LayerZero
Power Systems, Inc.

The Foundation Layer

Series 70 eRPP-FS

Web-Enabled Remote Power Panel

Product Brochure

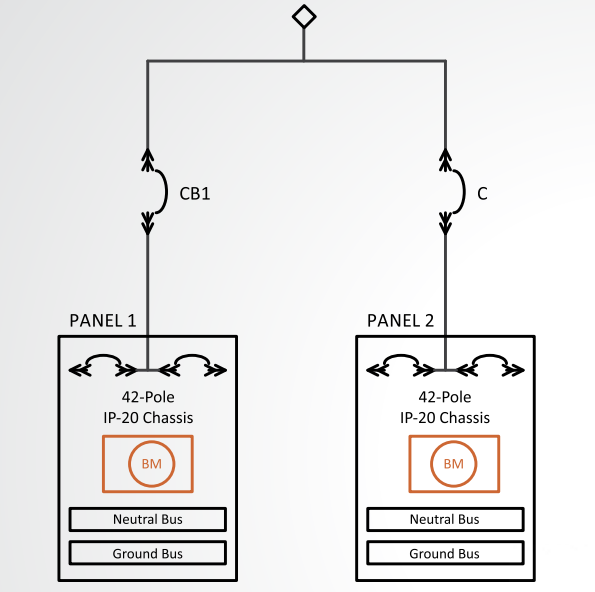
Increase Reliability and Safety In Two Ways
With eRPP Remote Power Panels

Reliability Increase #1: Finger Safe

The panel board of the eRPP is designed for maximum operator safety with a fully enclosed current-carrying bus. Branch breakers are inserted into IP-20 (finger-safe) wells and bolted into place using non-conducting screws.

Reliability Increase #2: Selective Trip Coordination

The Series 70 eRPP is supplied with circuit breakers that are tested for selective trip coordination up to 35 kAIC at 208V. In the event of a downstream fault, the branch breaker will always trip before the main breaker under fault conditions up to 35,000 AIC.



One Line Diagram

Reliability

Silver Plated Terminals:
Silver Has Excellent Conductivity To Provide Superior Electrical Performance and Reliability

Convection Cooling:
Natural Convection-Cooled Heat Dissipation System is Maintenance-Free

Machined Hardware:
Machined Cap Screws and Engineered Disc Springs Maintain Constant Torque Throughout Product Life

Selective Trip Coordination:
Main Breaker Will Not Trip In The Event of a Downstream Fault.

Serialized Critical Board Tracking:
Critical Boards Are Serialized And Cataloged in an Active Database For Traceability

Safety

INSIGHT IR® Cameras:
Built-in Infrared Cameras to Continuously Scan Bolted Connections For Irregular Rises In Temperature

Sectionalized Components:
Separations Between Each Section To Maintain Maximum Operator Safety

Polycarbonate Windows:
Allows Critical Board LEDs To Be Viewed With The Dead-Front Door Closed

Guided Wireways:
Helps Keep Wires Organized

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 with No Exposure to Exposed Live Parts

Connectivity

Ethernet Connectivity:
Secure VPN Router Connects To Network For Advanced Remote Monitoring Capabilities

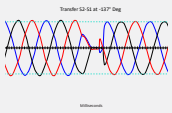
Modbus/TCP:
Open Connectivity to Existing Monitoring Systems Without Proprietary Limitations

NTP Time Clock Synchronization:
Facilitates Timeline-Based Logging For Post-Event Reconstruction

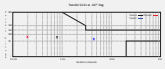
SNMP Connectivity:
Permits Remote Management Via Simple Network Management Protocol

Dry Contacts:
Access Alarms Data with Dry Contacts Connections

Power Quality Monitoring



Real-Time Waveform Capture:
Automatically Captures A Picture Of The Power Six-Cycles Before and After Every Event



ITIC Plotting:
Generate ITIC Plots To Determine if Connected Equipment Was Affected by Power Quality Events

Optional Local Touch-Screen Interface:
Password-Protected Color Touch-Screen GUI For Local STS Setup/ Operation/Administration

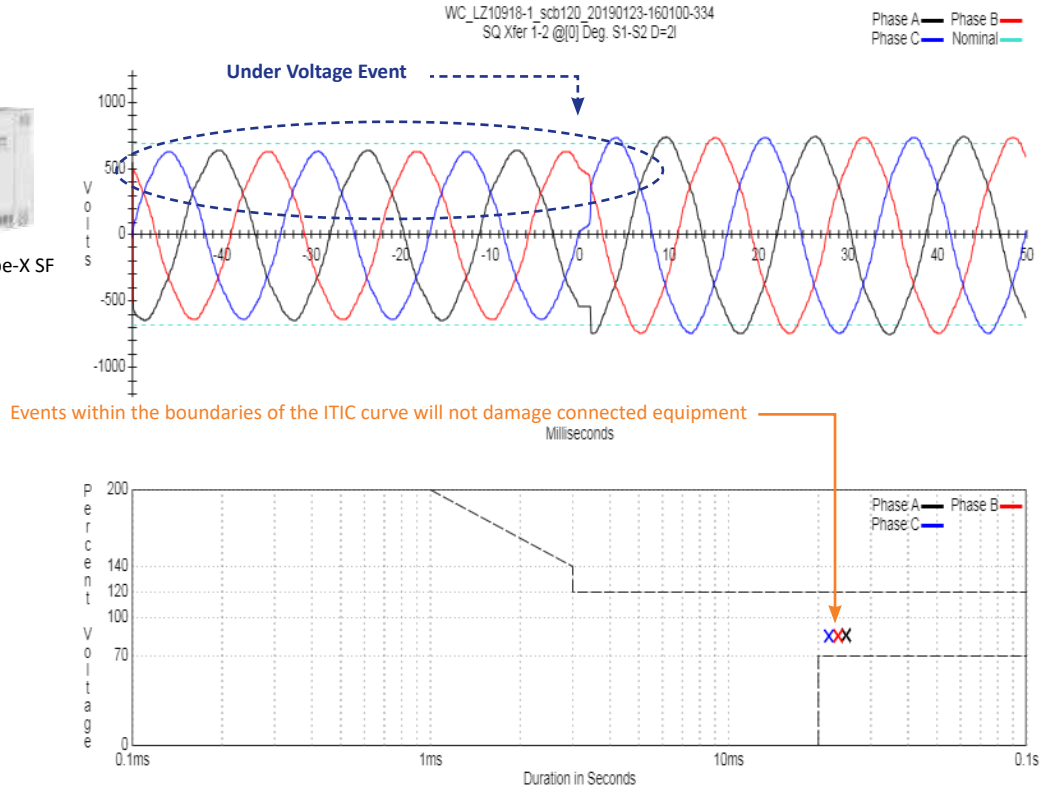
All LayerZero products break down power sources into samples for power quality analysis. This data is remotely accessible by connecting to the units via web browser.

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.

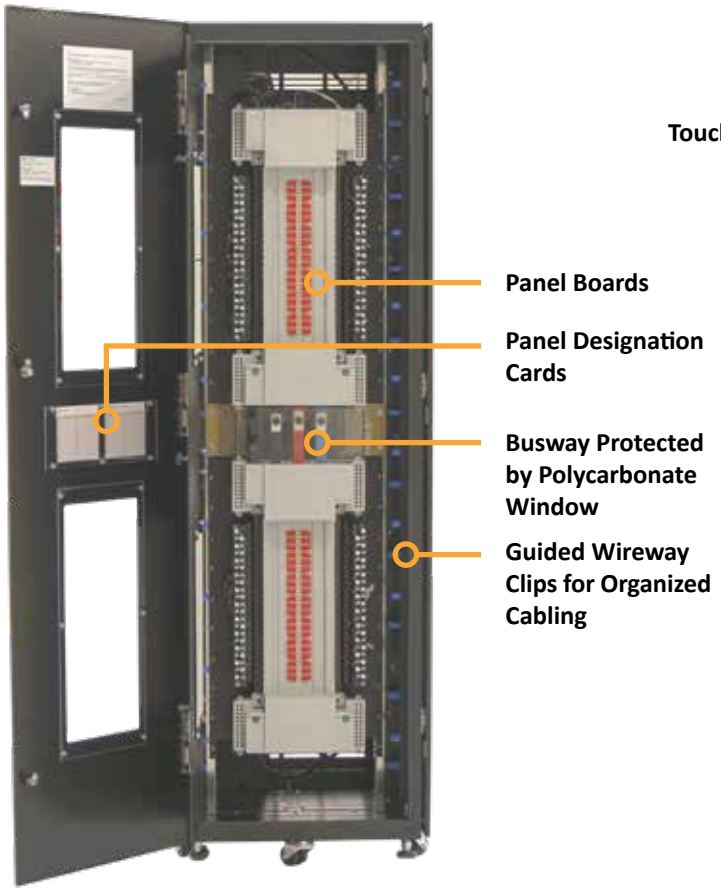
ePODs: Type-X SF PDU

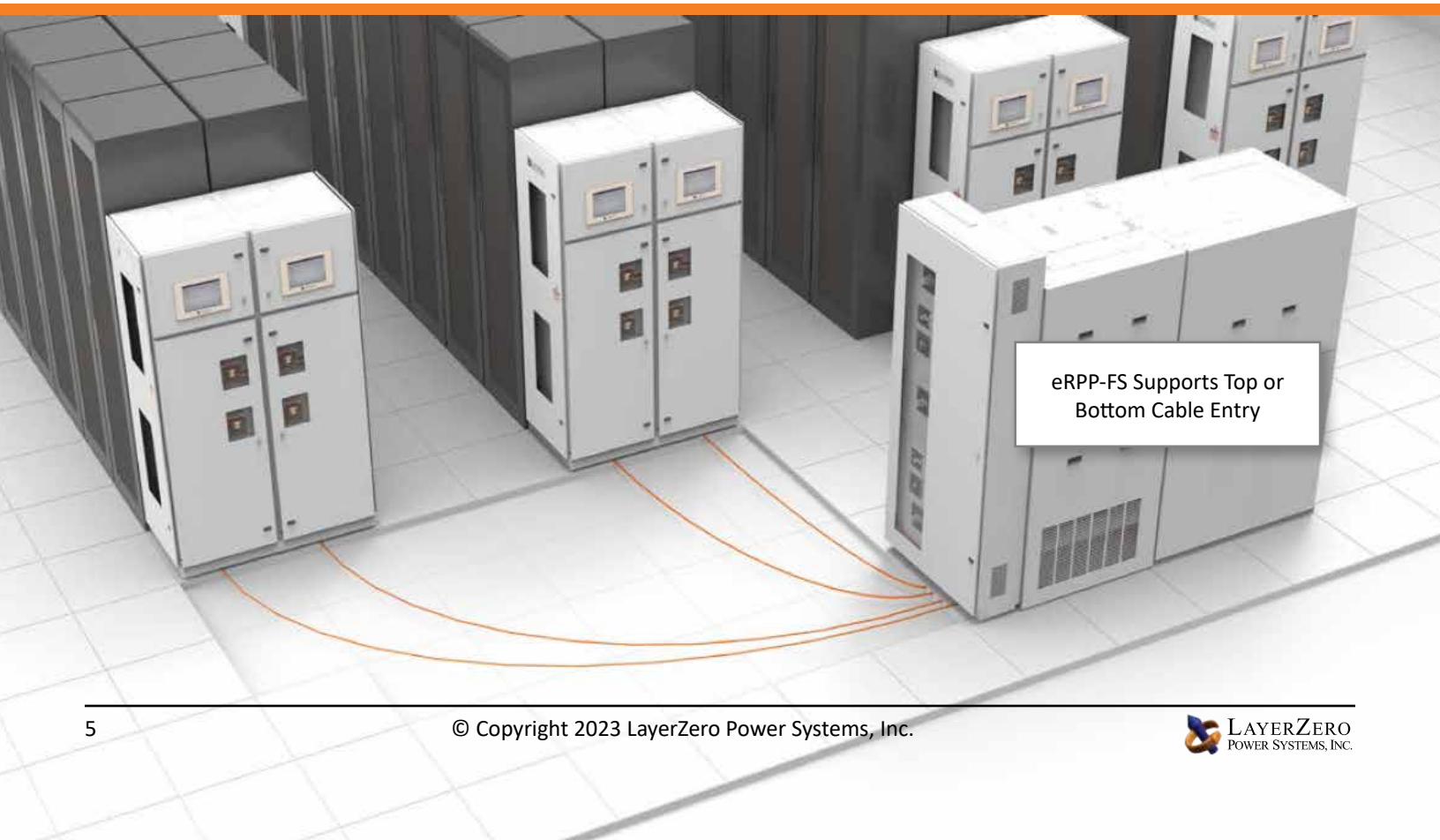


How to Read the Curve

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.

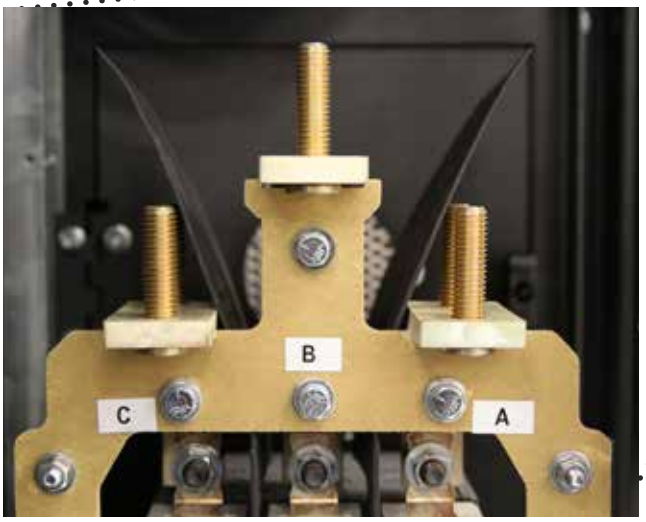
Equipment Layout

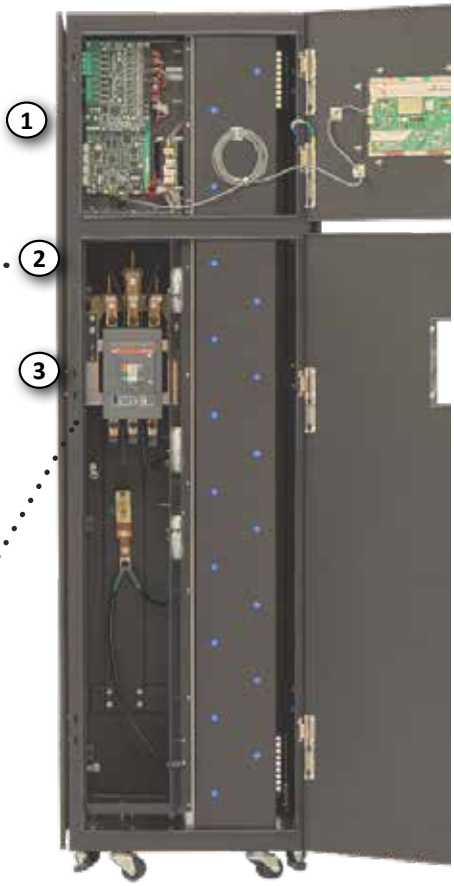




Equipment Construction Detail

1. LayerZero DPQM Controls
2. Silver Plated NEMA 2-Hole Compression Inputs
3. Main Circuit Breaker





4. Alarm Indicator
5. PBM Status Indicator
6. Logged In User
7. Navigation Menu

Reliability Features

Silver Plated Terminals

LayerZero utilizes silver plating on all bus joints to be able to provide the highest performance. Silver has high conductivity and low resistance - which makes for a great contact.

Silver-Plated Customer Connections

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.

Machined Cap Screws and Engineered Disc Springs
Utilized in LayerZero Power Systems Products

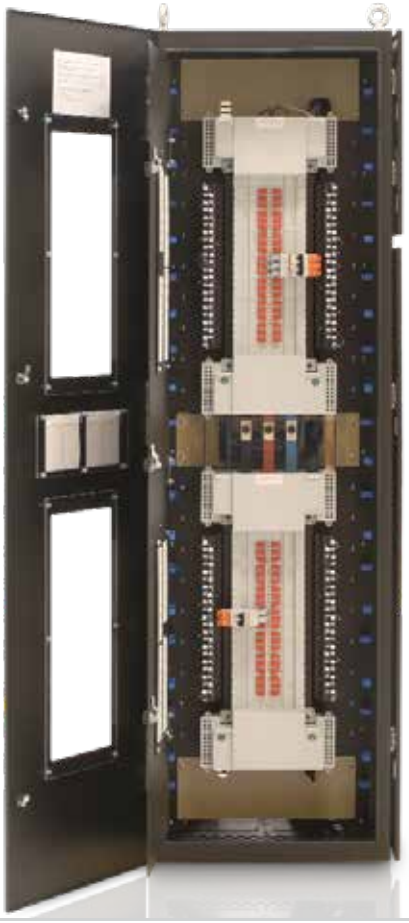
Serialized circuit boards

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.

All Critical Boards are Serialized and Tracked in a Database

Reliability Features



Selective Trip Coordination

LayerZero Series 70 eRPP-FS Remote Power Panels are selective trip coordinated.

Selective Trip Coordination ensures that the main breaker will remain unaffected by the branch circuit breakers in the event of a downstream fault.

The Fault Current Opens the Solenoid Magnet, Causing The Contacts To Part

Unequal Pressure on Each Side of The Arc Causes the Plasma Wave To Rotate Away From The Contacts

The Plasma Wave is Driven into 12 Evenly Spaced Dividers

The Plasma is Rapidly Cooled

Transient Voltage Attempts To Re-Strike The Arc, But The Plasma Is Again Pushed Into The Dividers

When Sufficiently Cool, Charged Particles Recombine And The Fault Current Is Stopped Quickly & Safely

Safety Features

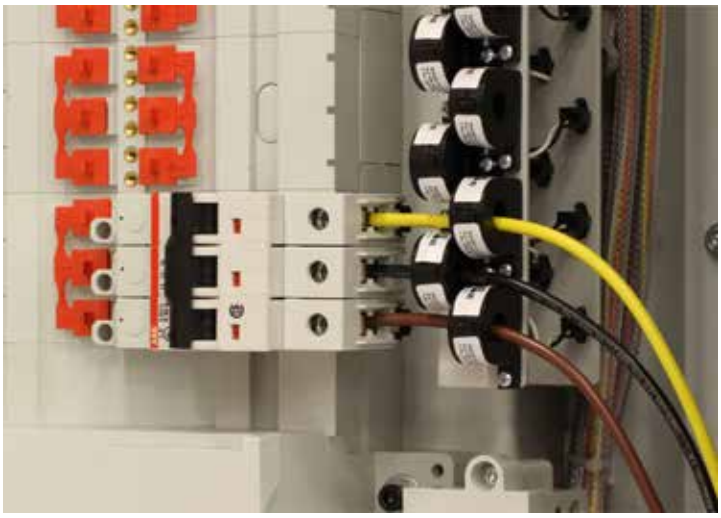
Circuit Breaker Shrouds

LayerZero Series 70 eRPP Remote Power Panel provides optional circuit breaker shrouds, designed to eliminate exposure to live parts.

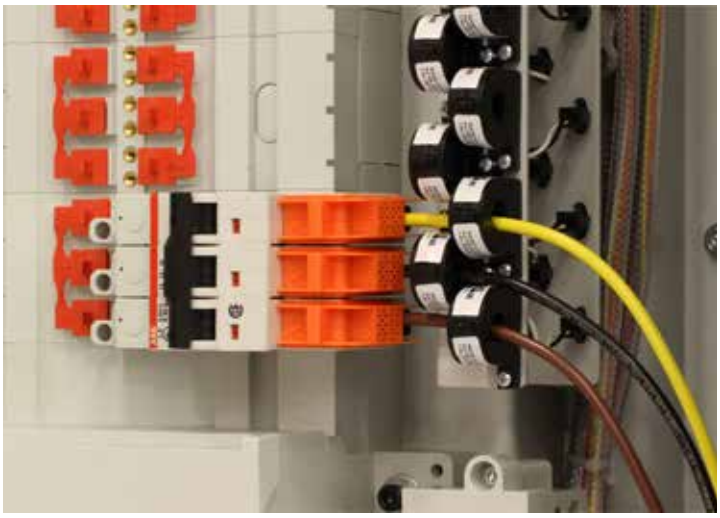
No Exposed Live Parts

LayerZero's patent-pending Circuit Breaker Shrouds cover exposed wiring, maximizing operator safety.

LayerZero's patented orange Circuit Breaker Shrouds



Wiring Without Shrouds Leaves Wiring Exposed



Circuit Breaker Shrouds Maximize Operator Safety

Ease of Maintenance/Safety Features

Scan Bolted Connections with Dead-Front Doors Closed

Strategically positioned IR-scan portholes to enable safe thermal scanning of all bolted connections with the deadfront closed, without exposing the operator to power circuit voltage.

The IR window swivels upward and unlocks with key-hole access to reveal a mesh, allowing the operator to point-and-shoot thermal cameras to obtain accurate readings. LayerZero provides documentation for proper thermal scanning procedures.

INSIGHT IR® Portholes on the eRPP-FSR

Sectionalized Components Help Maximize Operator Safety

Operators are well-protected from exposed connections. There is a physical separation between the main circuit breaker(s) and branch circuit breakers. All connections are optically isolated to minimize risk. Polycarbonate windows are utilized to permit visibility and maximize operator safety.

Energized parts are all insulated, covered, recessed, &/or internally mounted for safer operation of the unit. In addition, sections that isolate machine components are insulated.

Sectionalized Layout in the eRPP-FSR Power Panel

View CB Positions With Dead-Front Doors Closed

The Series 70: eRPP-FS is equipped with polycarbonate windows located on the outer door.

Circuit breaker positions can be viewed with the dead-front door closed.

Polycarbonate Windows for Main and Branch CBs

Safety Features

The LayerZero Finger-Safe SafePanel®

The Series 70 eRPP features an IP-20, finger-safe panel board, meaning that the opening will not allow ingress of ½" (12.5mm) diameter probe, for maximum operator safety.

An arc can form as two live conductors are separated – such as the removal of a circuit breaker from a panel board. The SafePanel design ensures that a potential arc would be contained in the connection well so that even if a branch breaker were to be removed, the arc would be contained in the connection well.

Insulated with the components deeply isolated, removal of the breaker is safe and easy.

Isolated, Non-Conducting Brass Screws

The Protective Cover Is Removed

The Breaker Is Inserted Into The Opening

The Breaker Snaps Into The DIN Rail

The Breaker Is Secured With An Isolated, Non Conducting Screw

Power Quality Monitoring

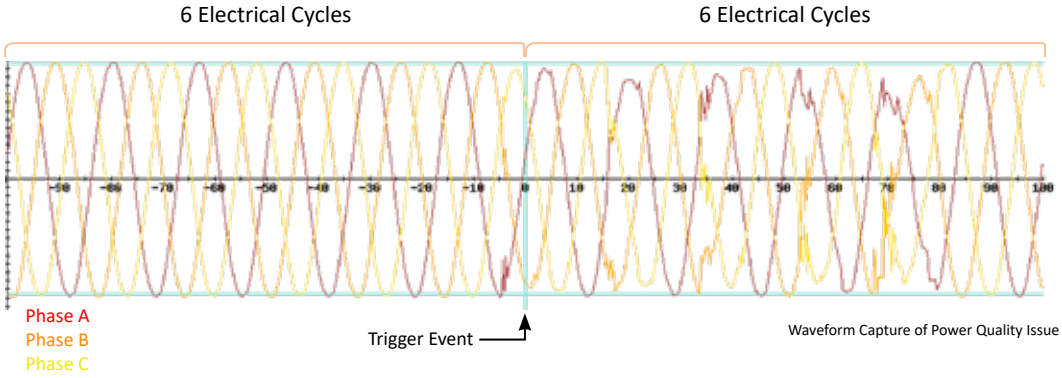
LZ DPQM

The Series 70 eRPP-FS is equipped with LayerZero DPQM (Distribution Power Quality Monitoring), an all encompassing monitoring system with local and remote communications options.

From basic monitoring & alarm reporting, to advanced power quality monitoring functionality, LayerZero DPQM provides a wide-range of options to help you be aware, be vigilant, be proactive in your quest to create a safe, stable and reliable operation.

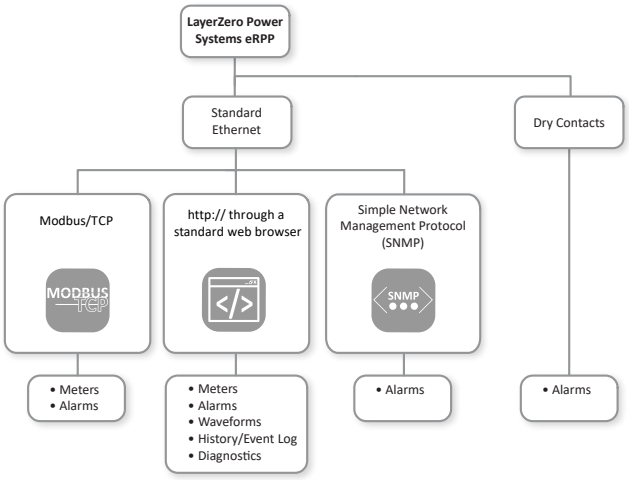
LayerZero DPQM Provides Answers

LayerZero 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 actively captures power quality information at the STS, PDU, and RPP - permitting thorough post-event analysis.



Open Connectivity with No Proprietary Protocols

Connect with existing Building Management Systems (BMS) with ease utilizing non-proprietary protocols, including Modbus/TCP, https, SNMP, and dry contacts.



Technical Specifications

LZ DPQM

LayerZero 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	24”W x 80”H x 24”D (610 mm x 2032 mm x 610 mm)	
Weight	500 lbs (227 kg)	
Enclosure Mounting	Free-Standing	
Frame Construction	Welded Frame	
Electrical Connections	Flexible Bus Bar, Silver-Plated Solid Busbar	
Color	Textured Powder Coat White (RAL 7035), Blue (RAL 5017), Black, Custom	
Seismic Floor Anchors	Optional	
Seismic Floor Stand	Optional	
Sectionalization	Engineered Composite Insulation, Dead Front Doors	
Circuit Breaker Identification	Labels Viewable Through Polycarbonate Window	
Electrical Characteristics		
Input Voltage	120/208 V, 3-phase, 4-wire + Ground; 208V, 3-phase, 3-wire + Ground; 220/280 V, 3-phase, 4-wire + Ground; 230/400 V, 3-phase, 4-wire + Ground; 240/415 V, 3-phase, 4-wire + Ground; 277/480 V, 3-phase, 4-wire; 480V, 3-phase, 3-wire + Ground	
Number of Output CBs	84-Circuit	
Configuration	1 Input, 2 Panels	2 Inputs, 2 Panels
	Parallel (P), Shared Parallel (SP)	Dedicated (D), Feed Through (FT)
Frequency	50 Hz, 60 Hz	
Poles	3-pole, 4-pole	
Input Feeder Termination	Single, Mechanical; Dual, Mechanical; Two-Hole, Compression	
Phases	3-Phase, 3-Wire (Input); 3-Phase, 4-Wire + Ground (Output)	
Neutral Rating	100%, 200%	
Circuit Breaker Mounting Type	Fixed, Plug-In	
Distribution	SafePanel® Distribution	
Power Quality Monitoring		
Power Quality Monitoring Technology	LayerZero 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 Top Only Access
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	
UL	ETL and cETL listed to UL 60950, UL 67
CSA	CSA C22.2

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Learn more at www.LayerZero.com

LayerZero Power Systems, Inc.

LayerZero Power Systems, Inc.
1500 Danner Drive
Aurora, OH 44202 U.S.A.

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