

# Synerion 24 M

## Medium power lithium-ion module 24 V – 2 kWh

Synerion 24 M module combines energy and power for applications requiring high storage capacity and immediately available power with short and medium charge and discharge cycles.

Built with proven Saft Li-ion technology, Synerion 24 M provides maintenance-free energy 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

- Renewable generation: supporting wind and solar farms
- Smart grids: optimizing energy flows and usage
- Community energy storage

### Features

- Compact module integrating VLM Li-ion cells, module supervision and cell balancing
- Advanced industrial design offering highest reliability and robustness
- 20 years design life with high daily energy throughput
- 2C power capability enabling highly dynamic charge/discharge profiles from any state of charge
- Best energy efficiency of all available energy storage systems
- State of charge and state of health indication through BMM<sup>(1)</sup>
- Saft's system design experience in high tech industry markets stands for safe, reliable and durable product solutions

### Benefits

- Different power and energy functions provided with minimum installed energy
- 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

Voltage (V)	24
Capacity* (C/5) (Ah) at + 25°C/+ 77°F	84
Volumetric energy density (Wh/l)	118
Gravimetric energy density (Wh/kg)	104

#### Mechanical characteristics

Width (mm)	445 (448 rack mounted)
Height (mm)	131 (128 when stacked)
Depth (mm)	292
Weight (kg)	19.2

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

Rated energy <sup>(3)</sup> (C/5) (Wh)	2 000
Voltage (V)	21 to 28
Maximum continuous discharge current (A)	160
Continuous power at 50 % SOC (W)	3 800
Peak power in 5 s at 50 % SOC (W)	13 800
Maximum continuous charge current (A)	34
Recharge time (h)	3
Recharge peak power in 5 s at 50 % SOC (W)	10 000
Faradic charge efficiency	99 %
Energy charge efficiency	96 %
Module consumption (active mode)	24 V – 0.5 W
Insulation resistance (1 000 V – 0C)	>100 MΩ
Dielectric	3 kV rms

#### Operating conditions

Typical lifetime at + 20°C perm (+ 68°F)	20 years
Typical lifetime at + 40°C (+ 104°F)	>10 years
Cycle life (60 % DOD; + 20°C/+ 68°F)	6 000 cycles
Operating temperature	- 25°C/+ 60°C (- 13°F to + 140°F)
Storage time at - 40°C/+ 65°C (- 40°F to + 149°F)	6 months
Cooling	Natural convection

<sup>(1)</sup> BMM: Battery Management Module

<sup>(2)</sup> MBMM: Master Battery Management Module

<sup>(3)</sup> Ufloat 28 V Ucutoff 21 V, + 20°C / + 68°F



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## System capability

- Saft BMM<sup>(1)</sup> included in any system configuration
- Series connection of up to 36 modules plus one BMM<sup>(1)</sup> for string management and interfacing
- Multi-string paralleling up to 36 strings with Saft MBMM<sup>(2)</sup>

## Functional characteristics

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

- Outstanding calendar and cycle life and reliability
- Stable internal resistance
- High capacity 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)
- Black box with calendar SOH and alarms (available on request)

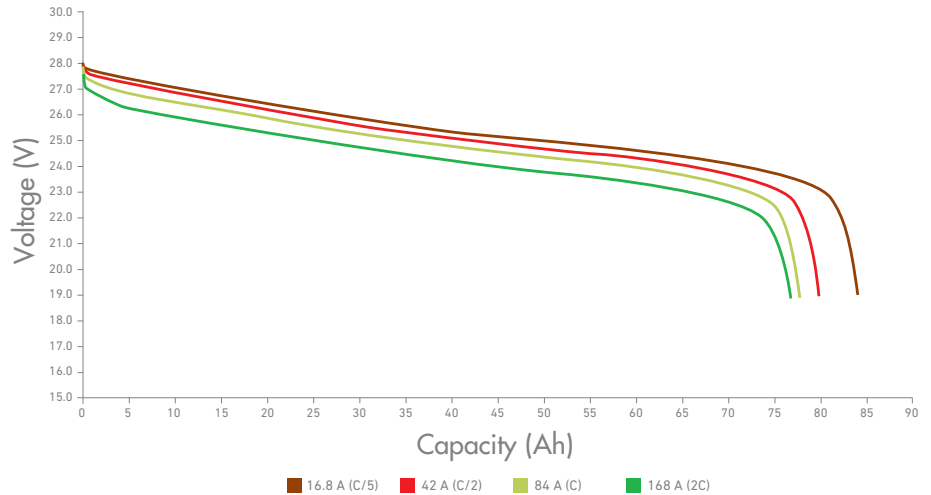
## Safety

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)

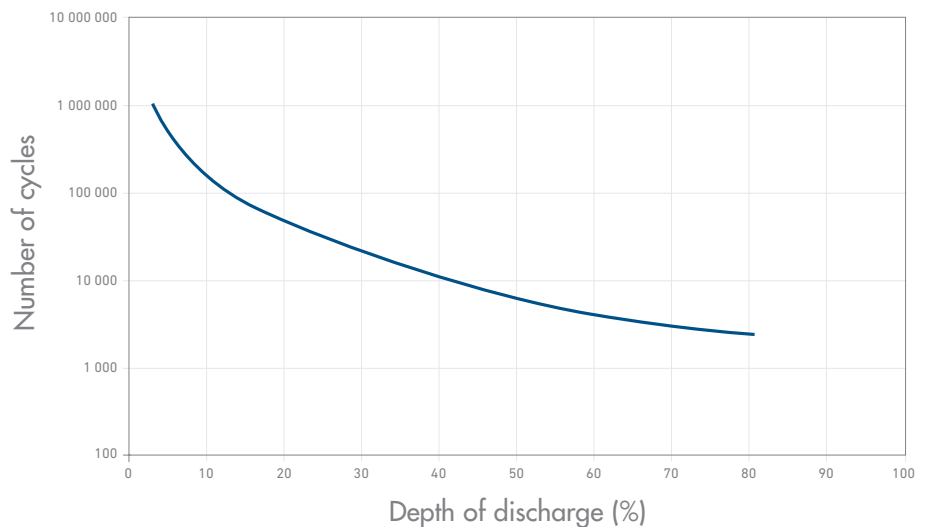
## Energy storage module

Typical discharge at + 25°C/+ 77°F after charge to 28 V



## Energy storage module

Cycle life at + 25°C/+ 77°F



## Compliance to standards

Cell safety	UL 1642
Module safety	EN 50178
Transport regulation compliance	ST/SG/AC.10/11 Rev 5 § 38.3
EMC (module in cabinet)	IEC 62 040 Cat C3
Protection class	IP 20
Transport classification	UN 3480 – Class 9
Environment	IEC 62093
Directives	ROHS, REACH, WEEE

The Synerion 24 M 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).



## Saft

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