Leclanché
Energy Storage Solutions

ENERGY STORAGE SOLUTIONS
FOR MARINE APPLICATIONS

Marine Rack System

(MRS)

- DNV-GL RINA & DMA certifications
- Both G-NMC and LTO* battery chemistries available
- MODULAR, SCALABLE, and FLEXIBLE
  Suitable for both hotel and propulsion loads
- HIGH SAFETY, LONG LIFE
  8,000 cycles G-NMC,
  20,000 cycles LTO

e-TRANSPORT SOLUTIONS

Providing our customers with high quality energy storage solutions for both transport & utility applications since 1909.

The **E-ferry**

The Leclanché MRS was originally developed for the E-ferry, the world's largest full electric ferry by battery capacity.

E-ferry is an EU Horizon 2020 project.

Capacity: **31 cars** or **5 HGV trucks** & **8 cars**

Maximum speed: **15.5 knots**

Propulsion motor: **Liquid cooled electric motor**
(Synchronous reluctance assisted permanent magnet technology)

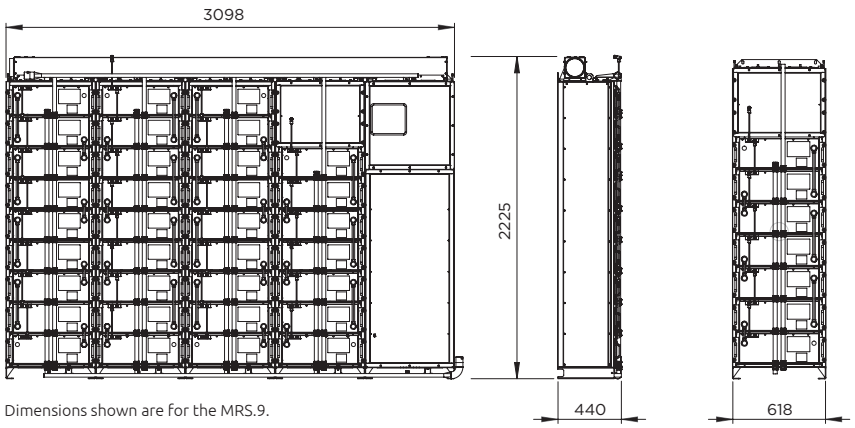
Light ship weight: **747 tons**

Passengers: **198**

European Commission
Horizon 2020
European Union funding for Research & Innovation

TYPE APPROVED PRODUCT DNV·GL DNVGL.COM/AF

RINA



Dimensions shown are for the MRS.9.

	MRS.3	MRS.6	MRS.9	MRS.10
Dimensions (WxHxD) in mm	618x931x440	618x1578x440	618x2225x440	618x2440x440
Control rack weight in kg (G-NMC/LTO)	80/80	267/261	453/441	515/502
Energy rack weight in kg (G-NMC/LTO)	243/238	430/418	616/599	678/659
Control rack energy kWh (G-NMC/LTO)	0/0	19.2/6.6	38.5/13.2	45.0/15.5
Energy rack energy kWh (G-NMC/LTO)	19.2/6.6	38.5/13.2	57.8/19.9	64.2/22.1
IP Class IP65	yes	yes	yes	yes

Approvals/Certifications: UNDoT 38.3 (4s8p M2 Modules), DNV-GL, RINA, Danish Maritime Association, Norwegian Maritime Association.

In the Control racks, the switching and BMS master occupy 3 module positions. The Energy racks contain only battery modules.

*In progress.

The Marine Rack System (MRS) is a **modular and scalable** Li-ion battery system for marine applications.

Designed to be **extremely safe**, the MRS has undergone numerous fire propagation tests and is both **DNV-GL and RINA** certified.

With redundant **fire detection systems**, hot gas extraction channels and the choice of two integrated fire suppression systems (foam or water mist based) the risk of fire propagration has been reduced to zero. The water mist system integrates easily with existing water based fire suppression systems. **IP65 ingress protection** allows the MRS to operate reliably in hostile marine environments.

The MRS is available with both G-NMC and LTO* cell chemistries for both energy and power dense applications.

Built in, marine certified, switching units and **integrated liquid cooling** are all carefully monitored and controlled by the Leclanché G2 Battery management system (BMS).

The MRS is available in multiple rack heights including: 3, 6, 9 and 10 module variants. These can used with 4s8p, 8s4p and 16s2p module configurations and connected in series to make a pack of any voltage **up to 1100 volts** and of any capacity. For larger capacities, the system can be built up as parallel strings at pack level, using the Leclanché pack controller. This allows battery packs of multiple MWh in capacity, as used in the E-ferry.

The MRS is now available with the options of a **230 VAC Power supply** as well as **isolated DCDC power supply**.

The MRS is designed for installation in battery rooms or shipping containers giving multiple deployment options.

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MRS EN B201910_0