Spar Power Technologies Inc.

Altus-500® Supercapacitor Energy Storage System Datasheet

The Altus-500® Supercapacitor Energy Storage System (SCESS) represents a shift in the maritime industry. No other Energy Storage System can compete with long life (+25years), safety and practically no maintenances. High quality manufacturing facility located in Canada.

When launched in 2020, Altus-500® combined +5 years of industry-leading research and development efforts backed by Canadian Scientists and engineers with years of experience, offering unparallel after sale 24/7 service and remote monitoring, from our R & D facility located in BC. Canada. We have built the industry's safest, most reliable, high performing and cost-effective maritime SCESS.

Applications:

Altus-500® is ideal for applications that are in need of both energy and a high amount of power, moving large amounts of energy at an inexpensive lifetime cost per kWh. Typical vessel-types are:

- Ferries
- Cruise ships
- Ro/Ro – Ro/Pax
- Yachts

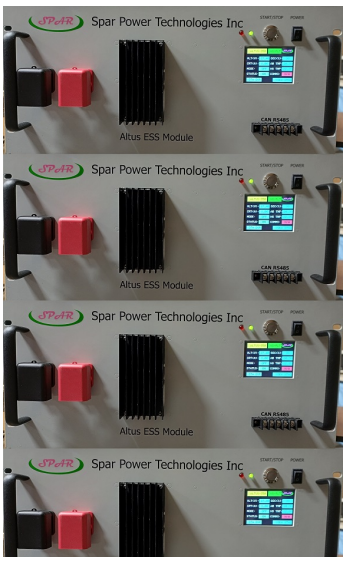
Offshore vessels

- Rigs
- Tugs
- Fishing vessels

- Merchant vessels
- Port cranes
- Shore charging
- Fish farms

Features:

- High C-Rate – up to 6C continuous
- Designed for voltages up to 2000 VDC
- Low installation and commissioning time
- Can be assembled on vessels with limited access
- Uses standard 19inch IT Racks
- Very Low life cycle cost
- Flexible and modularised design
- Hot swipe-able modules
- Scalable capacity and voltage according to vessel requirements
- Innovative and user-friendly Capacitor Management System (CMS)
- Remote monitoring capabilities



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Technical Specifications | Altus-500®

Performance Specifications	
C-Rate - Peak (Discharge / Charge)	Up to 10C
C-Rate - Continuous (Discharge / Charge)	Up to 6C / 6C
System Specifications	
Single Module Size / Increments	5.1 kWh / 48 VDC (36-54 Vdc
Single Module Range	5.1 kWh
Dimensions	485X610X180 mm (5.1kWh)
Weight	54 kgs
Max Gravimetric Density - **Module**	94 Wh/kg 10.6 kg/kWh
Max Volumetric Density - **Module**	96 Wh/l
Racks	
Energy per Unit	51kWh
Maximum number of modules per /unit/rack	10 (Ten)
Voltage	Max: 540 VDC | Nom: 480 VDC | Min: 360 VDC
Dimensions - 51 kWh	Height: 2200 mm | Width: 485 mm | Depth: 610 mm | 560 kg
Example System – 1.02MWh	
Energy	1020 kWh
Number of Racks	20
Voltage	Max: 2,160 VDC | Nom: 1,920 VDC | Min: 1,440 VDC
Dimensions – 5.1X20 kWh	Height: 2,200 mm | Width: 9,700 mm | Depth: 610 mm | 11,200 Kg
Safety Specifications	
Thermal Runaway Anti-Propagation	Not Required
Fire Suppression	Standard fire suppression for electrical equipment
Capacitor balance	Passive capacitor balance with Over/Under voltage protection
Safety Protection	Over/Under temperature, Over/Under String voltage, overcurrent
Short Circuit Protection	Solid-state protection, System Shut down
Emergency Stop Circuit	Hard-wired (Optional)
Ground fault Detection	System level
Disconnect switchgear rating	Optional
General Specifications	
Ingress Protection	Ventilated Enclosure NEMA 12
Environmental	-40 to +65 Deg. C (Ambient) R. Humidity <95% non condensing
Cooling	Convection

Note: Specifications may change without notice