

Power- Management- System (PMS)



Revolutionary Power-Management-System (PMS)

ETP's iT-1000 platform enables real-time Power-Management-System (PMS), designed to enable real-time coordination between Inverter-Based-Resources (IBRs) and Distributed-Energy-Resources (DERs) at both transmission and distribution levels. iT-500 is industrial-grade and rugged ready to maximize performance of power plants ranging from 5 MW to 500 MW. ETP's PPC offers unparalleled control, reliability, and efficiency.

Key Features

- **In-Millisecond Operation Time-Frame:** Millisecond-level response time, including communication delays, to maximize utilization of utility-scale Battery-Energy-Storage-Systems (BESS) and enhance grid reliability and resiliency.
- **Patented Decision-Making Algorithm:** The computationally powerful and patented algorithm optimizes grid stability, reduces outages and enhances grid overall performance.
- **Modular and Scalable Design:** The PMS can be implemented in a distributed architecture to both reduce communication latency and enable a scalable solution upon power system expansion.
- **Industrial Cyber-Security:** The PMS is compliance with latest grid codes and standards in terms of cybersecurity including NERC-CIP.



Applications

Microgrid Operation: The PMS enables real-time power sharing between microgrid Inverter-Based-Resources (IBRs) and Distributed-Energy-Resources (DERs) to enable grid-connected and islanded operations as well as seamless islanding and re-synchronization processes.

Virtual-Power-Plants (VPPs): The PMS can enable real-time coordination between utility-scale BESS units, solar-PV plants, and wind power plant, to enable fixed power mode, or fixed voltage mode at the Point-of-Common-Coupling (PCC) and enable VPP operation of the entire plant from utility standpoint.

Clean Hydrogen Production Facility: The PMS solution can enable real-time coordination between the hydrogen production facility compressors and electrolyzers along with other IBRs and DERs to enable net-zero operation of the facility.

AI-based Data Centers: Data centers should be equipped with Uninterruptible-Power-Supplies (UPS) to mitigate adverse impacts of severe load fluctuations on the grid which require a high-speed PMS technology.

Head Office: 1021 Kennedy Avenue, North Vancouver BC, Canada, V7R 1L6
Laboratory: Unit 213, 2030 Marine Drive, North Vancouver, B.C., Canada, V7P 1V7
 +1 (800) 669-4797 | www.etpower.ca | info@etpower.ca

Factory-Acceptance-Testing (FAT)

Control-Hardware-In-the-Loop (C-HIL) Testing: The PMS unit will be tested for each project at ETP's real-time simulation laboratory to ensure that the complete HW+SW (embedded) PMS system is operational prior to field deployment.

Dynamic Performance Compliance: Interacting the PMS with the targeted power system transients and dynamics to ensure that the PMS is achieving its objectives. For example, ensuring proper performance of the PMS unit for islanded and grid-connected operation of the microgrid system.

Communication Medium Testing: Measuring latency and sampling rate of communication medium that will interconnect the PMS to the power system apparatus, e.g., IEC-61850, MODBUS, DNP3, TCP, UDP, MMS



Compliance with Industry Standards

Our Electric Grid Edge Controller adheres to crucial North American standards, ensuring seamless integration and operation:

- **Grid Code Compliance:** Meets IEEE-1547, CSA, NERC, and FERC standards for reliable performance and integration.
- **CSA & UL Certification:** Certified to meet the highest safety and operational standards, ensuring dependable performance in various environments.
- **IEC-61850 Compliance:** Ensures compatibility with modern communication protocols for seamless grid integration.



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Power Management System Specifications

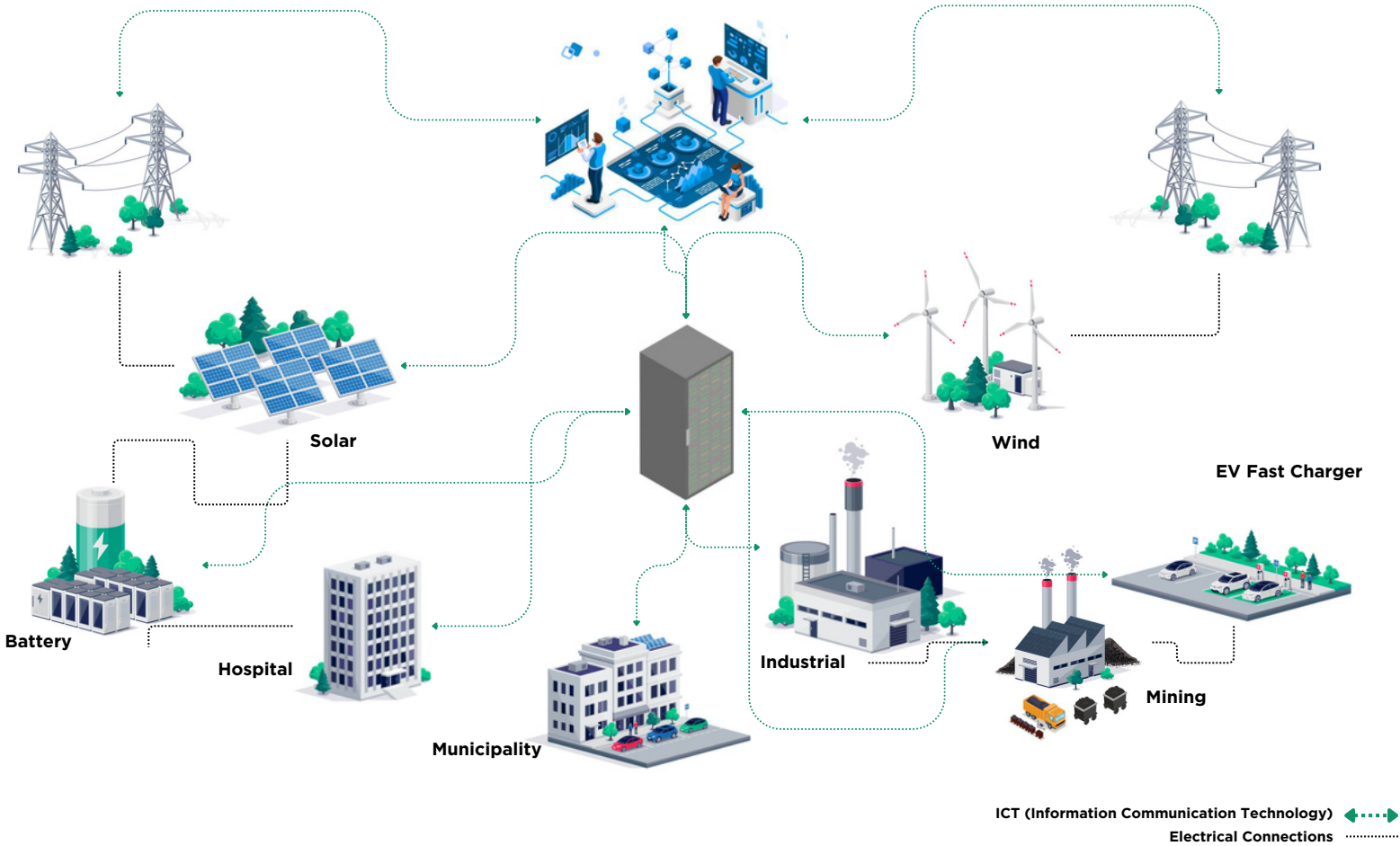
Specifications | Physical Features

High-definition HMI panel	<ul style="list-style-type: none"> • 25.7 cm / 10.1" TFT-display, 1280 x 800 pixels (WXGA) • Arm® Cortex®-A53, 4x 1.2 GHz • 2x USB host 2.0, 1x Ethernet (10/100 Mbps), RJ45 • Yocto/Linux, Chromium Browser
HVAC System	<ul style="list-style-type: none"> • Condensation prevention • Temperature range: -18°C to +38°C (0°F to +100°F) • Fan Auto/On switch with pilot light, aluminum alloy casing
SEL-RTAC Control System	<ul style="list-style-type: none"> • Up to 480 GB, DVI/VGA, Form C IO, IEC 61131 Programming
Power-supply System	<ul style="list-style-type: none"> • QUINT POWER, 24 V DC / 10 A, DIN rail mounting
Input-Output Modules	<ul style="list-style-type: none"> • Axioline F, 8 analog inputs and outputs
Cabinet Rating	<ul style="list-style-type: none"> • NEMA 3R / IP44
Cellular-based Module	<ul style="list-style-type: none"> • Industrial LTE 4G router, fallback to 3G and 2G • 2 Ethernet interfaces, SMS, and email transmission
Single Cabinet Dimensions	<ul style="list-style-type: none"> • 800 mm (W) x 1200 mm (H) x 400 mm (D) • 31.5" (W) x 3.98" (H) x 2.67" (D)

Performance | Compliance Data

Grid Code Compliance	<ul style="list-style-type: none"> • IEEE-1547, CSA, NERC, FERC
Warranty	<ul style="list-style-type: none"> • Standard: 3 years, Extended: 4-10 years
Certifications	<ul style="list-style-type: none"> • UL and CSA
Compliance	<ul style="list-style-type: none"> • IEC-61850, IEEE-1547, NERC
Advanced Features	<ul style="list-style-type: none"> • Computationally powerful algorithm for grid management • Modular, scalable, and future-proof • Cyber-security ready for harsh environments

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Built on Expertise

Developed with extensive experience in energy management and grid resiliency:

- **Established Performance:** A strong history of providing high-performance and dependable solutions across a wide range of energy systems.
- **Comprehensive Warranty Coverage:** Includes a standard 3-year warranty with the option to extend up to 10 years, offering long-term security and peace of mind.

Why Choose Our Power-Management-System (PMS)

- **Dependability:** Designed to deliver consistent performance across diverse operating conditions.
- **Optimization:** Equipped with advanced features to boost energy output while minimizing operational expenses.
- **Versatility:** Easily adaptable to various configurations and energy demands.
- **Dedicated Assistance:** Supported by a committed team focused on ensuring the success of your system.

Contact Us for More Information

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Experience the Future of Energy Management

Elevate your energy infrastructure with our state-of-the-art Power Management System (PMS). Integrating innovative technology, full compliance with industry standards, and exceptional support, our PMS sets the benchmark for efficient and reliable energy management solutions.