

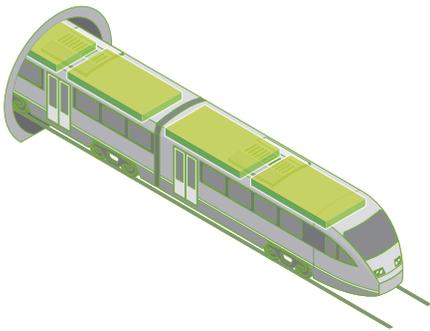
# Rail Traction Battery Systems



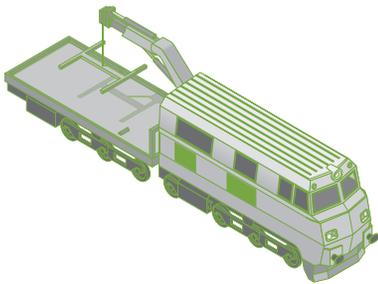
High-performance, European-made lithium-ion traction battery systems for trains, locomotives and maintenance vehicles.



**Locomotives**



**Trains/Multiple Units**



**Maintenance Vehicles**

## The Technology

At Leclanché, we pride ourselves on being in control of the entire battery system's development process, from cell electrochemistry development and manufacturing to complete solutions which incorporate our own dedicated battery management systems.

Our experienced research and development team continually strives to develop cutting-edge, high-energy and high-power lithium-ion cells, which also deliver class-leading cycle life.

Our product roadmap delivers relentless cell performance improvements to provide the best cost of ownership options for our customers.

## The Specifications

- European-made (cells, modules, packs and BMS)
- Fully self-supported high strength pack structure (suitable for end-mounting)
- Multiple packs can be integrated using a multi-string controller
- Liquid cooling and integrated thermal hazard protection
- Suitable for multi-pack systems of over 1 MWh
- Class leading cycle-life
- Proven and reliable technology
- Standard CANopen communication
- Compliant with highest fire safety rail industry standards.



## INT-53 Energy

High-energy battery system for rail traction applications, fully certified and available for delivery.

M3 Module Configuration	20s1p ( 60 Ah )
Pack Nominal Voltage	876 V
Nominal Energy	52.8 kWh
Maximum Discharge Power	158 kW
Dimensions (H x W x D)	409 x 612 x 1637 mm
Weight	536 kg
Energy Density	98.5 Wh/kg
Energy Density	128.8 Wh/litre
Enclosure Material	Aluminium
Mounting Positions	Underframe, Roof and Compartments
Mounting Orientation	Horizontal or side
Certifications	IEC62928, IEC62619, IEC61373, IEC62620, EN45545, EN50124, EN60529, EN50155, UN38.3
IP Rating	IP 66



## INT-105 Energy

Example of one of our tailor-made battery systems for rail traction applications, designed according to specific customer requirements.

M3 Module Configuration	16s2p (60 Ah)
Pack Nominal Voltage	876 V
Nominal Energy	105.1 kWh
Maximum Discharge Power	200 kW
Dimensions (H x W x D)	792 x 620 x 2646 mm
Weight	1104 kg
Energy Density	95.2 Wh/kg
Energy Density	129.1 Wh/litre
Enclosure Material	Steel
Mounting Position	Roof



## MSM-M3-RA

A Multi-String Manager (MSM) is required when more than one battery is used in parallel.

Quantity of packs	Up to 8 (in parallel)
Weight	0.259 kg (controller only)
Hardware	Wago
Software	Leclanché SA
Dimensions (L x W x H)	100 x 112 x 72 mm (controller only)
Certifications	EN/IEC 61373, EN 50657, DIN EN 50125-1, EN 50155, IEC 60571



# Leclanché Manufacturing Sites

Norway  
Oslo  
(Sales office)

An environmentally conscious manufacturing company.

- All manufacturing facilities are fully powered by renewable energy
- Conventional cell manufacturing involves the use of harmful solvents: Leclanché manufactures all cell electrodes using patented water-based binder technology
- Automated cell production at our state-of-the-art facility in Germany.

Production and engineering facilities fully accredited by the leading international quality standards organisations including ISO 9001, 14001 and ISO/TS 22163 (IRIS).

Germany  
Willstätt

Switzerland  
Yverdon-les-Bains



Leclanché Cell Production Line

Trusted by:

**STADLER**

**ALSTOM**

**schalke**  
LOCOMOTIVES GMBH

**KONČAR**



**UROMAC**

**MEDHA**

**CPKC**

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**STATIONARY SOLUTIONS**



**e-MOBILITY**



**SPECIALTY BATTERY SYSTEMS**

**WE ARE ENABLING THE ENERGY TRANSITION**