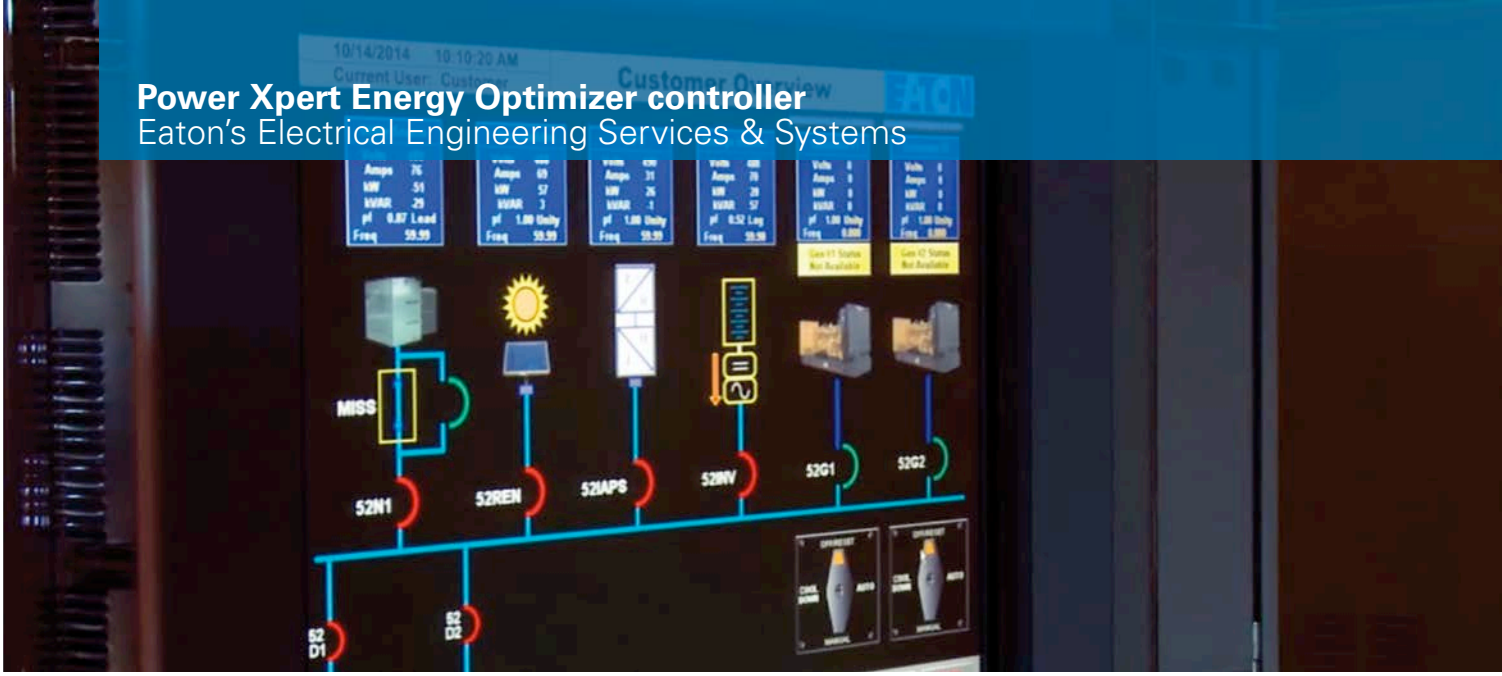


Power Xpert Energy Optimizer controller
Eaton's Electrical Engineering Services & Systems

Maximize microgrid performance

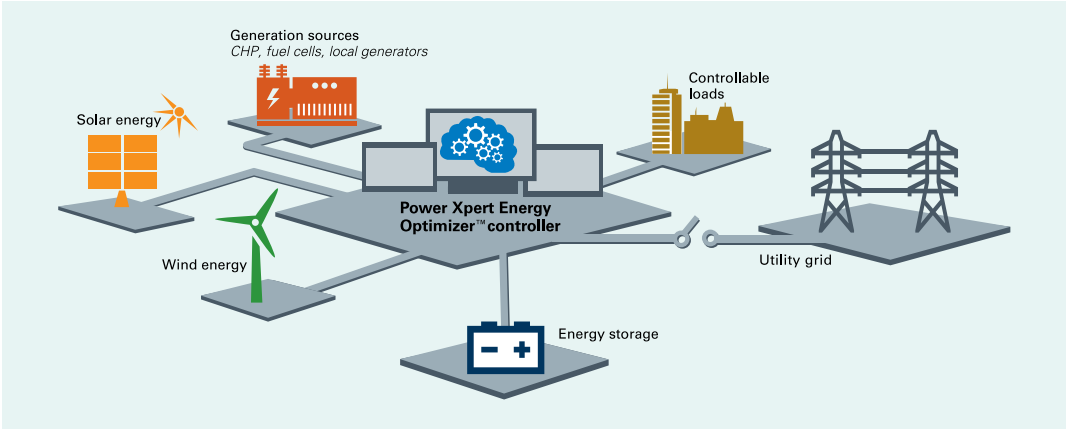
Microgrid and energy storage systems are stand-alone electrical power systems that consist of multiple generating and storage sources and dedicated loads that can be powered independent of the primary utility grid. At the heart of such a power system, there should be a flexible control system with standardized communications that enables easy system configuration, commissioning and future adaptability to changing system assets.

Eaton's solution: The Power Xpert Energy Optimizer™ controller

Our years of experience in automation, supplying control systems for microgrid and energy storage applications, molded the architecture for the Power Xpert Energy Optimizer controller: a microgrid/energy-storage control system that simplifies control system configuration, is pre-engineered for device and system testing, and is adaptable to changing microgrid assets.

The controller is programmed and ready to maintain overall system stability, shave peak demand, shift loads, manage black starts, achieve lowest total cost of operation, maximize renewable energy contribution and provide utility demand response functionality.

At Eaton, we believe that advanced control systems should be configured instead of custom programmed, allowing for maximum flexibility and scalability—the Power Xpert Energy Optimizer controller accomplishes these goals for both microgrid and stand-alone energy storage applications.



Power Xpert Energy Optimizer controller; the brains of a microgrid or energy storage solution

EATON
Powering Business Worldwide

The details

Local and system controllers

A local controller is used at each controllable asset. This local controller provides semi-autonomous and fast device control, maintains operation within connected equipment limits, provides local sequencing and alarm management and includes an integrated sequence of events recorder. The Power Xpert Energy Optimizer controller can include local controllers for:

- Energy storage
- Photovoltaics
- Generators
- Load local (sheddable loads)
- Utility interconnection

A system controller interfaces with upstream SCADA and optimizes and coordinates the operation of power system assets (sources and loads) through the downstream local controllers. The system controller can support various system-wide applications, such as optimal source dispatching or demand control, and applications for specific sources, such as renewable firming and more.

Local HMI and historian

The Eaton Power Xpert Energy Optimizer controller's human-machine interface (HMI) provides system configuration, device monitoring and application control functionality. Its integrated historian continuously monitors system operation and performance and collects detailed operational history.

While the server-based historian is a significant element of the control system, the balance of the control system can continue to operate independent of the server (during server upgrade, maintenance or outage).

Configured programming

Eaton's solution focuses on configured rather than custom programming and is built around the utility-proven SMP family of controllers, server and I/O modules coupled with Eaton's Yukon™ Visual T&D HMI products.

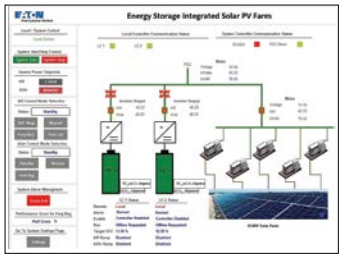
By careful design, the latest utility cybersecurity features and safeguards are embedded into each system device as well as system wide. For ease of configuration and maintenance, the Eaton Power Xpert Energy Optimizer controller is based on open standards, including IEC 61850 communications.

Modular and scalable

The control capabilities of the Power Xpert Energy Optimizer controller are aligned with emerging international standards. A modular approach is used, providing local controllers for each generation source and load; configured for specific devices using standard templates. Each module includes the unit/load control functions, alarms, reports and needed HMI screens for integration and implementation of that generation source or load. This modular framework allows the Eaton Power Xpert Energy Optimizer controller to be efficiently scaled for application size, or adapted to changing generation/load assets simply by choosing and configuring the appropriate templates. Preconfigured templates allow you to achieve your specific functional requirements.

Control functions

Automated system sequencing and coordination: Coordinates sequencing for the system components in response to user commands, system status, limits or faults



Energy storage integrated solar PV farm

Active control functions: Provides multiple modes of operation with well-defined transitions between modes

Data logging: The data log is a true historian, providing a complete record of all system data, alarms, operator actions and events with millisecond time tagging

Alarm and event management: Provides alarms at the system and local levels and provides access to alarm-event management

Alarms and events

Comprehensive alarm and event processing: Alarms and events are available via HMI and remotely via Web browser. User notification of significant alarms and events by email, SMS or pager may also be configured

Graphical system display and control: Interactive diagrams to monitor status and operate the system

Secure remote pass-through access: Allows owner to grant other users secure access to specific device(s) connected

Optional features

The Power Xpert Energy Optimizer controller provides additional significant functionality:

- Automatic retrieval and processing of event files from digital fault recorders and relays
- Integration and secure configuration management of all connected IEDs
- Enhanced secure pass-through access to connected IEDs through server; adds session logging, automatic password login and role-based access
- DNP3 with Secure Authentication V5 between system controller and upstream SCADA

Eaton's microgrid/energy storage experience

Over the last decade, Eaton has successfully applied its power systems and automation expertise to the design and implementation of control systems and complex energy storage systems for military facilities, campuses and utilities. We understand microgrids' and energy storage's inherent electrical operation and control challenges. Our power system experts have developed and harnessed unique optimization strategies that maximize system performance, functionality and reliability.

THE EATON DIFFERENCE

- Eaton has one of the largest and most experienced teams of power system engineers, field technicians and customer support engineers in the industry—strategically positioned around the world for rapid, dedicated local support
- Through our extensive service network, Eaton provides unparalleled access to the expertise and customized solutions needed to help optimize, build and maintain an automated, secure and cost-effective grid
- The Power Xpert Energy Optimizer controller is a factory-designed and tested microgrid and energy storage control system
- Eaton delivers configurable, adaptable systems designed to accommodate changing power requirements and generation assets
- Eaton's Power Xpert Energy Optimizer controller leverages proven technology fielded in harsh, utility applications worldwide for substation automation

For more information, visit Eaton.com/microgrid or Eaton.com/service

Follow us on social media to get the latest product and support information.

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