Flex'ion™ Li-ion Battery System

For Mission Critical Applications

DATA CENTERS

OIL & GAS

UTILITY

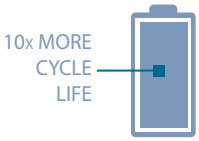
Flex'ion™ main advantages

Flex'ion™ Battery Solutions offer a wide range of energy and power combinations for Mission Critical Applications from 1 to 500 kWh and 10 kW to 2.3 MW

Main benefits versus VRLA lead-acid products

LIFE TIME

20 YEARS CALENDAR LIFE

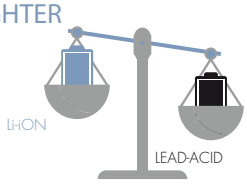


INSTALLATION SPACE

3x MORE COMPACT

INSTALLATION WEIGHT

6x LIGHTER



MAINTENANCE-FREE

Flex'ion™ assets

A SCALABLE, HIGH POWER AND RELIABLE Li-iON BATTERY SOLUTION

Built with Saft's proven Super Lithium Iron Phosphate (SLFP ™) proprietary technology, Flex'ion™ offers superior performance whilst maintaining the highest levels of safety, reliability and availability.

Flex'ion™ modular design provides outstanding system flexibility in terms of power, operating voltage and backup time answering your specific application's needs.

DESIGNED FOR MISSION CRITICAL APPLICATIONS

Flex'ion™ battery systems are designed for AC and DC UPS (Uninterruptible Power Supply), ancillary power backup and switchgear applications in mission critical facilities, such as data centers, telecom, offshore / onshore oil & gas and utility markets.

Flex'ion™ advanced Li-ion battery solutions are fully IEC, UL and UN certified to address the most demanding market requirements.

ENGINEERED AND MANUFACTURED IN USA & EUROPE

Flex'ion™ battery systems are designed and manufactured at Saft's state of the art Li-ion sites in North America (Jacksonville, Florida) and Europe (Nersac, France and Raškovice, Czech Republic).

Saft lithium-ion technology benefits from more than 25 years of worldwide industrial and field experience in standby, space, defense, aviation and energy storage.

This cutting-edge battery system delivers a reduced total cost of ownership (TCO), an industry-leading power and energy density, and an outstanding 97% roundtrip* efficiency that reduces power consumption.

*Roundtrip : charge / discharge

It is available either as a full system including cabinets or as a kit of sub-componentsto be integrated with power electronic equipment.

Flex'ion™ scalable architecture

Voltage, energy and power on-demand

Flex'ion™ fully integrated SLFP ™battery solution comprises modules, BMM (Battery Management Module), MBMM (Master Battery Management Module) for multi-string paralleling, Intelli-Connect supervision system and cabinet.

Its modular design allows serial and serial/parallel connection to reach different energy and power requirements, answering your specific application's needs.

- Serial connection from 87 V to 750 Vdc (CE) and 600 Vdc (UL)
- BMM (Battery Management Module) included for string management and interfacing
- Multi-string paralleling up to 18 strings through MBMM (Master Battery Management Module) to achieve :
  - High power up to 2.3 MW
  - High energy up to 500 kWh
- Intelli-Connect integration system
  - Facilitates power management and allows use with conventional constant potential (CP) or smart chargers
  - Enables the battery string to discharge, even if the charge circuit has opened

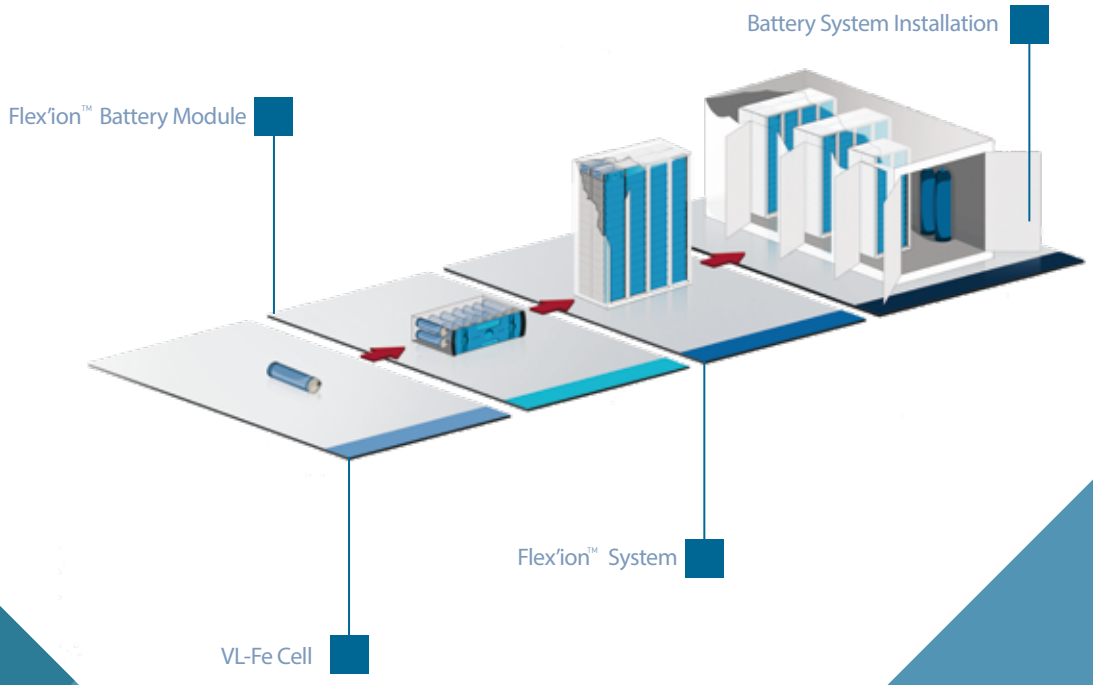
Energy to High power modules Flex'ion™ SLFP ™compact solution is based on 3 different modules:

- 23 M Fe, 46 M Fe (Energy / Medium power)
- 46 P Fe (High power)

The patented Super Lithium Iron Phosphate (SLFP ™) chemistry invented by Saft R&D has a flat discharge curve, which is a natural fit for UPS systems that supply constant power.

Its 3.7C (23 volt & 46 volt M Fe) and 11C (46 volt P Fe) maximum discharge power capability is optimizedfor high power applications.

Saft value chain : from cell, to module and system

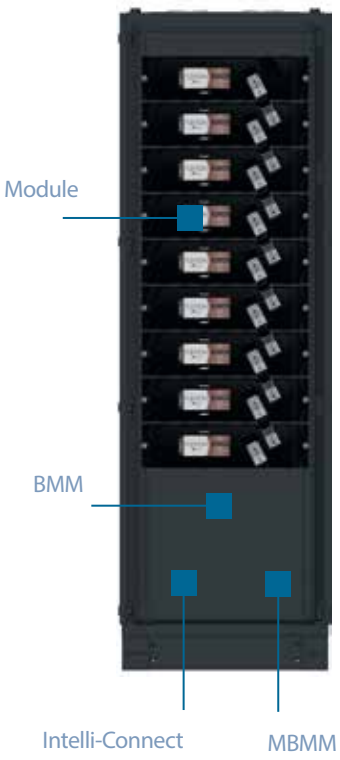


Flex'ion™ module range
Technical data

An advanced Battery Management System

The battery management system includes a Master Battery Management Module (MBMM), Battery Management Modules (BMM) and an Intelli-Connect proprietary monitoring system providing the following functions:

- Monitoring and control of voltage, current and temperature at cell level
- State of Charge (SOC) balancing between cells, modules and strings
- Real time calculation of:
  - Charge and discharge current limits
  - SOC using temperature, aging, voltage and current
- Programmable logic controller (PLC) with pre-loaded protocols: CANopen, Modbus (RS485 or TCP/IP), Ethernet (IEEE 802.3) and OPC communication
- Indication of:
  - State of Health (SOH) of the system integrating calendar aging and cycling
  - State of Charge (SOC) of the system
- Alarm and fault management



A scalable 19" rack cabinet (optional)

The battery modules fit standard 19" racks and are mounted in Saft designed cabinets, ensuring reduced floor space in battery rooms. They are available in both certified seismic and non-seismic versions.

Saft's Flex'ion ™ cutting-edge design includes an intuitive optional Human-Machine-Interface (HMI) and front panel battery condition visual indication.

Flex'ion™ product range
Technical data

4 sizes of cabinet answering your specific needs

Depth 512 mm / 20.2 inches
140 kg
Up to 11 modules

Depth 512 mm / 20.2 inches
130kg
Up to 9 modules

Depth 512 mm / 20.2 inches
120kg
Up to 8 modules

Depth 512 mm / 20.2 inches
100kg
Up to 5 modules

COMPLIANCE TO STANDARDS	CE MARKING	2011/65/UE 2014/35/UE EN 62477-1 2014/30/UE EN 61000-6-2/4
	UL MARKING	UL1973 UL1998 UL991 UL94 V0
	ENVIRONMENTAL	IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-6 IEC60068-2-11 IEC 60068-2-14 IEC 60068-2-21 IEC 60068-2-27 IEC 60068-2-30 IEC 60068-2-78 IEC 60721-3-12 IEC 61587-1 IBC 2016 CBC 2014 IEEE 693 Bellcore GR-63
	SAFETY	IEC 61508 IEC 62619 FCC IFC 2012 §608
	PERFORMANCE	IEC 62620
	TRANSPORTATION	UN 3480
MECHANICAL & ELECTRICAL INTERFACE	Horizontal installation	
	Supplied as a system (including cabinets) or a kit (excluding cabinets and wiring harness)	
	Power connectors on the front panel for ease of access	
	Includes 3U rack-mount brackets for 'KIT' format (excludes cabinet)	
MECHANICAL & ELECTRICAL SAFETY	Safety driven design for cells, modules and systems guarantees safe behaviour in case of abuse usage or component failure	
	Implementation of redundant safety features at: - Cell level (e.g. shutdown effect separator, mechanical vent) - Module level (e.g. electronic boards, voltage and temperature monitoring, balancing) - System level (e.g. electronic boards, power switch & current sensor)	

Flex'ion™ product range
Technical data

		MEDIUM POWER		HIGH POWER
		FLEX'ION 23 M Fe 23 VDC - 78 Ah	FLEX'ION 46 M Fe 46 VDC - 39 Ah	FLEX'ION 46 P Fe 46 VDC - 28 Ah
FUNCTIONAL CHARACTERISTICS	Proprietary cell chemistry	Super Lithium Iron Phosphate		
	Cell type	VL41 M Fe		VL30 P Fe
FEATURES	Adapted for discharge time of	>= 8min		1s TO 15min
	Optimized for discharge time of	>= 10min		
	Power capability discharge :	3.7 C		11 C
GENERAL CHARACTERISTICS	Nominal voltage (V)	23	46	46
	Capacity (C/5 AH)	78	39	28
	Rated energy (C/5 kWh)	1.792		1.294
	Volumetric power density (W/L)	358		617
	Gravimetric power density (W/KG)	300		568
MECHANICAL CHARACTERISTICS	Width (MM/INCH)	445 / 17.5		
	Height (MM/INCH)	131 / 5.2		
	Depth (MM/INCH)	292 / 11.5		
	Weight (KG)	18.5		
ELECTRICAL CHARACTERISTICS AT +20°C (+68°F)	Voltage range (V)	17.5 to 26.6	35.0 to 53.2	
	Maximum continuous discharge current (A)	250	150	250
	Peak discharge current in 10 sec (A)	350		450
	Maximum continuous recharge current (A)	80	40	140
	Recharge time (H)	1.25		
	Module consumption (active mode)	0.1 W		
	Insulation resistance (1000 VDC)	>100 MΩ		
	Dielectic	3 kV RMS		
MAXIMUM POWER (kW) 25°C (77°F), 100% SOC CUT-OFF VOLTAGE 2.5 V/CELL	10 sec	-		15.8
	1 min			10.5
	5 min			10.5
	10 min			7.0
	15 min	5.2	6.1	4.7
	30 min	3.1	3.1	-
	45 min	2.2	2.2	
	1 h	1.7	1.7	
OPERATING CONDITIONS	Operating temperature	20°C±5°C (68°F±7°F) (max -20°C/+40°C (-4°F to +104°F)) with performance limitations		
	Cycle efficiency	93% to 99%		
	Self-discharge	5% per month (open circuit conditions)		
	Calendar lifetime at +20°C (+68°F)	20 + years to 75% capacity at EOL		
	Cooling	Natural convection		
	Maximum relative humidity	95% (non condensing)		
STORAGE CONDITIONS	Storage temperature	-20°C/+50°C (-4°F to +122°F)		
	Storage duration (80% SOC - 40°C (104°F))	10 months		

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