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) (1)	2.5	2.5
Voltage (V)	811	1216
Nominal rate in charge and discharge	0.5C	0.5C
Mechanical characteristics		
Length w/o HVAC (m)	6.1	6.1
Lenght 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
Electrical characteristics		
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) (2)	2500	1680
Charge and discharge power (DC) at maximum current (at 50% SOC) (MW) (2)	2.0	2.0
Discharge time at nominal power (h)	2	2
Operating conditions		
Operating temperature	–25°C to +55°C	
Cycle efficiency (DC roundtrip, 0.5C)	96%	
Self-discharge	<6% / month	
Design life	20 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

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- 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

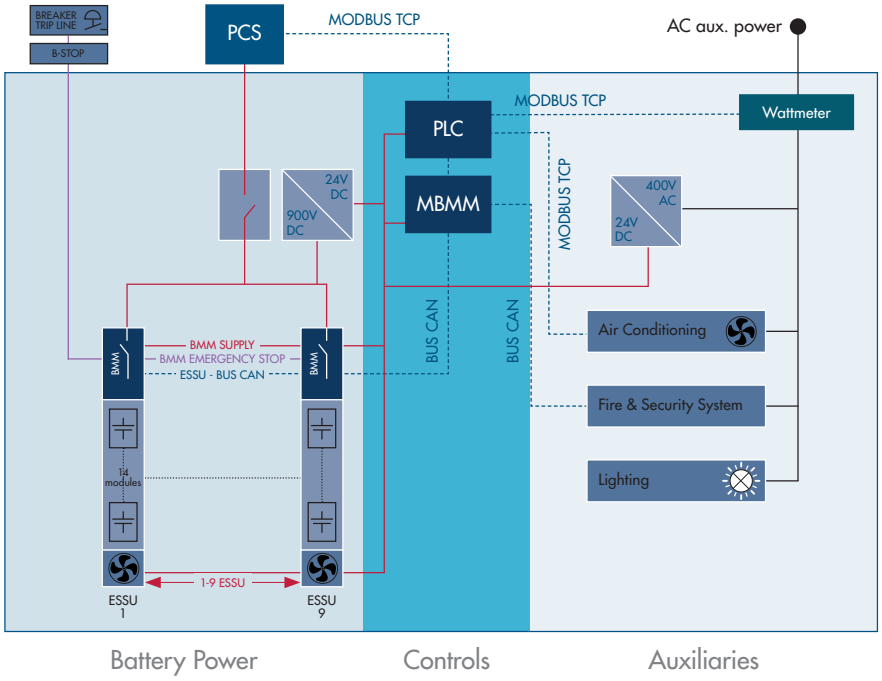
Benefits

- 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, overtemperature 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	–30°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



Block diagram IHE 1000V

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

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