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Технические характеристики на ЛИТИЙ-ИОННЫЕ АККУМУЛЯТОРНЫЕ КОНТЕЙНЕРЫ для железнодорожного транспорта серии Intensium

Intensium® Max 20 High Energy

Very high energy lithium-ion container 2.5 MWh

The Intensium® Max 20 High Energy is 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 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	1210 V
Nominal rate in charge and discharge	0.5C	1C
Mechanical characteristics		
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
Electrical characteristics		
Minimum Voltage (V)	672	1008
Maximum Voltage (V)	923	1385
Rated continuous current (charge and discharge) (A)	1575	2100
Charge and discharge power (DC) at rated continuous current (at 50% SOC) (MW)	1,25	2.0
Maximum current (charge and discharge) (A) ⁽²⁾	1575	2100
Charge and discharge power (DC) at maximum current (at 50% SOC) (MW) ⁽²⁾	1.25	2.5
Discharge time at nominal power (h)	2	2.5
Operating conditions		
Operating temperature	-25°C to +55°C	
Cycle efficiency (DC roundtrip, 0.5C)	95%	
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 62620

(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

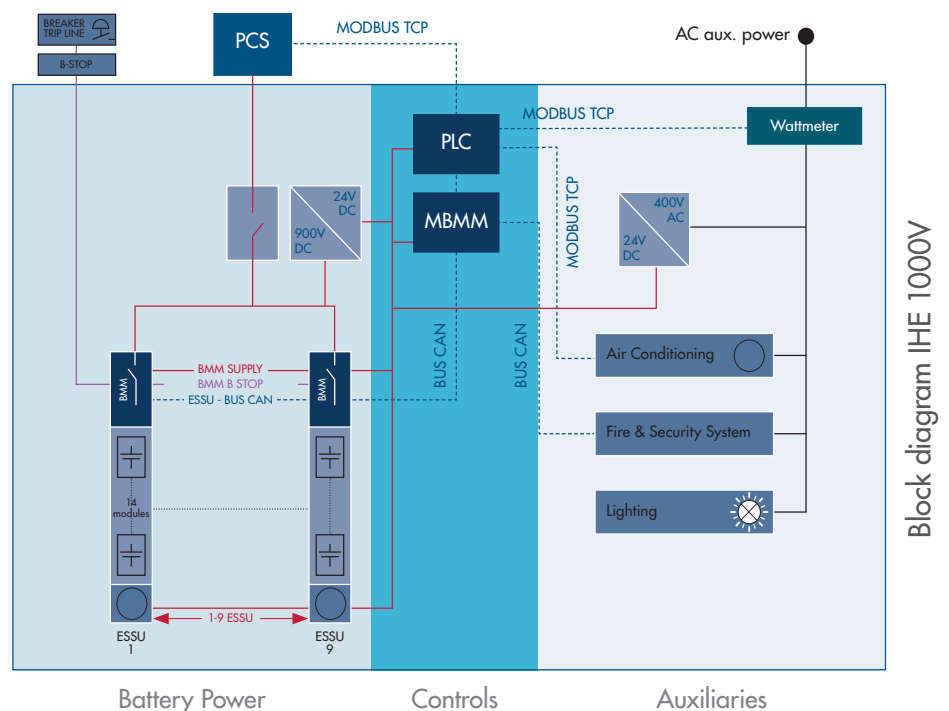
Benefits

- 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, overtemperature and over-voltages
 - Container level: B STOP 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	12 months
Compliance to standards	
Cell safety	UL 1642
System safety	IEC 62619, IEC 62093, IEC 62477, UL 1973, EN 54
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 8 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
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 (IHE 1000) and 2,5 MW (IHE 1500) 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
- Ground fault detection function (optional)
- External battery stop

Intensium[®] Max 20 High Energy

2.3 MWh high energy lithium-ion battery storage container

The Intensium[®] Max 20 High Energy is 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 Lithium Iron Phosphate (LFP) technology, the **Intensium[®] Max 20 High Energy** is a fully integrated storage system, combining high energy density with high levels of safety, operational reliability and compliance with international standards.

The design choices of the **Intensium[®] Max 20 High Energy** are leveraging 10 years of technology and operational experience in multiple applications and environments to maximize the value of your next battery Energy Storage System asset.

Benefits

- 1 Flexible**
High energy density building blocks, suitable for storage assets ranging up to several hundreds of MWh
- 2 Project de-risking**
Quick and cost-effective installation of containers, 'plug and play' delivered and factory tested
- 3 Easy system integration**
Compatible with most Power Conversion Systems available in the market
- 4 Maximized energy storage economics**
 - Optimized energy and power availability over SoC
 - Multiple charge-discharge cycles per day with minimum auxiliary consumption
 - Long lifetime cells and optimum thermal management
 - High availability and serviceability
- 5 Low maintenance with CUBE**
Real-time battery control, supervision and big-data publishing platform for enhanced analytics and services.
- 6 Safety driven design**
To guarantee safe behavior during operations and in case of an abusive event, protecting assets, operators and first responders

Applications

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

Features

Advanced industrial design offering highest safety and robustness:

- Unmanned container with external access, fully assembled and tested within manufacturing hubs
- Single, easy access distribution cabinet integrating all power and control interfaces, supervision and safety devices

Proven architecture for high availability:

- Individually connectible strings with one Battery Management Module per string
- Master Battery Management for global charge and discharge management, auxiliary equipment monitoring and diagnostic functions
- CUBE platform for external communication, battery containers parallelization, remote monitoring and supervision, data management to lower operation and maintenance with a high cybersecurity level

Sophisticated battery management for enhanced operability:

- Monitoring and control of voltage, current and temperature
- Balancing of State of Charge (SoC) between cells and strings
- Real-time indication of State of Charge (SoC)
- Alarms and faults management
- 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 within containers

Safety driven design to guarantee safe behavior in case of abuse usage or cell thermal runaway at module, string and container levels:

- UL9540A tested Lithium Iron Phosphate (LFP) technology
- Short-circuits, over-currents, over-temperature and over-voltages management
- Stop push button, disconnect switch, ground fault detection
- Fire detection and two levels of suppression systems (gas, water) to fight fires in their initial stages and prevent collateral damages
- Blast panels on the container roof
- Safety features focus to protect first line intervention personnel

Specifications

Electrical

Rated energy [C/5] ¹	2.3 MWh
Discharge duration range	1 – 4 hours
Voltage range	1040 V – 1400 V
Rated DC power	1.1 MW charge/discharge
Rated current	900 A charge/discharge
Maximum DC power	2.2 MW charge/discharge
Maximum current	1800 A charge/discharge

Mechanical

Dimensions (L, H, W) without HVAC	6.1m, 2.9m, 2.4m / 20ft, 9ft 6in, 8ft
Dimensions (L, H, W) with HVAC	6.7m, 2.9m, 2.4m / 22ft, 9ft 6in, 8ft
Weight	< 30,500 kg / 60,000 lbs
Container protection class	IP 54 (operation)

Operating & storage conditions

Ambient temperature	-25°C to +55°C
Design lifetime	≤ 20 years
Altitude above sea level	≤ 2000 m
Ambient relative humidity	Up to 100%
Storage temperature	-25°C to +55°C
Storage time	12 months (under conditions)

CUBE platform

Features	Local HMI and cloud interface
External controllers	Sunspec MESA, Modbus TCP/IP

Standards

Safety	IEC 62619, IEC 62477 UL 1973, UL 9540, UL 9540A
Marking	CE, UL
Directives	REACH
Manufacturing hubs	ISO 9001, QS 9000, ISO 14000
Cybersecurity	IEC 62443-4-2
Transport (fully populated)	UN3536

¹ According to IEC 60620



CUBE: energy and asset performance

CUBE is real-time battery control, supervision and big-data publishing platform for enhanced analytics and services; it enables storage asset owners access to highly granular system data. CUBE has a high level of cybersecurity ensuring data confidentiality, product availability and safety.

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