ZENERGY™

MARITIME BATTERY LINE

Low-cost and safe maritime batteries

ZEN OCEANS

Patent pending ZENERGY™ modularized, safe and low-cost maritime battery system is specifically designed for high-energy operations at sea.

MODULE

57 kWh

PACK

3.4 MWh

SYSTEM

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Watertight

100% watertight modules, allowing for water flooding as primary mean for fire prevention and mitigation

Safe

No thermal runaway propagation risk between cells and modules. World class fire safety properties

High energy density

Battery containers at >2x volumetric energy density compared to other systems on market

Low cost

The simple and reliable system yields low OPEX and low CAPEX relative to other systems on market

Low C-rate

System designed for low c-rate, implying low cooling demand and thus low system complexity

Scalable

Modularized / containerized system designed for scalability and battery swapping

Rugged

Structural integrity and cell fixation is satisfied without using reinforced steel encapsulation

Proven

System built and based on off-the-shelves components and proven subsea encapsulation technology

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TECHNICAL SPECIFICATIONS	ZENERGY (G1)
Cell Chemistry	LFP (271Ah)
Performance specification	
C-Rate - Peak (Discharge / Charge)	0.3C / 0.3 C for 20 minutes
C-Rate - Continuous (Discharge / Charge)	0.2C / 0.2C
System Specification	
Single Module Size/Increments	57 kWh
Single Pack Range	1134-3403 kWh / 520 - 949 VDC
Max Gravimetric Density - Room	149 Wh/kg
Max Volumetric Density - Room	252 Wh/l
Example Pack	**1 Pack - 60 modules**
Energy	3 403 kWh
Voltage	Max: 1142 VDC | Nom: 832 VDC | Min: 571 VDC
Dimensions	Height: 1100mm | Width: 2314 mm | Length 5898 mm
Weight	22 800 kg
Volume	14 987 l
Gravimetric Density	149 Wh/kg
Volumetric Density	227 Wh/l
Example System - Room	**10 packs in series**
Energy	34 032 kWh
Voltage	Max: 1142 VDC | Nom: 832 VDC | Min: 571 VDC
Dimensions	Height: 1100mm | Width: 2314 mm | Length 5898 mm
Weight	228 000 kg
Volume	15 013 l
Gravimetric Density	149 Wh/kg
Volumetric Density	227 Wh/l
Example System – 20-foot container	**1 Pack - 60 modules**
Energy	3 403 kWh
Voltage	Max: 1142 VDC | Nom: 832 VDC | Min: 571 VDC
Dimensions	Height: 1300mm | Width: 2438 mm | Length 6058 mm
Weight	25 080 kg
Volume	19 200 l
Gravimetric Density	136 Wh/kg
Volumetric Density	177 Wh/l
Safety Specifications	
Thermal Runaway anti-propagation	Passive cell-level thermal runaway isolation with exhaust gas system
Fire suppression recommended	Per SOLAS and Class
Disconnect circuit	Hardware-based fail-safe for over-temperature and over-voltage
Short Circuit protection	Fuses included on the module and string level
Emergency Stop Circuit	Hard-wired
Ground Fault Detection	Integrated
Disconnect Switchgear Rating	Full load
General Specifications	
Class Compliance	Pending
Type Approval	Pending (DNV)
Ingress Protection	Subsea
Cooling	Natural convection with water, air or transformer oil
Vibration and Shock	Pending
EMC	Pending