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Pow-R-Line 4F fusible panelboards

Contents

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Panelboards Overview

Choices to quickly change feeder breakers in electrical distribution equipment have evolved over the years. While using drawout switchgear with power air circuit breakers remains a highly reliable solution, requests for drawout molded case circuit breakers (MCCBs) have increased. And, customers need a wall-mounted panelboard solution with front-accessibility and front-connected equipment to meet space requirements and application needs.

Eaton's drawout MCCB Pow-R-Line® 4DX (PRL4DX) panelboard provides this solution.

This is the first design to offer two- and three-pole MCCBs in a mechanical drawout design. Breaker ratings from 20 A to 600 A use unique drawout cassettes. Breakers are inserted and removed via a mechanical removal system similar to other drawout designs associated with switchgear; however, these breakers are horizontally mounted in a traditional panelboard group-mounted manner.

Market and Segment Applications

While the drawout MCCB panelboard design may be substituted for nearly any traditional application with feeder MCCBs, it has been specifically designed to meet the needs of several industries, including:

- Electrical distribution systems where a changeout of circuit breakers is needed to upgrade equipment to a new process
- Data centers
- Industrial facilities to minimize downtime
- Institutions
- Laboratories
- Healthcare facilities
- Critical load applications

Standards and Certifications

- UL® 67 Listed for wall-mounted applications from 600 A to 1200 A
- National Electrical Code®

Available Ratings

The panelboards are rated at 240 Vac, 480 Vac and 600 Vac. Fault current is available up to 200 kAIC at 240 Vac, 100 kAIC at 480 Vac and 65 kAIC at 600 Vac. The short-circuit current rating of the panelboard is determined by the low short-circuit current rating of the lowest rated overcurrent device in the panelboard.

Boxes and trims are UL 50 Listed and labeled. Both the box and the trim are painted ANSI-61 light gray. Deadfront covers are also painted ANSI-61 light gray to match box and trim.

Drawout feeder MCCBs are available in two- and three-pole offerings from 20 A to 600 A. Main breakers above 600 A are fixed-mounted using a traditional bolt-on design. Main breakers 600 A and below are available with either the traditional fixed-mounted, bolt-on design or in a drawout cassette. For drawout mains or feeders above 600 A, please use Eaton's switchboard offering.

Panelboard Options

- Copper and silver-plated copper
- Copper lugs
- Density-rated bus
- Ground bars
- Customer-owned meters
- Service entrance equipment construction
- Surge protective devices
- Seismically qualified panelboards

General Construction Features

Eaton's assembled panelboards are designed for sequence phase connection of branch circuit devices. This allows complete flexibility of circuit arrangement (single-, two- or three-poles) to allow balance of the electrical load on each phase.

Sturdy, rigid chassis assembly ensures accurate alignment of interior with panel front; prevents flexing and minimizes possibility of loosening or damage to current carrying parts during and after installation.

Four point in-and-out adjustment of panel interior is provided to meet critical depth dimensions on flush installations. This compensates for possible misalignment of box at installation.

Main lugs are mechanical solderless type and approved for copper and aluminum conductors.

Enclosures

Boxes are code-gauge galvanized steel except for column type panelboards, which include a painted box finished in ANSI-61 light gray to match the trim. Standard panelboard cabinets are designed for indoor use. Alternate types are available for outdoor and special purpose applications.

All enclosures are furnished in accordance with UL standards and include wiring gutters with proper wire bending space. Special cabinets can be provided at an additional charge.

The box dimensions shown are inside dimensions. For outside dimensions, add 0.25-inch (6.4 mm).

Standard panelboard boxes are supplied without knockouts (blank endwalls).

EZ™ Trim

The EZ Box and EZTrim are provided standard for Pow-R-Line 1X and Pow-R-Line 2X lighting panelboards, as well as Pow-R-Line 3X and Pow-R-Line 3E mid-range panelboards.

EZ Trim Provides Standard Door-in-Door Construction With No Exposed Hardware or Sharp Ridges. No Tools are Required for Installation.

The trims for lighting and appliance branch circuit panelboards and small power distribution panelboards include a door with rounded corners and concealed hinges. A flush-type latch and lock assembly is included. All locks are keyed alike. These trims are available in both surface and flush mounted designs.

Fronts for power distribution panelboards use a unique breaker front cover design in which each device has a dedicated bolt-on steel cover. The individual covers form a single deadfront for the panelboard that is used in conjunction with two wiring gutter covers to complete the trim. A door is not finished as part of the standard offering on these panelboards but can be provided, for an additional charge, using a deeper than standard box.

Combination AFCI Circuit Breakers

Eaton's 125 Vac AFCI single- and two-pole, 15 A and 20 A bolt-on breakers in panelboards meet Article 210.12 of the NEC®. See the NEC for definitions and details.

Pow-R-Line 4F Power Panels

- Pow-R-Line 4F panelboard uses fusible switches
- A single chassis accommodates both circuit breakers and fusible switches
- Main and neutral are located at the same ends to provide additional space for branch devices
- Three-piece trim facilitates installation
- UL tested and approved. Meets NEC and NEMA standards

Application Considerations and Definitions

Standards

All Eaton's panelboards are designed to meet the following applicable industry standards, except where noted:

1. Underwriters Laboratories
   a. Panelboards: UL 67
   b. Cabinets, boxes and trims: UL 50

Note: Only panelboards containing UL listed devices can be UL labeled.

2. National Electrical Code
3. NEMA Standards: PB 1
4. Federal Specification W-P-115c
   Circuit breaker—Type I Class 1
   Fusible switch—Type II Class 1

Panelboard Selection Factors

In selecting a panelboard, the following factors must be considered:

a. Service (voltage and frequency).
b. Interrupting capacity (fully or series rated).
c. Ampere rating of main.
d. Ampere ratings of branches.
e. Installation environment.
f. Codes and standards mandates.

Panelboard Short-Circuit Rating

The short-circuit rating of Eaton's assembled panelboards are test verified by, and listed with, Underwriters Laboratories. Generally, these ratings are that of the lowest interrupting rated device in the panel.

Certain exceptions to this rule exist where branch devices have been UL tested in combination with specific main devices having a higher interrupting rating. Where these defined main breaker and branch breaker combinations are used, the **series short-circuit rating** of the assembled panelboard will be the same as the series tested rating of the approved rated main breaker.

These series ratings apply to panels having main devices, or main lug only panelboards fed remotely by the device listed in the series ratings chart as the main, for which UL listed tests were conducted.

Selective Coordination

Please refer to Molded Case Circuit Breakers Design Guides for detailed information on overcurrent protective device combinations for use on selectively coordinated systems.

Service Entrance Equipment

NEC Articles 230.F and G, and UL, require that:

a. Panels used as service entrance equipment must be located near the point where the supply conductors enter the building.
b. A panelboard having main lugs only shall have a maximum of six service disconnects to de-energize the entire panelboard from the supply conductors. Where more than six disconnects are required, a main service disconnect must be provided.
c. Must include connector for bonding and grounding neutral conductor.
d. A service-entrance-type UL label must be factory installed.
e. Ground fault protection of equipment shall be provided for solidly grounded wye electrical services of more than 150 V to ground, but not exceeding 600 V phase-to-phase for each service disconnecting means rated 1000 A or more.

Service entrance panels must be identified as such on the order entry to the manufacturing location.

Column Type Panelboards

The same general code restrictions apply as for standard width panels except where trough extensions are used.

Multi-Section Panelboards

When more than 42 overcurrent protective devices are required, two or more separate enclosures may be required. Separate fronts for each box are standard.

Interconnecting Multi-Section Panelboards

When a panelboard, for connection to one feeder, must be furnished in more than one section (box), each section must be furnished with main bus and terminals of the same rating, unless a main overcurrent device is provided in each section.

Sub-feed or through-feed provisions must also be added to provide connection capability to the second section.

Note: Sub-feed or through-feed lugs cannot be used on any panelboard that is not protected by a single main overcurrent device either in the panelboard or immediately upstream, i.e., service entrance panelboards with main lugs only using the six disconnect rule.

Sub-Feed Lugs (Figure 22.4-1)

Sub-feed lugs are one means of interconnecting multi-section panels. The sub-feed (second set of) lugs are mounted directly beside the main lugs. These are required in each section except the last panel in the lineup. The feeder cables are brought into the wiring gutter of the first section and connected to the main lugs. Another set of the same size cables are connected to the sub-feed lugs (Section 1) and are carried over to the main lugs of the adjacent panel. Cross connection cables are not furnished by Eaton. Sub-feed lugs are only available on main lug only panels.

Note: Sub-feed lugs may not be used on main lug only (six disconnect rule) service entrance panels.

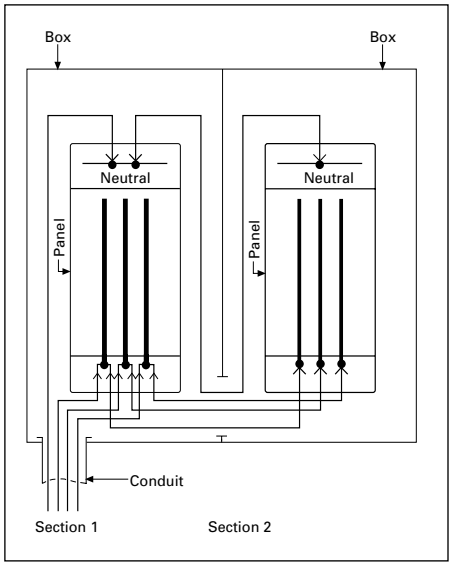


Figure 22.4-1. Sub-Feed Lugs

Through-Feed Lugs (Figure 22.4-2)

Through-feed lugs are another method to interconnect multi-section panelboards. The incoming feeder cables are connected to the main lugs or main breaker at the bottom of panel (Section 1). Another set of lugs (through-feed) are located at the opposite end of the main bus. The interconnecting cables are connected to the through-feed lugs in Section 1 and are carried over to the main lugs in Section 2. The connection arrangement could be reversed, i.e., main lugs at top; through-feed lugs at bottom end of panel. Cross cables are not furnished by Eaton.

Note: Through-feed lugs may not be used on main lug only (six disconnect rule) service entrance panels.

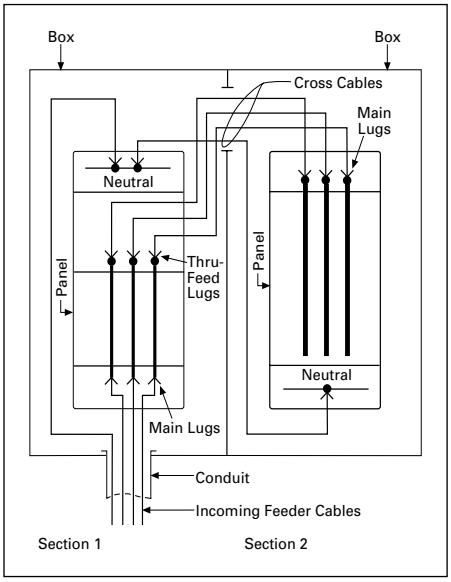


Figure 22.4-2. Through-Feed Lugs

Multiple Section Panelboard—Flush Mounted

Shown below is the standard method for flush mounting multiple section lighting and distribution panelboards using standard flush trims.

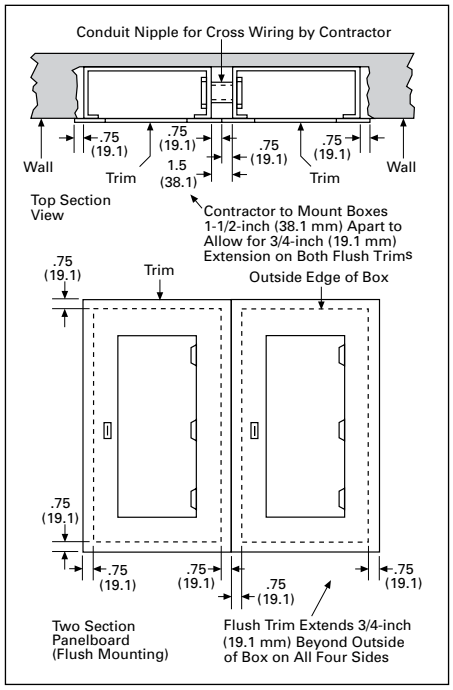


Figure 22.4-3. Multiple Section Panelboard—Flush Mounted—Dimensions in Inches (mm)

Branch Circuit Loading for Lighting Panels

The size of mains and branches should be selected based on the following:

a. Lighting circuits: NEC Article 210, 215, 220 and 240.
b. Distribution circuits, actual or continuous loads: NEC Article 384.16.
c. Motor circuits: NEC Article 430.
d. Diversity factor.
e. Provision for future loading.

Overcurrent Protection

National Electrical Code Article 408 states a panelboard shall be protected by an overcurrent protective device having a rating not greater than that of the panelboard. The overcurrent protective device shall be located within or at any point on the supply side of the panelboard.

Exceptions to Article 408 selectively apply. Refer to the National Electrical Code Article 408 for specifics.

Ground Fault Protection

Ground fault protection (GFP) may be added to most panelboards using Eaton's integral molded case circuit breaker GFP and included feeder devices on power panelboards and mains on all panelboards.

Arcflash Reduction Maintenance System™

Eaton's Arcflash Reduction Maintenance System is available on many molded case circuit breakers from 70 A to air power circuit breakers at 5000 A. Recognized by the 2011 National Electrical Code and the National Electrical Safety Code (NFPA 70E), the Arcflash Reduction Maintenance System allows breakers to trip quickly thus significantly reducing the available arc flash potential.

Ambient Temperatures

The primary function of an overcurrent device is to protect the conductor and its insulation against overheating. In selecting the size of the devices and conductors, consideration should be given to the ambient temperature surrounding the conductors within and external to the panelboard. Cumulative heating within the panelboard may cause premature operation of the overcurrent protective devices.

UL test procedures are based, in part, on 80% loading of panelboard branch circuit devices. Article 408 of the NEC limits the loading of overcurrent devices in panelboards to 80% of rating where in normal operation the load will continue for three hours or more.

Further derating may be required, depending on such factors as ambient temperature, duty cycle, frequency or altitude.

Exception: There is one exception to this rule in both UL and NEC. It applies to assemblies and overcurrent devices that have been approved for continuous duty at 100% of its rating. This exception is covered in NEC 210.20 (a). Also see Molded Case Circuit Breakers Design Guides for additional information.

Special Conditions

Standard panelboards, assembled with standard components, are adequate for most applications. However, special consideration should be given to those required for application under special conditions such as:

a. Excessive vibration or shock.
b. Frequencies above 60 cycles.
c. Altitudes above 6600 ft (2012 m).
d. Damp environment (possible fungus growth).
e. Compliance with federal, state and municipal electrical codes and standards.

Seismic Qualification

Refer to Power Distribution Systems Design Guides for information on seismic qualification for this and other Eaton products.

Harmonic Currents

Standard panelboard neutrals are rated for 100% of the panelboard current. However, because harmonic currents can cause overheated neutrals, an option is provided for neutrals to be rated at 200% (1200 A maximum neutral for 600 A main bus) of the panelboard phase current. Panelboards with the 200% rated neutral are UL listed as suitable for use with nonlinear loads.

Prior to specifying the 200% rated neutral, Eaton recommends a harmonic survey be conducted of the distribution system, be it new or existing.

Surge Protective Devices (SPD)

The quality of power feeding sensitive electronic loads is critical to the reliable operation of any facility. In modern offices, hospitals and manufacturing facilities, the most frequent causes of microprocessor-based equipment downtime and damage are voltage transients and electrical noise.

Electrical loads and microprocessor-based equipment are highly susceptible to both high and low energy transients. High energy transients include lightning induced surges and power company switching. These high energy transients can destroy components instantly.

More frequently the electrical system experiences low energy transients and high frequency noise.

The effects of continual low energy transients and high frequency noise can cause erratic equipment performance or sudden failure of electronic circuit board components.

Eaton can provide protective and diagnostic systems integral to panelboards. The SPD is integrated into the panelboards using a "zero lead length" direct bus bar connection. Integral disconnect is used on all Pow-R-Line 4 panels.

Eaton SPDs May be Integrated into Most Panelboards

The SPD protects sensitive electronic equipment from the damaging effects of high and low energy transients.

For complete product description and available ratings, refer to Surge Protection (SPD) & Power Conditioning Products Design Guides.

Compact Panelboard Meter

Most Eaton panelboards can integrate a compact meter for reading the panelboard power and energy usage. Eaton's Power Xpert Meter 350 has ANSI 12.20 0.5% accuracy, a bright backlit LCD display, real energy pulse output, phase loss alarm and optional RS-485 communication capability.

Product Overview

PRL4F Fusible Panelboard

General Description

Panelboard Ratings

Voltage

- 240 V, 480 V or 600 Vac maximum
- 600 Vdc maximum

Main Lugs

- 250–1200 A

Main Breakers

- 250–1200 A

Main Switches

- 200–1200 A

Branches

- Fusible switches 30–1200 A, bolt-on

Short-Circuit Current Ratings (Symmetrical)

- 240 Vac: 10–200 kA fully rated
- 240 Vac: 22–200 kA series rated
- 480 Vac: 14–200 kA fully rated
- 480 Vac: 22–150 kA series rated
- 250 Vdc: 10–22 kA fully rated

Service

- Three-phase, four-wire 208Y/120 V, 240/120 V delta and 480Y/277 V
- Single-phase, three-wire 120/240 V
- Single-phase, two-wire 120 V
- Three-phase, three-wire 120, 240, 480 and 600 V
- Two-wire 125 Vdc
- Two-wire 250 Vdc
- Two-wire 600 Vdc

Suitable for service entrance applications when specified.

Bussing

250–1200 A tin-plated aluminum is standard; copper is available as an option. Density rated bus is also available as an option.

Main Lugs Only

The short-circuit rating of the MLO assembled panelboard will be fully rated based upon the lowest rated branch device or may be series rated with an approved upstream device.

Main lugs only ampere ratings: 250, 400, 600, 800 and 1200.

Terminal Wire Ranges

Terminal Wire Ranges, Pressure-Type Al/Cu Terminals Except as Noted

Where copper-aluminum terminals are supplied on designated panelboard types, best results are obtained if a suitable joint compound is applied when aluminum conductors are used.

Table 22.4-1. Standard Main Lug Terminals

Panel Type	Wire Size Ranges for Ampere Capacity						
	100 A	225 A	250 A	400 A	600 A	800 A	1200 A
Pow-R-Line 4F	—	—	#4–500 kcmil	(2) #4–500 kcmil	(2) #4–500 kcmil	(3) #4–500 kcmil	(4) #4–500 kcmil

Note: Optional 750 kcmil mechanical screw-type terminals are available upon request. Panelboard dimensions may be affected. Refer to Eaton.

Table 22.4-2. Fusible Switch Terminals

Ampere Rating	Wire Size Ranges
30 60 100	#14–1/0 #14–1/0 #14–1/0
200	#4–300 kcmil
400	250–750 kcmil or (2) 3/0–250 kcmil
600	(2) #4–600 kcmil or (4) 3/0–250 kcmil
800	(3) 250–750 kcmil or (6) 3/0–250 kcmil
1200	(4) 250–750 kcmil or (8) 3/0–250 kcmil

Metering Devices

Power Xpert Meter 1000

Power Xpert Meters 2000

IQ 130/140/150

The Power Xpert 1000 Meter

The Power Xpert Meter 1000 (PXM1000) series power and energy meters monitor the most critical aspects of an electrical distribution system. This premier metering instrument uses the latest in advanced technology to make it simple to use, powerful, scalable and highly flexible.

The PXM1000 is a revenue grade power and energy meter that delivers a cost-effective solution for energy and sub-metering applications. This three-phase meter provides high accuracy and advanced features in the standard 4-inch form factor and can be expanded with multiple modular I/O options.

Key features include:

- ANSI C12.20 and IEC 62053-22 utility billing accuracy will help meet stringent customer specifications
- Available in 5 A and 333 mV CT type inputs, allowing ease of use in multiple applications
- Rogowski coils allow for ease of use in retrofit applications
- Multiple protocols including Modbus TCP and BACnet/IP and with available HTTP push, allowing data to be sent to the cloud to help meet energy code data storage requirements

The Power Xpert 2250 Meter

This meter provides all the core functions for monitoring power consumption and power quality, ethernet connectivity and onboard gateway card limits. This unit uses D/A technology to sample circuits at 400 samples per cycle for extremely accurate measurement of power factor and energy consumption. In addition, the meter has 256 MB for logging meter data.

The Power Xpert 2260 Meter

This meter adds the ability to monitor total harmonic distortion and the ability to set onboard meter limits. The meter also will illuminate LEDs on the faceplate, indicating that a limit has been exceeded and provides 512 MB for data logging.

The Power Xpert 2270 Meter

This meter adds the ability to monitor individual harmonics and visualize waveforms on your desktop using the embedded web server and raises the storage to 768 MB for data logging.

Meter series benefits include:

- Fully understand your facility's power quality
- Detailed event information; pinpoint the root causes of problems—or prevent them from occurring
- Measure, trend and analyze power via information through onboard web and comma separated values (CSV) exporting capabilities
- Up to 768 MB of storage; typically 15 years of storage capability depending on the meter model and frequency of events
- Local or remote configuration

IQ 130/140/150

Providing the first line of defense against costly power problems, Eaton's IQ 100 electronic power meters can perform the work of an entire wall of legacy metering equipment using today's technology.

- 24-bit AD converters that sample at more than 400 samples per cycle
- Meet ANSI C12.20 standards for accuracy of 0.5 percent
- Confidently used for primary revenue metering and submetering applications
- Direct-reading metered values such as watts, watt demand, watthours, voltage amperes (VA), VA-hours, vars, varhours and power factor
- Also available in Eaton's enclosed meter product

IQ 250/260

The IQ 250 and IQ 260 electronic meters provide capabilities you wouldn't normally expect in an affordable, ultracompact meter—such as fast sampling rate and accurate metering for a full range of power attributes. Built-in slots allow for future upgrades.

- Comprehensive metering
- High-end accuracy
- Self-test capability to validate accuracy
- Large, easy-to-read display
- Local or remote configuration
- Industry-standard communication protocols
- Mix-and-match input/output options
- Integration with Eaton's Power Xpert Architecture
- Field-upgradeable

For information on other available power meters, visit www.eaton.com/meters.

Monitoring Equipment and Surge Protective Devices

Power Xpert Gateway

Integrated Surge Protective Devices

Power Xpert Gateway

Eaton's Power Xpert Gateway (PXG) bridges the IT and facilities management worlds by bringing disparate panelboards, switchboards and other power equipment onto the network. The PXG takes the complexity out of connecting power equipment to the network. The web-enabled PXG is an out-of-the-box device that can support up to 96 devices, translate most industrial communication protocols, and offer user-selectable events and real-time trending. It also features e-mail notification of events, waveform capture and data/event logging—all with no special software. Adding basic meters or the utility's meter, the PXG assists in tracking energy usage. The PXG recognizes the interdependence of IT systems and power systems, and delivers what organizations need to bring these worlds together for seamless, end-to-end system reliability.

The PXG consolidates data available breakers, meters, motor controllers and protective relays, and presents the information in a variety of ways (a web browser being the most widely used method). The PXG is a stand-alone solution. As needs change and grow, the PXG can be integrated through Power Xpert Software into a broader solution that encompasses other intelligent hardware and can integrate with third-party network management systems (NMS) or building management systems (BMS) for system-wide monitoring and reporting of power and IT.

For detailed information, please visit www.eaton.com/meters.

Integrated Surge Protective Devices

Eaton integrates our industry-leading surge protective devices (SPD) into switchboards. Lead length is kept to a minimum to maximize SPD performance. SPD units are available with ratings up through 400k, and are UL listed and labeled to UL 1449 3rd Edition.

All switchboards with integrated SPD units are connected to a lineside overcurrent protective device for disconnecting means. When applied on the lineside of a service entrance main, the disconnecting means does not count as a service disconnect per National Electrical Code Article 230.71[A].

For complete SPD product description, application and ratings, visit www.eaton.com/spd.

Pow-R-Line Metering and Monitoring Options

Device	 Pow-R-Line 1X	 Pow-R-Line 2X	 Pow-R-Line 3X	 Pow-R-Line 3E	  Pow-R-Line 4X / 4F
Power Xpert Meter 350	■	■	■	■	
Veris E30 Branch Circuit Monitor	■	■	■	■	
Power Xpert Branch Circuit Monitor	■	■	■	■	
IQ 130/140/150					■
IQ 250/260					■
Power Xpert Meter 1000					■
Power Xpert Meter 2000					■
Power Xpert Multi-Point Meter					■ (Type PRL4X only)
Power Xpert Gateway					■

PRL4F Layout Guide

Technical Data and Specifications

Main Fusible Switches

The short-circuit rating shown is that of the main switch only. The short-circuit rating of the assembled panelboards is the rating of the lowest fully rated main or branch device or the rating of an approved series rated combination. (Fuses are not included.)

400 and 600 A switches with shunt trip will be rated 100 kA.

Note: Circuit breaker panelboards are designated PRL4X. Fusible Switch panelboards are designated PRL4F.

Table 22.4-3. Main Fusible Switches

Switch Rating Amperes	Fuse Class	Interrupting Rating (kA Symmetrical)		
		240 Vac	600 Vac	250 Vdc
Switches Rated 240 Vac, 250 Vdc				
200	R,T	200	—	10
400	R,T	200	—	10
600	R,T	200	—	—
800	L	200	—	—
1200	L	200	—	—
Switches Rated 600 Vac				
200	R, J,T	200	200	—
400	R, J,T	200	200	—
600	R, J,T	200	200	—
800	L	200	200	—
1200	L	200	200	—

Table 22.4-4. Branch Fusible Switches (Fuses are not included)

Switch Rating Amperes	Mounting	Fuse Class	Interrupting Rating (kA Symmetrical)		
			240 V	600 V	250 Vdc
Switches Rated 240 Vac, 250 Vdc					
30/30	Twin	R	200	—	10
60/60	Twin	R	200	—	10
100/100	Twin	R	200	—	10
200/200	Twin	R,T	200	—	10
100	Single	R	200	—	10
200	Single	R,T	200	—	10
400	Single	R,T	200	—	10
600	Single	R,T	200	—	—
800	Single	L	200	—	—
1200	Single	L	200	—	—
Switches Rated 600 Vac					
30/30	Twin	R, J	200	200	—
60/60	Twin	R, J	200	200	—
100/100	Twin	R, J	200	200	—
200/200	Twin	J,T	200	200	—
100	Single	R, J	200	200	—
200	Single	R, J,T	200	200	—
400	Single	R, J,T	200	200	—
600	Single	R, J,T	200	200	—
800	Single	L	200	200	—
1200	Single	L	200	200	—

Note: Twin branch switches of different ampere ratings are available, i.e., 30/60, 30/100, 60/100.

Modifications

Enclosures

Types 12, 3R, 4/4X.

Ground Bar

Standard bolted in box with (3) #6–300 kcmil terminals. Aluminum is standard, copper is available as an option.

Trims

Trim with door is available as an option for Type 1 enclosures.

Surge Protective Device (SPD)

Integrated onto panelboard chassis. For complete product description and available ratings, refer to Surge Protection (SPD) & Power Conditioning Products Design Guides.

Main Lug (MLO), Main Breaker, Neutral, Through-Feed (TFL) and Sub-Feed Lug (SFL) "X" Space Requirements

(For compression lugs, or other configurations not shown, refer to Eaton.)

● = Blank means no bus under cover to meet NEC cable bending space.

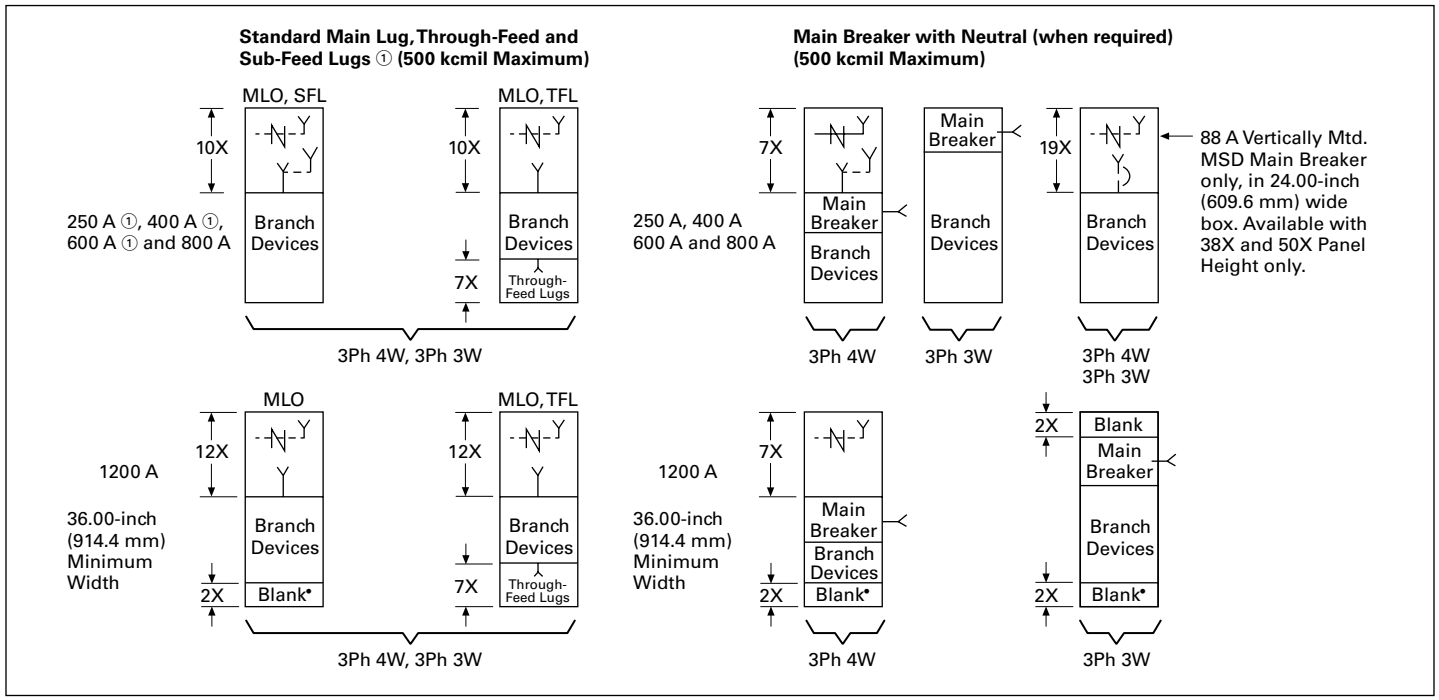


Figure 22.4-4. "X" Space Requirements—Dimensions in Inches (mm)

① Sub-feed lugs are available 250–600 A. For 600 A, use 1200 A "X" space.

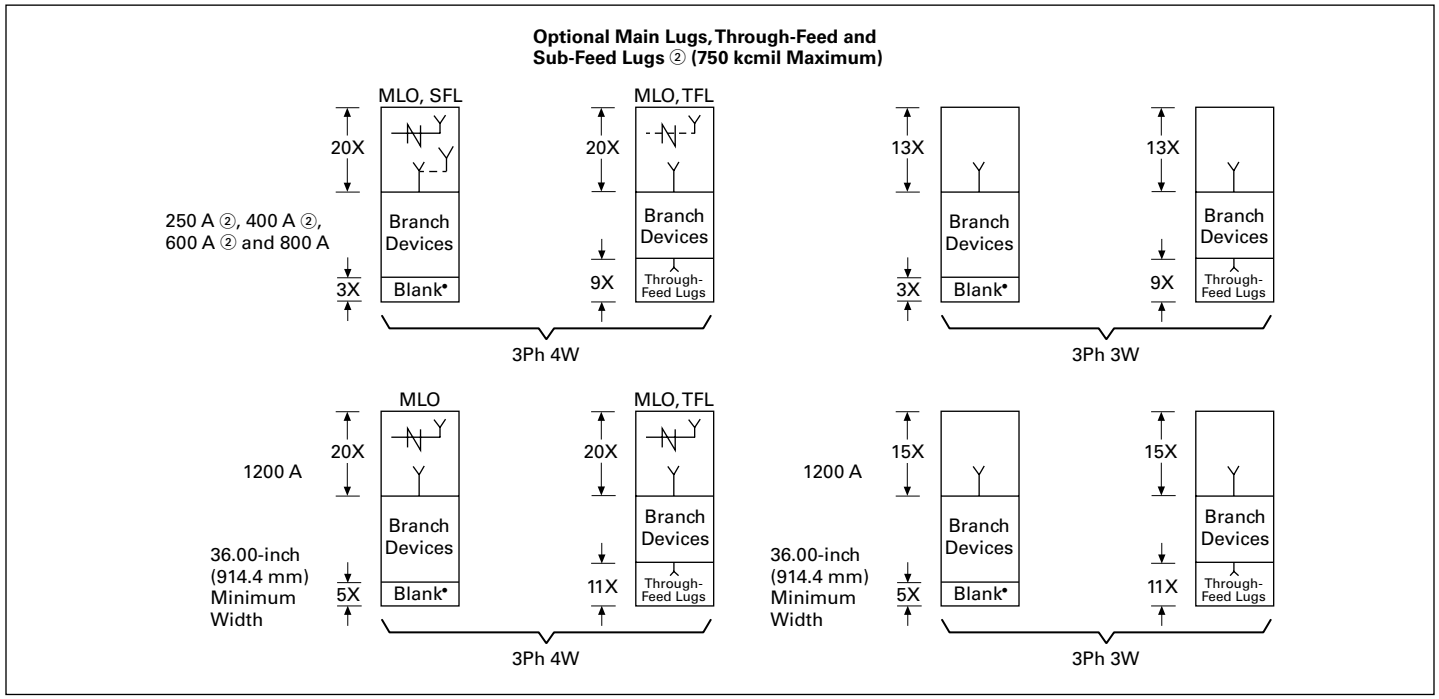


Figure 22.4-5. "X" Space Requirements—Dimensions in Inches (mm)

② Sub-feed lugs are available 250–600 A. For 600 A, use 1200 A "X" space.

Fusible (PRL4F) Type Distribution Panelboards 600 Vac, 250 Vdc

Panel Layout and Dimensions

To determine the dimensions of a given panelboard enclosure, make a layout sketch by fitting together the main branch and lug modules according to the appropriate tables in the layout guide. Assign "X" units to each module as shown and obtain a total "X" number.

The height of the enclosure is related to the total "X" units in the layout as shown in **Figure 22.4-6**. Three standard box heights are available to accommodate any and all layout arrangements. "X" unit totals that do not exactly match those in **Table 22.4-5** must be rounded off to the next higher standard (38X, 50X).

When a calculated "X" total for a panel exceeds 50X, the panel must be split into two or more separate sections with "X" space for through-feed lugs figured in for all but one section. If a neutral is required, a separate neutral bar and appropriate "X" space must be included in each section.

Layout Example

1 – PRL4F, three-phase, four-wire, 208Y/120 V complete with 400 A main switch and the following branches:

- 1 – 200 A/three-pole
- 2 – 100 A/three-pole
- 2 – 30 A/three-pole

Panel to have short-circuit rating of 100,000A symmetrical.

400 A Neutral		7X
30 A/three-pole	30A/three-pole	4X
100 A/three-pole	100A/three-pole	4X
200 A/three-pole		6X
400A three-pole main switch (vertically mounted)		22X
	Total =	43X

Note: In the above example, if a horizontally mounted 400 A main switch was used, the enclosure size would be: 73.50 inches H x 44.00 inches W x 11.30 inches D (1866.9 mm H x 1117.6 mm W x 287.0 mm D).

1. From layout guide, "X" height of panel = 43X.
2. Rounded off to next higher standard = 50X.
3. From **Table 22.4-5**, enclosure height for 50X panel = 90.00 inches (2286.0 mm).
4. Width = 36.00 inches (914.4 mm) because no switch in the assembly requires a 44.00-inch (1117.6 mm) wide enclosure.
5. Total enclosure depth = 11.30 inches (287.0 mm)—standard for all PRL4 panelboards.

Cabinet Specifications

Boxes: Code-gauge commercial galvanized sheet steel (no knockouts).

Table 22.4-5. Standard Panel and Box — Dimensions in Inches (mm)

Panel Height	Box Height	Box Width	Box ① Depth
38X	73.50 (1866.9)	36.00 (914.4)	10.40 (264.2)
50X	90.00 (2286.0)	36.00 (914.4)	10.40 (264.2)
38X	73.50 (1866.9)	44 (1117.6)	10.40 (264.2)
50X	90.00 (2286.0)	44.00 (1117.6)	10.40 (264.2)

① Box depth is 10.40 inches (264.2 mm), cover adds 0.90 inches (22.9 mm) for overall enclosure depth of 11.30 inches (287.0 mm).

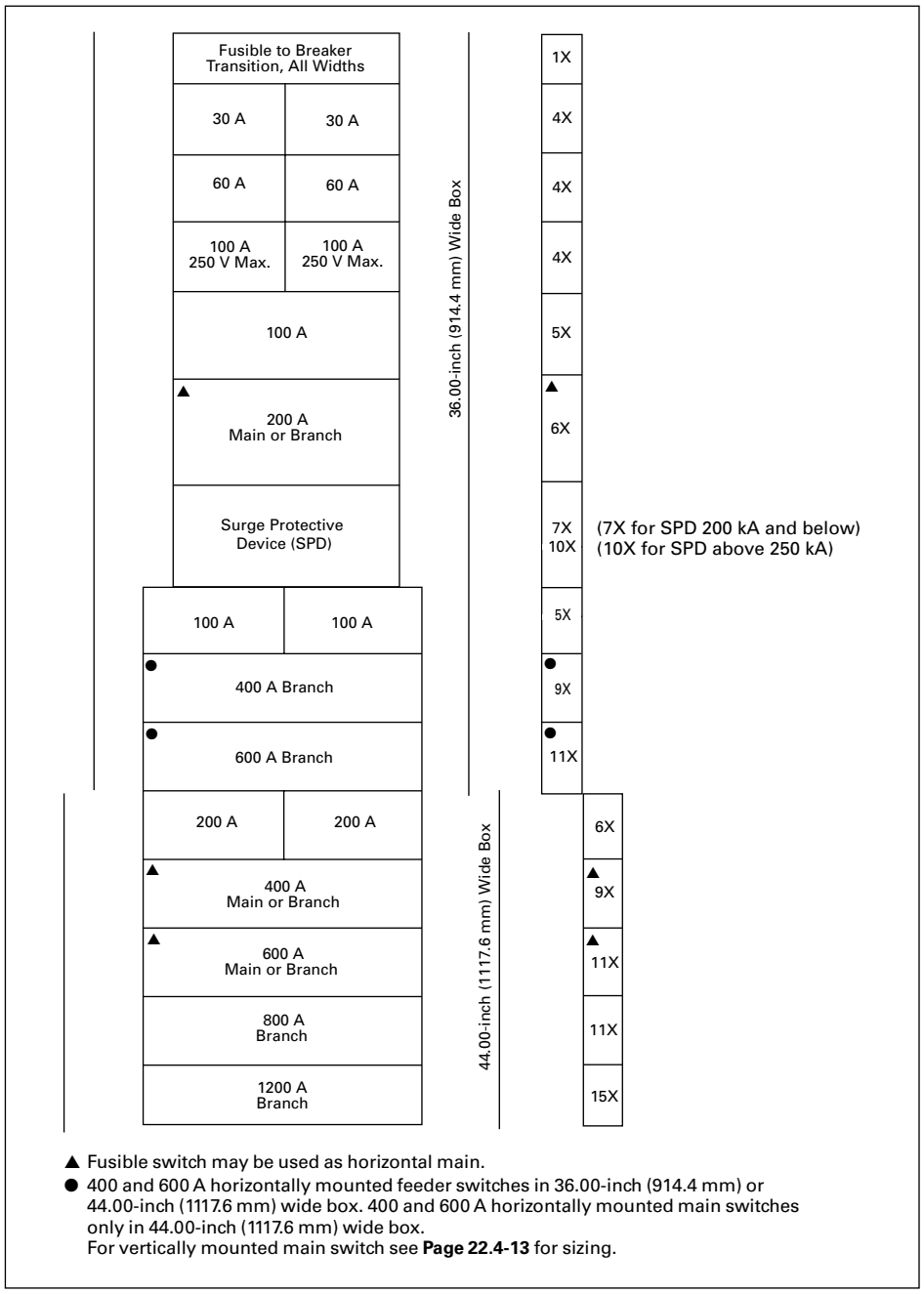
Note: Flush trims are available on PRL4F panels with door-in-door enclosure only.

Top and Bottom Gutters (minimum)

- 10.63 inches (269.9 mm)

Side Gutters (minimum)

- 36.00-inch (914.4) wide box:
  - 200 A maximum— 8.00 inches (203.2 mm)
  - 400–1200 A maximum— 6.00 inches (152.4 mm)
- 44.00-inch (1117.6 mm) wide box:
  - 200 A maximum— 10.00 inches (254.0 mm)
  - 400–1200 A maximum— 8.00 inches (203.2 mm)



▲ Fusible switch may be used as horizontal main.
● 400 and 600 A horizontally mounted feeder switches in 36.00-inch (914.4 mm) or 44.00-inch (1117.6 mm) wide box. 400 and 600 A horizontally mounted main switches only in 44.00-inch (1117.6 mm) wide box.
For vertically mounted main switch see **Page 22.4-13** for sizing.

Figure 22.4-6. Branch and Horizontally Mounted Main Fusible Switch Layout — Dimensions in Inches (mm)

Note: See **Page 22.4-13** for MLO or neutral and vertically mounted main space requirements.

Panelboard Selection Guide

Table 22.4-6. Product Types

					
Type PRL1X	**Fusible Lighting Panelboard PRL1XF**	**Type PRL1X-LX Column Type**	**Type PRL2X**	**Fusible Lighting Panelboard PRL2XF**	**Type PRL2X-LX Column Type**
Bolt-on or plug-on circuit breakers 240 Vac maximum	240 Vac maximum	Bolt-on circuit breakers 240 Vac maximum	Bolt-on or plug-on circuit breakers 240 or 480Y/277 Vac 125/250 Vdc maximum	240 and 480Y/277 Vac maximum	Bolt-on or plug-on circuit breakers 240 or 480Y/277 Vac 125/250 Vdc maximum
Main lugs only 600 A maximum	Main lugs only 400 A maximum	Main lugs only 225 A maximum	Main lugs only 600 A maximum	Main lugs only 400 A maximum	Main lugs only 225 A maximum
Main circuit breaker 600 A maximum		Main circuit breaker 225 A maximum	Main circuit breaker 600 A maximum		Main circuit breaker 225 A maximum
Branch circuit breakers 100 A maximum Single, two- and three-pole	Branch overcurrent protective devices 30 A maximum, Single-, two- and three-pole utilizing Class CC fuses	Branch circuit breakers 100 A maximum Single-, two- and three-pole	Branch circuit breakers 100 A maximum Single-, two- and three-pole	Branch overcurrent protective devices 30 A maximum, Single-, two- and three-pole utilizing Class CC fuses	Branch circuit breakers 100 A maximum Single-, two-, and three-pole

Table 22.4-6. Product Types (Continued)

			
Retrofit Panelboard PRL-1RX and PRL-2RX	**Type PRL3X**	**Type PRL3E**	**Type PRL4X / PRL4F**
Bolt-on or plug-on circuit breakers 240 or 480Y/277 Vac	Bolt-on circuit breakers 240, 480 or 600 Vac; 250 Vdc maximum	Bolt-on circuit breakers 240 Vac maximum	Circuit breakers or fusible switches; 240, 480 or 600 Vac; 600 Vdc maximum
Main lugs only 225 A maximum	Main lugs only 800 A maximum	Main lugs only 600 A maximum	Main lugs only 1200 A maximum
			Main circuit breaker 1200 A maximum
Main circuit breaker 225 A maximum	Main circuit breaker 600 A maximum	Main circuit breaker 600 A maximum	Main fusible switch 1200 A maximum
			Branch circuit breakers 1200 A maximum, Single-, two- and three-pole
Branch circuit breakers 100 A maximum Single-, two- and three-pole	Branch circuit breakers 225 A maximum Single-, two- and three-pole	Branch circuit breakers 125 A maximum Single-, two- and three-pole	Branch fusible switches 1200 A maximum, Single-, two- and three-pole

Table 22.4-6. Product Types (Continued)

		
Pow-R-Command	**Multipoint Metering Distribution Panelboard**	**Elevator Control Panelboard**
Bolt-on or plug-on circuit breakers 240 or 480Y/277 Vac	Bolt-on circuit breakers 600 Vac or 600 Vdc maximum	Bolt-on fusible switches 600 Vac maximum
Main lugs only 400 A maximum	Type PRL4X panelboard specially formatted to provide a compact and flexible multipoint metering solution for 250–1200 A applications	Controls for up to four elevators in a single panelboard
Main circuit breaker 400 A maximum		Main lugs only 800 A maximum
Branch circuit breakers 225 A maximum Single-, two- and three-pole		Branch overcurrent devices 15–200 A fusible switches with Class J fuse clips maximum
Single- and two-pole remote operated circuit breakers		
Integral load switching and dimming controls		Designed to meet specific sections various codes impacting elevators

Table 22.4-7. Panelboard Selection Guide

Panelboard Type	Device Type	Maximum Voltage Rating		Maximum Main Rating, Amperes		Branch Circuits Ampere Range	Short-Circuit Current Ratings rms Symmetrical Amperes, AC	
		AC	DC	Main Lugs Only	Main Device		Fully Rated (kA)	Series Rated (kA)
Pow-R-Line 1X ①	Breaker	240	—	600	600	15–100	10–22	22–200
Pow-R-Line 2X ①	Breaker	240 480Y/277	250	600 400 ②	600 400 ②	15–100 15–100	65 14	65–200 22–150
Pow-R-Line 3X ①	Breaker	240 480 600	250	800 800 800	600 600 600	15–225 15–225 15–225	10–200 14–100 14–35	22–200 22–150 —
Pow-R-Line 3E ①	Breaker	480	250	600	600	15–125	35–65	35–100
Pow-R-Line 4X ①	Breaker	240 480 600	600	1200 1200 1200	1200 1200 1200	15–1200 15–1200 15–1200	10–200 14–200 14–200	22–200 22–150 —
Pow-R-Line 4F ①	Fusible switch	240 600	250	1200 1200	1200 1200	30–1200 30–1200	100–200 100–200	— —
Pow-R-Line 4DX	Breaker	240 480	— —	1200 1200	1200 1200	20–600 Drawout 15–1200 Fixed	100 65	— —
Pow-R-Line 1XF	Fusible switch	240	—	400	400	15–30	200	200
Pow-R-Line 2XF	Fusible switch	480Y/277	—	400	400	15–30	200	200
Pow-R-Line 1X-LX	Breaker	240	—	225	225	15-30	10–22	18–200
Pow-R-Line 2X-LX	Breaker	480Y/277	125/250	225	225	15–30	14	25–150
Pow-R-Line 1RX	Breaker	240	—	225	225	15–100	10–22	22–100
Pow-R-Line 2RX	Breaker	480Y/277	—	225	225	15–100	14	22–150
Elevator control panelboard ①	Fusible	480	—	800	800	15–200	10–200	14–100

① Available with surge protective device (SPD) and metering.
② Amperage rating for DC voltage.

Type PRL4F Modifications

Type PRL4F

Modifications Selection Guide

Table 22.4-8. Modifications—Alphabetical Index

Modification	Available on Panelboard Types
	PRL4F
Ambient compensating breakers	—
Bus density	Yes
Cabinets—special: Types 2, 3R, 4, 4X, 12	Yes
Complete assembly	Yes
Compression type lugs, mains only	Yes
Concealed trim clamps (LT trim)	No
Conduit covers	Yes
Copper lugs	Yes
Copper main bus	Yes
Directory frame—metal	Yes
Doors, special	Yes
Electronic trip units	—
Fungus-proof	Yes
Ground bar	Yes
Ground fault protection (zero sequence)	Yes
Handle lockoff device	Std.
Hinges, special (LT trim)	Yes
Increased dimensions	No
Increased panel bus rating	No
Interiors to fit existing boxes	Yes
Locks, special (LT trim)	Yes
Metering devices	Yes
Molded case switches	No
Nameplates engraved	Yes
Neutral rated 200%	Yes
Painting and special coating	Yes
Permanent circuit numbers	Yes
Remote control switches (ASCO 920)	No
Service entrance	Yes
Shunt trips	Yes
Split bus or meter loop	No
Sub-feed breakers	No
Sub-feed lugs	Yes
Sub-metering	No
Surge protective device (SPD)	Yes
Tamperproof screws (LT trim)	Yes
Terminals, copper only for breakers	—
Through-feed lugs	Yes
Time clock space only	—
Touchup paint	Yes

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