

Home Microgrid Integration Setup Manual - Official Commercial BESS Technical Overview & Datasheet

EXECUTIVE SUMMARY

The Home Microgrid Integration Setup Manual serves as the definitive engineering and deployment reference for residential and light commercial energy storage systems. Designed for seamless integration with photovoltaic arrays, smart home ecosystems, and utility grid interfaces, this platform delivers reliable, scalable, and safe backup power. Leveraging Tier-1 LFP cell chemistry and advanced liquid cooling, the system ensures optimal performance across diverse operating conditions. This datasheet outlines the system architecture, safety mechanisms, compliance standards, and technical specifications necessary for successful microgrid deployment.



SYSTEM ARCHITECTURE & SAFETY

The Home Microgrid Integration Setup features a modular, stackable architecture that accommodates varying energy demands. Each cabinet integrates a high-voltage battery stack, a bi-directional power conversion system (PCS), and a smart energy management system (EMS). Safety is paramount: multi-level thermal runaway suppression, real-time cell monitoring, and isolated fluid flow cooling channels prevent hazardous conditions. The system supports both grid-tied and off-grid operation, with seamless islanding transition to ensure uninterrupted power supply.

KEY FEATURES

- Modular Expandability: Scale from 5 kWh to over 100 kWh by paralleling cabinets.
- Smart EMS: AI-driven load forecasting and peak shaving optimization.
- Liquid Cooling: Uniform temperature regulation extends cell lifespan.
- Integrated Safety: UL 9540A compliant fire suppression and gas detection.
- Remote Monitoring: Cloud-based dashboard for real-time performance analytics.
- Seamless Backup: <20 ms switchover for critical loads.

COMPLIANCE & STANDARDS

The system complies with major international standards including UL 9540, UL 9540A, IEC 62619, IEC 63056, and CE marking. Grid interconnection certifications include IEEE 1547 and UL 1741 SA for advanced inverter functions.

TECHNICAL SPECIFICATIONS

Each cabinet offers a nominal capacity of 10 kWh, with a usable capacity of 9.6 kWh at 96% depth of discharge. The DC bus voltage ranges from 200 V to 500 V, and the AC output is 240 V / 120 V split-phase. The system operates at a round-trip efficiency of 95%. Communication protocols include Modbus TCP, CAN, and Wi-Fi/Ethernet for EMS integration.

Parameter	Specification
Nominal Capacity	10 kWh per cabinet (expandable to 100+ kWh)
Usable Capacity	9.6 kWh at 96% DoD
Cell Chemistry	Tier-1 LFP (Lithium Iron Phosphate)
Cooling Method	Smart Liquid Cooling
DC Bus Voltage	200 V - 500 V
AC Output	240 V / 120 V split-phase
Round-Trip Efficiency	95%

Communication	Modbus TCP, CAN, Wi-Fi/Ethernet
Safety Certifications	UL 9540, UL 9540A, IEC 62619, CE
Grid Interconnection	IEEE 1547, UL 1741 SA
Operating Temperature	-20°C to 50°C
Enclosure Rating	IP55 (indoor/outdoor)
Dimensions (WxDxH)	600 x 400 x 800 mm
Weight	85 kg per cabinet

INDUSTRIAL DEPLOYMENT

For residential installations, the system can be wall-mounted or floor-standing. For light commercial applications, multiple cabinets can be paralleled to achieve higher capacity. The compact footprint and low noise operation (<45 dB) make it suitable for indoor garages or outdoor enclosures. The setup manual provides detailed wiring diagrams, clearance requirements, and commissioning procedures.

