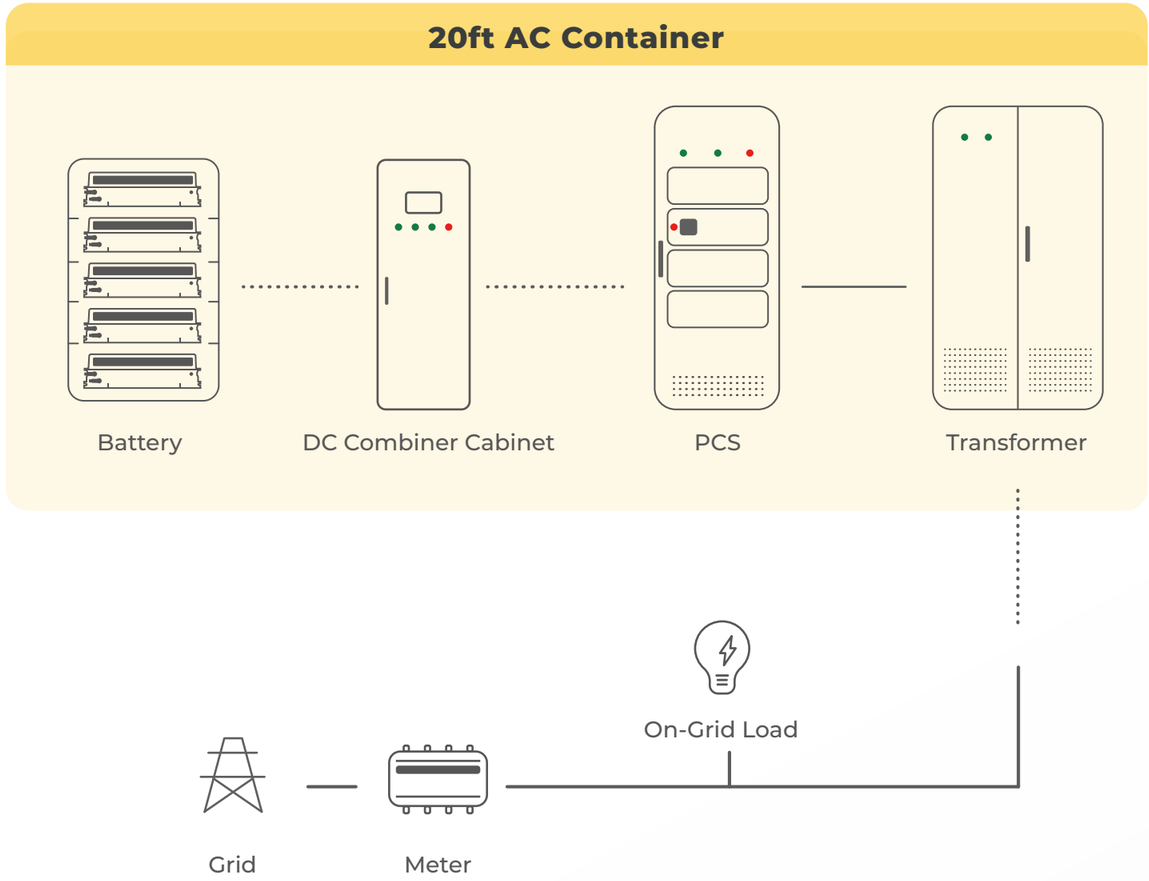
Aster TB250/TB500

Model	Aster TB500-EX01
DC Parameters	
Nominal Capacity	Max.1410.7 kWh
Battery Cluster Connection	Max. 6 Clusters in Parallel
Rated Voltage	748.8 VDC
Working Voltage Range	631.8 ~ 842.4 VDC
Battery Chemistry	LFP ($LiFePO_4$)
Battery Cooling Type	Liquid Cooling
AC Parameters	
Rated Charging and Discharging Power	500 kW
AC Current	440 A / 880 A
AC Frequency	50 Hz / 60 Hz (±2.5Hz)
Rated Grid voltage	400 VAC(±15%)
Physical Parameters	
Dimensions (W x D x H)	6058 x 2438 x 2896 mm
Ingress Protection	IP55
Product Type	Outdoor (Container)
Fire-Fighting System	Aerosol
System Weight	23 t
Battery Parameters	
Battery Model	M166314-52S-EX
Rated Voltage	166.4 V
Nominal Capacity	52.2 kWh
Rated Charging and Discharging Power	26.1 kW (0.5 P)
Ingress Protection	IP67
Weight	340 kg
Dimensions (W x D x H)	810 x 1125.5 x 237.5 mm
Operating Temperature Range	-30 °C ~ 50 °C *
Certification	
Safety	UN38.3,UN3536, IEC 62619, IEC 62477, IEC 61000, UL9540A

*The optimum temperature range is 15~35℃.If the ambient temperature is too high or too low, the battery performance may deteriorate.

ON-GRID SYSTEM

By integrating grid, solar, and battery sources, our system allows customers to select various operating modes. In the event of a grid outage, the on-grid load will be disconnected, and the system will automatically switch to supplying backup load, keeping you unaffected by power disruptions.



COMPONENTS

The TB series three-phase battery inverter is a leading product on the market today. It offers multiple power options to suit various customer needs and features a modular design, including modular transformer units, for easy installation and scalable deployment.

PCS TB500 Battery Inverter

- 8 × 62.5kVA PCS
- 340 – 460 V, 50/60 Hz, 3L/N/PE

The PCS is a key component of a microgrid. It provides bidirectional DC/AC conversion and regulates the current waveform to match the grid, enabling seamless interaction. Supporting voltages up to 460V, it allows multiple batteries and PV arrays to be connected in series or parallel.

Transformer 500kVA

- Provides Galvanic Isolation and Delta-to-Star Conversion

The transformer has a maximum input voltage of 380V and a maximum output voltage of 400V/800V. In addition, it utilises Delta-to-Star conversion to isolate the grid from the devices within the energy storage system, providing maximum protection for the system against grid fluctuations.

BATTERY CLUSTER SYSTEM

Battery Module

Model	**M166314-S**
Nominal Capacity	52.249 kWh
Max. Charging/Discharging Current	157 A
Depth of Discharge	98% (On-Grid), 90% (Off-Grid)

High Voltage Box

Model	**HV1500250-AL003-C02**
Rated Voltage	Max. 1500V
Rated Current	Max. 250A
Operation Temperature	-30 - 50°C
Dimensions (W × D × H)	522 × 620 × 200 mm
Weight	30 kg

Battery Cabinet

Rated Energy	235.1 kWh
Max. Rate	0.5 P
Rated Capcity	314 Ah
Nom. Voltage	748.8 V
Voltage Range	631.8 – 842.4 V

MULTIPLE UNITS EXPANSION

SCALABLE

ASTER TB250/TB500 CONTAINERS IN PARALLEL

TOTAL POWER CAPACITY:

250kW / 500kW / 1MW / 2MW...

STORION-LC 836

836 kWh | 1500V Liquid-Cooled System

This energy storage system features an optimal 836 kWh capacity, avoiding the high cost of multi-cabinet setups required by smaller systems. Its modular and unitised design ensures flexible configuration, easy transportation, and fast installation with plug-and-play connectors and front cable access, eliminating complex foundations or civil works.

Equipped with a multi-level BMS and cloud connectivity, it enables real-time monitoring and adopts active balancing to ensure cell consistency and extend battery life.

Scalable from 1 to 6 liquid-cooled battery cabinets, the system delivers a capacity range of 836 kWh to 5,016 kWh, offering a safe, flexible, and worry-free clean energy solution.

Key Advantages

- Easy Installation & Transport
- Pre-assembled design with most components integrated at the factory
- Simple external wiring for first-time installation
- Plug-and-play connectors for effortless on-site cabling
- Front cable access, eliminating complex foundations and civil works

O&M Friendly

Dual shut-off valves in the liquid-cooling pipelines allow battery pack replacement without draining the system

Longer Lifespan

Active balancing strategy ensures cell consistency and extends battery life

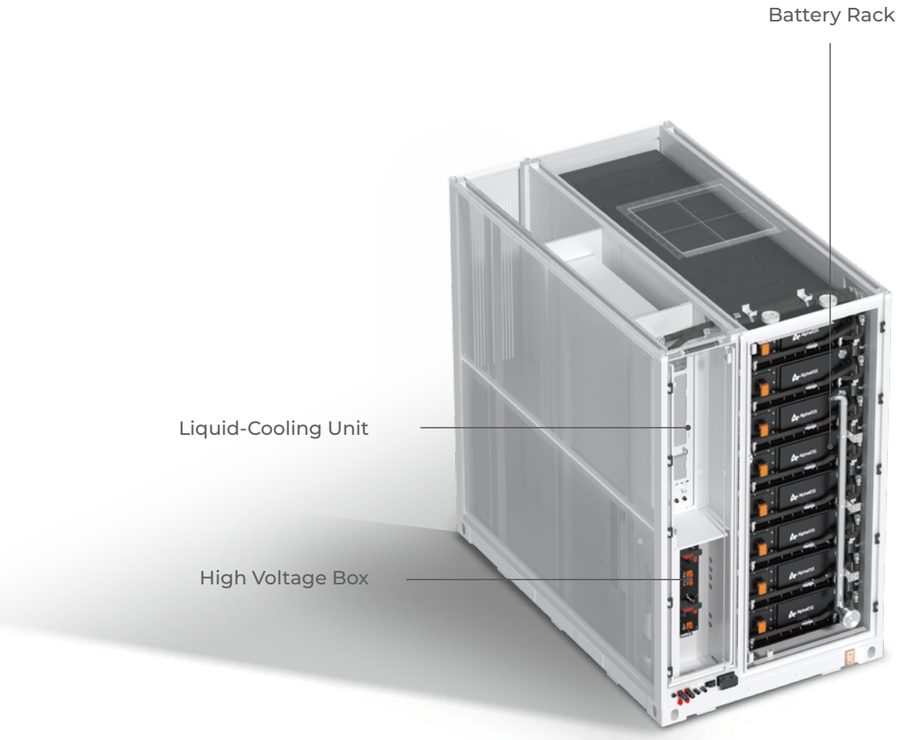
Comprehensive Safety

- Built-in aerosol and water mist fire suppression systems
- Enhanced lightning protection and water ingress alarm

Flexible Capacity Expansion

- Configurable from 1 to 6 liquid-cooled cabinets
- Capacity range: 836 kWh – 5,016 kWh

BATTERY CABINET



Battery Type	$LiFePO_4$
Nominal Capacity	835.9 kWh
Weight	7.5 t
Dimensions (W × D × H)	1450 × 2480 × 2435 mm
Housing	IP55
DC Voltage Range	1123.2 – 1497.6 V
Rated Power	0.5 C
Cooling	Liquid-Cooling
Operating Temperature	-30°C – 50°C

STORION-LC 836

Model	STORION-LC 836
System Parameters	
Dimensions (W × D × H)	1450 × 2480 × 2435 mm
System Weight	7.5 t
Ingress Protection	IP55
Rated Voltage	1331.2 V (4 Modules per Cluster)
Nominal Capacity	835.9 kWh (8 Modules)
Rated Charging and Discharging Power	417.9 kW (0.5 P)
Battery Connection	2P416S
Battery Chemistry	LFP ($LiFePO_4$)
Cooling	Liquid Cooling
Product Type	Outdoor Cabinet
Fire Protection System	Aerosol + Sprinkler
Operating Temperature Range	-30 °C – 50 °C
Relative Humidity	0 – 95%
Battery Parameters	
Battery Model	M332314-104S-EX
Rated Voltage	332.8 V
Nominal Capacity	104.4 kWh
Rated Charging and Discharging Power	52.2 kW (0.5 P)
Ingress Protection	IP67
Weight	670 kg
Dimensions (W × D × H)	790 × 2210 × 245 mm
Certification	
Transportation	UN 38.3, UN3480
Safety	IEC 62619, IEC 62477, IEC 61000, IEC 60730, IEC 62933, UL 9540A, UL 1973

ASTER 5000

5015.9 kWh / 4597.9 kWh / 4179.9 kWh / 3761.9 kWh

1500V Liquid-Cooled System

Aster 5000 is engineered with cutting-edge Active Balancing BMS, ensuring optimal cell consistency and extended battery life. Its Intelligent Thermal Management Strategy maintains stable operation under diverse environmental conditions, enhancing overall system reliability. Featuring a Dual Fire Protection Design, the system integrates multiple levels of fire detection and suppression to safeguard personnel and assets.

The low-noise liquid cooling unit further contributes to a quiet operating environment while maximising thermal efficiency. Designed for scalability and safety, Aster 5000 offers flexible configuration options within a 20ft container, with capacities ranging from 3,761.9 kWh to 5,015.9 kWh, making it an ideal solution for utility-scale BESS projects.

Highly Integrated Design

- Single-door structure with back-to-back battery container layout
- 35% increase in energy capacity compared to the previous generation
- 40% reduction in footprint, optimising space efficiency

Advanced BMS (Battery Management System)

- ***Cloud-based BMS platform*** enables intelligent operation and management of the energy storage system, including real-time monitoring, remote fault diagnostics, and online maintenance
- ***Active Balancing BMS*** supports multi-level balancing within each PACK and battery cluster, using intelligent algorithms to maintain cell consistency, maximise system capacity, and extend cycle life — improving overall lifespan by up to 10%
- ***(Optional) 4-Level BMS architecture*** enhances system scalability, ideal for long-duration energy storage applications

Low-Noise Intelligent Liquid Cooling System

- Horizontally mounted, top-discharge liquid cooling unit with noise levels below 75 dB
- Equipped with an automatic liquid replenishment system, reducing maintenance frequency

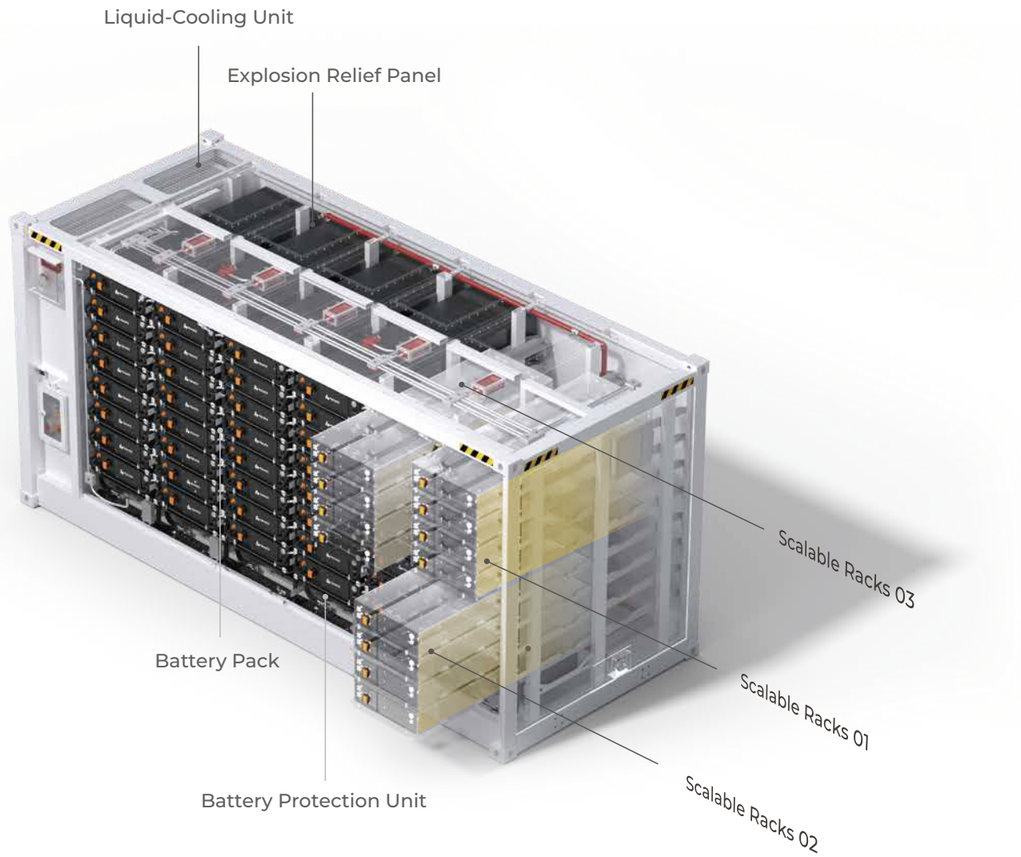
Thermal Safety

- Aerogel insulation between battery cells to effectively prevent thermal propagation
- Aerosol fire suppression at module level for rapid and efficient extinguishing
- Multiple fire detection devices, with dual protection via aerosol and sprinkler system
- Explosion relief panels on top of the container for directional venting, preventing container explosions and safeguarding nearby personnel and equipment

Electrical Safety

- Module-level MSD for enhanced maintenance safety
- Built-in dehumidifier to maintain a dry operating environment
- Multi-layer electrical protection with fuses integrated at the PACK level, in the high-voltage cabinet, and at the group fuse level

20FT CONTAINER



Battery Type	$LiFePO_4$
Nominal Capacity	3761.9 / 4179.9 / 4597.9 / 5015.9 kWh
Weight	34 / 37 / 40 / 43 t
Dimensions (W × D × H)	6058 × 2438 × 2896 mm
Housing	IP55
DC Voltage Range	1123.2 – 1497.6 V
Rated Power	0.5 P
Cooling	Liquid-Cooling
Operating Temperature	-40°C – 50°C

Aster 5000

System Parameters	Alpha-H20-DC-LC-EX				Alpha-H20-DC-LC-EX-D	
Model	3761	4179	4597	5015	4179	5015
Nominal Capacity	3761.9 - 5015.9 kWh				4179.9 kWh	5015.9 kWh
Rated Charging and Discharging Power	0.5 P					
Battery Cluster Connection	9 - 12 Clusters				10 Clusters	12 Clusters
Number of DC Busbar	1				1 / 2	1 / 2
Dimensions (W × D × H)	6058 × 2438 × 2896 mm					
Rated Voltage	1331.2 V					
Ingress Protection	IP55					
Battery Chemistry	LFP ($LiFePO_4$)					
Cooling	Liquid Cooling					
BMS Balancing Type	Active Balancing					
Noise	≤75dB@1m					
Product Type	Outdoor (Container)					
Fire Protection System	Aerosol + Sprinkler (Explosion relief panel is standard configuration)					
Battery Parameters						
Battery Model	M332314-104S-EX					
Rated Voltage	332.8 V					
Nominal Capacity	104.4 kWh					
Rated Charging and Discharging Power	52.2 kW (0.5 P)					
Ingress Protection	IP67					
Weight	670 kg					
Dimensions (W × D × H)	790 × 2210 × 245 mm					
Operating Temperature Range	-40 °C – 50 °C*					
Certification						
Safety	IEC 62619, IEC 62477, IEC 61000, IEC 62933, UL 9540A, UL 1973, NFPA 69					

4 SMART ENERGY

EMS 4.0 for C&I

EMS 4.0 for C&I, the fourth generation of AlphaESS's energy management system, was launched in 2024. Since the first release in 2013, our R&D team has continuously advanced the EMS to keep pace with market needs and technological progress. With robust performance and versatile features, EMS 4.0 empowers commercial and industrial users to tackle complex challenges, adapt to diverse applications, and unlock flexible solutions.

EMS 4.0 for C&I

- **Comprehensive Functionality**

  Self-Consumption, Time-Based Charging/Discharging, SOC Calibration, Power Rationing Support, Peak Shaving, Modbus Scheduling (RTU), Battery-Only Operation, Diesel Generator Control, Dual Power Supply, API Data Access, Remote Upgrades

- **Friendly Display**

  SCADA monitoring system with a user-friendly display screen powered by the Windows operating system.

- **Compact & Secure Design**

  An integrated battery DC combiner cabinet within the enclosure and an external SCADA HMI display screen. This design saves space and adds an extra layer of protection, enhancing security.

- **Reserved Communication Port**

  Conveniently located communication port for seamless control of other equipment through the energy storage system.

DC Combiner Cabinet

AlphaCloud

- Customisable system diagrams for clear energy flow visualisation.
- Cell-level monitoring with full operational insight.
- Intuitive energy production and consumption analytics.
- Remote configuration and upgrades to minimise installer revisits.
- One-page overview of all installed systems for efficient daily maintenance.