

# Intensium® Max 20 High Energy

## Very high energy lithium-ion container 2.5 MWh

The Intensium® Max 20 High Energy is Saft's unmanned and ready to install Energy Storage System (ESS) in a 20-foot container, enabling utility-scale storage solutions for grids, renewables and industries.

Built with advanced NMC Li-ion technology, Intensium® Max 20 High Energy is a very compact and fully integrated storage system, combining high energy density with high levels of safety and operational reliability. The design of the latest addition in the well-proven family of Saft's Intensium Max containers is a concentration of technology leveraging years of operational experience in multiple applications and environments.

### Applications

- Integration of variable renewables: smoothing, shaping and shifting, minimizing curtailment
- Peaking capacity
- Transmission & distribution grid support
- Microgrids
- Energy management in large C&I sites

### Features

- Advanced industrial design offering highest safety and robustness
- Unmanned container with external access
- A single, easy access distribution cabinet integrating all power and control interfaces, supervision and safety devices and power supplies for the container
- Proven architecture for high availability
  - Individually connectible strings with one Battery Management Module (BMM) per string
  - Master Battery Management Module (MBMM) for global charge and discharge management, data management, auxiliary equipment monitoring and diagnostic functions
  - One PLC for external communication and remote monitoring
- Sophisticated battery management for enhanced operability
  - Monitoring and control of voltage and temperature
  - Real time supervision of charge and discharge current limits
  - Real time indication of State of Charge (SOC)
  - Balancing of State of Charge (SOC) between cells and strings



Nominal characteristics at +25°C / +77°F	1000V	1500V
Rated energy (C/5) (MWh) <sup>(1)</sup>	2.5	2.5
Voltage (V)	811	1216
Nominal rate in charge and discharge	0.5C	0.5C
<b>Mechanical characteristics</b>		
Length w/o HVAC (m)	6.1	6.1
Length incl HVAC (m)	6.7	6.7
Width (m)	2.4	2.4
Height (m)	2.9	2.9
Weight (t)	<30	<30
Ingress Protection (IP) rating	IP 54	IP 54
<b>Electrical characteristics</b>		
Minimum Voltage (V)	672	1008
Maximum Voltage (V)	923	1385
Rated continuous current (charge and discharge) (A)	1575	1050
Charge and discharge power (DC) at rated continuous current (at 50% SOC) (MW)	1.2	1.2
Maximum current (charge and discharge) (A) <sup>(2)</sup>	2500	1680
Charge and discharge power (DC) at maximum current (at 50% SOC) (MW) <sup>(2)</sup>	2.0	2.0
Discharge time at nominal power (h)	2	2
<b>Operating conditions</b>		
Operating temperature	-25°C to +55°C	
Cycle efficiency (DC roundtrip, 0.5C)	96%	
Self-discharge	<6% / month	
Design life	15 years	
Maximum altitude	2000 m above sea level	
Maximum relative humidity	100% (controlled inside at 60%)	

(1) According to IEC 60620

(2) Maximum duration is application dependent

- Alarms and faults management (contactor opening rules)
- Indication of State of Health (SOH) integrating cycling and calendar aging
- Advanced thermal management system based on air conditioning unit and controllable fans
  - High cooling efficiency
  - Temperature homogeneity
- Safety management system with smoke detection, fire suppression system and alarms

## Benefits

- Flexible, high energy density building blocks to optimize energy storage configurations up to 100MW
- Quick and cost effective installation, with containers delivered 'plug and play', fully assembled and tested ex factories
- Easy system integration: compatible with most power conversion systems in the market
- Excellent flexibility: scalable configuration of strings and containers
- High availability and serviceability due to parallel connection of strings
- Low maintenance – diagnostic interface available
- Remote supervision capability
- Low Total Cost of Ownership (TCO)
  - High energy and power availability over SOC
  - Multiple charge-discharge operations per day with minimum auxiliary consumption
  - Long life time due to optimum temperature management

## Safety

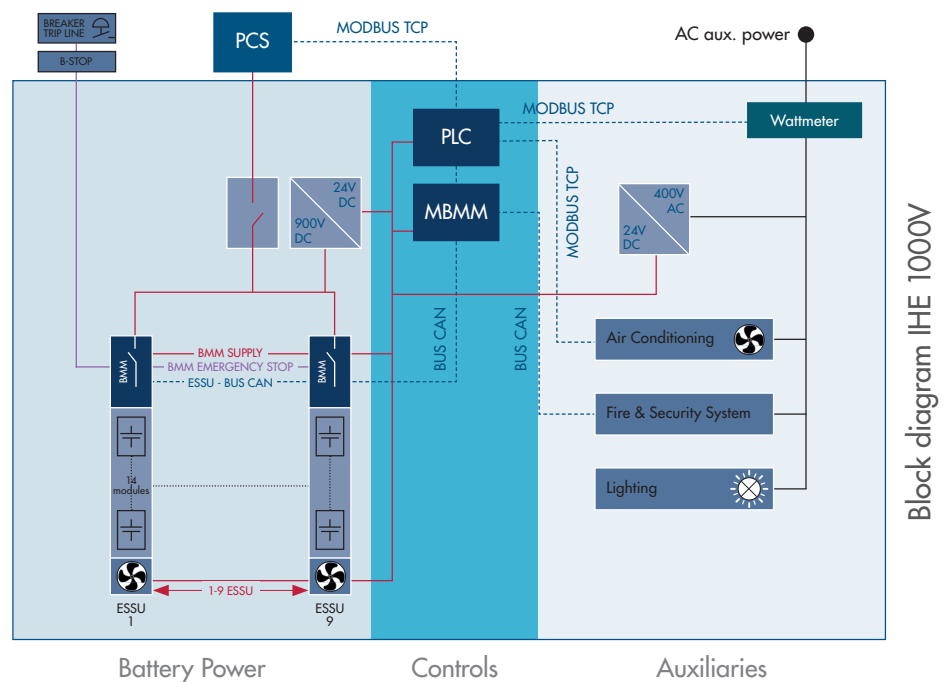
- Safety driven design guarantees safe behaviour in case of abuse usage or cell thermal runaway at module, string and container levels
  - Module level: electronic board for cell monitoring and balancing
  - String level: BMM to manage short-circuits, over-currents, over-temperature and over-voltages
  - Container level: emergency push buttons, DC disconnect switch, ground fault detection and fire suppression system
- Fire detection and suppression system to suppress fires in their initial stages and prevent collateral damages due to propagation. FSS status transmitted by communication bus and hard signals

## Storage conditions

Storage temperature	-25°C to +55°C
Storage time	6 months

## Compliance to standards

Cell safety	UL 1642
System safety	IEC 62619, IEC 62093, IEC 62477, UL 1973
EMC	IEC 61000-6-4 / IEC 61000-6-2
Insulation resistance	IEC 62477 overvoltage cat II
Container protection class (operation)	IP 54
Container dimension and transport	ISO668
Seismic	Eurocode zone 5 / IEEE 693 high level
Environment conditions	IEC 60721
Transport classification	UN 3536 - Class 9
Transport regulation compliance	UN 38.3
Marking	CE
Directives	ROHS, REACH, WEEE
Manufacturing plants	ISO 9001, QS 9000, ISO 14000



## Battery System Architecture

- 1000V class: 9 Energy Storage System Units (ESSU)
  - 14 battery modules in series
  - One Battery Management Module (BMM)
- 1500V class: 6 Energy Storage System Units (ESSU)
  - 21 battery modules in series
  - One Battery Management Module (BMM)
- Distribution cabinet for 1.2 MW DC power output

- Communication interface via MODBUS TCP
- Disconnect switch
- Master Battery Management Module (MBMM)
- Programmable Logic Controller (PLC)
- Two auxiliary power supplies
  - 400V AC for HVAC, FSS, lighting
  - 24V DC internal self-supply for electronics and fans
- Ground fault detection function (optional)
- External battery stop