

# Synerion® 24E

## High energy lithium-ion module 24 V – 2.2 kWh

Synerion 24E module is suited for energy applications requiring high storage capacity and long charge and discharge cycles

Built with proven Saft Li-ion technology Synerion 24E provides maintenance-free storage in a reduced volume, combining high operational reliability over thousands of cycles with outstanding energy efficiency. Its modular design allows adaptation of the battery configuration through serial or serial/parallel connection to reach energy levels up to hundreds of kWh in one functional entity.



### Applications

- Renewables capacity firming: supporting integration of wind and solar farms in power systems
- Smart energy management: load leveling, peak shaving, microgrids
- Residential and community energy storage
- UPS

### Features

- Compact module integrating VLE Li-ion cells, module supervision and cell balancing
- Advanced industrial design offering highest reliability and robustness
- 20 years design life
- Full energy availability for discharges of one hour or longer
- State of charge and state of health indication through BMM (Battery Management Module)
- Saft's system design experience in high tech industry markets stands for safe, reliable and durable product solutions

### Benefits

- Compactness
- Best energy efficiency of all available energy storage systems
- Easy system integration and upscaling (19" rack)
- High operational reliability
- Smart energy management and remote supervision capability
- Preventive but not premature replacement at end of life

#### Nominal characteristics at + 25°C/+ 77°F

Voltage (V)	24
Capacity (C/5) (Ah)	87
Rated energy (C/5) (Wh)	2200
Volumetric energy density (Wh/l)	128
Gravimetric energy density (Wh/kg)	119

#### Mechanical characteristics

Width (mm)	448
Height (mm)	131
Depth (mm)	293
Weight (kg)	18.5

#### Electrical characteristics at + 25°C/+ 77°F

Voltage (V)	21 to 28
Maximum continuous discharge current (A)	160
Maximum continuous discharge power (W)	3800
Peak discharge power in 5 s (W)	8500
Maximum continuous recharge current (A)	45
Maximum continuous recharge power (W)	1150
Peak recharge power in 5 s (W)	5500
Recharge time (h)	3
Module consumption (active mode)	5 V – 0.45 W
Insulation resistance (1000 V DC)	>100 MΩ
Dielectric	3 kV rms

#### Operating conditions

Operating temperature	- 20°C/+ 60°C (- 4°F to + 140°F)
Cycle efficiency	96% to 99%
Self-discharge	<5% per month
Calendar lifetime at + 25°C/+ 77°F	>20 years
Cooling	Natural convection



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## System capability

- Saft BMM included in any system configuration
- Series connection of up to 36 modules plus one BMM for string management and interfacing
- Multi-string paralleling up to 36 strings with Saft MBMM (Master Battery Management Module)

## Functional characteristics

Saft energy storage module technology contains VLE cells with advanced nickel-based lithium-ion technology:

- Outstanding calendar and cycle life and reliability
- Stable internal resistance
- High energy density cells

## Mechanical & electrical interface

- Vertical or horizontal implementation
- Stackable up to 8 modules
- Optional 3U rack-mount brackets
- Power connectors on the front panel
- Installation in dedicated cabinets or containers with adequate mechanical design and ventilation

## BMM communication

- 2 communication connectors on front panel
- CAN Open bus communication protocol carrying:
  - State of charge (SOC)
  - State of health (SOH)
  - Alarms
  - Operating conditions (voltage, temperature, identification number)
  - Operating limits (maximum voltage and current values in charge and discharge)
- Black box registering alarms (overcurrent, overvoltage, high temperature etc.) and the number of charge and discharge cycles.

## Safety

Safety driven design for cells, modules and systems guarantees safe behaviour in case of abuse usage or component failure. This includes:

- Stringent design rules and qualification processes
- Implementation of redundant safety features at cell level (e.g. shutdown effect separator, mechanical vent), at module level (e.g. electronic board, voltage and temperature monitoring, balancing), and at battery level (e.g. electronic board, power switch, current sensor)

## Storage conditions

Storage temperature	- 30°C/+ 70°C (- 22°F to + 158°F)
Storage time	6 months
Maximum altitude	3000 m above sea level
Maximum relative humidity	95% (non condensing)

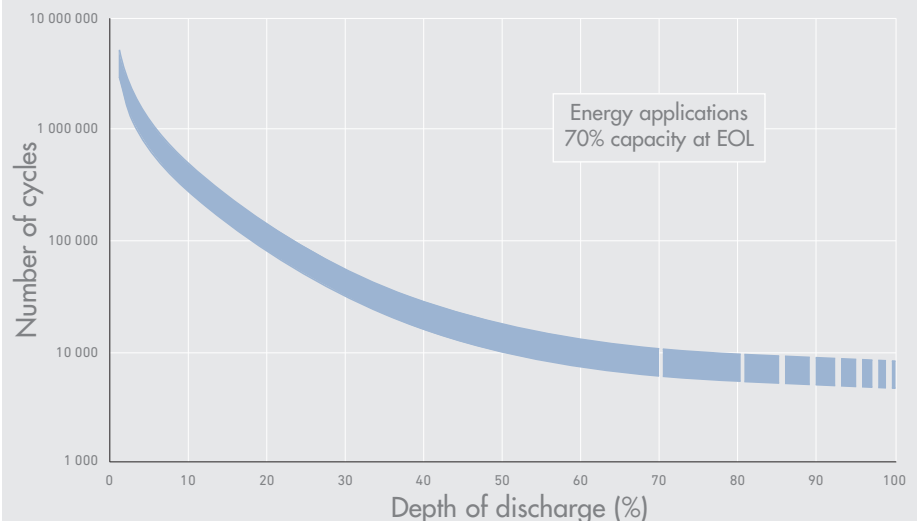
## Compliance to standards

Cell safety	UL 1642
Module safety	EN 50178 / IEC 60950 / CSAus 60950
EMC (module in cabinet)	IEC 62 040-2 Cat C1 and C3
Protection class	IP 20 (indoor controlled conditions)
Environment	IEC 62093 (indoor controlled conditions)
Transport classification	UN 3480 – Class 9
Transport regulation compliance	UN 3480 - ST/SG/AC.10/11 Rev 5 § 38.3
Directives	RoHS, Reach, WEEE

The Synerion 24E module has been developed and qualified along IEC 61508/SIL2 standards to suit the demanding requirements of performance and operational reliability of our customers, who are manufacturing or operating high-value, long life equipment.

Manufacturing plants comply with the legislation in force in each country and with international quality and environment standards (ISO 9001, QS 9000, ISO 14000).

## Energy storage module Cycle life at + 25°C/+ 77°F



Cycle life depends on both depth of discharge (DOD) and charging rates. The above results are based on testing at a fixed DOD and varying charging rates. The end of life (EOL) is reached when the remaining capacity is 70% of the initial capacity.



## Saft

Industrial Battery Group  
12, rue Sadi Carnot  
93170 Bagnolet - France  
Tel. : +33 1 49 93 19 18  
Fax : +33 1 49 93 19 64  
www.saftbatteries.com

Doc No.: 21823-2-0412

Edition: April 2012

Data in this document is subject to change without notice and becomes contractual only after written confirmation.

Société par Actions Simplifiée au capital de 31 944 000 €

RCS Bobigny B 383 703 873

Produced in the UK by Arthur Associates Limited