

FZSoNick
+  -

GREEN & SAFE SALT BATTERY

POWERED BY SALT.



Sodium Metal Chloride Battery System

Technical Overview

FZSONICK ENERGY BACKUP

Your best choice for critical applications

FZSONICK TECHNOLOGY

Sodium Metal Chloride (SMC) or Salt batteries are the latest generation of secondary batteries developed specifically to the constraints of the heavy industrial applications.

They use metal-based cathode and molten Sodium anode to provide exceptionally safe and reliable power backup that is enclosed in the industrial-grade steel case and equipped with integrated Battery Monitoring. Stable chemical reactions, zero maintenance and insensitivity to temperature and storage aging make them one of the best choices for Oil & Gas, Power Generation, Transmission and Distribution, Communications, Rail, Offshore and other industrial uses.



SMC Battery Modules

HOW IT WORKS

In the discharged state, the active materials are sodium chloride and metal powders (mainly nickel). In the charged state, they are converted to sodium and metal chlorides.

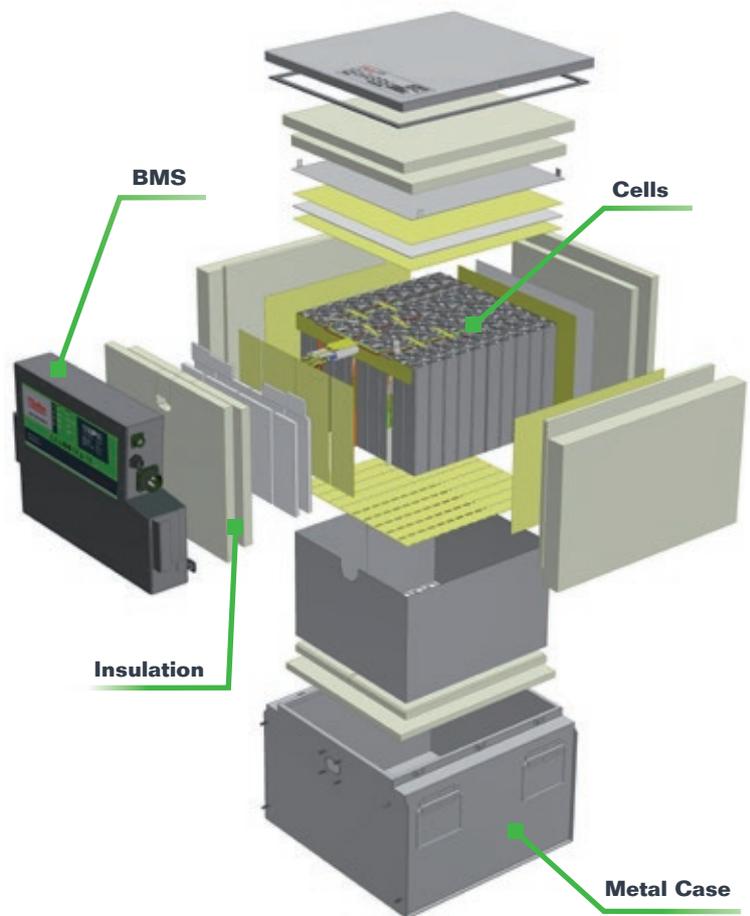
The solid state electrolyte, β -alumina, provides fast transport of sodium ions and ensures the galvanic insulation between anode and cathode.

Cell operating temperature is around 250°C and the thermal insulation of the battery is such that the surface temperature of the enclosure is just a few degrees above the environment.

The BMS is installed on the external front side of each module and performs the following tasks:

- Charge regulation: sets the optimal charging voltage and current
- Monitoring and diagnostic: performs constant check of correct functioning
- Electrical risks elimination: protects the user from accidental exposure to high voltage
- Battery protection: avoid abuse related risks
- Thermal management: controls the operational temperature
- Remote connection and supervision: provides periodical status of health report*

* additional service



Module Contents

KEY ASPECTS

Eco Friendly



SMC batteries are 100% recyclable and do not contain rare-earth materials. At the end of life, the batteries can be sent to specialized sites to be completely recycled.

Safe



The safest among existing high-density batteries in all conditions: transport, storage and operation. They emit no gas and have zero risk of explosion even when exposed to fire.

Extreme Temperature



SMC batteries can operate continuously in the range of -20°C to +60°C (-4°F / +140°F) and tolerate peaks of -40°C to +75°C (-40°F / +167°F). The IP55 protection makes them very suitable for outdoor installations.

Maintenance Free



SMC batteries do not require any maintenance operations throughout its operating life. There are no user-serviceable parts inside the module or BMS.

Space Reduction



Up to 80% reduction in space and weight compared with conventional batteries. The savings can be higher considering the removal of ventilation and air conditioning systems.

Weight Reduction



SMC weight can be up to 90% lower than traditional batteries, generating major benefits in all stages of the project execution.

Smart



All SMC models can provide and store information on battery and charger functioning as well as ambient temperature.

Modularity



Each battery is connected in parallel with the other modules and works independently, reaching an unprecedented availability and flexibility.

APPLICATIONS



UTILITIES



TELECOM



OIL & GAS



RAILWAYS



MARINE



RENEWABLES

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MULTI MODULES SYSTEM

Junction Box

Connects the modules in parallel to assure the maximum system availability

Safety

Robust plug-in connections prevent the operator from the electrical risks

Availability

Each module works independently

Scaleable

Additional modules can be added anytime

Rack

Seismically tested and certified

Compact Design

200 kWh/m² (18 kWh/ft²)

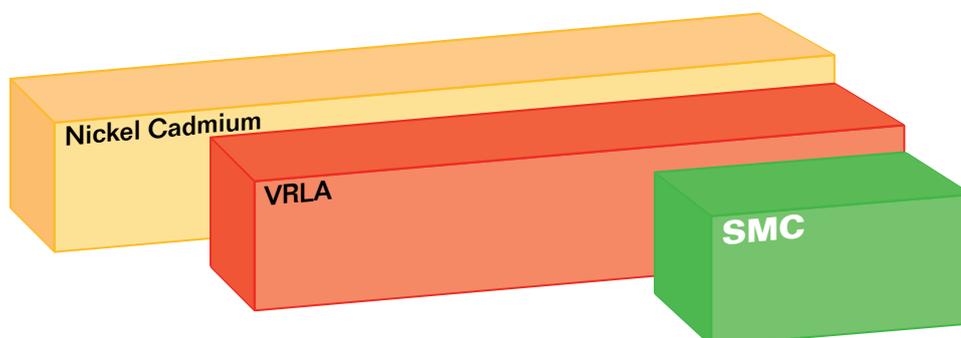
Modern & Smooth Installation

SMC batteries do not require ventilation or air conditioning and can be remotely connected



HOW DO THEY COMPARE ?

Parameter	Lead-acid (VRLA)	Nickel Cadmium	Lithium	SMC
Lifespan	Short	Moderate	Moderate	Very long
Long autonomy (energy density)	Low	Moderate	Moderate	High
Short autonomy (power density)	Low	Low	High	Low
Required footprint	Large	Large	Large	Low
Weight	High	High	Low	Low
Recharge	Moderate	Moderate	Fast	Fast
Safety	Moderate	Moderate	Low	High
Battery Management Systems	Not applicable	Not applicable	Built-in	Built-in
Battery Monitoring System	Optional	Optional	Built-in	Built-in
Temperature sensitivity	Very high	High	High	Very low
Installation	Battery Room	Battery Room	UL-listed cabinet in sprinkler equipped room	Open rack or inside UPS cubicle
Maintenance cost	Moderate	Moderate	Low	None
Upfront cost	Low	Moderate to High	High	High



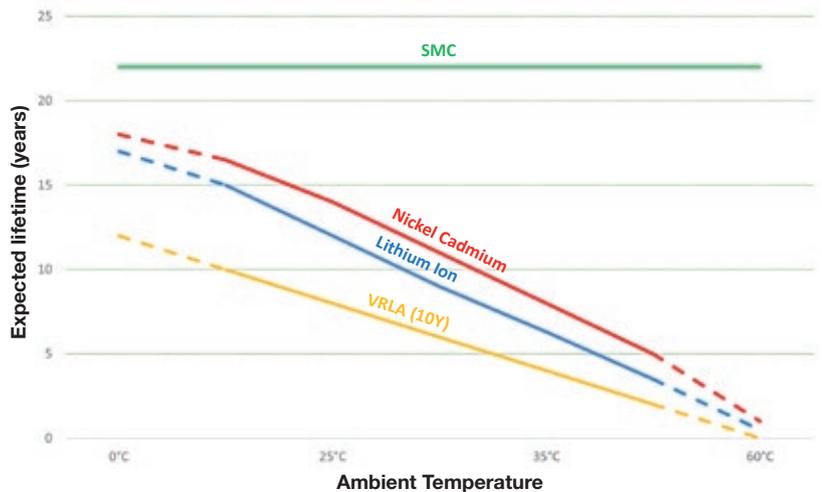
Typical volume of different battery types for 6 hours autonomy

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Temperature

Traditional battery technologies have their performance reduced when temperature decreases below 25°C (77°F) and therefore loss of capacity need to be compensated by a derating T factor. In an opposite situation, their performance increase when temperature get over 25°C (77°F) but their design life is drastically reduced without means for compensation.

SMC battery is not subject to any temperature derating factor and can operate without disturbance on an unprecedented temperature window.

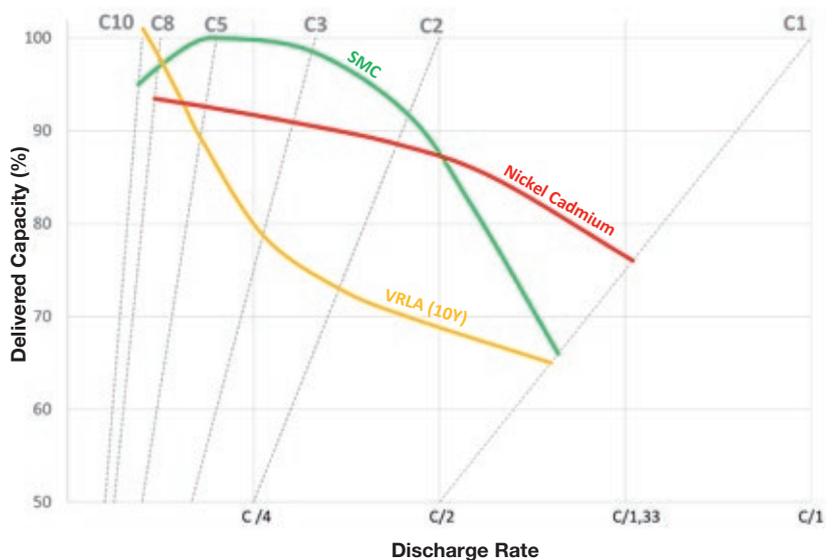


Efficiency

The ideal discharge rate for SMC batteries is between C2 and C10.

In this range the efficiency can be 20% better in comparison with traditional batteries.

Unlike the other battery technologies, the efficiency of Salt batteries is constant and not related with the external temperature.



SIZING

The SMC batteries sizing output differs compared to conventional batteries. Ageing and ambient temperature have no impact on calculation, while efficiency and redundancy can further improve the result.

Ageing

Conventional lead acid or nickel cadmium batteries slowly reduce their performance throughout the floating life. That is why their capacity should be at least 125% of the load expected.

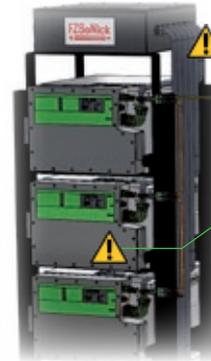
SMC battery technology does not suffer from ageing during its design life and therefore does not require any factor to be added on the battery calculation.

Redundancy

Unlike the conventional batteries, each SMC battery module works independently and is connected in parallel to the others. Consequently n+1 or n+m battery redundancy configuration combined with redundant UPS provides an unprecedented system reliability.



With traditional technologies a single breakdown (e.g.: connection, cell,..) results in a system failure



With SMC technology a single breakdown (e.g.: connection, module,..) does not result in a system failure



PRODUCT SPECIFICATIONS

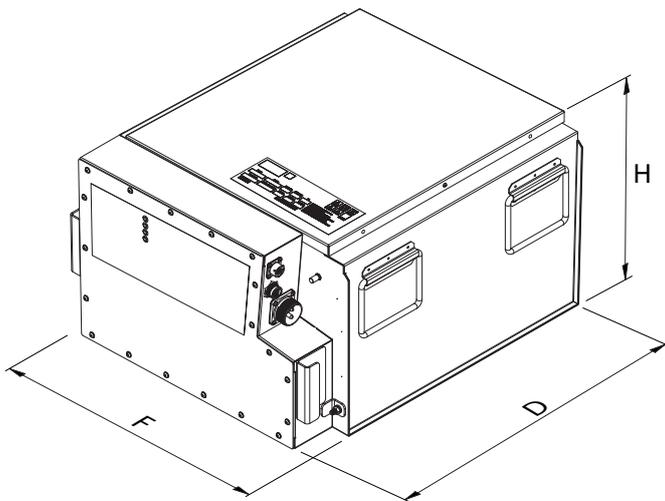
Model	Nominal Voltage (V)	Charge Voltage range (V)	Nominal Capacity at 4 hour rate		Minimum Voltage (V)	Max Continuous Discharge Current (A)	Max Charging current (A)	Interface
			(Ah)	(Wh)				
24UP40	24	27-30	40	960	18	30	8	RS485 /USB
24UP80	24	27-30	80	1920	18	60	16	RS485 /USB
24UP120	24	27-30	120	2880	18	90	24	RS485 /USB
24UP160	24	27-30	160	3840	18	120	32	RS485 /USB
24UP200	24	27-30	200	4800	18	150	40	RS485 /USB
30UP40	30	35-38	40	1240	24	30	8	RS485 /USB
30UP80	30	35-38	80	2480	24	60	16	RS485 /USB
48UP200	48	54-59	200	9600	36	150	40	RS485 /USB
110UP80	110	121-160	80	8450	79	120	16	RS485 /Canbus /USB
125UP80	125	135-160	80	9600	90	120	16	RS485 /Canbus /USB
130UP80	130	141-160	80	9980	94	120	16	RS485 /Canbus /USB
220UP40	220	242-300	40	8640	162	60	8	RS485 /Canbus /USB
250UP40	250	270-300	40	9600	180	60	8	RS485 /Canbus /USB

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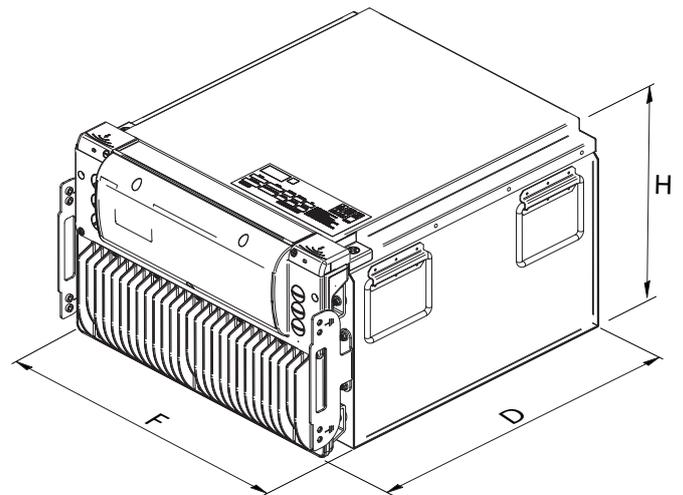
Your best choice for critical applications

Dimensions and Weights

Model	Front (mm / in.)	Depth (mm / in.)	Height (mm / in.)	Weight (kg / lb)
24UP40	500 / 19.7	341 / 13.4	322 / 12.7	35 / 77
24UP80	500 / 19.7	341 / 13.4	322 / 12.7	41 / 90
24UP120	500 / 19.7	341 / 13.4	322 / 12.7	45 / 99
24UP160	500 / 19.7	374 / 14.7	322 / 12.7	55 / 121
24UP200	500 / 19.7	374 / 14.7	322 / 12.7	61 / 134
30UP40	500 / 19.7	341 / 13.4	322 / 12.7	37 / 82
30UP80	500 / 19.7	341 / 13.4	322 / 12.7	45 / 99
48UP200	500 / 19.7	558 / 22.0	322 / 12.7	104 / 229
110UP80	500 / 19.7	522 / 20.6	322 / 12.7	114 / 251
125UP80	500 / 19.7	560 / 22.0	322 / 12.7	120 / 264
130UP80	500 / 19.7	598 / 23.6	322 / 12.7	125 / 275
220UP40	500 / 19.7	522 / 20.6	322 / 12.7	114 / 251
250UP40	500 / 19.7	560 / 22.0	322 / 12.7	120 / 264



110UP80 - 125UP80 - 130UP80 - 220UP40 - 250UP40



24UP120 - 30UP80 - 48UP200

General Characteristics

Operating Temperature Range	-20°C / +60°C -4°F / +140°F continuous -40°C / +75°C -40°F / +167°F peak*
Storage duration	Indefinite (-40° / +60°C -4°F / +140°F)
Recharge time (0-90% SOC)	<7 h
(0-100% SOC)	< 12h
Design life	20 years
Ingress protection	IP55 (IP65 as optional)
Max charging current	Self limited up to 0.2C
Short circuit current	6C limited to 100ms
Power connector**	MS3102 to MIL-DTL 5015 Series I
Data connector**	MS3110 to MIL-C-26482 Series I
Cycles	> 4500 Cycles at 80% DoD

* Tested up to 16 hours continuously

** 24UP120, 30UP80, 48UP200: M8 power terminals - RJ45 data connector

Applicable Standards

IEC62984 High temperature secondary batteries

UL9540A (Safety)

CE Mark

Design to comply with UL1973 ed.2

IEC60529 Degrees of protection provided by enclosures

EN 61000-6-2 / EN 61000-6-4

Comply with DNV rules for offshore installations

RINA



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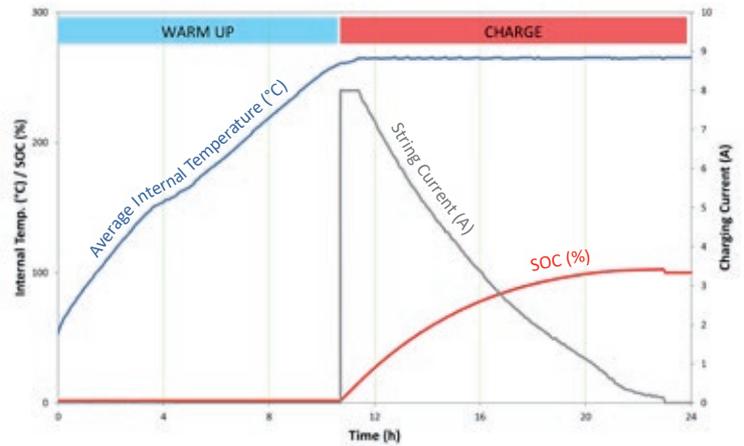
KEY PERFORMANCE PARAMETERS

Time to Service and Recharge

SMC batteries are high temperature batteries. They need to reach the internal operating temperature of about 250°C to be operative. The warm-up period is managed by the built-in BMS that assures gradual and safe heat-up and lasts less than 12 hours. This time should be compared to the system commissioning time for traditional batteries.

The recharge time of SMC batteries technology from 0% to 100% of State of Charge (SoC) is reduced to less than 12 hours, while only needing less than 7 hours to get the module to 90% State of Charge (SoC) with no impact on maintenance or charger size.

The charging current is self-limited to 0.2C. Boost or equalization charge are never necessary.



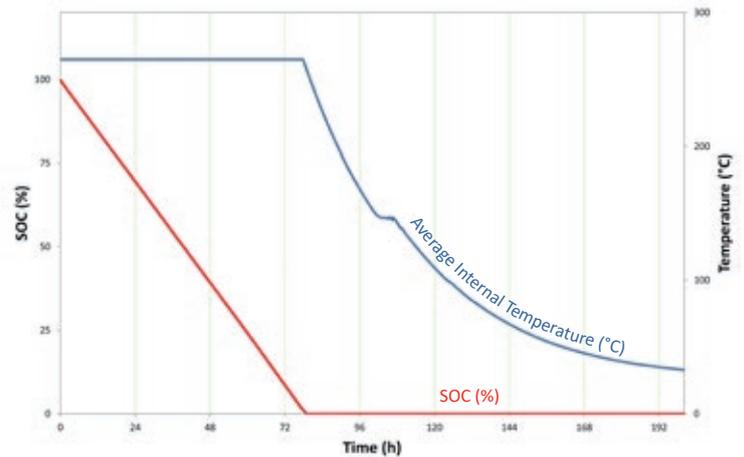
Self Discharge

The BMS is designed to keep a battery at its working temperature as long as internal energy is available.

The self-discharge process of the SMC modules is very slow and takes 80 hours before the battery reaches 0% SOC. At this point the internal temperature slowly reduces. The cool down period is extremely gradual thanks to a high level of battery insulation.

The total time of self-discharge and cool down last approximately 200 hours.

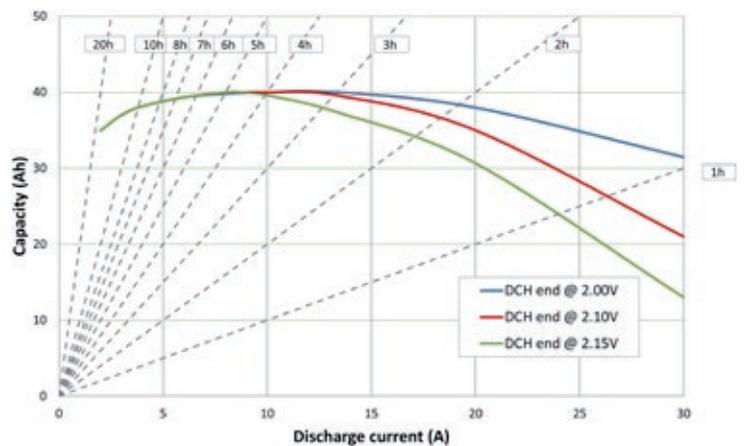
It is also important to note that the battery will not be damaged if it is fully discharged.



Discharge

Within C2-C10 rates of discharge SMC batteries are more efficient than conventional technologies, while the applications with very long or very short backup time are a little less suitable. Peaks of power during a discharge are usually well tolerated.

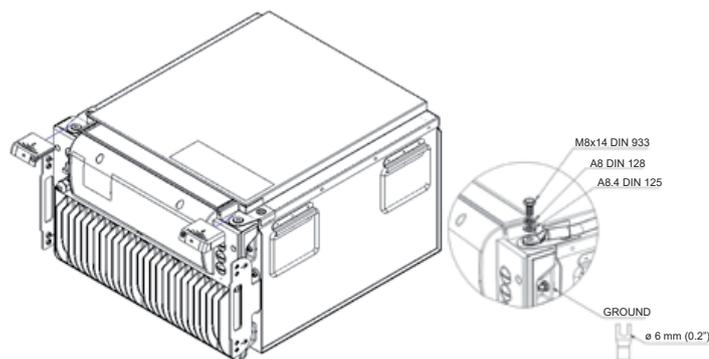
The below schematic will help to understand if Salt battery can fit your request.



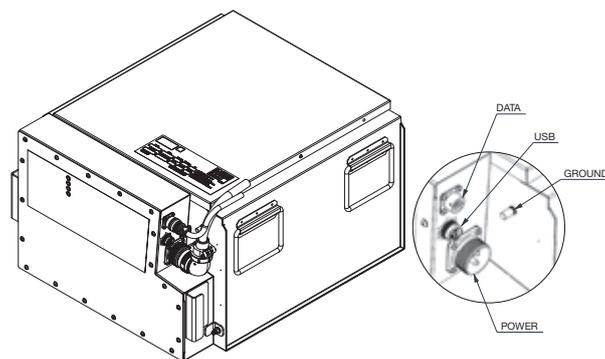
INSTALLATION AND POWER CONNECTION

SMC batteries can be connected in parallel without limitation in number in order to achieve the required level of energy. 48V and lower voltage models are equipped with standard M8 threaded terminal posts with tin plated brass inserts to guarantee highest conductivity and easy installation. Higher voltage models are characterized by special robust connectors with die cast housings and IP65 sealing to avoid any electrical risk for the user.

The installation is simple and flexible. Either indoor or outdoor there is no need for air conditioning or ventilation. Old and new modules can work together seamlessly, allowing a quick system upgrade whenever needed.



24UP120 - 30UP80 - 48UP200



110UP80 - 125UP80 - 130UP80 - 220UP40 - 250UP40

MONITORING

Each battery module has various communication capabilities using different communication ports: USB, RS485 or CAN-bus.

The end user can decide to implement the batteries in existing building management systems, or adopt the FZSONICK Multilayer Communication Software to constantly monitor the proper functioning and, as an option, request for a complete state of health report*.

*additional service



Multilayer Communication Software

TRANSPORTATION AND STORAGE

The SMC batteries are easy to transport. They do not need a temperature-controlled environment and can be transported by land, sea and air without limitation in capacity (Ah). They have more flexibility in transport compared to other technologies even if they get damaged or at the end of life.

When stored, SMC batteries are in “solid” state, which means that their internal temperature is below the reaction threshold and there is no chemical process going on. There are very important advantages to this capability. Firstly, the battery can be stored for indefinite period of time without any degradation to its capacity. Secondly, the battery can also hold the charge for this indefinite period, reducing the commissioning time when reactivated.

DISPOSAL

Salt batteries are 100% recyclable and do not contain any toxic material. FZSONICK has partnered with recycling companies that can completely recycle the product: ceramics and salt are reused for road slug and metallic parts are recycled for metal alloys.

OUR COMMITMENT FOR A BETTER ENVIRONMENT

FZSONICK is a global leader in the design, production and commercialization of innovative storage systems for energy backup, sustainable mobility and energy storage applications.

We are committed to supplying affordable safe energy on demand using natural resources responsibly to support the decarbonization process towards a fully sustainable environment.

FZSONICK defined its 2030 Goals to adequately respond to the challenges and opportunities of the ongoing energy revolution.

We are contributing to planet decarbonization reducing by half the CO₂ emission generated by the battery manufacturing process in our factory. While always a challenge, we will remain committed to continuous improvement to keep reducing our carbon footprint.

CO₂ emission



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