



Overview: EMOS Hub

1) Monitor Microgrid Assets

Monitor every power meter, battery management system, solar array, power converter, diesel gen-set, and other microgrid assets at a central location. Plot and analyze real-time and historical data, and analyze trends.

2) Configure and Program Microgrid Elements

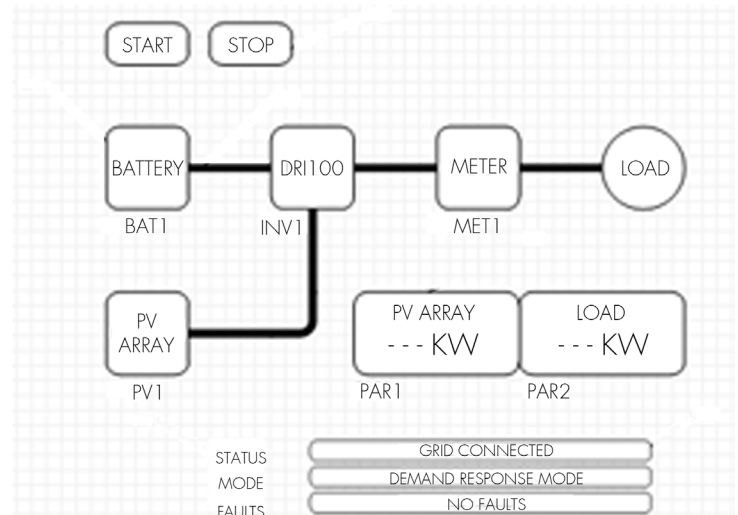
Configure and program each element of a microgrid or battery system to adjust performance, add functionality, and maximize efficiency.

3) Connect to SCADA, Cloud, Monitoring Platforms

Connect with external platforms for remote access, monitoring, and control.

4) Perform Advanced System Control Functions

Perform peak shaving, frequency regulation, pv-ramp-rate control, and automated generator start/stop/synch while coordinating the operations of multiple different components.



ABOUT PRINCETON POWER SYSTEMS

Microgrid Controller and Kiosk- On Alcatraz Island, a Princeton Power Systems' EMOS Hub connects eight (8) GTIB-100's, a 2 Mwh battery, 300 kW solar array, two diesel gen-sets, and multiple power meters, to monitor battery state of charge, operate generator cycling, solar production, and ensure that power matches the loads, while maximizing solar energy and minimizing diesel, in this fully off-grid installation. The Princeton Power Systems' EMOS Hub also provides access to a database for an external kiosk that displays real-time information about the solar-plus-storage system to visitors.

Frequency Regulation Interface (PJM) – In several installations throughout the PJM territory, Princeton Power Systems' EMOS Hub interface between Princeton Power Systems' Converters and the PJM RegD signal, enabling these battery systems to provide 24/7 frequency regulation services.

PV Ramp-rate Control and Peak Shaver – At the San Diego Zoo, a Princeton Power Systems' EMOS Hub monitors solar output of the 200 kW carport array, and performs a sophisticated PV Ramp-Rate Control algorithm to smooth the voltage and power fluctuations at the grid connection. The Princeton Power Systems' EMOS Hub also coordinates with a lithium-ion battery bank, and SDG&E's SCADA system to allow remote dispatch by the utility.

Features

- Power supply from both AC (grid) and DC (battery) for black start, redundancy, reliability
- Graphical Touchscreen Interface (local or remote access)
- Breakthrough Jaguar Generator Synch technology
- Indoor and Outdoor enclosures available
- Configurable Software Modules

COMMUNICATION INTERFACES & PROTOCOLS

- RS 485, RS 232, Ethernet, GSM Modem
- Modbus TCP, Modbus RTU, CANBUS, TCP
- DNP3, Open Charge Point Protocol, SunSpec

COMPATIBILITY

Compatible with nearly all Modbus-enabled equipment, and designed to be flexible and adaptable. More complex integrations may require custom programming support from Princeton Power Systems' EMOS Hub team.



EMOS Hub Touch-Screen Interface

HARDWARE OPTIONS

- 17" touchscreen wall-mount w/USB front plug
- PC Tower or 19" rackmount (no monitor or keyboard interface included)
- NEMA 3R key-access cabinet w/o screen (for outdoor installation)

AGGREGATE MULTIPLE NODES

- New devices can be loaded to scale the system complexity to the user requirement.
- All control inputs and measurements are aggregated and made available
 - Supports Modbus TCP, Modbus RTU, DNP3, SunSpec or OCPP
 - Scalable control functions that aggregate all hardware and peripherals to control the microgrid system
 - Aids in viewing status of the microgrid in real-time from one access point

ADVANCED FUNCTIONS

The Princeton Power Systems EMOS Hub has built-in control algorithms to allow participation in ancillary service markets including Area Frequency Regulation, Auto Demand Response, Peak Power Limiting, VAR Support, and others.

ALGORITHM/FEATURE SUPPORT

- Volt/VAR Support
- Frequency Regulation
- Demand Response
- Peak Shaving
- Generator Start/Stop with Pre-sets
- Short and long term data logging
- Data plotting and exporting to external systems
- Data aggregation
- Battery Management System Integration
- PV Smoothing
- Modbus Functionality (allows the transmission of any device parameter over Modbus)
- Scheduling (allows scheduling any parameter change)

ABOUT PRINCETON POWER SYSTEMS

Princeton Power Systems, based in New Jersey and founded in 2001, designs and manufactures state-of-the-art technology solutions for energy management, microgrid operations and electric vehicle charging. The company is a global leader working with customers and partners across North America, Europe, Africa and the Caribbean. It manufactures UL and CE-certified power electronics that are used in advanced battery operations and alternative energy, with built-in smart functions for ancillary services. The company solves power issues to allow continued growth of distributed renewable energy by providing energy storage solutions that are proven to work, even in harsh environments. Princeton Power Systems builds integrated systems and designs, commissions and operates microgrids for leading organizations, including Fortune 500 automakers and industrials, and non-profit organizations. The company proudly manufactures its products in the USA. More information about Princeton Power Systems is available at www.princetonpower.com.

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SOFTWARE CONFIGURATIONS

Basic Configuration	Upgraded Packaging	Full Control Package
MODBUS Slave Interface	Long-term Data Logging, Data Aggregation	Remote Kiosk Display
Programmable Scheduler	Programmed Response	
Data Logging, Data Plotting	Generator Start/Stop/Synch	

