LayerZero Power Systems, Inc.

The Foundation Layer

# Series 70 ePODs: Type-maX

Industrial Load Center

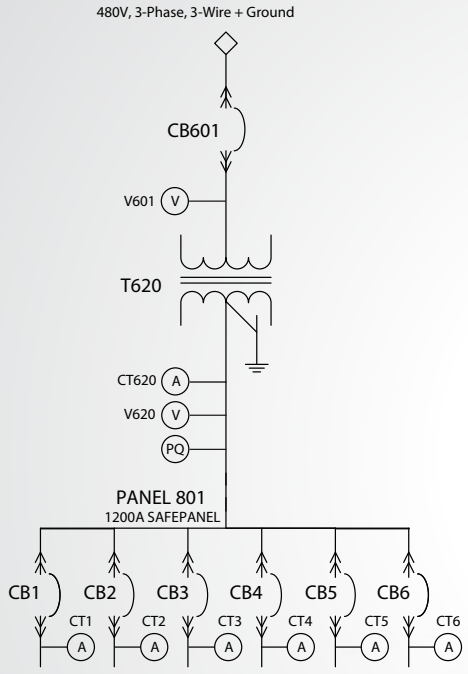
Product Brochure

# The LayerZero ePODs: Type-maX PDU
# Maximizes Operator Safety

### ePODs Type-maX - Inspired by NFPA-70E

The Series 70 ePODs: Type-maX is a Power Distribution Unit engineered for industrial applications with high reliability requirements. Combining 480V and 208/120V loads into a single, compact package, this PDU streamlines your power distribution setup by eliminating the need for multiple panels and transformers. This design minimizes field terminations, with all wiring completed in a controlled factory setting, ensuring precision and reducing installation risks. The Series 70 ePODs: Type-maX is designed for ease of use, facilitating quick and safe installation while meeting the highest standards of reliability and safety in mission-critical power distribution.

**NFPA 70E Friendly Design:** Sectionalized layout and IP-20 rated Finger-Safe SafePanel® provides enhanced protection.
**High Reliability and Safety:** Emphasis on reliability with robust safety measures ensures uninterrupted power distribution.
**Space-Saving Compact Design:** Single-cabinet design saves valuable floor space, ideal for environments with growing or constantly changing needs.
**Advanced Monitoring and Metering:** Fully monitored and metered for comprehensive power quality monitoring.
**Cyber Security:** Built-in cybersecurity features to safeguard your critical power infrastructure.




One Line Diagram

# LayerZero's ePODs: Type-maX Product Features

## Reliability

- ☑ **Silver Plated Input Terminals:** Silver has excellent conductivity to provide superior electrical performance and reliability.
- ☑ **Machined Hardware:** Machined cap screws and engineered disc springs maintain constant torque throughout product life.
- ☑ **Screw Thread Inserts:** Prevents screws from loosening under vibration for long-term reliability.
- ☑ **Serialized Critical Board Tracking:** Critical boards are serialized and cataloged in an active database for traceability.
- ☑ **Transformer Vibration Isolation:** Vibro-elastic pads to absorb vibrations from the transformer.
- ☑ **Combines 480V, 208/120 loads into one package:** Streamlines power distribution for increased reliability.
- ☑ **Set one piece of equipment in place versus setting several panels and a transformer:** Reduces complexity and potential points of failure, enhancing reliability.
- ☑ **Wiring to and from equipment done in controlled factory setting, less field terminations:** Ensures consistent quality and reliability through controlled factory conditions.

## Safety

- ☑ **INSIGHT IR® Portholes:** Bolted connections can be IR scanned with the dead-front doors closed.
- ☑ **INSIGHT IR® Cameras:** Monitor critical connections 7/24 for abnormal rises in temperature
- ☑ **Sectionalized Components:** Separations between each section to maintain maximum operator safety.
- ☑ **Polycarbonate Windows:** Allows circuit breaker positions to be viewed with the dead-front door closed.
- ☑ **Dead Front Hinged Doors:** Barrier to provide a safe working area with no exposed live parts.
- ☑ **SafePanel® Distribution:** IP-20 rated finger-safe panel board designed for operator safety
- ☑ **Guided Wireways:** Helps keep wires organized.
- ☑ **Cyber Security:** Protects the system from cyber threats, ensuring safe and secure operation.

## Connectivity

- ☑ **Ethernet Connectivity:** Secure VPN router connects to network for advanced remote monitoring capabilities.
- ☑ **Modbus/TCP:** Open connectivity to existing monitoring systems without proprietary limitations.
- ☑ **NTP Time Clock Synchronization:** Facilitates timeline-based logging for post-event reconstruction.
- ☑ **SNMP Connectivity:** Permits remote management via Simple Network Management Protocol.
- ☑ **Compact approach, one cabinet saves floor space:** Enhances system connectivity by simplifying the setup.

## LZ DPQM

- ☑ **Real-Time Waveform Capture:** Automatically captures a picture of the power six-cycles before and after every event.
- ☑ **Optional Local Touch-Screen Interface:** Password-protected color touch-screen GUI for local ePODs setup/operation.
- ☑ **Black-Box Forensics:** ePODs captures and records events to provide vital information in root-cause analysis.
- ☑ **Fully monitored and metered:** Provides comprehensive monitoring capabilities for real-time insights and management.

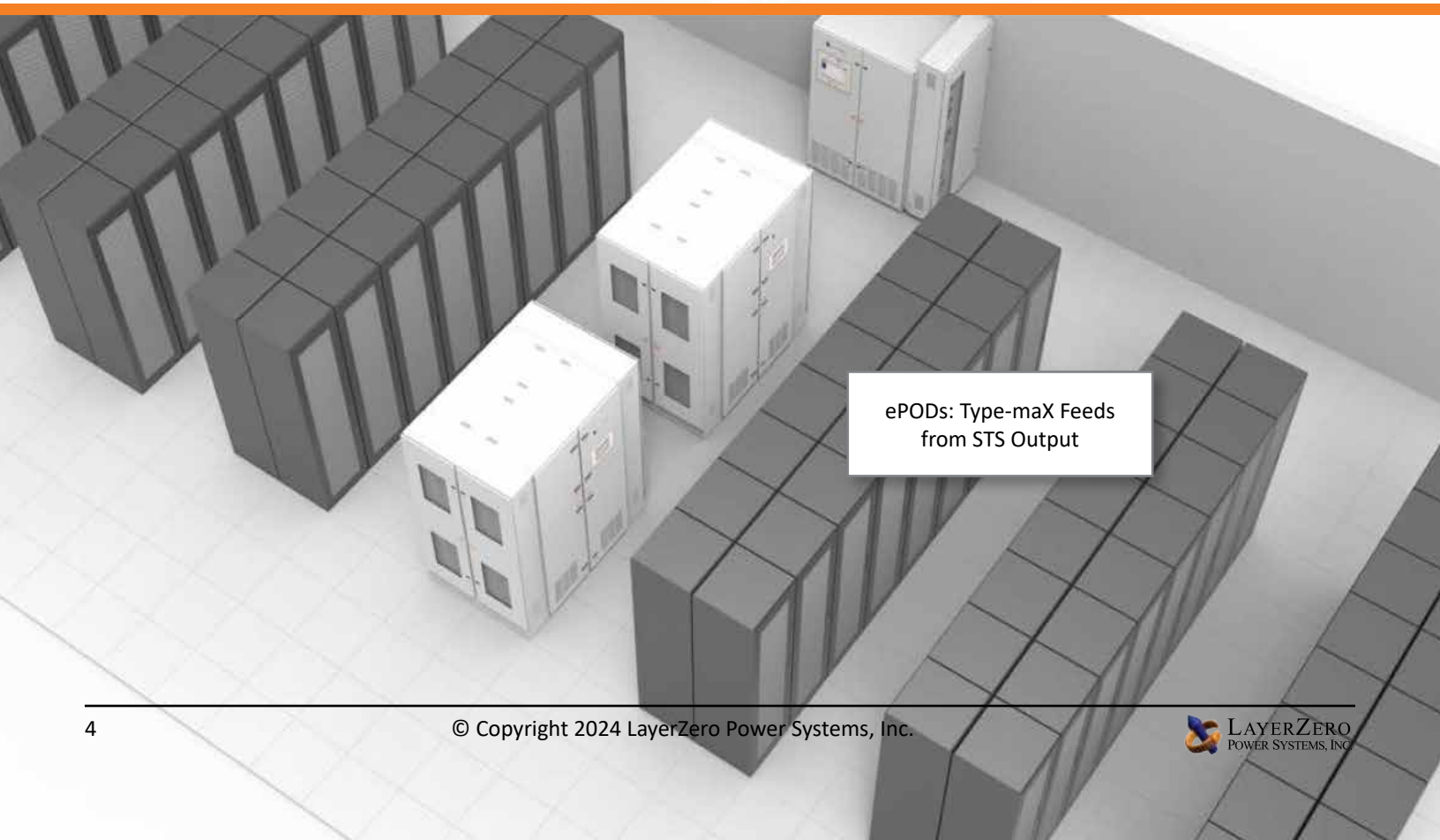
## Equipment Layout

**Main Circuit Breaker Section:**
Auxiliary MCB optional
Mounting: Fixed, Plug-In
Type:
Molded Case Switch
65kA, 100kA
Electronic Trip
65kAIC, 100kAIC
Accessories:
CB Shunt-trip
120VAC, 24VDC
CB Position Indication:
Open, Tripped, Closed

**Monitoring Section:**
Color-Touch Screen Interface Option
Local/Remote EPO Option

**Distribution Section:**
Sub-feed distribution
1200A SafePanel®

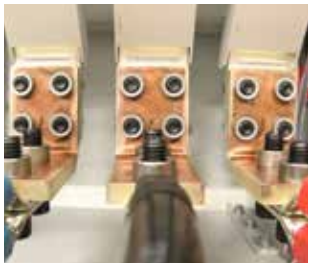
**Transformer Section:**
DOE 2016 Efficiency Standard



ePODs: Type-maX Feeds from STS Output

## Reliability Features

### Silver Plated Terminals



LayerZero ePODs: Type-maX PDUs leverage the superior performance of silver-plated terminals. Silver has excellent conductivity, minimizing resistance and ensuring optimal power delivery. This translates to reliable operation for your mission-critical equipment.

### Machined Hardware

Our bolted connections utilize machined cap screws and engineered disc springs. The result is a flat pressure vs deflection profile to ensure that all bolted connections maintain constant torque through the life of the product.

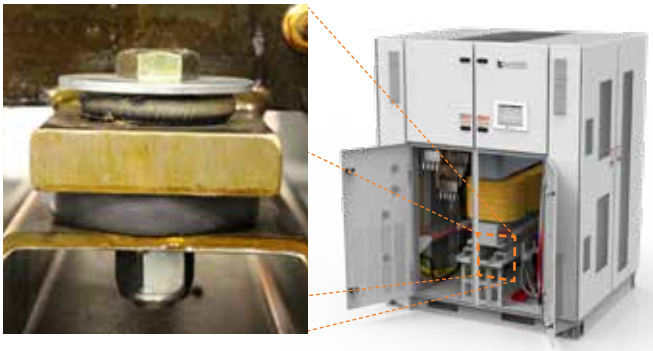
These technologies have been well tested in disparate environments of wide temperature ranges to help ensure that, once connections have been tightened, they stay that way.

### Enhanced Traceability with Serialized Circuit Boards

We serialize and track all critical circuit boards and memory cards through our eBOSS portal, which allows customers to reference which components their machines are made from, who tested the components, as well as the ability to view notes generated from testing.

Serialized components offer the ability to drill-down on prospective component failure utilizing predictive modeling techniques, so if part fails, the instance can be cross-referenced with similar parts. This preventative maintenance helps ensure maximum uptime.

### Vibration Isolation Damper Mounts



Transformers in the Series 70: ePODs Type-maX Power Distribution Unit are equipped with vibration isolation damper mounts, helping to reduce the amount of vibration and noise that originates from transformers, ultimately leading to a higher reliability of electrical and mechanical connections over the life of the product.

## Reliability/Safety

### Combines 480V, 208/120 loads into one package

Combining 480V and 208/120V loads into one package streamlines power distribution, reducing installation complexity and enhancing system reliability, ultimately saving customers time and reducing operational costs.

### INSIGHT IR®

INSIGHT IR® Portholes and INSIGHT IR® Cameras provide unparalleled safety in power distribution systems. These advanced tools allow for non-invasive thermal inspections, enabling real-time monitoring and early detection of potential issues, ensuring optimal performance and reliability.


### De-Energizable Monitoring Section

To help make maintenance easier and safer, the ePODs: Type-maX is equipped with fuses. These fuses allow for the safe isolation and replacement or upgrade of the LZ DPQM Panel Board Monitor without interrupting power delivery to mission-critical equipment.

### View Status LEDs and Distribution CB Positions With Dead-Front Doors Closed

LayerZero® equipment is equipped with polycarbonate windows, to view circuit breaker positions and critical board LEDs.

Operators can view the status of diagnostic LEDs without exposure to the energized power electronics section. In addition, SafePanel circuit breaker positions can be viewed with the dead-front door closed.

## Safety Features

### The LayerZero 1200 A Finger-Safe SafePanel®

The LayerZero 1200A SafePanel® Panel Board prioritizes operator safety above all else. This finger-safe design eliminates exposure to exposed parts, minimizing the risk of electrical hazards.

Additionally, the optional shrouds further enhance safety by covering unused spaces within the panel, creating a completely protected environment.

The Breaker Is Inserted Into The SafePanel

The Handle Is Unlocked

Screws Help Secure The Breaker

For Maximum Safety, The SafePanel Has Recessed Bus Work And IP-20 Finger Safe Lattice.

## Safety

### Dead-Front Hinged Doors

Our enclosures feature Dead Front Hinged Doors, creating a secure barrier that keeps exposed parts inaccessible while allowing for easy operation and monitoring. This innovative design prioritizes operator safety, letting you work with confidence.

### Guided Wireways

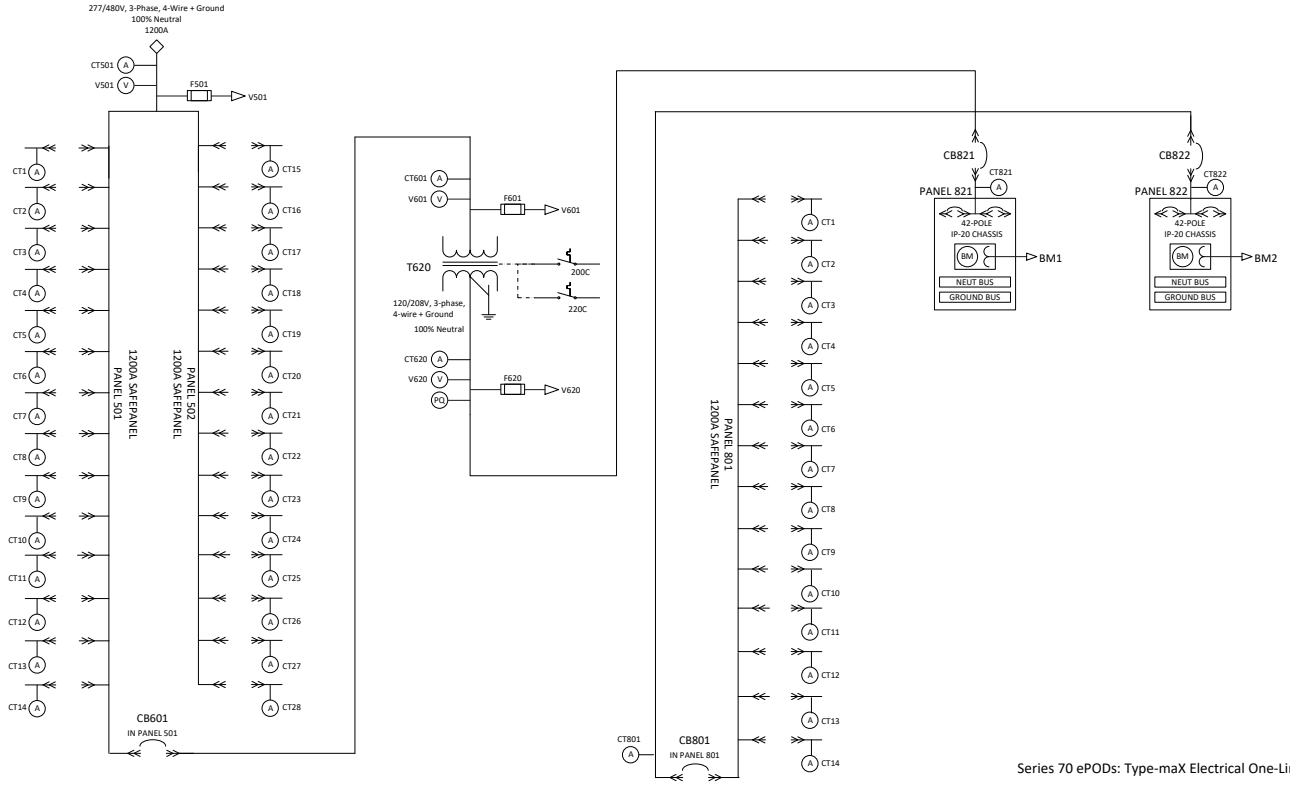
Keep your connections clean and organized with our Guided Wireways. This innovative feature channels and organizes wires, ensuring a clutter-free and manageable workspace.

In addition, a clean and organized system with properly routed cables presents a professional and polished look.

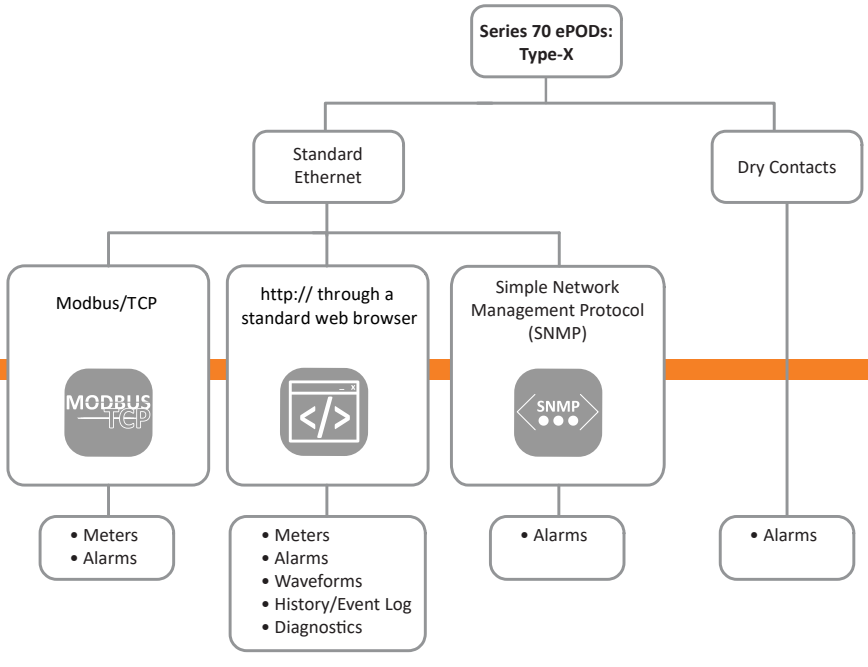
### Cyber Security

ayerZero Power Systems prioritizes security with our comprehensive Cybersecurity features. This built-in defense system safeguards your system against unauthorized access, malware, and other cyber threats. By employing a layered security approach, we ensure the safe and secure operation of your mission-critical power equipment.

## Connectivity




Series 70 ePODs: Type-maX Electrical One-Line Diagram




## Real-Time Waveform Capture with VDAT Plotting

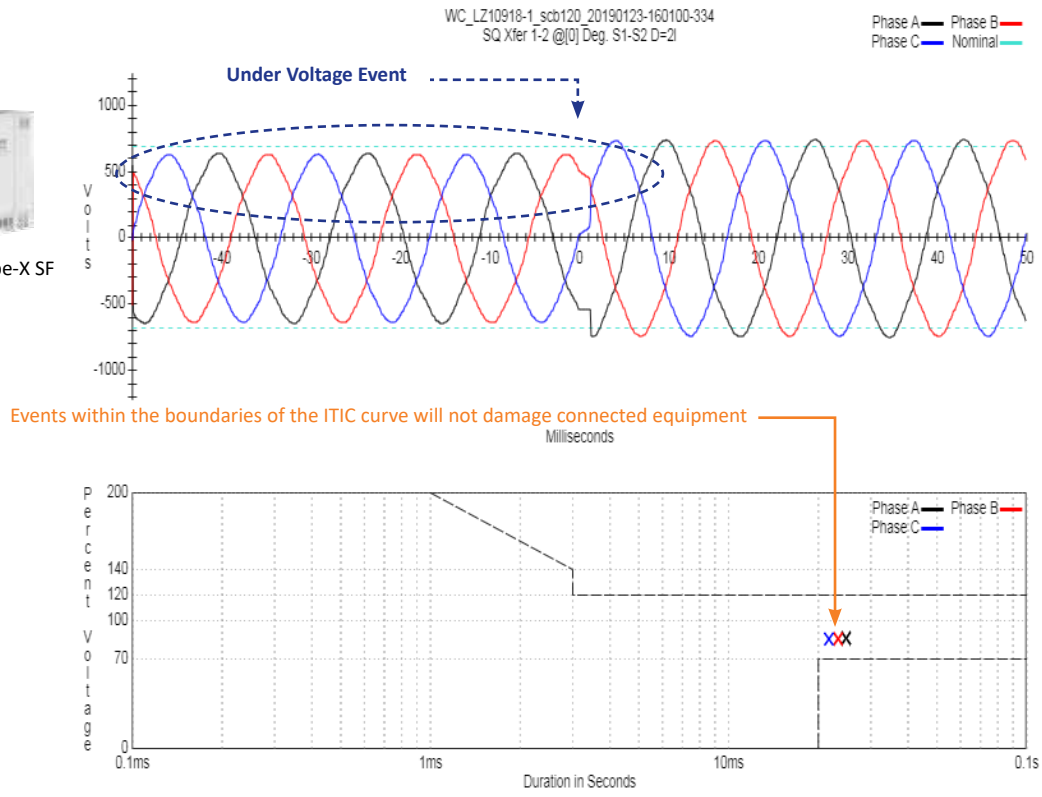
All LayerZero products break down power sources into samples for power quality analysis. This data is remotely accessible by connecting to the units via web browser.

The following “voltage sag” factory test was performed on a LayerZero Series 70 ePODs: Type-X PDU. Each phase is represented by a colored line, plotting the voltage over a period of time.

In the example below, the voltage of all three phases dropped below the user-defined setpoint, which triggered an undervoltage event, an automatic waveform capture, and an ITIC plot of the event.

On LayerZero PDUs and RPPs, waveforms and ITIC plots are generated for every phase, on every circuit, for every event.

ePODs: Type-X SF PDU




**How to Read the Curve**

On the y-axis you will see the % of nominal voltage, and the x-axis represents time typically shown using a logarithmic scale. As long as the voltage is contained within the boundaries the load will be maintained and there will be no damage to connected equipment. The examples above events plotted both within the boundaries.

## Power Quality Monitoring

LZ DPQM

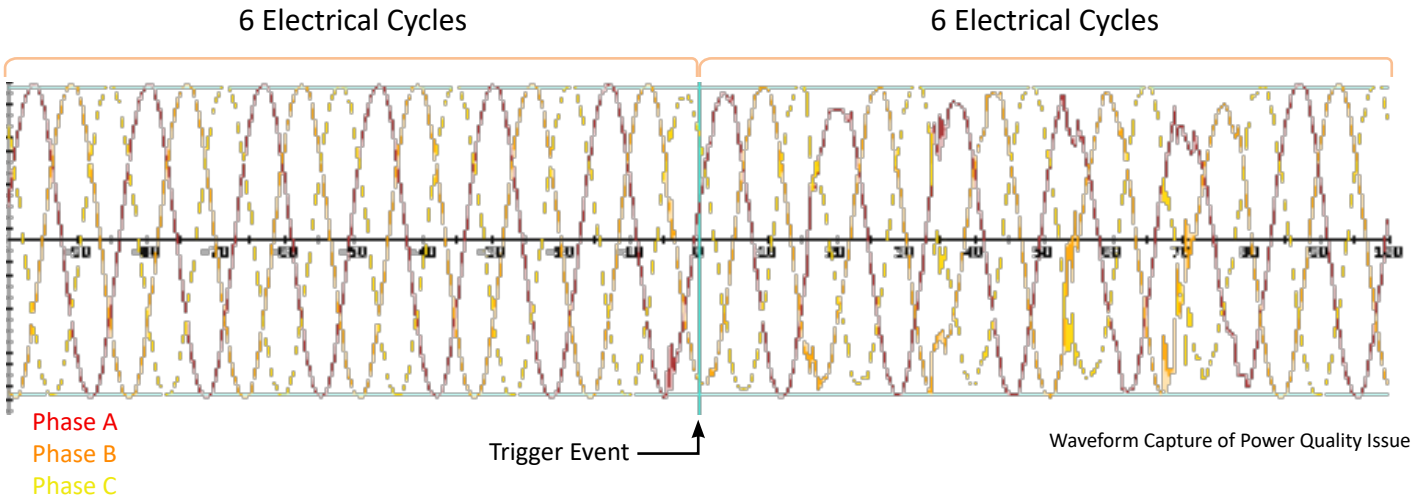
LayerZero ePODs: Type-maX PDUs integrate the industry-leading LZ DPQM (Distribution Power Quality Monitoring) system.

This comprehensive solution empowers you with local and remote communication options, providing a robust feature set. Gain actionable insights through critical power quality metric monitoring. Proactively address potential issues with detailed data and timely alarms. Make data-driven decisions to optimize system reliability and uptime.

LZ DPQM equips you for a proactive approach to power management, fostering a more resilient infrastructure for your operations.


### LZ DPQM Provides Answers

LZ DPQM provides timestamped pictures of waveforms before and after events, providing information that enables facilities to go back in time to methodically identify and correct the root causes of events. LayerZero® equipment actively captures power quality information at the STS, PDU, and RPP - permitting thorough post-event analysis.




Waveform Capture of Power Quality Issue

## Technical Specifications

LZ DPQM

| LZ DPQM Parameters | | Mains | Subfeeds or Branch Circuits |
|---|---|---|---|
| **Voltage Monitor** | Volts (L-L) Phase A/B/C (volts RMS) | ✓ | |
| | Volts (L-N) Phase A/B/C (volts RMS) | ✓ | |
| | Phase Rotation | ✓ | |
| **Current Monitor** | CT Reversed Phase A/B/C/N | ✓ | ✓ |
| | Current Phase A/B/C/N (amperes RMS) | ✓ | ✓ |
| **Power Monitor** | Frequency (hertz) | ✓ | |
| | Real Power (kilowatts) | ✓ | ✓ |
| | Apparent Power (kilovolt-amperes) | ✓ | ✓ |
| | Reactive Power (kilovolt-amperes reactive) | ✓ | ✓ |
| | Power Factor | ✓ | ✓ |
| | Energy (kilowatt-hours) | ✓ | ✓ |
| | Block Demand (kilowatts) | ✓ | ✓ |
| | Block Demand Peak (kilowatts) | ✓ | ✓ |
| | Rolling Demand (kilowatts) | ✓ | ✓ |
| | Rolling Demand Peak (kilowatts) | ✓ | ✓ |
| **Power Quality** | Percent VTHD (percent) | ✓ | ✓ |
| | Waveform Capture | ✓ | ✓ |
| **Alarms** | Phase - Under Voltage A/B/C (Alarm) | ✓ | |
| | Phase - Over Voltage A/B/C (Alarm) | ✓ | |
| | Phase - Low Voltage A/B/C (Warning) | ✓ | |
| | Phase - High Voltage A/B/C (Warning) | ✓ | |
| | Phase - Over Current A/B/C (Alarm) | ✓ | ✓ |
| | Phase - High Current A/B/C (Warning) | ✓ | ✓ |
| | Under Frequency (Alarm) | ✓ | |
| | Over Frequency (Alarm) | ✓ | |
| | High VTHD (Warning) | ✓ | |
| | Over VTHD (Alarm) | ✓ | |
| | Phase Rotation (Alarm) | ✓ | |

All product specifications are subject to change without notice.

## Technical Specifications

| Mechanical Characteristics | |
|---|---|
| Dimensions (Single Side Distribution) | Type-maX |
| | 92” H x 73” W x 60” D (2337 mm H x 1854 mm W x 1524mm D) |
| Weight | Please Contact LayerZero Engineering. |
| Heat Dissipation | Varies on Transformer Efficiency, Please Contact LayerZero Engineering. |
| Frame Construction | Welded Frame |
| Color | Textured Powder Coat White (RAL 7035), Blue (RAL 5017), Black, Custom |
| Seismic Floor Anchors | Optional |
| Seismic Floor Stand | Optional |
| Sectionalization | Dead Front Doors; Main CB(s); Monitoring; Transformer |
| **Electrical Characteristics** | |
| Input Voltages | Please Contact LayerZero Engineering. |
| Output Voltages | Please Contact LayerZero Engineering. |
| Transformer Size | 300 kVA, 400 kVA, 500 kVA |
| Frequency | 60 Hz |
| Neutral Rating | 100%, 200% |
| Circuit Breaker Type | Electronic Trip, LS/I (Standard), LSI, LSI G Available, Thermal Magnetic Trip (100 AF Only) |
| Distribution | SafePanel® Distribution |
| **Power Quality Monitoring** | |
| Power Quality Monitoring Technology | LZ DPQM (Distribution Power Quality Monitoring) |
| Waveform Capture | Local Display, Remote Display via Web Browser |

| Operational Characteristics | |
|---|---|
| Cooling | Convection Cooling |
| Cable Access | Top/Bottom |
| Service Access | Front and Side Access; Front-Only Access; or Front/Rear Access (Type-maX FR-Only) |
| IR Scan Port Type | InSight IR® Portholes |
| Display Type | 3.2” LCD with Membrane, 10.5” Color Touch Screen GUI (Optional) |
| **Connectivity** | |
| Meters | Local Display, Ethernet, Modbus/TCP, http via Web Browser (Non-Proprietary) |
| Alarms | Local Display, Ethernet, Modbus/TCP, http via Web Browser (Non-Proprietary) |
| Summary Alarm | Dry Contacts |
| Waveforms | Local Display, Ethernet, http via Web Browser (Non-Proprietary) |
| History/Event Log | Local Display, Ethernet, http via Web Browser (Non-Proprietary) |
| Diagnostics | Local Display, Ethernet, http via Web Browser (Non-Proprietary) |
| Time Synchronization | Network Time Protocol (NTP) |

| Standards Conformance: SafePanel Distribution | |
|---|---|
| UL | ETL Listed to UL 60950 |
| CSA | C22.2 No 29-M1989 |

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Learn more at www.LayerZero.com

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