



Power storage

Supercapacitors and lithium-ion capacitors

Back-up storage



ASI_043_A

Lithium-ion capacitor module



ASI_044_A

Lithium-ion capacitor cells

Batteries are the most common solution to ensure back-up power supply in a UPS solution, but they also are the weakest link in the system and the leading cause of power-related downtime. SOCOMEC proposes Lithium-Ion capacitor and supercapacitor UPS & back-up systems that are innovative energy storage solutions providing reliable back-up power for protecting critical applications from unplanned system outages.

Power supply continuity is a vital function for every critical application. The availability of a quality power supply is ensured by a UPS system, while the emergency energy to be provided during a power outage is stored using lead-acid batteries.

When the power fails, the UPS draws its power from banks of batteries until it is able to start and synchronize standby generators.

If lead-acid batteries are the most cost-effective energy solution, they are also unreliable and temperature sensitive, causing unexpected failures leading to power-related downtime.

Lead-acid batteries also require long recharging cycles, regular maintenance and also constant monitoring to ensure their availability and extend their life-cycle.

Reliable back-up power

In response to concerns over the reliability and limitations of lead-acid batteries and their impact on the environment, SOCOMEC has developed Supercapacitor and Lithium Ion Capacitor energy systems and innovative eco-friendly UPS energy storage solutions specific for:

- applications requiring a back-up time from seconds up to a few minutes,
- processes sensitive to frequent micro interruptions,
- applications working in critical environments where hazardous substances are not allowed,
- applications with severe ambient conditions.

Storage solution	Energy density	Power density	Life Cycle	Discharge time	Recharge time
Battery	Medium/High	Low	Short/Medium	Slow/Medium	Slow/Medium
Lithium-ion capacitor	Low	Very high	Ultra-long	Ultra-fast	Ultra-fast
Supercapacitor	Extremely low	High	Very long	Very fast	Very fast

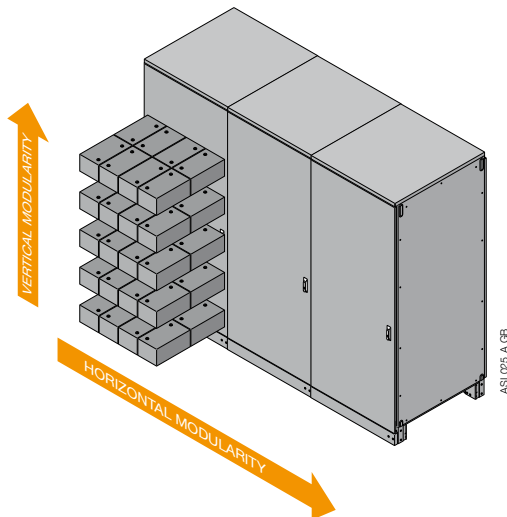
Lithium-ion capacitors

Maximum availability

- Ultra-fast recharge.
- Allows scalability for capacity or redundancy.
- No restrictions linked to traditional battery use.
- No maintenance risks.
- No fire risks.

Cost-effective solution

- Ultra-high power density.
- Small footprint.
- 15+ years' service life.
- Easy and minimum maintenance.
- Fully compatible with every SOCOMEC UPS unit.



Maximum reliability

- Performance not affected by critical operating conditions.
- No ageing due to frequent process micro interruptions.
- Wide operating temperature range (-10 °C to +70 °C).
- Embedded cell to cell monitoring.

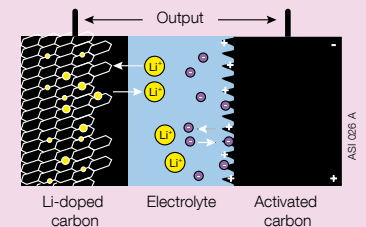
High sustainability

- No toxic materials.
- REACH/RoHS compliant materials.
- Designed, developed and produced by SOCOMEC in partnership with JSR, Japanese leader in materials innovation.

LIC Cell characteristics

- > 3300 F
- > 2.2 to 3.8 V
- > No thermal runaway
- > 0.7 mΩ equivalent series resistance
- > Millions of cycles without significant derating

Lithium-ion capacitors: operating principle



- > The activated carbon is a capacitor cathode
- > The Li-doped carbon anode is a battery anode, undergoing Li doping during charge and de-doping during discharge
- > Hybrid construction creates a capacitor which yields the best performance features of batteries and capacitors

Supercapacitors

- The supercapacitor is an evolution of the traditional capacitor but it can store hundreds of times the energy of a traditional capacitor due to a very high surface area in activated carbon. Socomec proposes supercapacitor solutions in its medium power range to support power bridging or for mains with frequent micro interruptions.
- According to the back-up time requested, the supercapacitor can be fitted inside the UPS or in an external battery cabinet.



Supercapacitor characteristics

- > 350 F
- > 2.7 V
- > No thermal runaway
- > 3.2 mΩ equivalent series resistance
- > 500,000 cycles without significant derating