

Hybrid Power Module[®]

'Plug & Play' battery solution



Our hybrid solution for retrofitting



EST-Floatch
Intelligent Energy Storage Solutions

From diesel-electric to hybrid with a 'plug & play' battery solution.



Due to the increasing demand for cleaner shipping, more and more vessels are being fitted with a diesel-electric drive during a refit. As a specialist in the field of electric and hybrid power, EST-Floattech has come up with a revolutionary simple 'plug & play' Hybrid Power Module® especially for these vessels. The solution is as simple as it is rapid and efficient; one of the diesel generators is replaced with a customised Hybrid Power Module® and the vessel is ready to go. With all the benefits of hybrid power and the quality of EST-Floattech's Green Orca battery solution.

Plug & play Hybrid Power Module

EST-Floattech's Hybrid Power Module® can be fully integrated into the existing generator set-up and operates fully automatically. It is easy to mount and interacts directly with the vessel's power

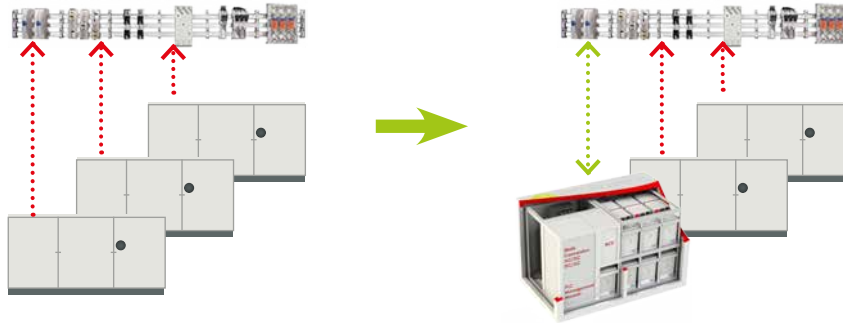
management system. The Hybrid Power Module® comes in three different power configurations, but can be scaled and customised if required. The module is built from 100% DNV certified sub-components, as well as being safe to use and maintenance-free.

Cutting costs as a result of more efficient combustion

Installation of the Hybrid Power Module® ensures maximum fuel efficiency by optimising the engine load. At peak demand, the Hybrid Power Module® supplies extra power in addition to the energy supplied by the diesel generators (peak shaving). This saves fuel and reduces the maintenance required, plus more efficient and consistent use of engines means they last longer. As a result, the same power can also be achieved with smaller engines, thereby reducing the TCO (Total Cost of Ownership).

Futureproof due to fewer emissions

Moreover, CO₂, NO_x and PM10 emissions are reduced substantially straight away. This means that vessels will be prepared for the stricter regulations that will be in place in more and more regions both now and in the future.

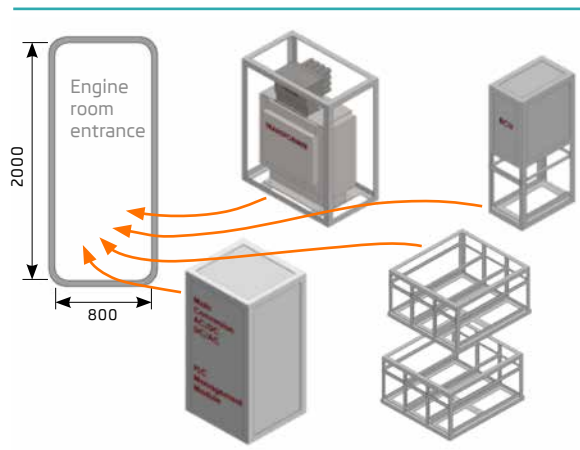


Three different power set-ups

The Hybrid Power Module® comes in three different power set-ups and can also be scaled according to the client's requirements. The standard set-ups supply 68, 136 and 189 kWh respectively and come with DNV GL tested batteries and a battery control unit as standard.

Compact and quick to install

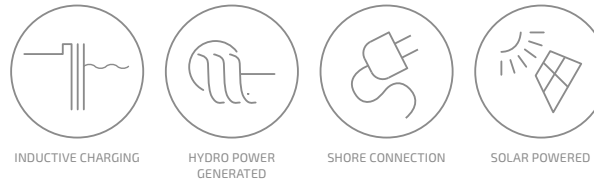
A significant benefit of the Hybrid Power Module® is the compact size of the unit. EST-Floattech battery systems achieve the optimum balance between weight and volume. The special cells (manufactured by Kokam Ltd.) can store up to 200Ah each, reducing



both weight and space. Traditional lead-acid battery systems can be up to 75% heavier and bigger. The unit is small (1,9 to 2.5 m³) and has a modular structure. The Hybrid Power Module® can therefore easily pass through an engine room door and existing structures will either require only minor alterations, or none at all. What's more, all the working parts are incorporated in the unit. The size of the Hybrid Power Module® can easily be adjusted to fit the available space

Any additional power sources can be connected

The Hybrid Power Module® can be connected to any grid (AC or DC). In addition to the diesel generators in the vessel itself, shore connection supplies power



from the main grid, perhaps using sustainable sources, such as solar, wind or water energy. Modules can be charged using a cable or EST-Floattech's latest induction technology.

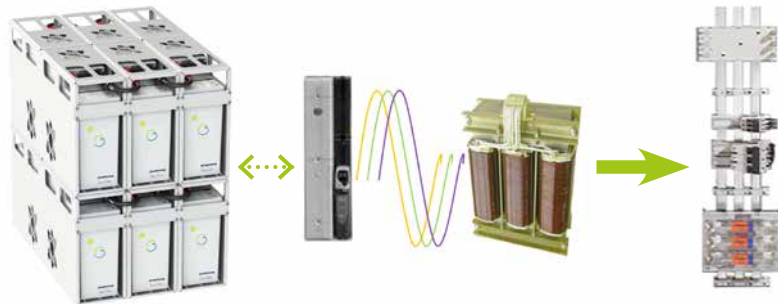


The highest quality

We use lithium polymer battery cells from market leader Kokam Ltd in South Korea as a basis for our battery systems. Kokam products are extremely reliable and powerful in terms of performance, and possess an excellent relationship between weight and volume. The strength of our battery solutions is that we are able to monitor and adjust the performance right down to cell level. However great your demand for energy is, safety and reliability of any desired constellation of strings is controlled by the Battery Control Unit. The entire energy chain of cell, module and battery management systems, up to and including the battery control unit – all components have been tested in accordance with DNV GL's new draft standard, which is expected to enter into force in 2017.

The benefits of the Hybrid Power Module®

- Great solution for retrofitting upgrades existing vessels ready for future regulations
- Plug & play; easy to install and integrate with existing generator set-up
- High-quality, high-safety, maintenance-free
- DNV GL certification for all components
- Ensures maximum fuel efficiency
- Emissions (CO₂, NO_x, PM10) are reduced considerably due to partial electrical drive and optimal engine load
- Peak shaving: high engine power achieved with smaller engines
- Reduces the Total Cost of Ownership
- Comes in different power set-ups and can be scaled



Hybrid Power module® - High over specifications

	HPM 68	HPM 136	HPM 189
Batteries	13x EST GO 525	13x EST GO 1050	18x EST GO 1050
System output KWh Gross	68	136	189
System output KWh Nett	54	108	151
UDC-min:	582	582	806
UDC-Max:	737	737	1.000
I short max:	9.000	9.000	9.000
System weight Kg (estimate):	1.200	1.600	2.100
System dimensions from (lxbxh)	1350x1200x1150	1600x1200x1150	1800x1200x1150
System volume M ₃ (estimate):	1,9	2,2	2,5
Conversion	15-130 KVA	15-250 KVA	15-350 KVA
Racking included	Std	Std	Std
Water cooling	Std	Std	Std
Battery Control Unit	Std	Std	Std

*All modules are scalable & customizable