# Power Module

Scalable and modular Lithium-Ion energy storage system



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PowerTech

## PowerModule<sup>®</sup> : Modular, Smart, Safe and efficient energy storage solution.

## **Modular Design**

Each **PowerModule block** is designed around a high performance **5.4 kWh Lithium Iron Phosphate** (LiFePO4) battery composed of **sealed cells**.

Each module is equipped with **BMS Matrix**<sup>®</sup> technology, which ensures the complete safety of the battery in real time and drastically extends its lifespan. The BMS also manages a cell **heating system** for operation in temperatures down to -25°C.



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

## Key advantages

- "Plug-and-Play" and flexible system : Easy and fast commissioning
- Scalable system : Serial and/or Parallel assembly up to 128 modules to fulfill the most complex appplications
- Real-time monitoring in the cloud is available
- Stainless steel housing with waterproof connection (IP67)
- External communication by CAN bus available
- High lifespan and number of cycles
- Certification : CE, UN 38.3

Further information at : **www.powertechsystems.eu** or contact our commercial office :

+33 185 400 970 or contact@powertechsystems.eu

## PowerModule Unit - Technical Specifications

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Min / Nominal / Max voltage	48.0 V / 51.2 V / 58.4 V
Nominal capacity (at 1C, 25°C)	105Ah (5.376 KWh)
Weight (+/- 3 %)	43.5 Kg
Dimensions (l x w x h)	400 x 290 x 230 mm
Operation temperature	from -25°C, up to +65°C
Power connector	Amphenol Powerlok IP67
Specific energy	123.5 Wh/Kg
Energy density	201.5 Wh/l
Continuous discharge current (at 20 °C)	125 A (6.40kW)
Peak discharge current (10 minutes)	200 A (10.24kW)
Peak discharge current (30 s)	250 A (12.80kW)
Recommanded charge voltage	57.0 V
Floating charge voltage (optional)	54.0 V
Standard charge Current	50 A (2.56kW)
Fast charge Current	100 A (5.12kW)

## Technical features of BMS Matrix® Technology

- **Monitoring** of each PowerModule block : current, power, voltage, PCB temperature, cell voltage and temperature, State of Charge (SOC), State of Health (SoH), Contactor states, etc...
- Realtime communication of alerts, warning and status messages using bus CAN 2B for external devices.
- Intra module balancing between each cell. This function is started as soon as a voltage difference >30mV is detected between 2 cells within the same module.
- Inter module balancing is launched as soon a voltage difference > 100mV is detected between two or more PowerModule
- Automatic cut-off triggered by alert events, ie : over-current, over-charge, over-temperature, etc, or manuall triggered by CAN message
- Cell heating system management

#### APPLICATIONS

- Industrical vehicles
- Marine
- UAV
- Robotics
- Heavy duty traction
- Energy storage
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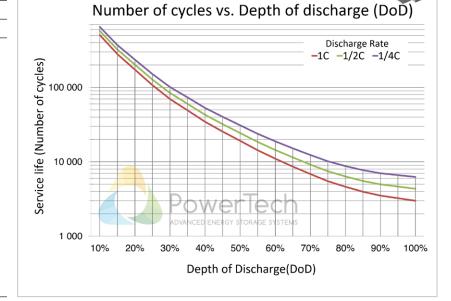
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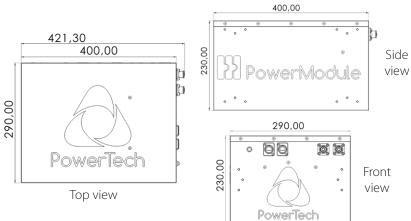
## Specifications of PowerModule assembly

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Nominal voltage	From 51.2 V, up to 819.2 V (16S)	
Nominal capacity (at 1C, 25°C)	Up to 688kWh (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	
	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) & 14S (716.8V) : up to 9 P	
	15S (768.0V) & 16S (819.2V) : up to 8 P	

## PowerModule Cycle Life



## PowerModule Enclosure Dimensions



## **Monitoring System**



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