Power Plant Controller (PPC)

Advanced Power Plant Controller (PPC)

ETP's iT-500 platform delivers cutting-edge Power Plant Controller (PPC), 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

- **Voltage Control:** Maintain stable voltage levels across your power plant to ensure efficient and reliable operation, minimizing fluctuations that could affect system performance.

- **Reactive Power Control:** Manage reactive power effectively to support voltage stability and enhance power quality, ensuring your system meets all grid requirements.

- **Power Factor Control:** Optimize power factor to reduce losses and improve overall performance, enhancing the efficiency of your energy systems.

- **Frequency Ride-Through Requirements:** Meet critical frequency ride-through requirements to maintain operation during frequency disturbances, stabilizing the grid and preventing outages.

State-of-the-Art Technology:

- **Advanced Voltage Stabilizer:** Provides exceptional voltage control even under variable grid conditions, ensuring stable operation and enhancing overall system reliability.

- **Power and Voltage Oscillation Damping:** Our controller includes novel technology for damping power and voltage oscillations. This advanced feature helps to stabilize energy systems and mitigate the impact of oscillations, ensuring smoother operation and preventing potential disruptions.

- **Mitigation of Low-Frequency Oscillations:** Sophisticated control mechanisms to manage and counteract low-frequency oscillations, enhancing system reliability and performance.

- **SSO/SSCI Management:** Advanced controllers for potential Sub-Synchronous Oscillation (SSO), ensuring synchronization with the grid and maintaining system stability (depending on the SSO/SSCI frequency and overall plant latency)

Ensuring Smooth Commissioning

Advanced Hardware-in-the-Loop Testing:

We recognize the challenges developers encounter during commissioning, such as integrating control and protection elements, finalizing settings for each controller, and assessing the performance of protection units.

To address these issues, we offer a unique solution that includes comprehensive plant performance testing through hardware-in-the-loop (HIL) simulations. This approach ensures a smoother commissioning process and aligns the plant's operation as closely as possible with the original design specifications

We take great pride in our Power Plant Controller and are committed to delivering a solution perfectly tailored to your plant's needs. Our advanced Hardware-in-the-Loop (HIL) testing guarantees that the final product will be the ideal fit, ensuring optimal performance and reliability.

Compliance with Industry Standards

Our Power Plant Controller adheres to crucial North American standards, ensuring seamless integration and operation:

- **ERCOT** (Electric Reliability Council of Texas): Meets ERCOT's stringent requirements.
- **PJM** (PJM Interconnection): Compliant with PJM standards for performance and integration.
- **MISO** (Midcontinent Independent System Operator): Aligns with MISO regulations for optimal grid compatibility.
- **CAISO** (California Independent System Operator): Adheres to CAISO regulations for efficient grid operation and integration.
- **AESO** (Alberta Electric System Operator): Compliant with AESO standards for grid integration and performance.
- **IEEE 1547**: Conforms to standards for interconnecting distributed resources with electric power systems.
- **NERC** (North American Electric Reliability Corporation) Standards: Adheres to reliability standards for robust system performance.
- **UL 1741**: Meets safety and performance standards for inverters, converters, controllers, and interconnection equipment

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Power Plant Controller Specifications

Specifications | Physical Features	
High-definition HMI panel	• 12.1" (30.7 cm) TFT Display, 1024 x 768 pixels (XGA) • Arm® Cortex®-A72, Dual-core 1.8 GHz • 1x USB 3.0 Host Port, 2x Ethernet (10/100/1000 Mbps), RJ45, Debian/Linux OS, Firefox Browser
HVAC System	• Condensation prevention • Temperature range: -18°C to +65°C (0°F to +149°F) • Fan Auto/On switch with pilot light, aluminum alloy casing
SEL-RTAC or PLCnext Technology	• Dual Ethernet Ports: 2x Ethernet (10/100 Mbps) for communication and networking • High-Speed Data Exchange and Protocol Conversion • Rugged Design for Industrial Environments • Supports Multiple Protocols, including IEC • 61850, DNP3, and Modbus • Secure Remote Access with integrated firewall and VPN support
Power-supply System	• QUINT POWER, 24 V DC / 10 A, DIN rail mounting
Input-Output Modules	• 64 DI-DO, 32 AI-AO, +-TTL voltage range, resolution +-5 µVoltage
Cabinet Rating	• NEMA 4 / IP65
Cellular-based Module	• Industrial 5G router with fallback to 4G, 3G, and 2G networks, and features two Ethernet ports (10/100/1000 Mbps) for high-speed connectivity.

Performance | Compliance Data	
Grid Code Compliance	• IEEE-1547, CSA 22.3, UL 1741, NERC, FERC, RFC (ReliabilityFirst), SERC, WECC
Warranty	• Standard: 3 years, Extended: 4-10 years
Certifications	• UL and CSA
Compliance	• IEC-61850, IEEE-1547, NERC-CIP
Advanced Features	• Modular and scalable design ensures future readiness, with built-in cybersecurity features for operation in challenging environments

ETP Hardware in the Loop Capabilities

SEL - RTAC

Monitoring Devised   **Protection Relays**

iT-500 (PPC)   **IBR and DER Controllers**

Hardware-Software Control and Protection Systems from Multiple Vendors (DuT)

Wide range of electric grid signals such as voltage, current and breaker status are sent to the DuT

The simulator and the DuT exchange data over:
- Industrial Communication Protocols, e.g., IEC-61850
- Analog and Digital IOs, and
- Fiber Optic

The control commands (or setpoints) and protection trip signals, issued by the DuT, are sent back to the real-time simulator

Real-Time Simulator

Dynamic performance of a wide range of embedded control and protection components (i.e. DuT), are verified.

Detailed model of the power system, including DERs, electrical machines, loads as well as transmission and distribution equipment, is simulated in real time.

Built on Expertise

Developed with extensive experience in the North American energy market:

- **Regional Insights:** Tailored based on a deep understanding of ERCOT, AESO, PJM, MISO, and other regional grids.
- **Proven Track Record:** A history of delivering high-performance, reliable solutions across diverse energy scenarios.

Why Choose Our Power Plant Controller?

- **Reliability:** Engineered for consistent performance under a variety of conditions.
- **Efficiency:** Advanced features to maximize energy output and minimize operational costs**.**
- **Flexibility:** Adaptable to different configurations and energy requirements.
- **Continuous Support:** A dedicated team committed to supporting your system's success.

Contact Us for More Information

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Experience the Future of Energy Management

Transform your energy systems with our advanced Power Plant Controller. Combining cutting-edge technology, adherence to industry standards, and expert support, our controller represents the pinnacle of energy management solutions.