# Green Shark®

## Module for ultra high-power applications

Green Shark®


EST-Floattech
Intelligent Energy Storage Solutions

# Green Shark®; 45 kW in the size of two crates of beer

Especially for ultra high-power applications such as a UPS, for example, we developed Green Shark®, an Ultra High Power Module that releases 30 kW in three minutes or a peak of 45kW. The continuous discharge is 20C, and the pulse discharge a maximum of 30C.

## Powerful and compact

The size of the Green Shark® is 32 x 40 x 54 cm, which is about the size of two crates of beer. As such, we offer one of the most powerful compact battery modules in the world. Thanks to its lithium polymer cells from market leader Kokam Ltd., Green Shark® is lightweight at just 0.87 kilograms per cell. The special cells can supply up to 30Ah per cell. Traditional lead-acid battery systems can be up to 75% heavier and bigger. The Green Shark® can be used in combination with any of EST-Floattech's other battery systems.

## High power, high safety

The strength of all our battery systems is that the performance, health and voltage of a battery can be monitored and adjusted down to the cell level. A single module contains 14 Li-NMC cells. The module is maintenance-free thanks to the application of spring tension instead of nuts and screws. Green Shark® has been equipped for airflow cooling.

## Active balancing

Thanks to its smart active balancing system, it isn't necessary to stop the system and balance it because the battery cells automatically distribute energy evenly. This system makes the familiar passive balancing of many battery systems redundant.

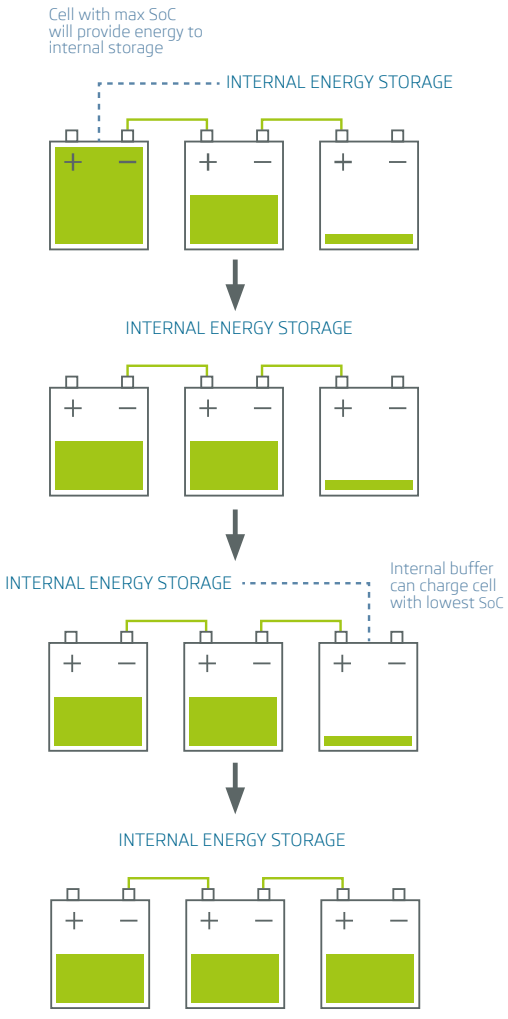
Advantages:

- Optimum energy distribution at all times
- The system is always fully operational
- Longer cycle life due to more evenly distributed loads


## Ultra High Power NMC

Advantages

- Improved performance with 4C charge
- Improved high power cycle life up to 10,000 cycles
- Decreased 50% of internal resistance against standard NMC
- Special coating applied to cathode to improve high power performance




- Minimum of heat development due to lower impedance
- The system monitors cell voltage, SOC, SOH and cell temperatures etc.
- Maximum safety: monitoring of individual cell behaviour/performance rather than only at battery level
- When unbalanced, the system transfers energy at voltage intervals of 0.01V
- Measurements are taken every 1/100 seconds

## 2nd life service

The Green Shark® is characterised by its high cycle life of over 1500 cycles at 80% DoD. Should it become clear over time that the cycle life limit is being reached, it is of course possible to replace the battery modules. Another and perhaps even better option is to use EST-Floattech's unique 2nd life service.

For example, during major maintenance work, EST-Floattech engineers replace the cells in the battery modules. The module - including the electronics and other parts - is recycled following a thorough inspection. This cuts down on the unnecessary replacement of parts (casing, wiring, BMS, etc.); parts that can often be used for many more years

before they reach the end of their technical life. Because each part is inspected, it is even possible to issue an extended warranty. 2nd life is therefore good for limiting investments and costs, and is an effective step towards achieving as sustainable a footprint as possible. All parts are recycled as far as possible, with the appealing certainty of an extended warranty.

## Properties of the Green Shark® Ultra High Power Module

- Air-cooled
- Active-balancing BMS
- Lightweight
- >1500 cycle life at 80% DoD
- Approximately 325x400x540 (WxHxD)
- 30 Ah, 52 V, 1.55 kWh
- Maximum discharge 20C continuous, 30C pulse
- Designed for short-term power peak requirements

## Green Shark® – Cell specifications

| **Kokam Cell** | |
|---|---|
| Capacity (Ah) | 30 |
| Dimensions from (WxLxT) | 198x220x9.9 |
| AC-IR (mΩ) | 1.0 |
| Weight (kg) | 0.870 |
| Discharge C-rate (C) | 20 Continuous |
| | 30 Pulse |
| Energy Density (Wh/kg) | 128 |
| Chemistry | UHP NMC |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