LayerZero
Power Systems, Inc.

The Foundation Layer

zen DPQM

Distribution Power Quality Monitoring

Zen DPQM Provides Advanced Power Quality Monitoring Capabilities

Zen is being aware. Zen DPQM is being aware of all activity in your critical power distribution systems. It is an all encompassing monitoring system with local and remote communications options. From basic monitoring & alarm reporting, to advanced power quality monitoring functionality, Zen 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.

Zen Maximizes Infrastructure Awareness

Zen DPQM continuously captures critical voltage and current data and makes this information readily accessible in the form of meters, waveforms, warnings, and alarms. With Zen DPQM, you see and gain an understanding as to what quality power looks like, helping you identify potential issues before they disrupt critical operations. In addition, Zen DPQM permits users with the capability to go back in time to retrace the exact sequence of historical events. No other tool in the mission-critical industry empowers users with this robust capability.

An Optional 10.4" Color Touch Screen Permits Local Viewing Capabilities

Zen DPQM Provides Answers

Zen DPQM provides timestamped pictures of waveforms before and after events, providing information that enables facilities to methodically identify and correct the root causes of power quality events. As electrons flowing through conductors have no memory, without a mechanism for capturing power quality data in real-time, this information is all too often lost.

Waveform captures of voltage and current for every pole of every circuit breaker are stored immediately before and after an event. Critical information is stored in battery backed non-volatile memory. The data is preserved in the event of a power loss.


An LCD Membrane Panel is Standard, Color Touch Screen Optional.

Zen DPQM Monitors Every Pole of Every Breaker

LayerZero's Zen DPQM System is based on a Panel Board Monitor (PBM) with modular expansion boards. Branch circuit monitoring is available from one to six 42-circuit panel boards. Sub-feed circuit monitor is available for up to (14) 3-pole sub-feed circuit breakers, 100AF - 800AF.

Features include Ethernet connectivity, Bluetooth, a display port, summary alarm dry contacts, up to 4 control power inputs for redundancy, and battery-backed non-volatile data storage memory.

CTs Mounted on a 42-Circuit SafePanel™ Panel Board
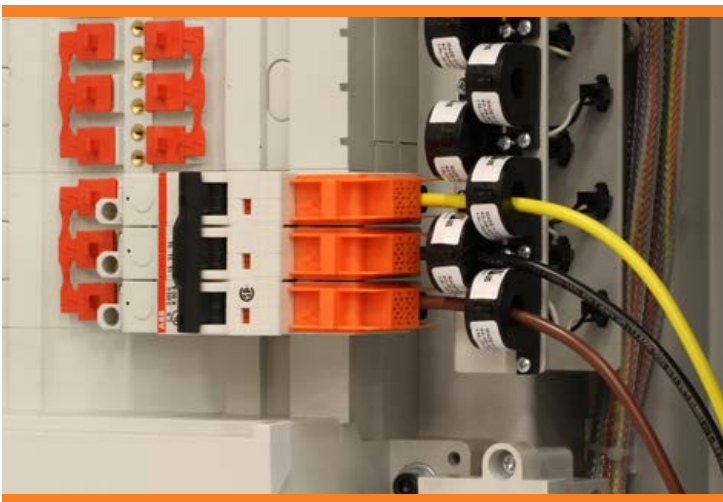
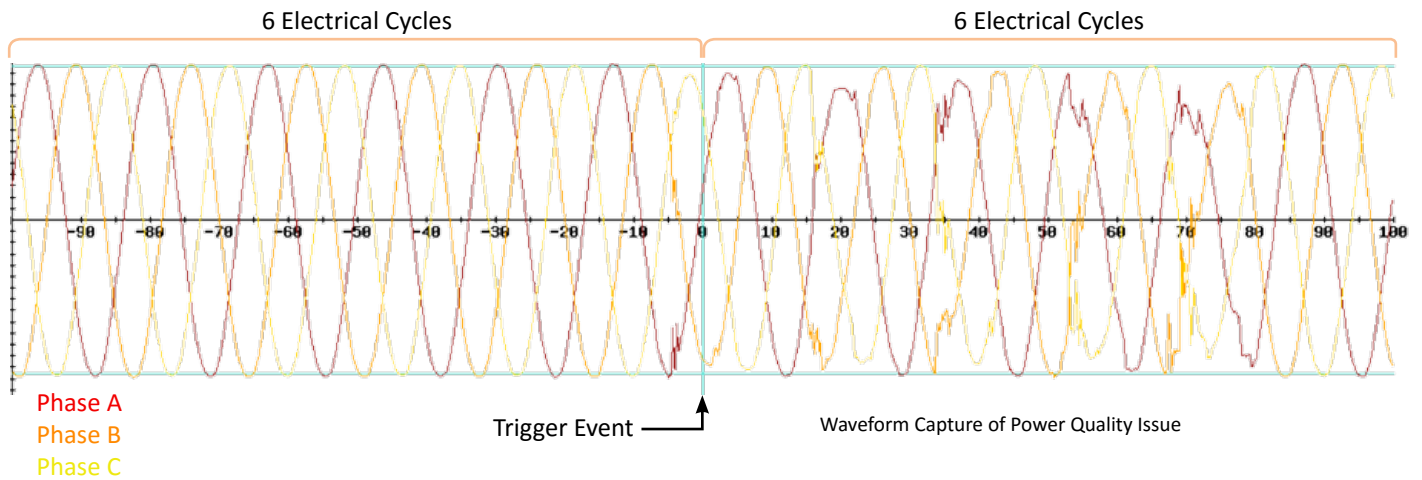Wiring Installed Through CTs on 42-Circuit SafePanel™

Zen DPQM Technical Specifications		
Voltage Monitor	**Mains**	**Subfeed or Branch Circuits**
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.

* N Applies to 4-Wire Power Systems

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Waveform Capture for Root Cause Analysis of Past Events

Zen DPQM captures waveforms of voltage and current of all phases six cycles before and after events. Events include bus voltage anomalies, instantaneous bus overcurrent, and single sub-feed circuit overcurrent.

6 Electrical Cycles   6 Electrical Cycles

Phase A
Phase B
Phase C

Trigger Event ————   Waveform Capture of Power Quality Issue

Zen DPQM Enables Auditing Even If Power Is Lost

LayerZero's PBM Monitor provides a waveform capture (WFC) before and after an event. A battery located on the printed circuit board retains the data in the RAM if power to the PCB is lost.

If an incident occurs, PBM Monitor captures all the data you need to determine the root cause:

• Zen DPQM synchronizes its clock with an external reference via the network

• A WFC of voltage & current is captured before, during, and after the event

• WFC at PDU inputs & outputs, at RPP inputs, and at each branch CB output

• Waveforms can be analyzed to determine the root cause of events

Zen DPQM Panel Board Monitor in ePanel-1

Zen DPQM Simplifies Panel Board Management with Bluetooth Connectivity

Zen DPQM helps you simplify operations, management of databases, and consistency of information with Bluetooth connectivity which can be activated from the front panel. Zen DPQM connects via a Bluetooth-enabled computer over a normal web-browser interface to input Circuit ID, Circuit Parameters, and Circuit Set Points. The Zen DPQM circuit monitor becomes the central database of accurate, up-to-date information.

Zen DPQM Data Can Be Accessed With a Standard Web Browser

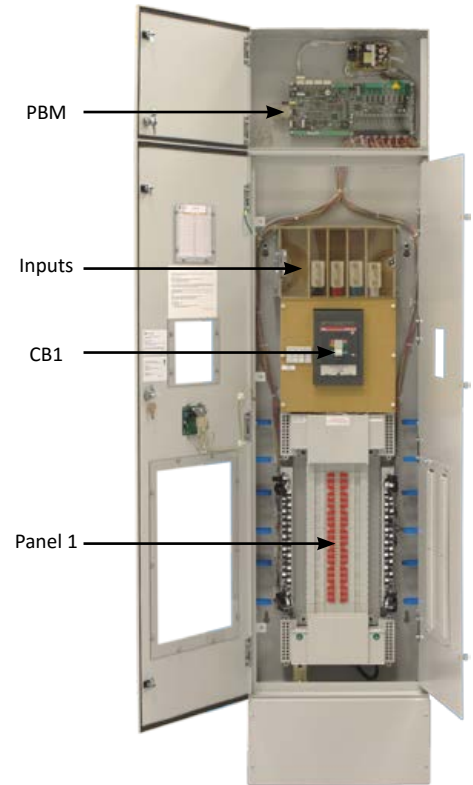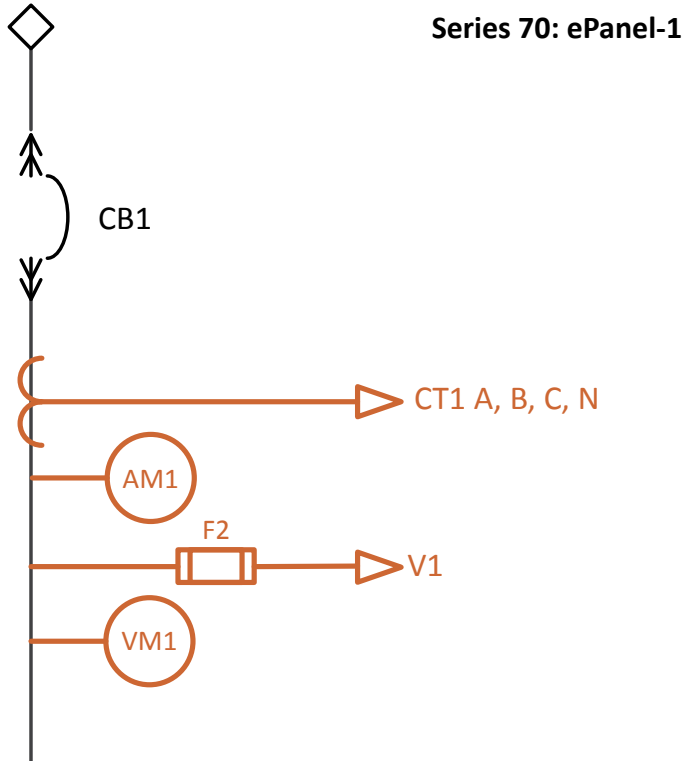Remote Connectivity via http, Bluetooth, SNMP, and Modbus/TCP

Zen DPQM is Available on ePanel, eRPP, eRDP, and ePODs: Type-X Products

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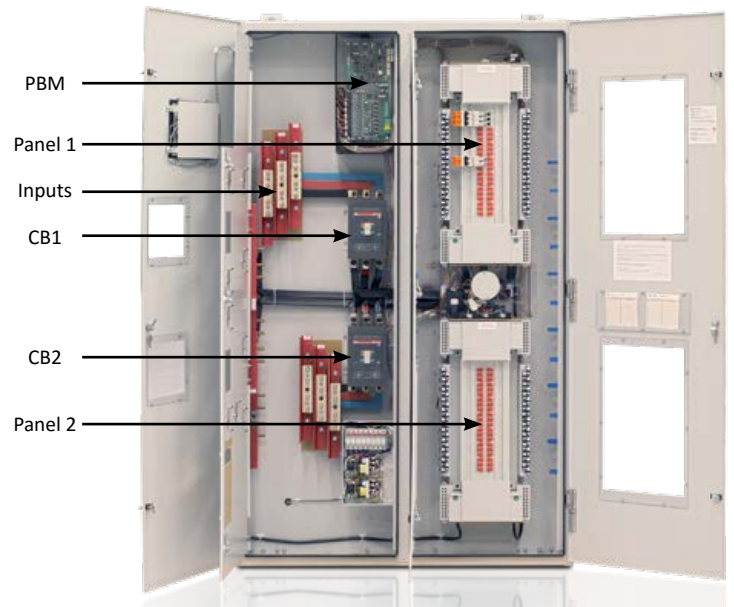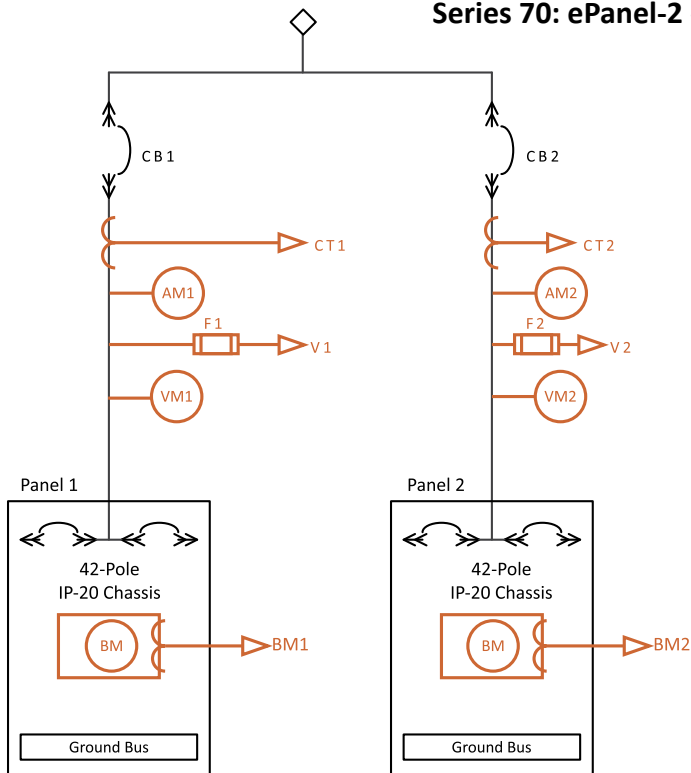# Zen DPQM Panel Board Monitor PCB Offers Many Connectivity Options

The Zen DPQM Panel Board Monitor printed circuit board is designed specifically for power quality monitoring. Zen DPQM provides voltage & current inputs, communications ports, Bluetooth connectivity, a built-in backup battery, and diagnostic LEDs. Zen DPQM Panel Board Monitor is expandable via Expansion Boards, and with an Enclosure Management Board.
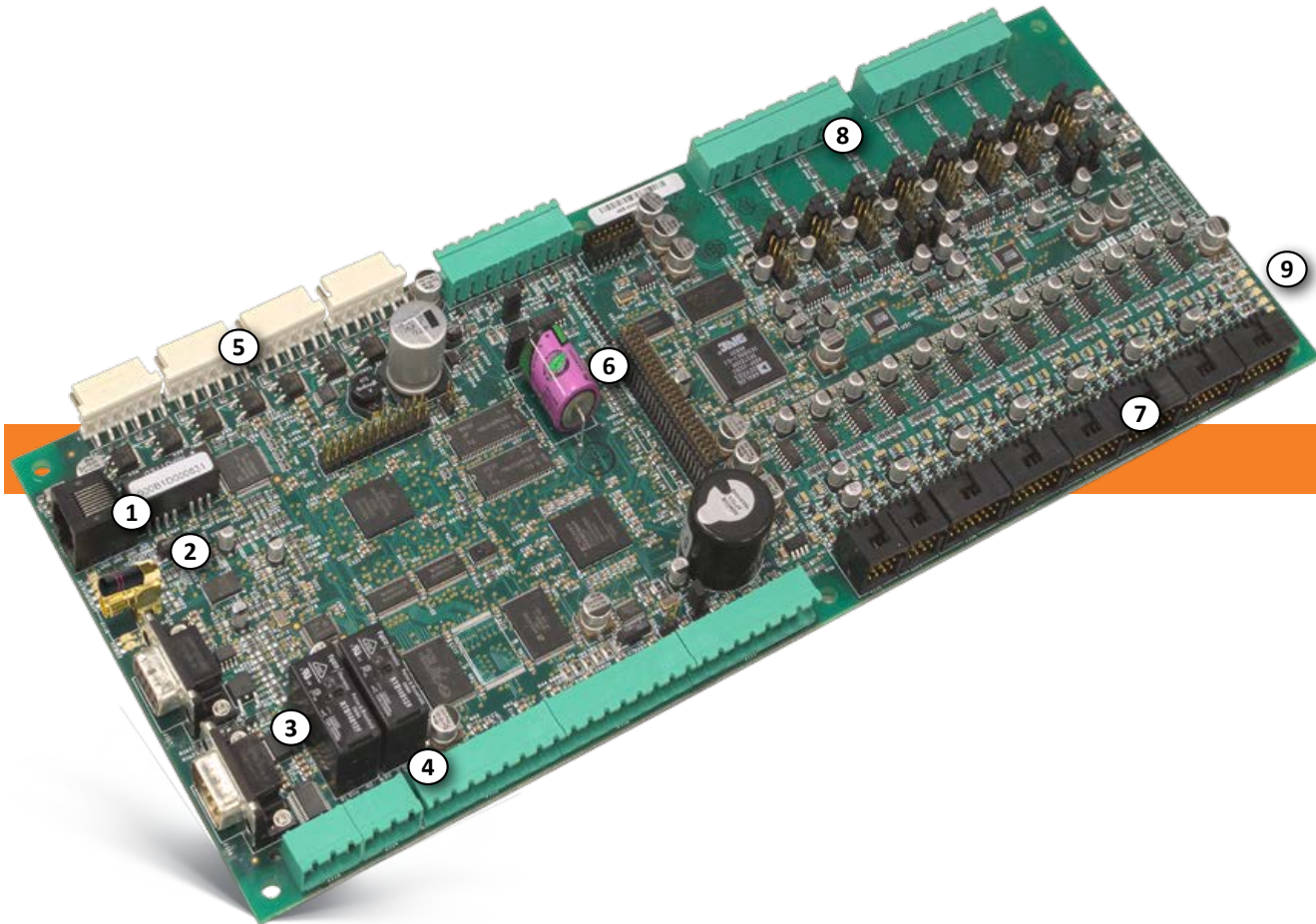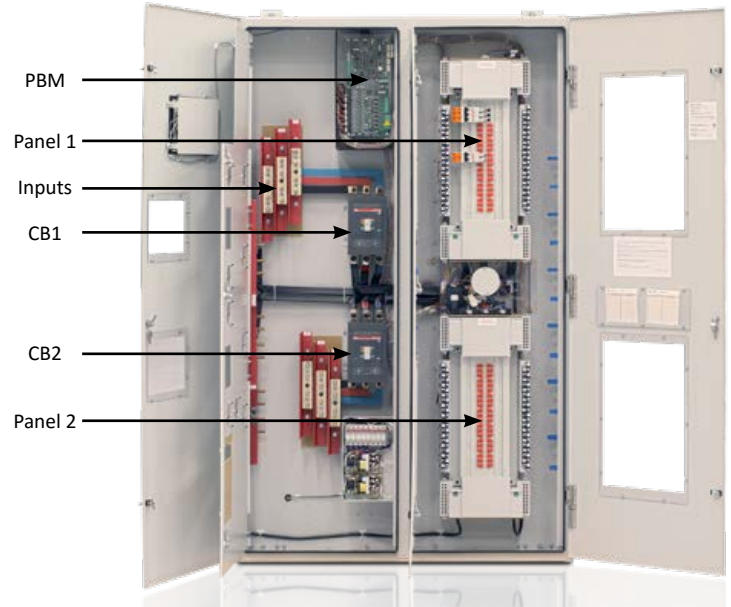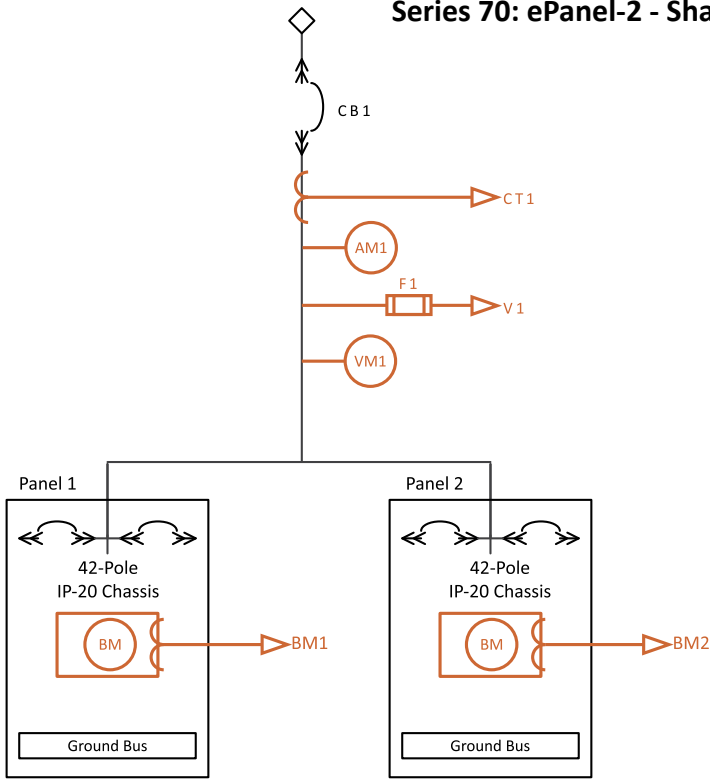

1. **CAT5 (Ethernet) Port:** Connects to LAN Networks for Real-Time Power Monitoring

2. **Bluetooth Antenna:** Allows Users to Wirelessly Set up Circuit Names and Assign Setpoints

3. **Service Port:** Serial Connection for LZPS Customer Service Engineers

4. **Summary Alarm Dry Contacts:** Permits Connectivity for Dry Contacts Alarms

5. **Redundant Control Power Inputs:** Permits (4) Multiple Power Sources where Redundancy is Appropriate

6. **Battery Backup for Data Storage:** Saves Information in Non-Volatile Memory

7. **Current Sense Inputs:** Captures Current Data

8. **Voltage Sense Inputs:** Captures Voltage Data

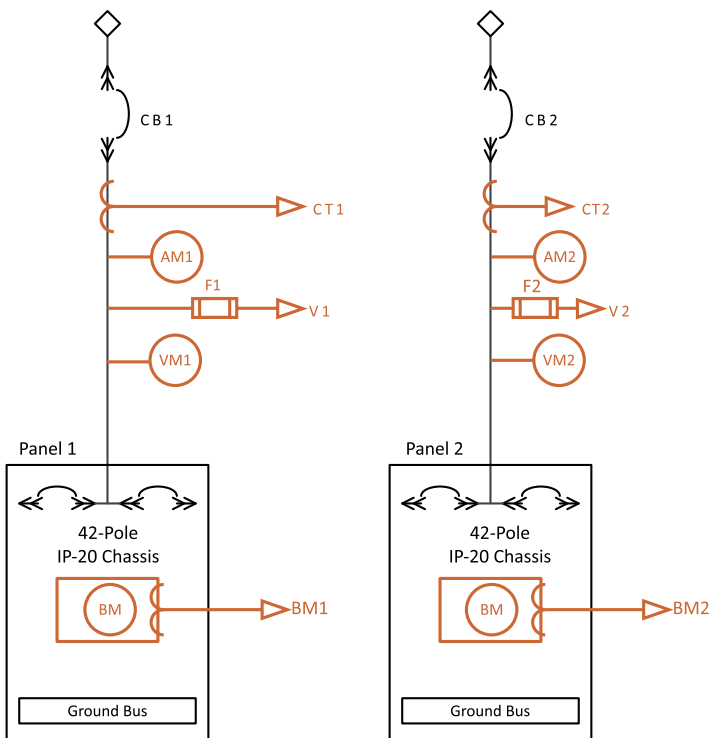9. **Diagnostic LEDs:** Provides Diagnostic Capabilities

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Series 70: ePanel-1

- PBM
- Inputs
- CB1
- Panel 1

CB1

CT1 A, B, C, N

AM1

F2

V1

VM1

Series 70: ePanel-2 - Parallel Configuration

- PBM
- Panel 1
- Inputs
- CB1
- CB2
- Panel 2

C B 1

C T 1

AM1

F 1

V 1

VM1

Panel 1

42-Pole
IP-20 Chassis

BM

BM1

Ground Bus

C B 2

C T 2

AM2

F 2

V 2

VM2

Panel 2

42-Pole
IP-20 Chassis

BM

BM2

Ground Bus

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Series 70: ePanel-2 - Shared Parallel Configuration

CB1

CT1

AM1

F1

V1

VM1

Panel 1

42-Pole
IP-20 Chassis

BM

BM1

Ground Bus

Panel 2

42-Pole
IP-20 Chassis

BM

BM2

Ground Bus

PBM

Panel 1

Inputs

CB1

CB2

Panel 2

Series 70: ePanel-2 - Dedicated Configuration

CB1

CT1

AM1

F1

V1

VM1

Panel 1

42-Pole
IP-20 Chassis

BM

BM1

Ground Bus

CB2

CT2

AM2

F2

V2

VM2

Panel 2

42-Pole
IP-20 Chassis

BM

BM2

Ground Bus
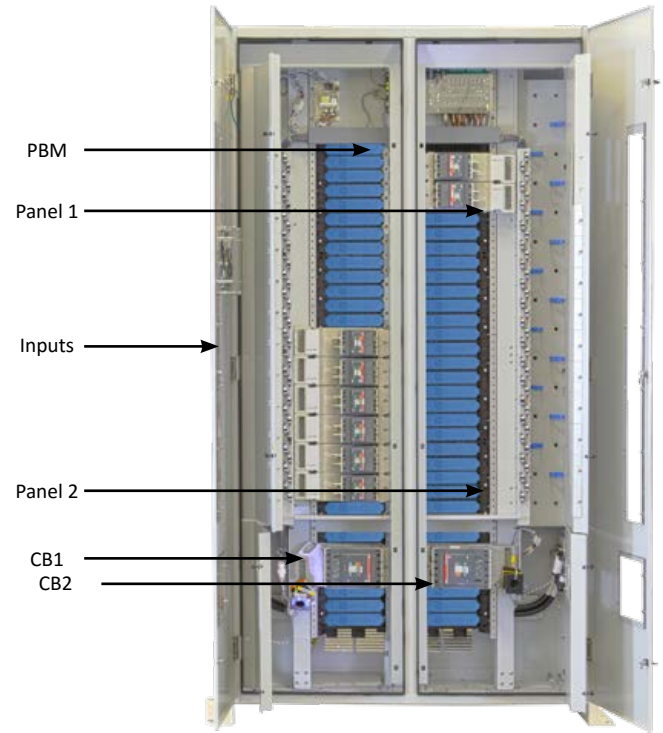
Series 70: ePanel-2 - Feed Through Configuration

CB1

CB2

CT1

AM1

F1

V1

VM1

Panel 1

42-Pole
IP-20 Chassis

BM

BM1

Ground Bus

Panel 2

42-Pole
IP-20 Chassis

BM

BM2

Ground Bus

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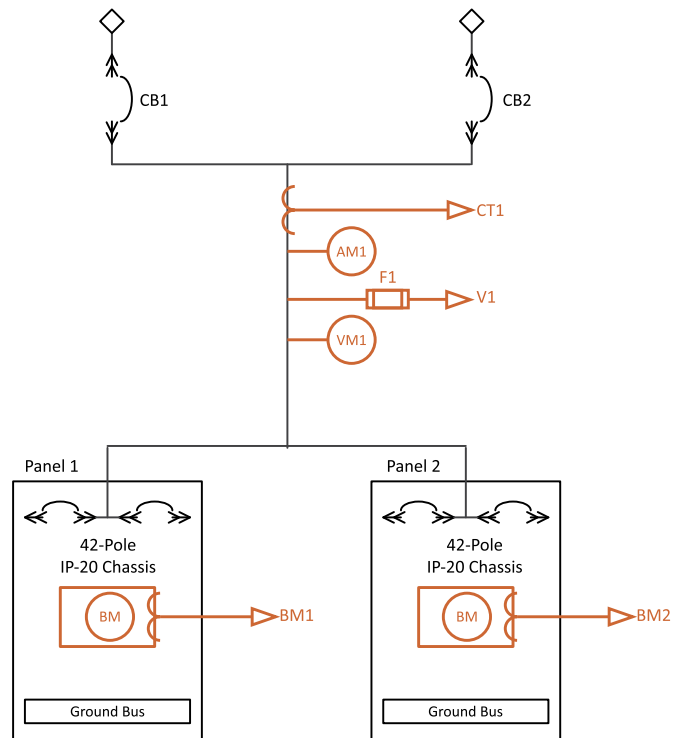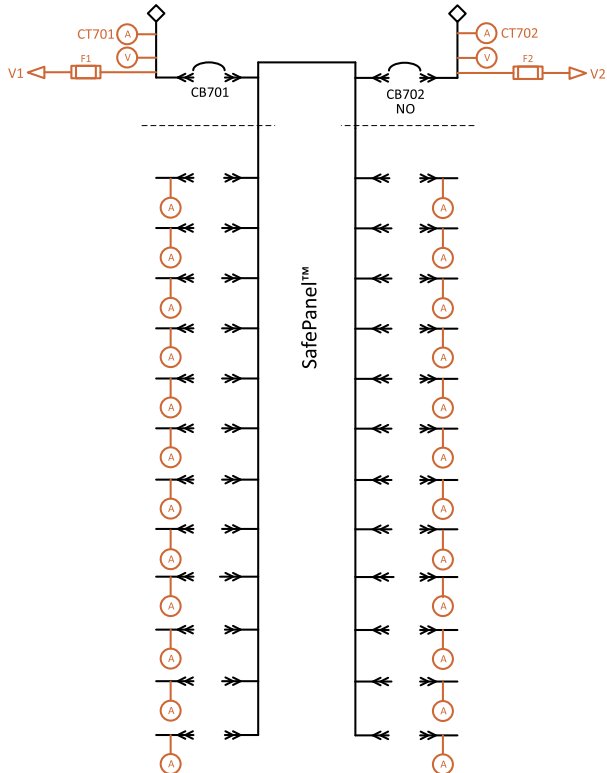
Series 70: ePanel-HD - Shared Parallel Configuration

CT701
V1
F1
CB701
SafePanel™

PBM
Panel 1
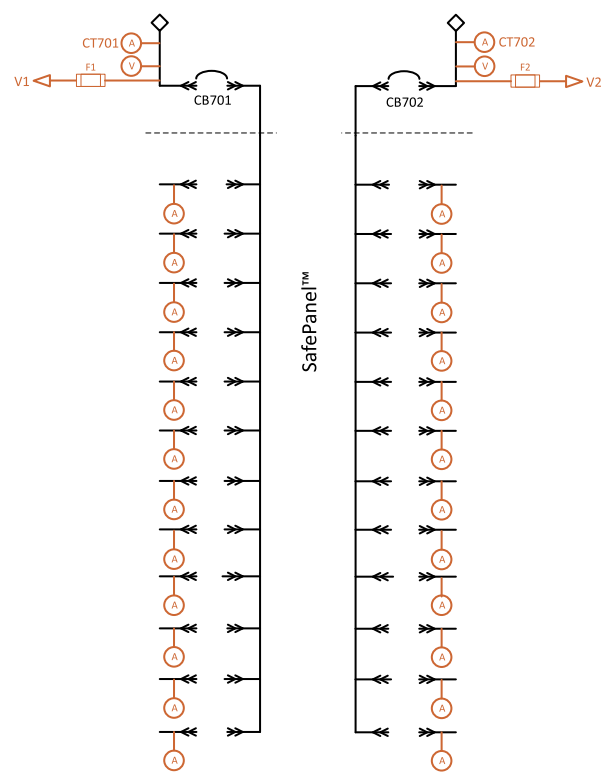Inputs
Panel 2
CB1
CB2
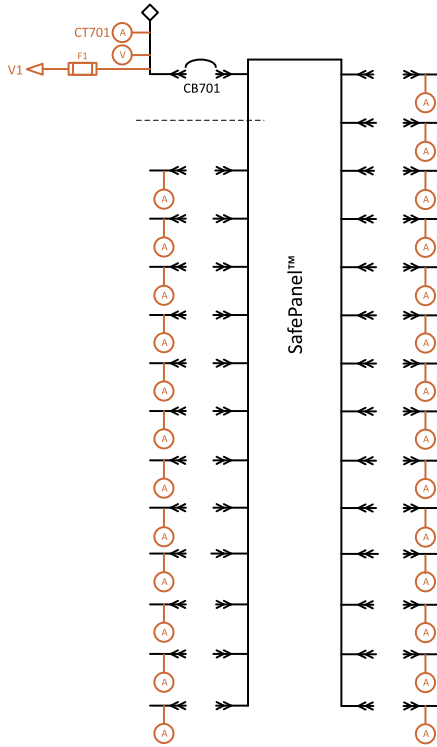
Series 70: ePanel-HD - Feed Through Configuration

CT701
V1
F1
CB701
SafePanel™
CB702
NO
F2
V2
CT702

Series 70: ePanel-HD - Dedicated Configuration

CT701
V1
F1
CB701
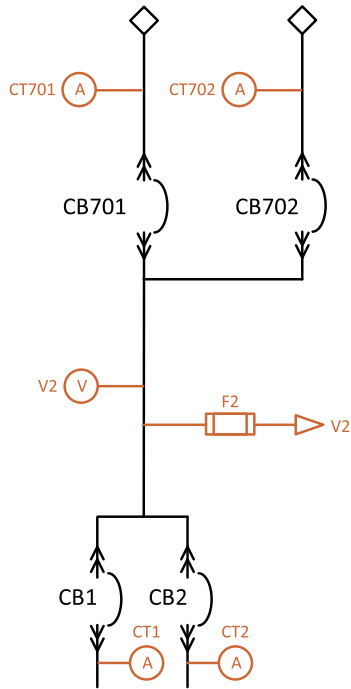SafePanel™
CB702
F2
V2
CT702

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Series 70: eRDP

Series 70: eRDP-FS

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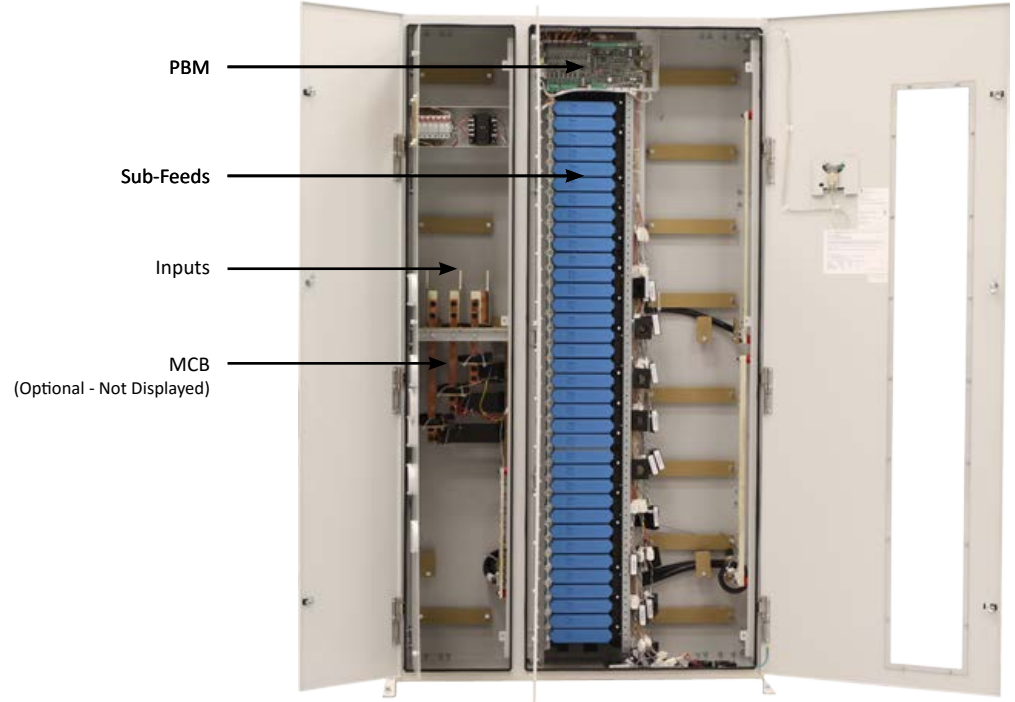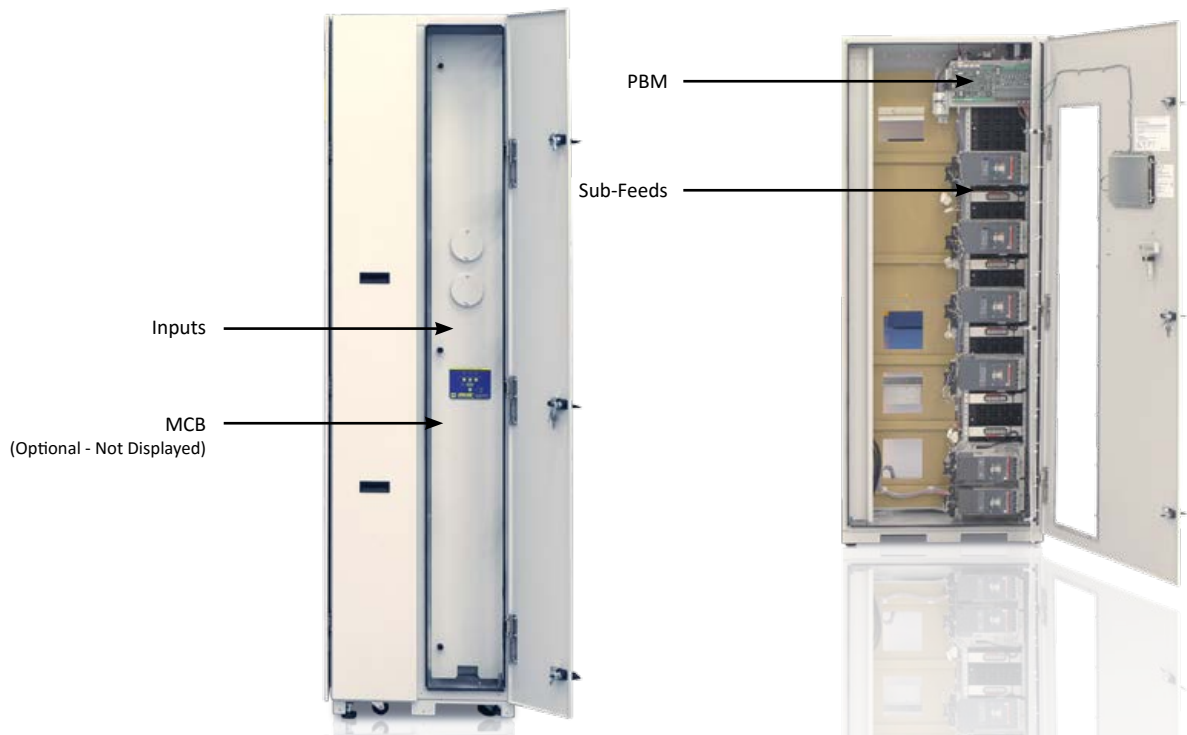
Series 70: eRPP - 1 Input 2 Panel Parallel Configuration

Inputs
PBM
CB1
CB2
Panel 1
Panel 2

CT1A,B,C,G
AM1
CB1
F1
V1
VM1
PANEL 1
42-Pole
IP-20 Chassis
BM
BM1
Neutral Bus
Ground Bus

CT2A,B,C,G
AM2
CB2
F2
V2
VM2
PANEL 2
42-Pole
IP-20 Chassis
BM
BM2
Neutral Bus
Ground Bus
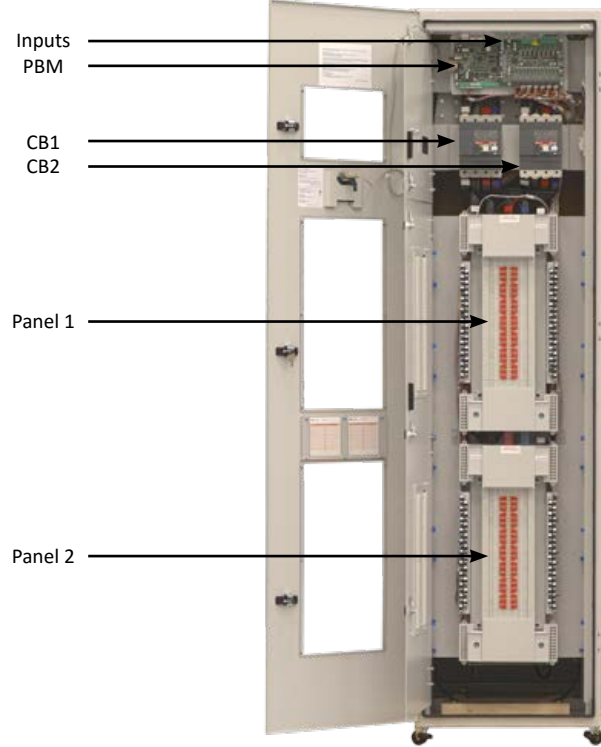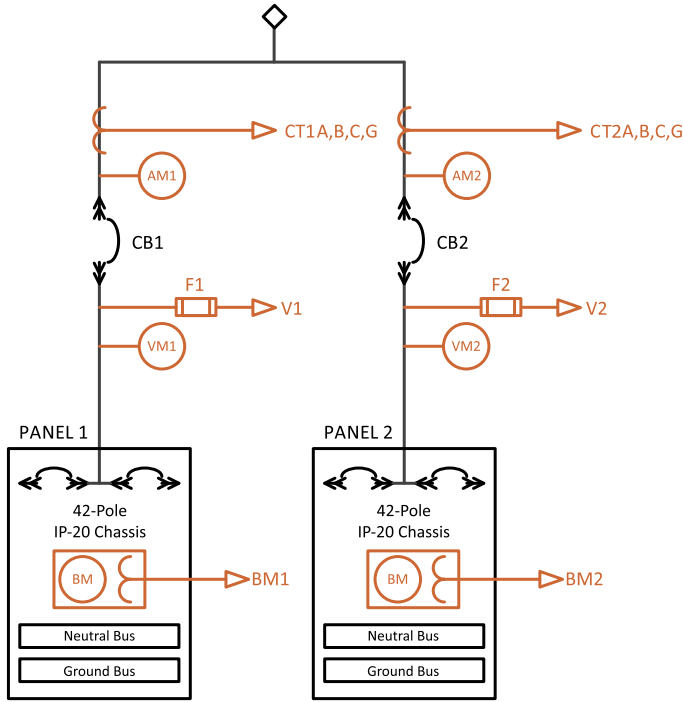
Series 70: eRPP - 1 Input 4 Panel Parallel Configuration

CT1A,B,C,G   CT2A,B,C,G   CT3A,B,C,G   CT4A,B,C,G
AM1   AM2   AM3   AM4
CB1   CB2   CB3   CB4
F1   V1   F2   V2   F3   V3   F4   V4
VM1   VM2   VM3   VM4
PANEL 1   PANEL 2   PANEL 3   PANEL 4
42-POLE   42-POLE   42-POLE   42-POLE
IP-20 CHASSIS IP-20 CHASSIS IP-20 CHASSIS IP-20 CHASSIS
BM   BM1   BM   BM2   BM   BM3   BM   BM4
NEUT BUS   NEUT BUS   NEUT BUS   NEUT BUS
GROUND BUS   GROUND BUS   GROUND BUS   GROUND BUS
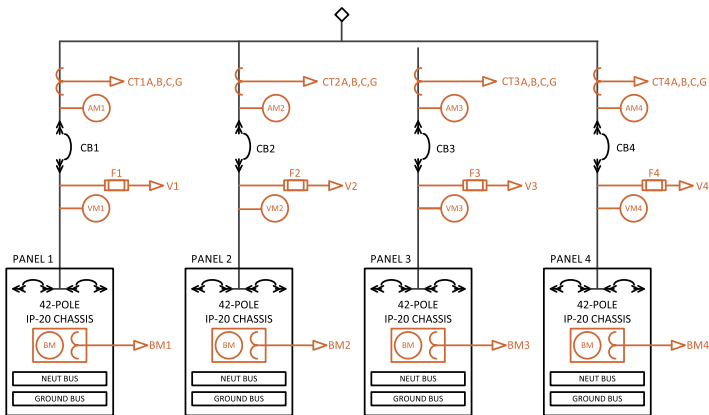
Series 70: eRPP - 1 Input 2 Panel Dedicated Configuration

CT1A,B,C,G
AM1
CB1
F1
V1
VM1
PANEL 1
42-POLE
IP-20 CHASSIS
BM
BM1
NEUT BUS
GROUND BUS

CT2A,B,C,G
AM2
CB2
F2
V2
VM2
PANEL 2
42-POLE
IP-20 CHASSIS
BM
BM2
NEUT BUS
GROUND BUS

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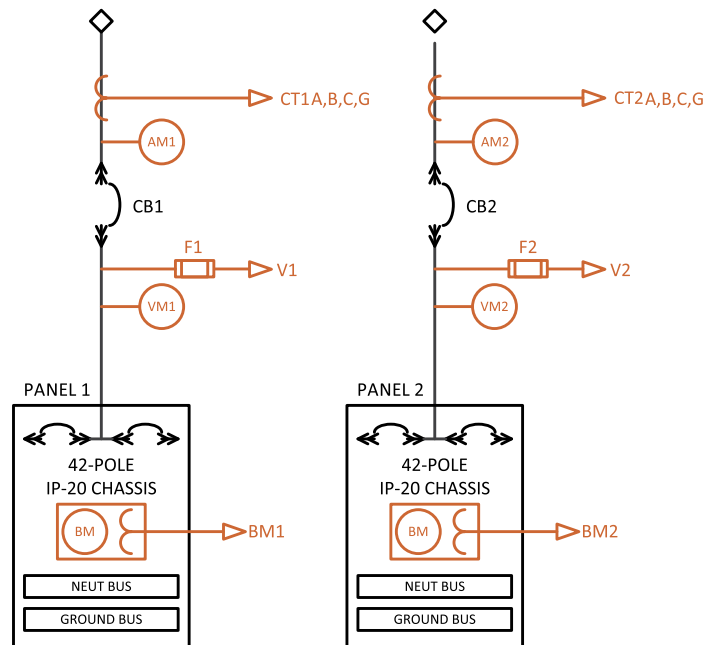
Series 70: eRPP - 2 Input 2 Panel Feed-Through Configuration

CB1

CB2
BASE
ONLY

CT1A,B,C,G

AM1

F1

V1

VM1

PANEL 1

42-POLE
IP-20 CHASSIS

BM

BM1

NEUT BUS

GROUND BUS

PANEL 2

42-POLE
IP-20 CHASSIS

BM

BM2

NEUT BUS

GROUND BUS
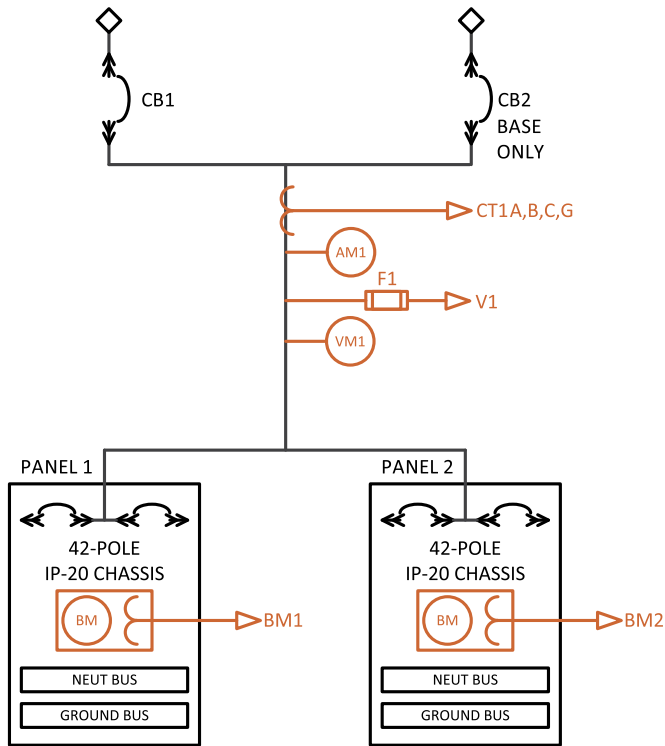
Series 70: eRPP - 4 Input 4 Panel Dedicated Configuration

CT1A,B,C,G   CT2A,B,C,G   CT3A,B,C,G   CT4A,B,C,G

AM1   AM2   AM3   AM4

CB1   CB2   CB3   CB4

F1   F2   F3   F4

V1   V2   V3   V4

VM1   VM2   VM3   VM4

PANEL 1   PANEL 2   PANEL 3   PANEL 4

42-POLE   42-POLE   42-POLE   42-POLE
IP-20 CHASSIS   IP-20 CHASSIS   IP-20 CHASSIS   IP-20 CHASSIS

BM BM1   BM BM2   BM BM3   BM BM4

NEUT BUS   NEUT BUS   NEUT BUS   NEUT BUS

GROUND BUS   GROUND BUS   GROUND BUS   GROUND BUS
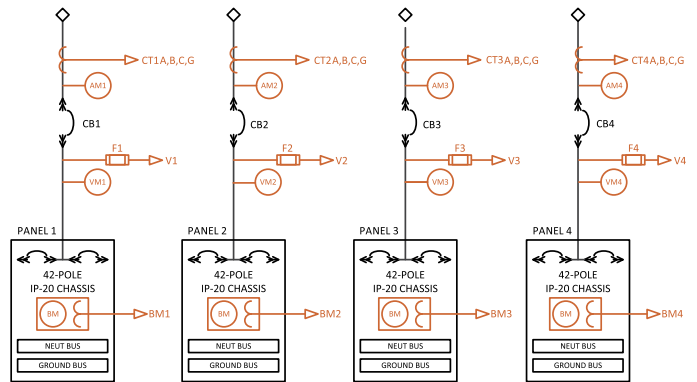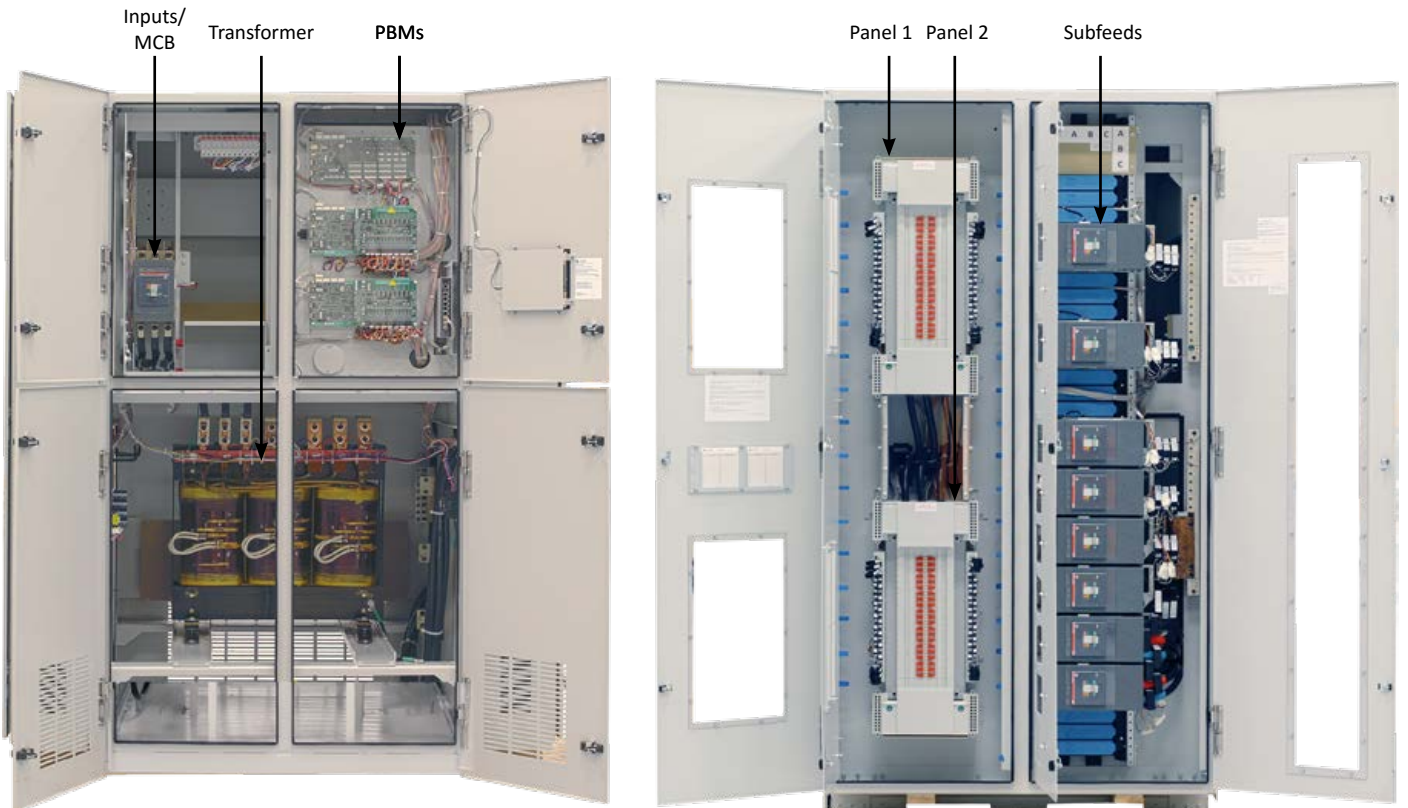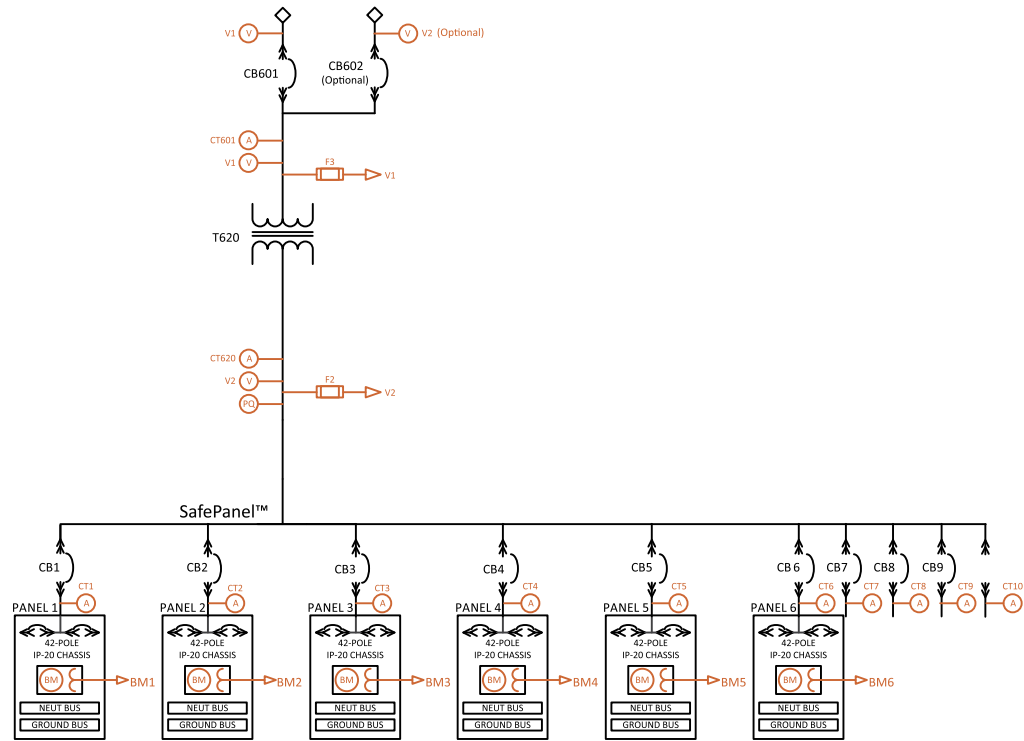
Series 70: eRPP - 4 Input 4 Panel Feed-Through Configuration

Series 70: eRPP - 2 Input 2 Panel Main-Tie-Main Configuration

Series 70: eRPP - 4 Input 4 Panel Main-Tie-Main Configuration

CB1   CB2
BASE
ONLY

CB3   CB4
BASE
ONLY

CT1A,B,C,G   CT2A,B,C,G

AM1   AM2

F1   F2

V1   V2

VM1   VM2

PANEL 1   PANEL 2   PANEL 3   PANEL 4

42-POLE   42-POLE   42-POLE   42-POLE
IP-20 CHASSIS   IP-20 CHASSIS   IP-20 CHASSIS   IP-20 CHASSIS

BM BM1   BM BM2   BM BM3   BM BM4

NEUT BUS   NEUT BUS   NEUT BUS   NEUT BUS

GROUND BUS   GROUND BUS   GROUND BUS   GROUND BUS
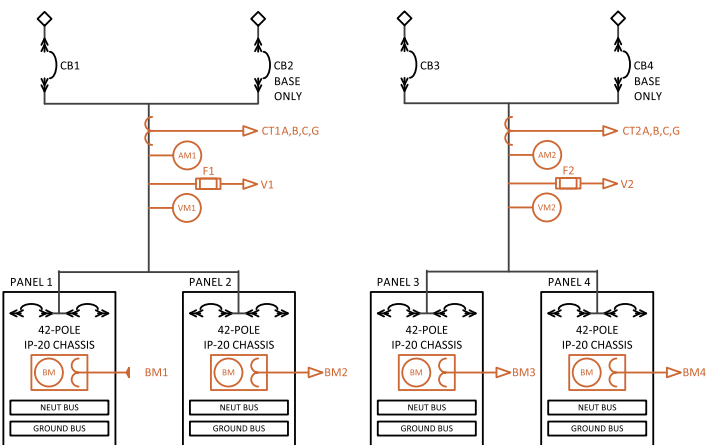
eRPP MTM One-Lines
Currently Unavailable

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Series 70 ePODs: Type-X - Subfeed/Panel Board Configuration

Inputs/MCB   Transformer   **PBMs**   Panel 1   Panel 2   Subfeeds

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Zen produces real-time waveform captures for every pole of every breaker.

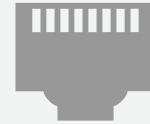Zen synchronizes its clock with an external reference via the network

Zen allows you to pinpoint the exact moment that power quality events happen.

Zen display provides local viewing of all parameters via touch screen display.

Zen equips you with the ability to view meters and waveforms remotely.

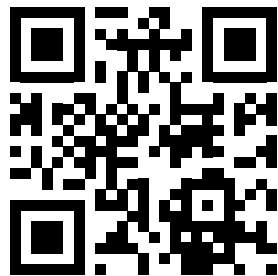Zen connects to the network with an Ethernet connection.

MODBUS TCP

Zen supports Modbus/TCP for open connectivity.

SNMP

Zen permits connectivity to SNMP for Remote Monitoring.

Bluetooth Connectivity enables panel designation at point-of-impact

Learn more at www.LayerZero.com

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