

Utility Scale Energy Storage Systems



Description

Power Conversion Systems depend on proven, reliable inverter technology. Parker Hannifin-SSD Division has a proven track record of over 35 years in design and manufacture of inverters for a wide range of utility, automotive, and factory automation and power management applications. Bidirectional 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.

Speed and Efficiency

The IGBT-based Active Bridge Bidirectional 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%.

Experience

Parker has successfully commissioned energy storage systems throughout North America and abroad. With an ever-growing installed base, our experience is second to none. For specific examples and case studies, please contact us. While utility scale energy storage is a relatively young technology, Parker has over 35 years of experience in the business of manufacturing solid state power conversion equipment, producing over 100,000 inverters and drives per year.

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. Inverters are manufactured at our ISO9001:2008 certified facility in Charlotte, NC.

About Parker

With annual sales of \$10 billion, Parker Hannifin is the world's leading diversified manufacturer of motion and control technologies and systems, providing precision engineered solutions for a wide variety of mobile, industrial and aerospace markets.

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Interior view - 4MW PCS



4 Megawatt PCS - Exterior view



ENGINEERING YOUR SUCCESS.

Typical System Specifications

Rated Power	1 MW bidirectional	2 MW bidirectional	4 MW bidirectional
VAR Capability	+/- 1 MVAR	+/- 2 MVAR	+/- 4 MVAR
Maximum MVA	1.1 MVA continuous	2.2 MVA continuous	4.4 MVA continuous
Overload	1.5 MVA for 60 seconds	3.0 MVA for 60 seconds	6.0 MVA for 60 seconds
Power Factor	> 0.99		
Peak Inverter Efficiency	> 98%		
DC Bus Voltage Range	750-1000 Vdc		
Nominal Output Voltage	480 VAC		
Ambient Temperature	0° to 55°C		
Line Frequency	50 or 60 Hz		
Altitude	0-1000m (to 3000m with derating)		
Compliances	Built to comply with IEEE519, IEEE1547, UL1741		
IGBT Cooling	Air or refrigerant cooled		
Refrigerant	Non conductive, non corrosive, CFC-free		
Communications (SCADA)	Ethernet/IP, Modbus/TCP, CANopen, Profinet, DeviceNet, Firewire, EtherCat, RS485		
Enclosure	Standard ISO shipping container		
Dimensions (Up to 4 MW)	20' x 10' x 10' approx.		
System status parameters	Grid Voltage, Total system Current, Total System KVA, Total System KVAR, Power Factor, Total System Power, Inverter Current,, Battery DC Voltage and DC Current, Run Status, Fault/No Fault Status		

Building Block Inverter

In both air cooled and refrigerant cooled systems, SSD PowerPak modules plug into a common bus rail system to form a COMPLETE Inverter section. Disassembly or removal of power wiring 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
- 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 Smallest-in-Class!

VAR Support

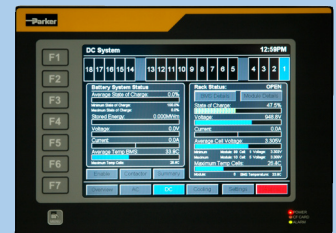
Provides the ability to supply reactive power to the grid, thus regulating system voltage and enhancing the stability of a weak grid. Solid state VAR control provides a response time measured in milliseconds, ensuring that momentary fluctuations on the grid are minimized. Real or reactive power can be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



1 Megawatt Inverter Stack



Removable Phase Module



Operator display - sample screen

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