Press Releases

Leclanché Announces Development of Third-Generation Marine Battery System for Electrification of Broad Range of Vessels

• New Navius MRS-3 provides significant enhancements in battery energy density, modularity and safety compared to company's award-winning MRS-2
• Liquid-cooled design increases lifespan of system, allows for compact design and permits up to 50% higher energy density compared to air-cooled systems
• Reduced carbon footprint with cells, modules, battery management system and racks all made in the EU
• Optional 10-year performance warranty available
• Product launch set for upcoming Electric & Hybrid Marine World Expo in Amsterdam

YVERDON-LES-BAINS, Switzerland and ANDERSON, Indiana, 20 June 2022 –Leclanché (SIX: LECN), one of the world's leading energy storage solutions companies, has completed development of a third-generation marine battery system designed to support the needs of ship builders in producing 100% electric and hybrid marine vessels.

Called the Navius MRS-3™ (Marine Rack System: images available here), the new system improves upon Leclanché's popular and award-winning MRS-2 – already powering a broad range of ferries, container ships and specialty vessels in service around the world. The newest version features significant improvements in battery energy density, modularity and safety making it the maritime industry's most flexible and powerful vessel electrification system ever created with the lowest carbon footprint.

The system will begin shipping in 2023 and has already been specified in several major design wins including Scandlines' 10MWh PR24 zero-emission freight ferry. The Navius MRS-3 will be formally introduced at the upcoming Electric & Hybrid Marine World Expo 2022 being held in Amsterdam from June 21-23 in booth 1367.

Enhanced performance

The long list of enhancements included in the Navius MRS-3 starts with the company's proprietary, high energy and best in class cycle life 65 Ah G/NMC cells fitted into its latest generation M3 Energy battery modules. Both are produced in-house at the company's European cell manufacturing facilities in Germany and the company's new automated, state-of-the-art module assembly line in Switzerland.

Battery string voltages of up to 1200 VDC are available with up to 720 A string continuous discharge current. The number of cells per module has been increased to 36 from 32 allowing each module to provide 8.7kWh of energy, representing a 13% increase over those fitted in the MRS-2. Critically important, the modules comply with the most stringent safety requirements for the marine, rail and road sectors.

"Leclanché's new Navius MRS-3 represents the latest generation in powerful, safe and emission-free electrification systems for the maritime industry," **said Anil Srivastava, CEO, Leclanché.** *"We've poured everything we've learned from our award-winning MRS-2 system into this project, setting a new performance standard for marine vessels including its liquid-cooling architecture which is now universally recognised as the safest in the industry."*

Safety is designed into every component and the overall system

Safety is engineered into every aspect of the Navius MRS-3 from individual cells to the complete system. For example:

- Cells- Laminated ceramic separators provide protection against internal short circuits and the reduce electrolyte design minimises the potential volume of flammable gases.
- Modules and enclosures- The M3 modules are each fitted with a functionally safe slave unit which measure cell voltages and temperatures and run diagnostics. The IP-rated enclosures provide protection against mechanical and electrical incidents and keep water and contaminants out in the event of a thermal runaway while keeping noxious gases/flames in and routed out via a sealed exhaust system. All parts of the system are protected against water ingress.
- Battery Management Systems (BMS) and control unit- A "Functionally Safe" BMS comprised of master and slave units integrated inside every module providing an unrivalled level of marine safety. An optional remote battery-data monitoring system is available enabling continuous monitoring of the batteries' condition.
- Liquid-cooling- All modules are liquid-cooled with dedicated aluminium cooling plates. Furthermore, all cooling-pipe connections are external to the module enclosure preventing the risk of leaks within the module that could cause thermal incidents. Separate aluminium conductive cooling sheets between the cells dissipate heat out of the modules, eliminating hotspots and helping to further prolong the battery system's life. The liquid-cooled design increases the lifespan of the

system and permits up to 50% higher energy density compared to air-cooled systems.
- Active safety system- Each module enclosure contains a fail-safe automated system to prevent thermal propagation.

Flexible System Configurations, Ease of Maintenance and New Service Options

The Navius MRS-3 racks are available in seven different heights enabling them to fit into nearly all battery rooms. They provide 27% more energy in a comparable footprint than earlier generation systems; the reduced rack width requires a third-less front access for maintenance.

The system's revised design focuses on ease of access to key components including:

- Cooling pipes which are easily accessible on the front of the racks
- High voltage cables can be reached from the rack's front and now feature a "quick-connect" system for simple and safe attaching and removal
- The control panel, including BMS, slides out from the rack
- Cooling system of each rack can be drained individually
- Modules can be taken out individually
- Single module enclosure design
- Overall easier installation

Enhanced Training and Service Options

Even the service and support options for the Navius MRS-3 have been rethought and improved to provide broader options for customers along the product's entire lifecycle. A new 10-year performance warranty is available to customers purchasing a Leclanché support and maintenance contract. The system comes standard with a two-year warranty.

In addition, Leclanché is introducing three new groupings of services:

- Reactive services include a 24/7 hotline and remote support and access to an in-house field service engineer as well as Leclanché's network of partners.
- Preventative services include maintenance training to instruct crews on how to provide maintenance and troubleshooting; and yearly preventative maintenance on-board to conduct visual, mechanical and electrical routine checks.
- Predictive services newly available to customers and based on a secure and reliable data monitoring of the battery systems. Users can access a user-friendly IoT platform allowing them to view a detailed analysis and reports on the condition of their battery system. They will also receive expert analysis, warning and recommendations across the lifetime of their system.

Leclanché is also offering spare parts kits to enable rapid on-site interventions and repairs.

For more information on the Navius MRS-3 visit https://www.leclanche.com/solutions/e-transport-solutions/e-marine/. To schedule a sales meeting at the Electric & Hybrid Marine World Expo 2022 or for a one-on-one consultation, please contact (info@leclanche.com).

Navius MRS-3 is a trademark of Leclanché SA. All other tradenames are the property of their respective owners.

About Leclanché

Headquartered in Switzerland, Leclanché SA is a leading global provider of high-quality energy storage solutions designed to accelerate our progress towards a clean energy future. Leclanché's history and heritage is rooted in over 100 years of battery and energy storage innovation. This coupled with the Company's culture of German engineering and Swiss precision and quality, continues to make Leclanché the partner of choice for both disruptors, established companies and governments who are pioneering positive changes in how energy is produced, distributed and consumed around the world. The energy transition is being driven primarily by changes in the management of our electricity networks and the electrification of transport, and these two end markets form the backbone of our strategy and business model. Leclanché is at the heart of the convergence of the electrification of transport and the changes in the distribution network. Leclanché is organised in three business units: energy storage solutions, e-Mobility solutions and specialty battery systems. Leclanché is listed on the Swiss Stock Exchange (SIX: LECN).

SIX Swiss Exchange: ticker symbol LECN | ISIN CH 011 030 311 9

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