



Energy Storage

FREEN-BSL-R

SODIUM
Na⁺

Low voltage sodium-ion battery stackable systems

The Freen-BSL-R is a compact, rack-mounted sodium-ion energy storage module built on proven layered oxide cell technology, delivering reliable performance, high safety, and long operational lifetime. Designed for standard 19" rack cabinets, system provides space-efficient energy storage for residential, commercial, and hybrid renewable applications with industry-leading cycle life, broad temperature tolerance, and minimal maintenance requirements.



your wind your power your way



Exceptional Safety

Sodium-ion layered oxide chemistry offers inherently lower thermal runaway risk compared to lithium-ion, significantly reducing the danger of fire or hazardous overheating in rack-mounted installations.



Stable Power Delivery

The sodium-ion cathode provides a consistent discharge profile, enabling stable inverter operation and ensuring predictable system performance across the full state-of-charge range.



Compact Rack-Mount Design

Engineered for standard 19" rack cabinets, Freen-BSL-R enables space-efficient integration into server rooms, technical closets, and compact installations where floor space is limited.



Ultra-Long Lifetime

Engineered for more than 10,000 charge-discharge cycles while retaining over 60% of original capacity, Freen-BSL-R systems deliver decades of reliable operation and extremely low lifetime ownership costs.



Broad Temperature Tolerance

Reliable operation even in challenging climates. Freen-BSL-R batteries can discharge at temperatures from -30°C to +60°C while maintaining dependable performance.



Low Upkeep Requirements

Intelligent battery management, CAN/RS485 communication, and advanced protection systems ensure reliable operation with minimal maintenance throughout the system lifetime.

Freen-BSL-R combines the proven reliability of sodium-ion chemistry with a space-saving rack form factor, delivering scalable, safe, and maintenance-free energy storage.

FREEN-BSL-R Specifications



BATTERY MODULE	FREEN-BSL-R
Module quantity ¹	1 - 16
Operating voltage	40-60 V
Nominal voltage	48 V
Rated capacity	66 Ah
Usable energy	3.16 kWh
Max. charging / discharging current	43.75 A
Max. charge / discharge power	2.1 kW
Dimensions, mm (W / D / H)	483 (411) x 575 x 133
Battery module weight	50.25 kg
Cell type	Sodium-ion (Layered oxide)
Installation	Indoor / Rack mounted
Operating temperature range	Charge 0 – +55 C ⁰ / Discharge -30 – +60 C ⁰
Storage temperature range	-10 – +35 C ⁰
Certificates, Standards compliance	CE, UN 38.3, IEC62619
IP rating	IP20
Cooling	Natural convection
Communication	CAN / RS485
Relative humidity	< 67%
Battery efficiency ²	> 97%
Expected service life ³	> 10000 cycles (60% SOH)

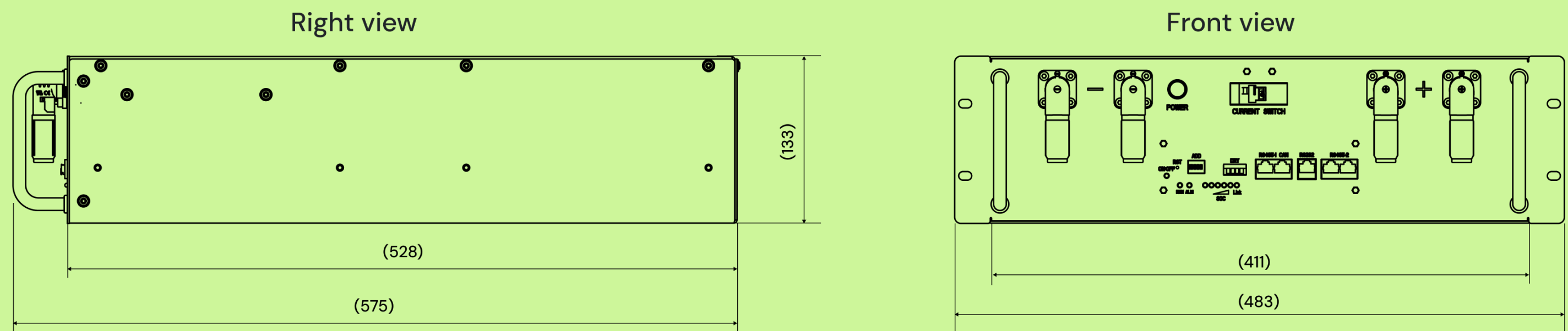
¹ Maximum parallel connection is 16 units, total capacity is 50,6 kWh per one rack cabinet

² At a charge/discharge rate of 0.5C, temperature of 25C⁰.

³ At a charge/discharge rate of 0.5C

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Drawings



Engineered Safety

The intrinsic safety of sodium-ion layered oxide chemistry is further enhanced by Freen's battery architecture, intelligent BMS, and robust mechanical protection. Unlike lithium-ion systems, sodium-ion cells exhibit significantly lower thermal runaway risk, reducing the danger of fire and hazardous gas release even under abuse conditions.

Combined with natural convection cooling, continuous monitoring of voltage, current, and temperature, and a reinforced metal enclosure designed for 19" rack installation, Freen-BSL-R delivers a safe, reliable, and long-lasting energy storage solution for residential, commercial, hybrid renewable, and critical infrastructure applications.

Freen OÜ

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