ST255CS-2HPowerStack C&I Liquid-Cooled Energy Storage System - Official Commercial BESS Technical Overview & Datasheet

PRODUCT OVERVIEW: ST255CS-2HPOWERSTACK C&I LIQUID-COOLED ENERGY STORAGE SYSTEM

Engineered for the next generation of commercial and industrial energy management, the ST255CS-2HPowerStack delivers a compact, high-density, liquid-cooled Battery Energy Storage System (BESS). Designed to optimize self-consumption, execute peak shaving, and provide critical backup power, this Tier-1 LFP-based platform reduces operational expenditures while ensuring superior safety and longevity. The IP55 outdoor-rated chassis integrates seamlessly with PV infrastructure, EV fast-charging hubs, and micro-grid control systems.

SYSTEM ARCHITECTURE & SAFETY PROTOCOLS

The ST255CS-2HPowerStack utilizes a multi-layered safety architecture. The intelligent Battery Management System (BMS) performs real-time cell monitoring with millisecond-level fault isolation. The integrated Passive Cell-to-Pack (CTP) design minimizes internal resistance while maximizing volumetric energy density. The Active Equalization function ensures each of the 280Ah prismatic LFP cells maintains balanced state-of-charge (SOC), extending cycle life beyond 8,000 cycles at 25°C.

KEY FEATURES

- Advanced Liquid Cooling: Maintains cell temperature differential < 3°C, reducing thermal stress and improving calendar life by up to 25% compared to air-cooled systems.
- Tier-1 LFP Cells: Zero thermal runaway propagation between cells; UL 9540A tested for maximum safety compliance.
- Modular Scalability: Supports parallel connection of up to 10 units (2.15 MWh total capacity) via external DC busbar, enabling stepwise capacity expansion.
- Grid-Forming & Islanding Capable: Seamless transition to off-grid mode within 20ms, ideal for industrial parks and critical infrastructure.
- Smart EMS Interface: Integrated cloud-based Energy Management System (EMS) supports remote firmware upgrades, predictive maintenance alerts, and

real-time arbitrage scheduling.

COMPLIANCE & STANDARDS

- UL 9540 (Energy Storage Systems & Equipment)
- UL 1973 (Batteries for Use in Stationary Applications)
- UL 9540A (Thermal Runaway Fire Propagation)
- IEC 62619 (Safety for Secondary Lithium Cells)
- IEC 61000-6-2 / -4 (Electromagnetic Compatibility)
- UN 38.3 (Transportation Safety)

TECHNICAL SPECIFICATIONS

System Parameters

- Nominal Energy: 215 kWh (DC side) / 215 kWh (AC usable, 100% DoD)
- Usable Capacity: 215 kWh @ 0.5C, 25°C, EOL 80% SOH
- Nominal Voltage: 768 V DC
- Voltage Range: 672 V – 876 V DC
- Max. Charge/Discharge Power: 100 kW / 100 kW (0.5C)
- Peak Power (60s): 130 kW
- Round-Trip Efficiency: ≥ 91% (DC/AC, @ 0.5C, 25°C)

Battery & Cooling

- Cell Chemistry: Lithium Iron Phosphate (LFP), prismatic 280Ah

- Cycle Life: ≥ 8,000 cycles @ 25°C, 0.5C, 90% DoD, EOL 60% SOH

- Thermal Management: Intelligent liquid cooling with anti-freeze coolant (IP67 pump)

- Operating Temp. Range: -30°C to +55°C (derated above 45°C)

- Relative Humidity: 0% – 95% (non-condensing)

Parameter	**Specification**
Nominal Energy	215 kWh (DC side)
Cooling Method	Smart Liquid Cooling (ΔT < 3°C)
Cell Chemistry	Tier-1 LFP (Prismatic 280Ah)
Max. Output Power	100 kW (continuous), 130 kW (peak 60s)
Round-Trip Efficiency	≥ 91% (DC/AC)
Cycle Life	≥ 8,000 cycles @ 25°C
Operating Temp. Range	-30°C to +55°C
Enclosure Rating	IP55 (cabinet)
Safety Certifications	UL 9540, UL 1973, IEC 62619
Parallel Scalability	Up to 10 units (2.15 MWh)

Inverter (PCS) Integration

- AC Output (Nominal): 100 kW / 100 kVA

- AC Voltage Range: 400 V ±15% (3W + N + PE), 50/60 Hz

- THDi: < 3% (full load)

- Grid Connection Type: 3-phase, 4-wire

- Islanding Mode: Supported (optional external transfer switch)

Enclosure & Logistics

- Dimensions (W x D x H): 1,200 mm x 1,400 mm x 2,200 mm

- Weight: Approx. 2,450 kg

- Ingress Protection: IP55 (cabinet), IP67 (connectors)

- Fire Suppression: Aerosol-based automatic suppression + gas detection

- Noise Emission: < 65 dB @ 1 m

INDUSTRIAL DEPLOYMENT RECOMMENDATIONS

For optimal lifetime performance and safety compliance, install the ST255CS-2HPowerStack on a flat, level concrete pad with a minimum load rating of 4,000 kg. Maintain a 1.5 m front clearance for service access and 0.8 m side clearance for thermal exhaust. For micro-grid or peak-shaving configurations, pair the system with an external AC combiner panel (rated ≥ 400 A). All installations must incorporate an external DC-rated disconnect switch for emergency response compliance per NEC 2023 / IEC 60364.