

# Samsung UL9540A Lithium-ion Battery Energy Storage System



## Overview

The Samsung SDI 128S and 136S energy storage systems for data center application are the first lithium-ion battery cabinets to fulfill the rack-level safety standards of the UL9540A test for Energy Storage Systems (ESS), which was developed by UL, a global safety certification company.

Providing power to critical loads requires a UPS (Uninterruptible Power Supply) to work in tandem with an energy storage solution. The Samsung lithium-ion battery systems were designed to meet the demands of large-scale UPS applications.

### Key Lithium-ion Battery Performance Factors:

- Runtime
- Power density
- Footprint
- Weight
- Usable / Lifespan / Cycle count
- Reliability
- Initial cost
- Maintenance cost
- Operating temperature

### Compliant

- UL 1642
- UL 1973

Qualified for immediate use with most current and legacy three phase Liebert UPS systems for the following:

- New data centers
- Cloud, colo, hosting facilities
- Enterprise data centers
- UPS Energy Storage
- Replacements for lead-acid batteries

## Lithium-ion Batteries

New fire codes such as NFPA 855 reference UL 9540A, a test method for evaluating thermal runaway fire propagation in Battery Energy Storage Systems (BESS). UL 9540A was developed to address safety concerns identified in the new codes and standards. The latest IFC and NFPA 855 documents allow the fire code official to approve larger individual BESS units, and separation distances less than 3 feet based on large scale fire testing conducted in accordance with the UL 9540A Test Method.



Samsung SDI lithium-ion battery cabinet

Samsung SDI lithium-ion battery module

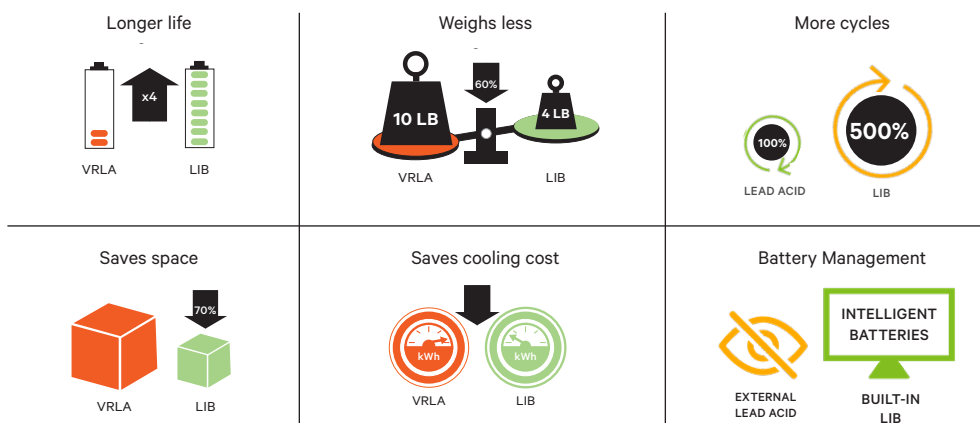
## Fire Safety Recognition

In addition to the system's UL 1973 certification the UL9540A test verifies the inherent safety of design of the Samsung SDI ESS.

The battery system has completed the UL9540A test for its capability of preventing large scale fire in the ESS by applying designs for the safety of cells, modules and racks to prevent battery thermal runaway propagation.

According to NFPA 855's ESS installation standards, when successfully completing a UL9540A test, three feet (92cm) spacing requirements between racks can be waived by the Authorities Having Jurisdiction (AHJ).

## Benefits of Lithium-ion Batteries



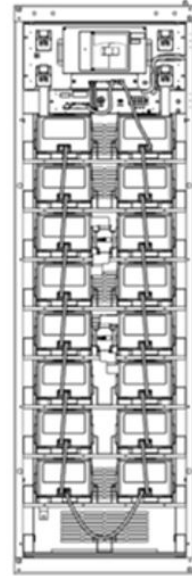
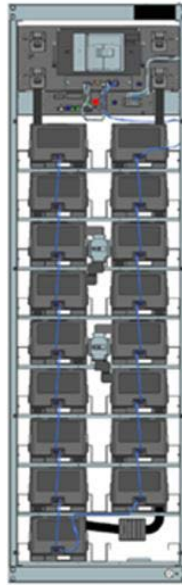
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## Specifications

| Types             |        | 136S | 128S |
|-------------------|--------|------|------|
| Number of Modules | Type A | 8    | 8    |
|                   | Type B | 9    | 8    |

### Appearance



| Configuration: XP/XS                         | 1P/136S  | 1P/128S  |
|--|--|--|
| Capacity, kWh                                | 34.6 kWh   | 32.6 kWh   |
| Nominal Voltage, Vdc                         | 516.8 Vdc  | 486.4 Vdc  |
| Standard Charging Current, A                 | 22.3A (1/3C)                                       | 22.3A (1/3C)                                       |
| Standard Full Charging Voltage, Vdc          | 571.2 Vdc  | 537.6 Vdc  |
| End of Charging Current, A                   | 1.34 A   | 1.34 A   |
| Maximum Charging Current, Vdc                | 67 A   | 67 A   |
| Maximum Charging Voltage, Vdc                | 571.2 Vdc (4.20 Vdc/cell)                          | 537.6 Vdc (4.20 Vdc/cell)                          |
| Standard Discharging Current, A              | 22.3 A (1/3C)                                      | 22.3 A (1/3C)                                      |
| Maximum Discharge Current, A                 | 184 kW (CP continuous), peak current 450 A at EODV | 173 kW (CP continuous), peak current 452 A at EODV |
| Discharge End Point Voltage, Vdc             | 408 Vdc (3.00 Vdc/cell)                            | 384 Vdc (3.00 Vdc/cell)                            |
| Recommended Discharge End Point Voltage, Vdc | 435.2 Vdc (3.20 Vdc/cell)                          | 409.6 Vdc (3.20 Vdc/cell)                          |
| Dimension (W*H*D)                            | 650 x 2055 x 530 mm                                | 650 x 2055 x 530 mm                                |
| Weight                                       | ~ 510 kg   | ~ 493 kg   |
| Recommended Operation Temperature            | 23 ± 5 °C  | 23 ± 5 °C  |

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