



PowerModule Solid State

High Performance and Scalable Lithium-ion energy storage system



PowerModule® Solid State: Modular, Smart, Safe and efficient energy storage solution.

Modular Design

PowerModule is designed around a high performance **5.43 kWh Lithium Iron Phosphate (LiFePO4)** battery composed of **Solid State technology cells**.

This new technology allow **fast charge**, **50% increased lifetime compared to legacy technology**, improved safety with **non-flammable electrolyte**, and **very low cell heat-up** during use.

Each module is equipped with **BMS Matrix®** technology with active balancing, to ensures total battery safety in real time and considerably extends battery life.

The BMS manages cell reheating for **low-temperature operation down to -25°C**.

The PowerModule blocks are connected to each other by a private and secure CAN communication bus. This distributed architecture ensures **high fault tolerance** and **easy commissioning**.

The high modularity and scalability allow to easily build storage systems **up to 819 VDC nominal and 700kWh**

Key advantages

- “Plug-and-Play” and flexible system : Easy and fast commissioning
- **New solid state cell technology** with highest safety and cycle life
- **Scalable system** : Serial and/or Parallel assembly up to 128 modules to fulfill the most complex applications
- **Real-time monitoring** in the cloud is available
- **Stainless steel housing IP 67 rated**
- Amphenol **waterproof connection (IP67)**
- Internal and external **communication** by CAN bus
- **High lifespan and number of cycles**
- **Pressure relief valve** on front panel



MADE IN FRANCE

PowerModule - Technical Specifications

Min / Nominal / Max voltage	48.0 V / 51.2 V / 58.4 V
Nominal capacity (at 1C, 25°C)	106Ah (5.43 KWh)
Weight (+/- 3 %)	49.5 Kg
Dimensions (l x w x h)	485 x 296 x 230 mm
Operation temperature	from -20°C, up to +60°C
Protection Index	IP67
Power connector	Amphenol Powerlok IP67
Specific energy	109.7 Wh/Kg
Energy density	164.4 Wh/L
Continuous discharge current (at 20 °C)	200 A (10.24kW)
Peak discharge current (at 20 °C)	300 A (15.36kW) for 15 minutes
Recommended charge voltage	57.0 V (max 58.4V)
Floating charge voltage	53.4 V
Standard charge Current	100 A (1 hour)
Fast charge Current	200 A (30 minutes)



Certifications

- CE, UN 38.3, IEC 62619, IEC62620
- Pending : Type Approval Off-shore Marine Battery System, ECE R100

Technical features of BMS Matrix® Technology

- **Monitoring** of each module : current, power, voltage, cell voltage and temperature, State of Charge (SOC), State of Health (SoH), Contactor states, etc...
- **Active Balancing** for a quick and energy efficient cell balancing process
- **Realtime communication** of alerts, warning and status messages using bus CAN 2B for external devices.
- **Intra and Inter module balancing.** This function ensures perfect cell balancing within each module and between all modules in a system
- **Automatic cut-off** triggered by alert events, ie : over-current, over-charge, over-temperature, etc, or manually triggered by CAN message
- **Cell heating** system management

APPLICATIONS

- **Industrial vehicles**
- **Last mile delivery**
- **Electric vehicles**
- **Marine**
- **UAV**
- **Robotics**
- **Heavy duty traction**
- **Energy storage**
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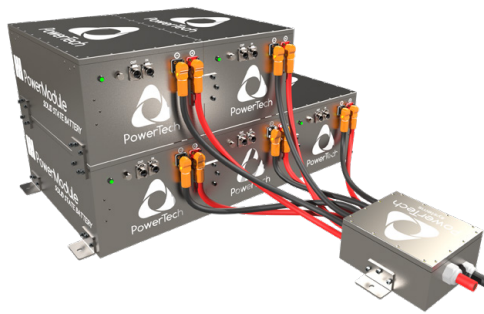


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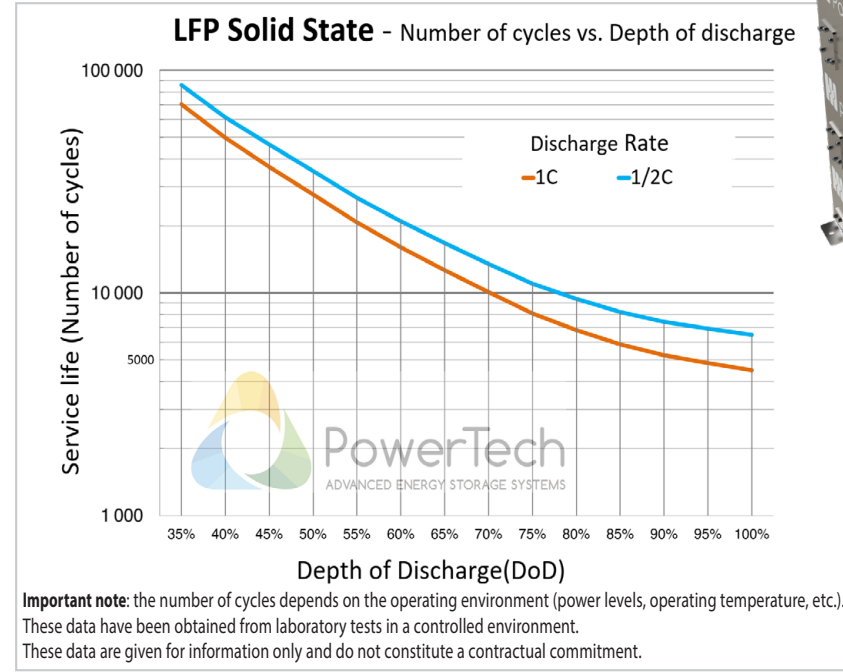
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Specifications of PowerModule assembly

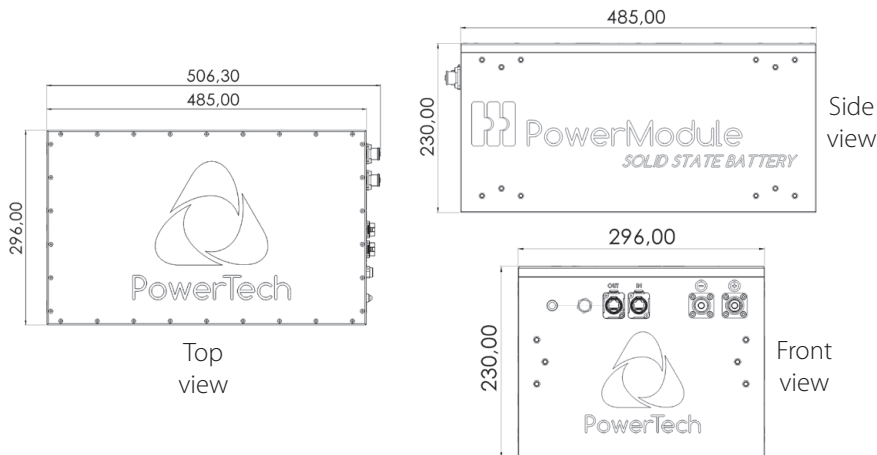
Nominal voltage	From 51.2 V, up to 819.2 V (16S)
Nominal capacity (at 1C, 25°C)	Up to 695kWh (128 modules)
Serial assembly	Up to 16 modules in series (819.2 V nominal)
Parallel assembly	Up to 128 modules in parallel (51.2 V nominal)
Serial and Parallel assembly	2S (102.4V) : up to 64 strings in parallel (P) 3S (153.6V) : up to 42 P 4S (204.8V) : up to 32 P 5S (256.0V) : up to 25 P 6S (307.2V) : up to 21 P 7S (358.4V) : up to 18 P 8S (409.6V) : up to 16 P 9S (460.8V) : up to 14 P 10S (512.0V) : up to 12 P 11S (563.2V) : up to 11 P 12S (614.4V) : up to 10 P 13S (665.6V) : up to 9 P 14S (716.8V) : up to 9 P 15S (768.0V) : up to 8 P 16S (819.2V) : up to 8 P



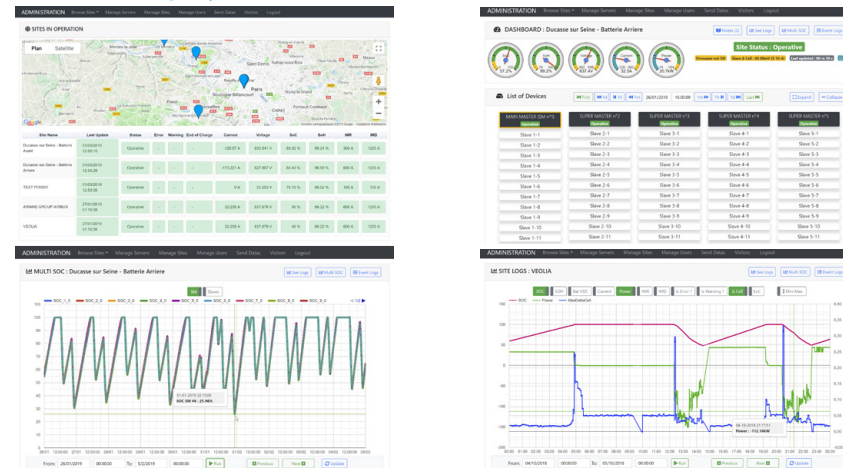
PowerModule Cycle Life



PowerModule Enclosure Dimensions



Monitoring System



PowerTech
systems
V1.6

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