

Turnkey C&I Energy Storage Solution Brief: Deploying Power Conversion Systems

TURNKEY C&I ENERGY STORAGE SOLUTION BRIEF: DEPLOYING POWER CONVERSION SYSTEMS

EXECUTIVE SUMMARY

This document serves as the official technical overview and specification sheet for our advanced Power Conversion System (PCS) platform, engineered specifically for Commercial & Industrial (C&I) energy storage applications. As the central intelligence of any Battery Energy Storage System (BESS), this PCS ensures bi-directional power flow with exceptional grid-forming and grid-following capabilities, achieving peak efficiencies up to 99.0%. It is designed to maximize return on investment through peak shaving, demand charge reduction, and PV self-consumption optimization, all while adhering to the most stringent international safety and grid interconnection standards.



SYSTEM ARCHITECTURE & SAFETY

The PCS is the cornerstone of a robust and scalable energy storage solution. Its architecture is defined by a modular, three-level topology that ensures both high performance and fail-safe operation. The system integrates seamlessly with a Battery Management System (BMS) and an Energy Management System (EMS) to form a cohesive unit. Safety is not an afterthought but a foundational design principle, embedded at every level from the hardware to the control logic.

KEY FEATURES

- Unmatched Efficiency: Achieves a peak efficiency of >99.0% (CEC weighted), minimizing operational losses and maximizing the economic viability of every

stored kilowatt-hour.

- Advanced Grid Support: Offers robust grid-forming and grid-following capabilities with seamless transition (<20ms), enabling peak shaving, load leveling, and reactive power compensation ($PF \pm 0.9$) for enhanced power quality.
- Intuitive Smart Controls: Features an integrated 10-inch HMI touchscreen for local monitoring and configuration, coupled with cloud-based remote monitoring for real-time data acquisition, predictive diagnostics, and over-the-air (OTA) firmware updates.
- Robust Thermal Management: Employs a smart air-cooling system that dynamically adjusts fan speed based on thermal load, ensuring optimal operating temperatures for all power components and extending the system's lifespan.
- Uncompromised Safety: Designed with multiple layers of protection, including active anti-islanding protection, DC overcurrent and overvoltage protection, and integrated arc-fault detection to ensure personnel and equipment safety.

COMPLIANCE & STANDARDS

The PCS platform has been rigorously tested and certified to meet the most demanding global standards. This commitment to compliance ensures seamless grid interconnection and eligibility for utility incentive programs

worldwide. The system is fully compliant with UL 1741 / IEEE 1547 for grid interconnection, holds safety certifications from UL 9540 for the complete system, and meets IEC 62477 for power electronics safety. It is also designed and validated to operate reliably under a wide range of environmental conditions, adhering to IEC 60721 for climatic and mechanical robustness.

TECHNICAL SPECIFICATIONS

Our PCS is offered in a range of power ratings to suit diverse project requirements. The core parameters for the standard model are detailed below. The system supports a wide DC voltage range, accommodating various battery chemistries and configurations.

Parameter	Specification
Rated Power	100 kW / 250 kW / 500 kW
Max. Efficiency	> 99.0% (CEC weighted)
DC Voltage Range	200 - 850 Vdc
Max. DC Current	250 A
AC Grid Connection	380 / 400 / 480 Vac (3W+PE), 50/60 Hz
THDi	< 3% (at rated power)
Cooling Method	Smart Air-Cooling
Ingress Protection	IP54

Operating Temperature	-25°C to +60°C (derating above 45°C)
Relative Humidity	0 - 95% (non-condensing)
Altitude	< 3000 m
Communication Protocols	Modbus RTU/TCP, CAN 2.0, IEC 61850 (optional)

INDUSTRIAL DEPLOYMENT

Deploying the PCS is streamlined by its compact, modular design. The unit is designed for both indoor and outdoor installations, with an IP54 ingress protection rating that shields it from dust and water jets. The cabinet is constructed from heavy-duty steel, coated with a corrosion-resistant finish for long-term durability. Installation is facilitated by clear electrical interfaces and structural mounting points. The system is pre-configured with standard communication protocols (Modbus, CAN, etc.), enabling rapid integration with existing site BMS, EMS, and SCADA systems. This turnkey approach reduces engineering time and lowers the total cost of ownership.

