

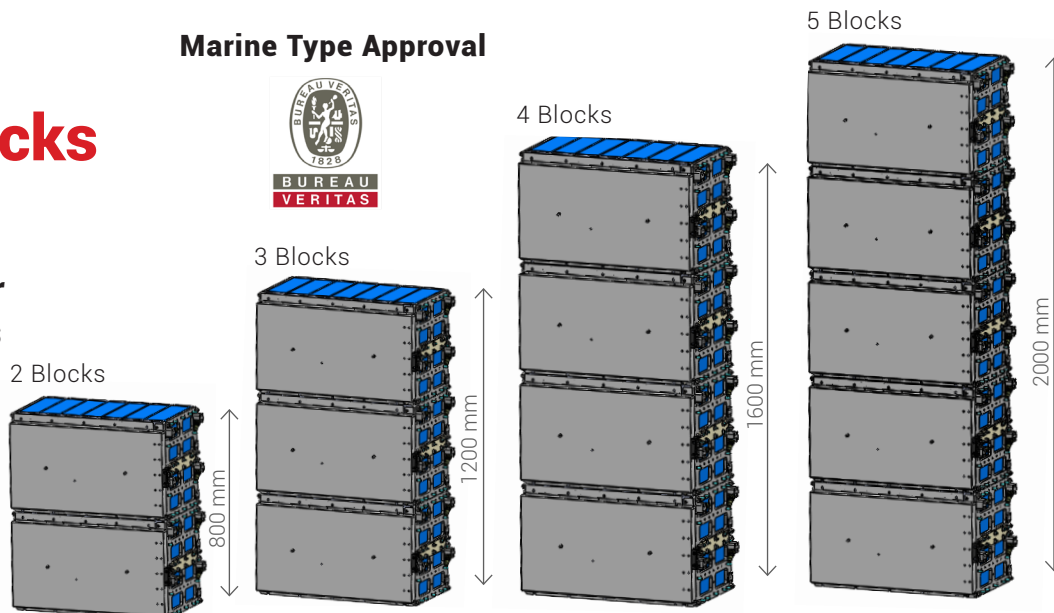
WATTALPS Maritime Packs 800 V

**For hybridization or
full electric vessels**

Immersion Cooling Technology

Cells and busbars fully immersed in a dielectric fluid for the most efficient active thermalization.

Marine Type Approval



Ambient Temp.(*)	Discharge/charge	0°C - 50°C											
	Storage	-5°C - 50°C											
Cells	Category	High Energy				Fast Charge & Life				Performance Power			
	Designation	HE01				FCL03				PP01			
Discharge	- Continuous	2 C				2 C				5 C			
	- Peak	4 C				8 C				8 C			
Charge	- Continuous	1 C				1 C				3 C			
	- Peak	2 C				6 C				8 C			
Voltage	- Nominal	706 V				719 V				706 V			
	- End of discharge	588 V											
	- Standby fully charged	804 V											
Base Blocks	Per pack (**)	2 Blocks	3 Blocks	4 Blocks	5 Blocks	2 Blocks	3 Blocks	4 Blocks	5 Blocks	2 Blocks	3 Blocks	4 Blocks	5 Blocks
Energy	Embedded	49 kWh	74 kWh	99 kWh	124 kWh	41 kWh	62 kWh	82 kWh	103 kWh	42 kWh	64 kWh	85 kWh	106 kWh
Discharge Power	Continuous	113 kW	169 kW (***)			79 kW	119 kW	158 kW	169 kW	169 kW (***)			
	Peak	183 kW	270 kW (***)			270 kW (***)				270 kW (***)			
Charging Power	Continuous	10 kW	15 kW	20 kW	25 kW	40 kW	59 kW (***)	79 kW (***)	99 kW (***)	127 kW	169 kW (***)		
	Peak	28 kW	42 kW	56 kW	71 kW	255 kW	270 kW (***)			270 kW (***)			

(*) No specific air conditioning or humidity level requested, battery pack cooling based on vessel seawater heat exchanger and water / glycol onboard circuit.

(**) Based on standard pack design. Alternative designs, arrangements and form factors available on request.

(***) Based on standard junction box definition. Higher power with upgraded junction box available on request.

Bureau Veritas maritime type approval for the 3 cell categories.

One pack = 2, 3, 4 or 5 module blocks + electric equipment set + active thermalization set. No additional racking structure necessary to maintain the blocks together on one rack.

One base block = 175 kg including immersion cooling fluid.

Volumetric energy density: up to 221.1 Wh/l Gravimetric density: up to 122.9 Wh/kg

Volumetric Continuous Power density : up to 1 150 W/l discharge- up to 663 W/l charge

Gravimetric Continuous Power density: up to 640 W/kg discharge - up to 663 W/l charge

WATTALPS Maritime Packs 800 V

Immersion Cooling

The most efficient thermalization solution for higher power and longer lifetime.

- Cells and busbars fully immersed in a dielectric fluid.
- **Compared to air cooling:** no need for air conditioning or any air treatment in the battery compartment.
- **Compared to liquid cooling:** no need for a compressor cooling down liquid at low temperature, as sea temperature $<32^{\circ}\text{C}$ is sufficient. This means less volume and energy losses.

Fig.1. Three-block pack functional view

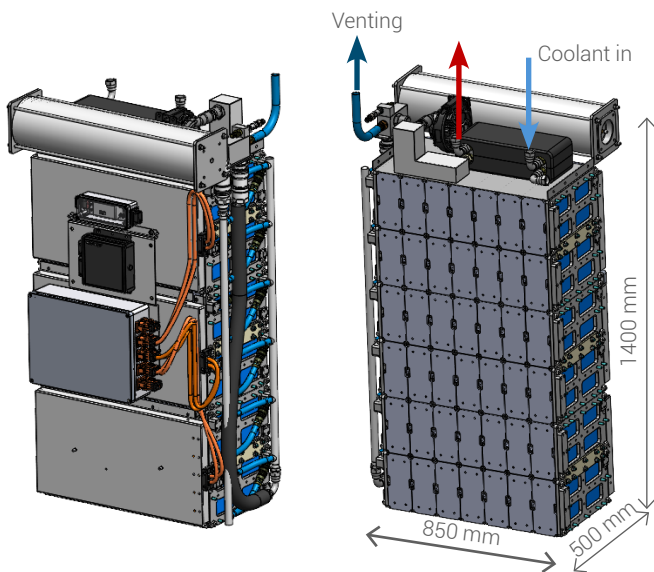


Fig.2. Installation synoptic, with WATTALPS/Vessel supply limits.
Four-block pack example.

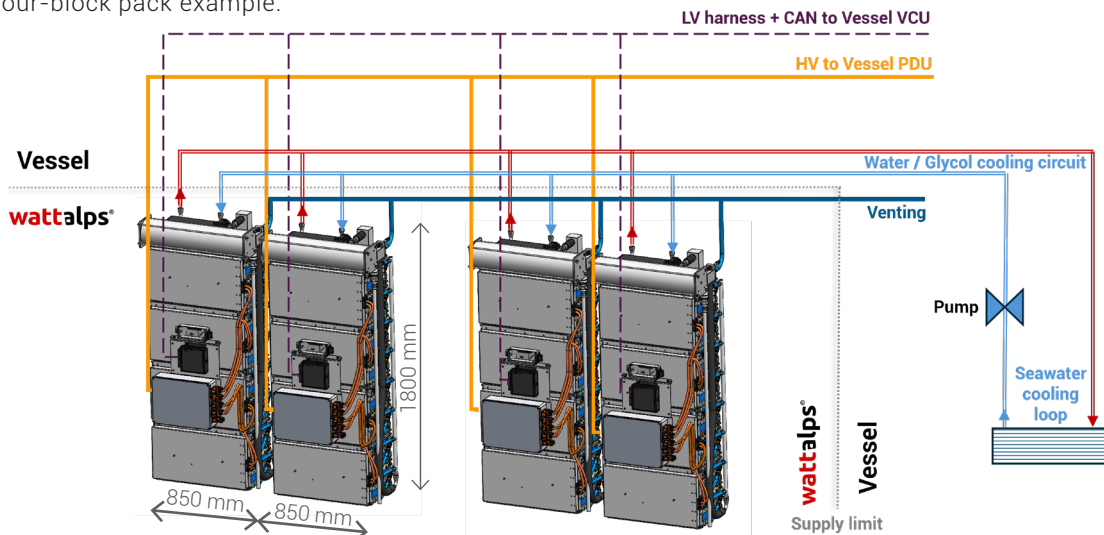


Fig.3. Minimal handling block.
Around 175 kg.

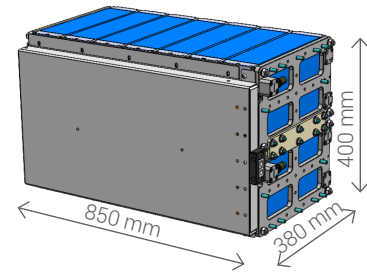


Fig.4. Two-block pack dimensions
incl. thermalization

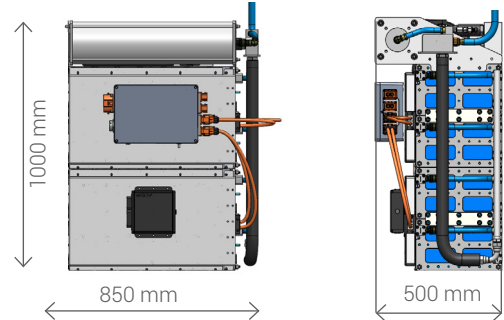
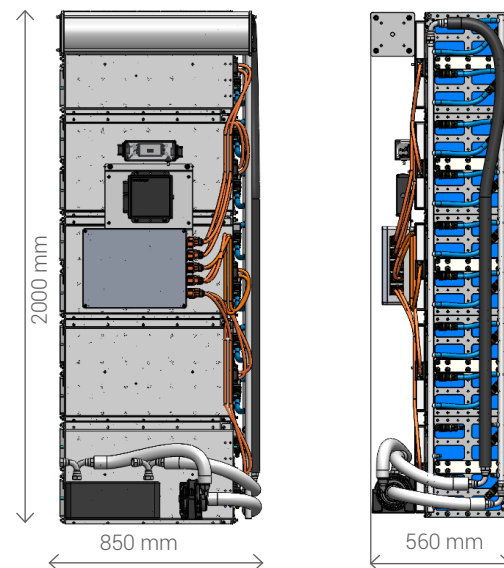


Fig.5. Five-block pack dimensions
incl. thermalization



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