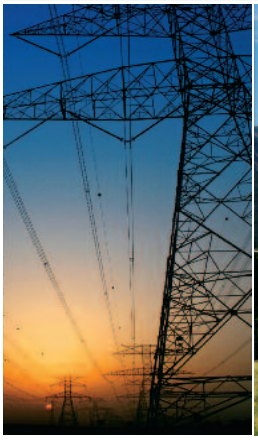
Intensium® Max

A range of ready-to-install containerised energy storage
for renewable energies and grid management



saft

Intensium Max



Saft Li-ion technology covers every energy storage need – from kilowatts to megawatts

The increasing penetration of decentralised and variable renewable generation presents important stability and reliability challenges for power grids. Effective energy storage can ensure that electricity is available wherever and whenever demand – rather than supply – dictates.

Building on over 10 years of proven expertise in the delivery of large format Li-ion battery systems, Saft has developed a range of innovative energy storage solutions to meet every power and energy need from kilowatts to megawatts. Our systems can optimise production, grid stability and efficient delivery across every part of the electricity value chain: from generation, through transmission and distribution, to the consumer.

Making renewable generation predictable and grid-compatible

Developers of solar and wind power schemes and utilities in remote or isolated areas know that the significant output peaks and troughs inherent in renewable energy sources are a factor that can make their successful integration into power grids more difficult.

Saft energy storage systems can smooth this intermittent generation and reduce ramp rates for medium- and large-scale renewable energy plants. Higher-energy systems also provide capacity firming, promoting renewable sources as a predictable component within the overall generation mix.

To stabilise wind farms and solar arrays, batteries must handle significant daily energy flows, high power output and very dynamic charge/discharge behaviour at variable depth-of-discharge. Saft Li-ion technology offers the ideal combination of energy and power output, with the proven capability to deliver high performance in demanding cycling conditions over a lifespan exceeding 10 years.

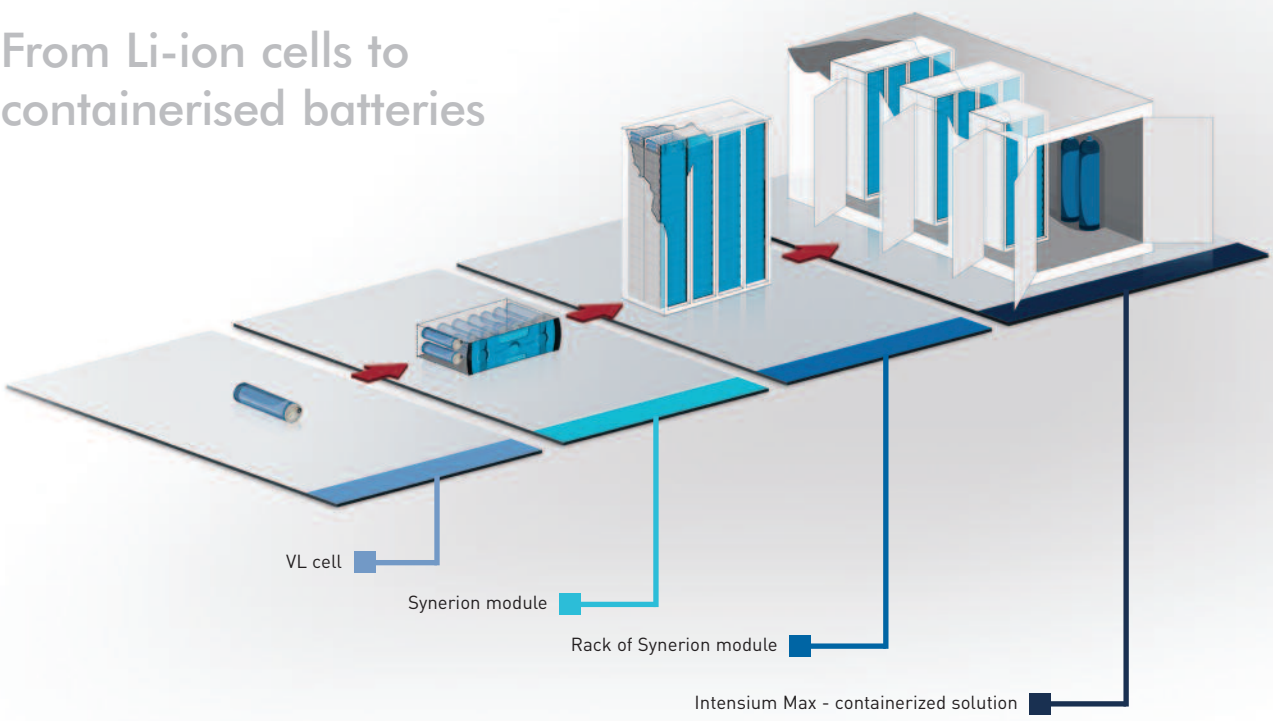
Saft provides complete solutions from Li-ion modules to our ready-to-install Intensium Max containers integrating power management and control interfaces, air conditioning and safety devices.

Thinking inside the box

A containerised Li-ion battery system

Intensium Max is Saft's ready-to-install containerised energy storage system designed for today's electricity grids, and for the smart grids of tomorrow.
It provides a megawatt-level energy storage solution which is readily scalable to suit a wide variety of applications, including installation in combination with renewable generation plants or direct connection to the grid. The IM20 is based on 10 parallel strings, each comprising 29 battery modules (24 V), delivering a nominal 700 V and a rated energy of 42, 58 and 62 kWh depending on the cell type. The IM20+ is a second generation container developed for E cell type consisting of 17 parallel strings of 28 synerion modules (24V).
The container delivers a rated energy of 1MWh.
Each string also incorporates an electronic Battery Management Module (BMM) that controls the charge and discharge cycles of each module as well as monitoring their state of charge and health.

From Li-ion cells to containerised batteries



Delivering megawatts of energy storage

Excellent energy and power characteristics in an efficient format

Intensium Max is delivered in a standardised 20-foot container that can be easily and efficiently transported to wherever you need it – including hard to reach spots.

The fully-integrated solution provides excellent power and energy characteristics with the flexibility and scalability to suit many different applications. Multiple containers can be integrated within a single Energy Storage System to deliver the desired high levels of energy (MWh) and power (MW).

Power and energy ratings:

	IM 20E High Energy	IM+ 20E High Energy Plus	IM 20M Medium Power	IM 20P High Power
Energy (kWh)	620	1000	580	420
Continuous discharge power (kW)	900	500	1100	1600
Peak discharge power 1min (kW)	1100	500	1100	1800
Nominal charge power (kW)	300	500	600	800
Current max (A)	1600	600	1600	2500
Voltage range (V)	609 - 812	588 -790	609 - 812	609 - 812
Dimensions L x W x H (m)	6.1 x 2.5 x 2.9			
Dimensions including roof L x W x H (m)	7.0 x 3.0 x 3.3			
Weight (t)	14.5	16.5	14.5	14.5

Each container comprises:

- Battery management system
- Active cooling system
- Monitoring panel
- Power and communication interfaces




The technology inside

The Intensium Max is built around Saft's range of Synerion E, M or P Li-ion modules, which provides maintenance-free energy storage in a compact, adaptable format that combines high operational reliability, long cycle life and outstanding efficiency with the capability to provide hundreds of kWh of energy from a single unit. Thanks to this technology, the Intensium Max has the best energy efficiency of all available energy storage systems on the market today.

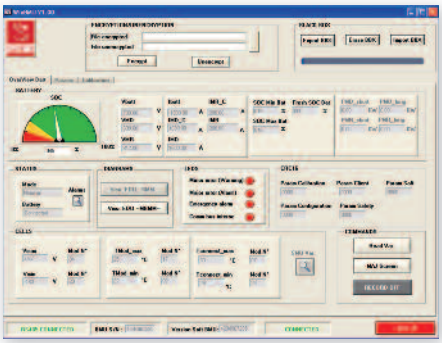
Energy efficiency, high reliability and robustness thanks to:

- Compact module that integrates VLE, VLM or VLP Li-ion cells, module supervision and cell balancing
- Advanced industrial design offering high levels of reliability and robustness
- 20 year long design life with high daily energy throughput
- Up to 4C power capability enabling highly dynamic charge/ discharge profiles from any state of charge

Saft's Synerion 24 M
Medium Power Li-ion module

Supervisory and power management system

To ensure optimum performance, reliability and safety, Saft Li-ion battery modules come complete with fully integrated electronic supervisory and power management systems.



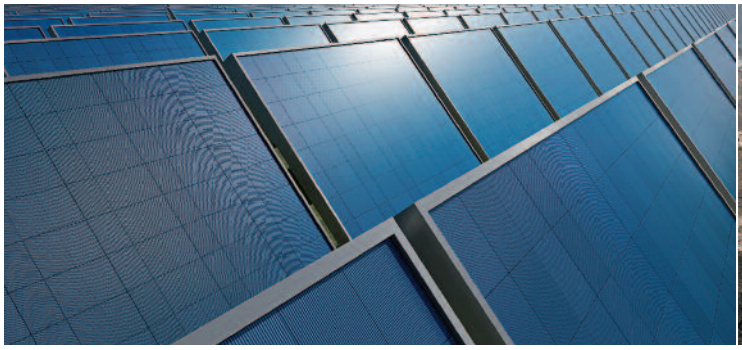
BMM
(Battery Management Module)

Each battery string is supervised by an electronic BMM (Battery Management Module). This controls the charge/dis-charge of the 28 or 29 individual battery modules and monitors their state of charge (SOC) and health (SOH) and other vital data such as temperature. The BMM can also electrically isolate individual strings if necessary.

MBMM
(Master Battery Management Module)

A Master Battery Management Module (MBMM) provides overall control of the 10 or 17 parallel battery strings. Its vital function is to monitor and control the state of charge in all the parallel strings. The MBMM also provides the control interface with the power conversion systems.

Intensium



One solution, multiple capabilities

Saft's containerised approach to energy storage systems offers multiple capabilities. This means that not only can a single technical solution address multiple applications, but also a single battery system can enable grid operators to realise multiple value streams.

Support for large renewable generation plants

- Improve grid integration of large solar or wind power plants
- Smooth intermittent generation
- Reduce ramp rates
- Shaping power output

Manage power flows in the medium voltage grid

- Reduce feeder congestion during demand and generation peaks
- Provide local dynamic voltage support
- Enable black start and islanding

Fully-integrated, easy and efficient

Saft has designed the Intensium Max container to provide an effective 'plug and play' approach to energy storage, with the emphasis on ease of specification, ease of installation, flexibility of application and user-friendly operation.

- Ready-to-install container
- Easy to relocate
- Suitable for multiple charge and discharge patterns, from high power short duration cycles to deep discharge duration
- Fully-integrated solution with sophisticated Battery Management System (BMS) and power and communication interfaces
- Incorporates Temperature and Safety Management Systems
- User-friendly monitoring interface

Max

Built upon our tested and proven Li-ion technology

Field-proven, with over 10 years experience in demanding applications, Saft Li-ion battery technology offers several critical advantages for energy storage systems.

- Fast response time, limited only by power electronics
- High power capability both in charge and discharge
- Excellent cycling capability
- High round-trip efficiency (better than 95%)
- High charge retention
- Long life (20 years with daily cycles at 60% depth of discharge)
- Maintenance-free with self-diagnostics

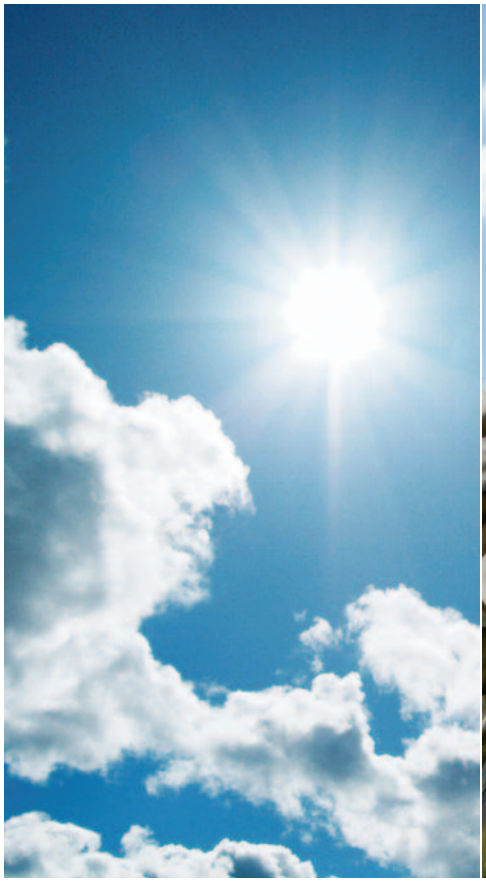
www.saftbatteries.com

Saft is committed to the highest standards of environmental stewardship

As part of its environmental commitment, Saft gives priority to recycled raw materials over virgin raw materials, reduces its plants' air and water releases year after year, minimizes water usage, reduces fossil energy consumption and associated CO_2 emissions, and ensures that its customers have recycling solutions for their spent batteries.

Regarding industrial batteries, Saft has had partnerships for many years with collection companies in most EU countries, in North America and in other countries. This collection network receives and dispatches our customers' batteries at the end of their lives to fully approved recycling facilities, in compliance with the laws governing trans-boundary waste shipments.

Saft has selected a recycling process for industrial lithium-ion cells with very high recycling efficiency. A list of our current collection points is available on our web site. In other countries, Saft assists users of its batteries in finding environmentally sound recycling solutions. Please contact your sales representative for further information.



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