



 **Leclanché**
Energy Storage Solutions




e-TRANSPORT
SOLUTIONS




STATIONARY
SOLUTIONS




SPECIALTY BATTERY
SYSTEMS

LeBlock™
Intelligent Energy
Integrated by **Leclanché**

14 March 2022



BRIDEX

 **Fuji Electric**
Innovating Energy Technology

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FE Fuji Electric
Innovating Energy Technology



World leading provider of high-quality energy storage solutions



E-Transport solution



Specialty Battery Systems



Stationary solution



110

Years of existence



350

employees



170 M€

Confirmed order booking &
Contracts

Our Experience in Stationary Storage



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LeBlock™

Intelligent Energy
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Modular



**Simplified
logistic**



**Fast installation
on site**



**Easy
augmentation**



Lower TCO



**Minimal
environmental
footprint**

Different Blocks to build LeBlock™

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BatteryBlock

- High density LFP lithium-ion batteries liquid cooled
- Including fire suppression system.
- 745 kWh each
- 7.5 tons each
- 1100-1500 VDC



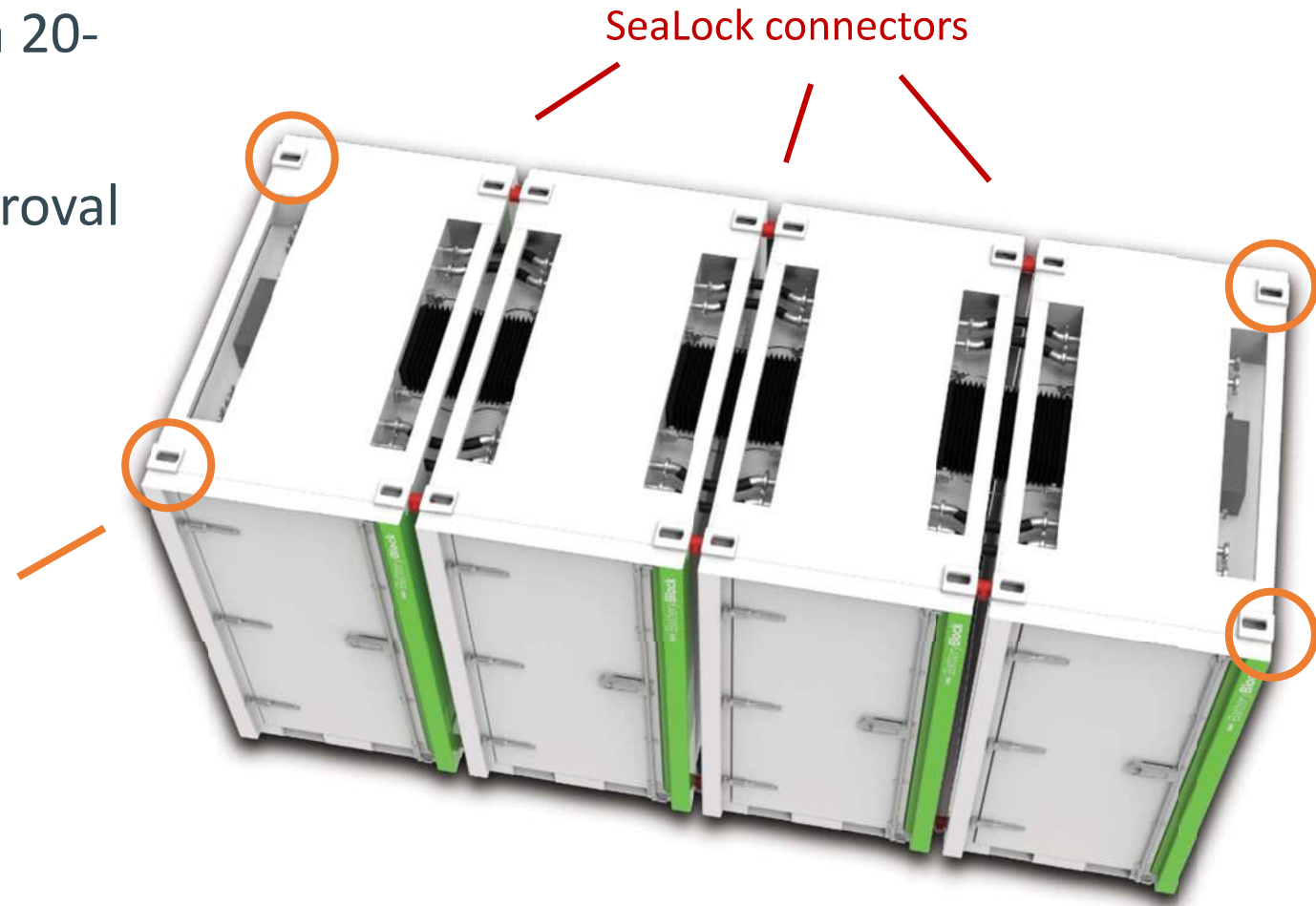
CombiBlock

- Interconnection and protection of the batteries
- Connection to battery inverter
- High efficiency temperature management for the batteries

LeBlock™: Transportable as an ISO Container

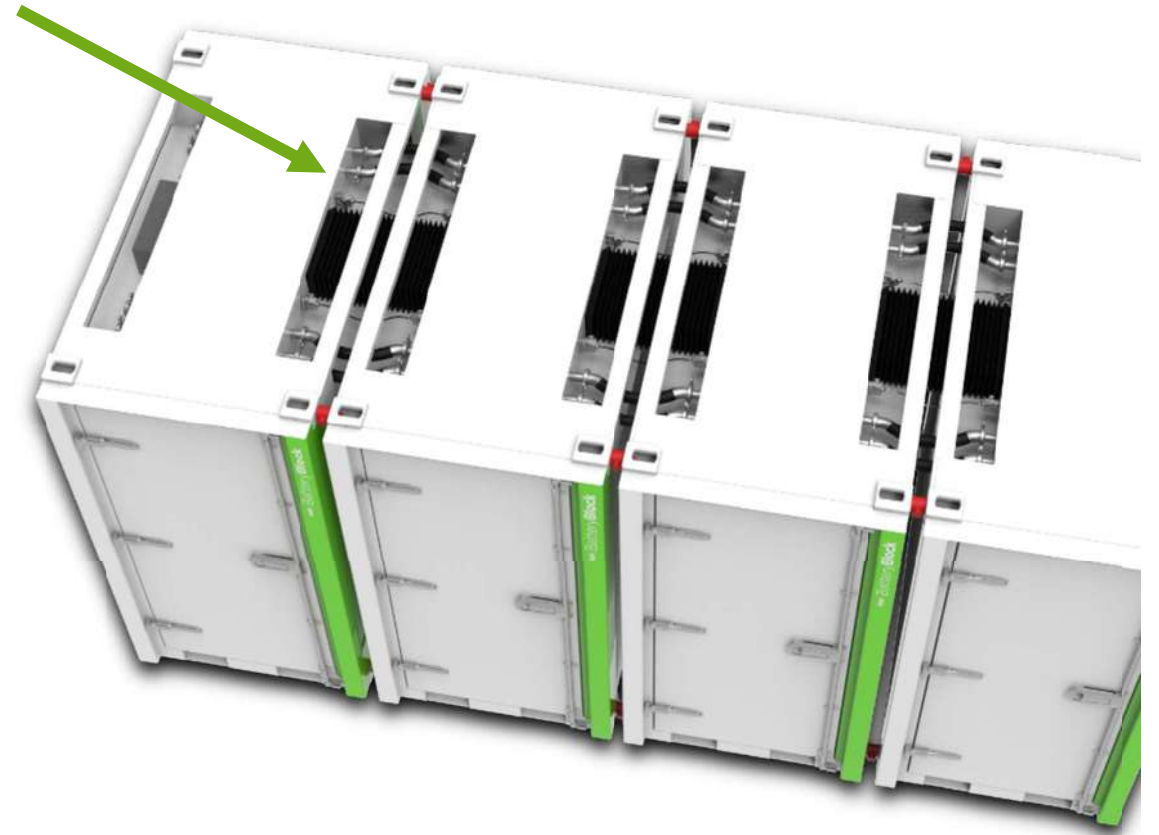
- ▶ 4 Blocks interconnected becomes a 20-ft ISO container
- ▶ Equipped with valid CSC safety approval plate

Corner fittings and strength standardized by international standardization organization (ISO)



Block Interconnections

- ▶ Simplified plug & play interconnection with liquid cooling pipes for the batteries and flexible bus bars



Safety

The Challenge



Four Firefighters Injured in Lithium-Ion Battery Energy Storage System Explosion (McMicken, Arizona)

The solution

Avoid propagation between racks



Contain and suppress fire at Block level

- Robust enclosures with fire resistant wall
- Fire detection and suppression for each Block

Ensure safety of operator and firefighters

- Enclosure cannot be entered and is serviced from outside

UL9540a certification

Battery Inverter

The CAB1000 from EPC Power scalable platform was specifically developed to offer a straightforward and simple solution to developers of utility-grade energy storage systems. In ~1 MW blocks, the CAB1000 platform offers a single modular system which is tailored to Utility systems of all sizes. The scalable power conversion system also boasts high-performance controls and system redundancy. With world-class power density and an easy to install design, your energy storage system will be commissioned quickly and easily.



Each 1 MW block is designed to support connections to independent battery banks. Each CAB1000 contains fully independent AC & DC disconnects, fuses, utility-grade surge suppression, environmental controls, and precharge, enabling an easy installation.

CAB 1000	
Model	CAB1000/AC-630
AC voltage range	630V +/- 10%
AC charge power	1369 kVA
AC discharge power	913 kVA
Frequency	50/60Hz
Efficiency	98.6%
DC voltage range	891 – 1500 Vdc
Maximum DC current	1400 A
Number of DC inputs	1
Ambient temperature	-40°C to 60°C
Protection Degree	IP 55
Dimensions (HxWxD)	2281 x 1000 x 1636 mm
Weight	1043 kg
AC/DC Disconnection	Motorized Switch
AC/DC Protection	Isc 200kA; Type 1 surge arresters
Control Interface	CAN, Modbus TCP/IP
Certifications	UL 1741, C22.2 No. 107.1-16 UL1741:2010 R2.18 (SA) IEEE 1547.1-2005 CA Rule 21 No. 16-06-052 Hawaii Rule 14 No. 2014-0192

Battery Inverter

The Freemaq PCSK inverter series from Power Electronics is a modular solution from 1600kW up to 4390kW.

The Power Electronics Freemaq PCSK offers proven hardware to meet storage and grid support challenges. Operators require stringent dynamic and static grid support features for inverters. The Freemaq PCSK can perform grid support functions such as: Peak Shaving, Ramp Rate Control, Frequency Regulation, Load Leveling and Voltage Regulation, controlled by an EMS.



FREEMAQ PCSK	
Model	FP4390K4
Operating Temperature	-35°C to 60°C
Rated AC Output Power	4390 kVA @ 40°C
Output Voltage	690V AC
Grid Frequency	50/60 Hz
THDi	<3% at any load condition
DC Voltage Range	976 – 1500 Vdc
Max. Efficiency PCA, nom(η)	98,93%
Protection Degree	IP 55
Colour	RAL 7035
Dimensions (WxDxH)	3700 x 2200 x 2200 mm
Humidity Control	Yes
Overvoltage protection AC	Type II
Overvoltage protection DC	Type II
Disconnection DC	Circuit Breaker Included
Ground fault detection	Isolation monitoring
Communication	Modbus RTU (RS485) Modbus TCP / IP (Ethernet)

Medium Voltage Skid

The MV Skid is a compact turnkey outdoor platform made from high resistance galvanized steel with all the medium voltage equipment integrated, including an outdoor power transformer, MV switchgear, oil tank, filter and built in fast power connection to the inverter.

Up to 36kV with power outputs up to 4390kVA, this compact solution allows simplifies the project design of the BESS plant, reducing installation costs and the amount of resources needed. The benefits of the MV Skid and the fact that it is also easier to transport and deliver into remote sites makes it the optimal solution.



MEDIUM VOLTAGE SKID	
TRANSFORMER	
No-load primary voltage	up to 34.5 kV
Rating Power at testing reference temperature [*]	up to 4390 kVA
Operating temperature range	-5°C to 40°C
Transformer type	ONAN oil (outdoor)
Vector group	Dy11
Primary voltage regulation (off-load)	± 2 x 2,5%
Primary/Secondary winding materials	Al/Al
Electrostatic screens	Included
Protection relay	DGPT2
Cable Boxes	Included
LV Transformer bus bar	Included
Oil Pit Tank for Transformer	Included
Others	According to IEC 60076 standards
MV SWITCHGEAR	
Protection cell device	Circuit Breaker
Insulation system	SF6 gas
Protection line device	Switch
Panel block	2L+2V
Protection relay	ANSI 50, 51, 50N, 51N
Rated voltage	11 – 34.5 kV
Busbar rated current	400A
Line rated current	400A
Rated short-time withstand current	16 kA (1s)
Ambient Temperature	-5° to 40°C
Others	According to IEC 62271-200 standards.

Fully Integrated Safety from Cell to the entire System

Cell

- All cells are certified to UN38.3, IEC62619, UL1973 and UL9540A

Module

- All modules are certified to UN38.3, IEC62619, UL1973 and UL9540A

Rack

- All modules are compliant with IEC62619, UL1973, IEC62477-1, IEC61000 and **UL9540A**

LeBlock System

- **The LeBlock enclosures isolates <750kWh and limits exposed material to an incident**
- **Enclosure cannot be entered and is serviced from outside**
- **Designed in accordance with IEC62933 and UL9540**
- **Includes Emergency Stop, Fire Detection and Suppression System**
- Ground Fault Detection and Battery Fault Protection incl. Voltage, Current and Temperature

Controls

- Leclanche EMS continuously monitors Battery Management System and crucial system devices
- Detection and isolation of potential anomalies with direct alert to operators

Customer Support

- Leclanche provides onsite commissioning
- Onsite Training for Operators, Maintenance Personnel and First Responders
- Comprehensive documentation for the system incl. First Responders Emergency Plan

Modularity



Modularity is key to have different option for the future

- ▶ Easily relocation / transportation without underground re-cabling
- ▶ Simple augmentation of capacity for other usages



Scope of offer Leclanché

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Turn-key solution for EPC

All the advantages of LeBlock + Design – Engineering – Procurement

- LeBlock batteries with LFP
- Inverters
- MV skid

Energy Management Software

Installation supervision

Commissioning



Example utility-scale with 25 MVA / 53 MWh

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