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AC890PX Inverter Systems

Fast-Acting, Utility Scale, Bi-Directional Power Conversion Systems for Energy Storage



ENGINEERING YOUR SUCCESS.



Parker SSD Power Conversion Systems

For Utility Energy Storage Applications

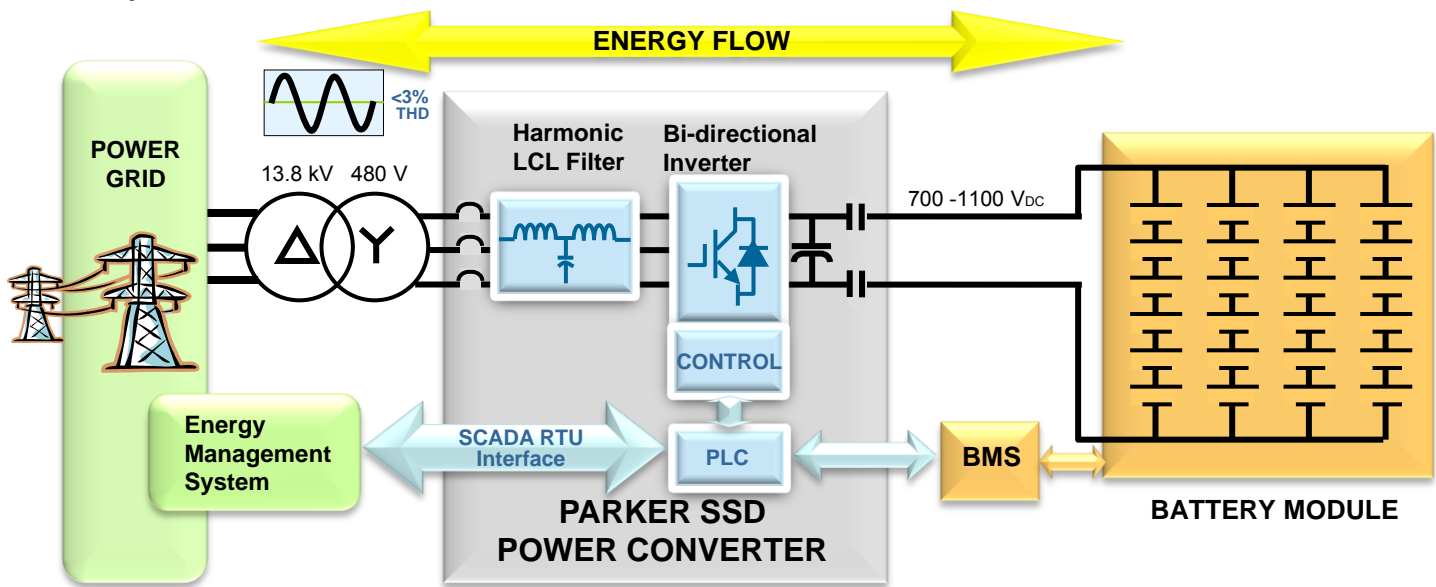
Power Conversion Systems depend on proven, reliable inverter technology. Parker Hannifin-SSD Division has a proven track record of over 30 years in design and manufacture of inverters for a wide range of utility, automotive, and factory automation and power management applications. Bi-directional inverter designs efficiently channel energy into storage elements, and retrieve stored energy for fast delivery on demand to the power grid.

Utility Scale, Modular Design Parker Power Conversion technologies are scalable from 100kW to multiple megawatts of power. For typical substation installations, multiple 1 MW modules are integrated into trailers or shipping containers.

Application Specific Control Logic Through the use of an industry accepted programmable logic controller (PLC) and the appropriate energy management interfaces, the Parker PCS can be customized to assume various application response profiles in order to meet specific utility duty cycles.

Quality and Protection The core of the PCS, Parker's AC890PX Inverter technology, provides quality power by incorporating an advanced Pulse-Width-Modulated (PWM) switching technology, automatically synchronizing to the AC power grid. Integral harmonic filters deliver pure sine wave power well within IEEE519 guidelines for Total Harmonic Distortion. The Parker system provides automated sequenced shutdown and disconnection under power loss events, in compliance with IEEE 1547 guidelines.

Speed and Efficiency The IGBT-based Active Bridge Bi-directional Inverter within the PCS is capable of delivering full power in either direction within 10ms, making it suitable for demanding applications like grid frequency stabilization. **The efficiency of the inverter exceeds 98%.**



Typical Utility Energy Storage System employing a Parker Power Conversion System

- AC voltage rating types from 380 – 690 VAC, 50/60 Hz
- Discrete DC outputs, for connection to each battery bank
- System Redundancy (failure of 1 section will proportionately limit capacity)
- Initialization charging for batteries, current and voltage control
- Main Power Input Disconnect and interlocks
- Interface to SCADA RTU for all necessary data and control parameters
- Installation support and service
- Air-cooled or refrigerant cooled configurations are available
- Efficiency of power converter exceeds 98%



System status screens display real-time data, and are web enabled for remote monitoring



AC890PX

Modular Bi-Directional Inverters

Building Block Inverter

PowerPak modules plug into a common bus rail system to form a **COMPLETE** Inverter section. Disassembly is not required when changing a module!

Plug-in Modularity

- Sealed PowerPak modules are easy to install and service
- Modules replace in minutes
- Easy-to-handle – under 50 pounds, no wheels or ramps required
- Replaceable by local technical staff
- Freight friendly, easily shipped around the world using major overnight carriers

Integrated Bus System

- Power wiring minimized
- Keyed modules eliminate errors

Compact Size

- Saves floor space
- Advanced Cooled units are *Best-in-Class!*

VAR Support

Provides the ability to supply reactive power to the grid, thus regulating system voltage and enhancing the stability of a weak grid. Solid state VAR control provides a response time measured in milliseconds, ensuring that momentary fluctuations on the grid are minimized.



“Smart Grid Powerhouse”, standard shipping container with 4 Megawatt bi-directional inverter. Climate control, lighting, and coolant plumbing is pre-installed for rapid on-site installation and commissioning.



1 Megawatt inverter rack – Advanced Cooled



Interior view of 4 Megawatt container



Cooling Technology Comparison

- Air cooled
 - Lowest power density
 - Requires clean, cool air
 - No heat exchanger required
- Advanced Refrigerant cooled
 - Non-conductive coolant
 - Higher efficiency
 - Self-contained **hermetic** system, no end user maintenance required
 - Highest power density

Applications

The Parker bi-directional inverter system can be configured for a multitude of energy and power storage applications. Depending on the type and capacity of the storage elements selected, the system can be used for frequency stabilization, as support for renewable power generation, for peak shaving, to replace or supplement spinning reserve, or even as a black-start system.



PowerPak Phase Module – Front View

Parker SSD PowerPak Modules

Each bay location holds 1 PowerPak module

Bus bars run across the PowerPak module back, with self-aligning, silver-plated pluggable connectors

Dry-break coolant connectors allow removal and replacement of modules without requiring system recharge (Advanced Cooled systems)

Modules can be replaced by one person without disassembly of inverter



PowerPak Phase Module – Rear View

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