Submittal #260570-2.0 260570 - Overcurrent Protective Device Study

C&S Companies
499 Col Eileen Collins Blvd.
Syracuse, New York 13212-3930
Phone: (315) 455-2000
Fax: (315) 455-9667

Project: 128.060.001 - Dutchess Stadium New Clubhouse & Improvements
1500 NY-9D
Wappingers Falls, New York 12590

Overcurrent Protective Device Study - Product Information

SPEC SECTION:	260570 - Overcurrent Protective Device Study	**SUBMITTAL MANAGER:**	Kara Mearon **(C&S Engineers Inc.)**
STATUS:	Submitted	**DATE CREATED:**	03/13/2023
ISSUE DATE:		**REVISION:**	0
RESPONSIBLE CONTRACTOR:	Piazza Brothers Construction	**RECEIVED FROM:**	Julianna LoPriore
RECEIVED DATE:	04/25/2023	**SUBMIT BY:**	
FINAL DUE DATE:	05/9/2023	**LOCATION:**	
TYPE:	Product Information	**COST CODE:**	
APPROVERS:	Allen Schmidt **(DLR Group)**, Sarah Treas **(DLR Group)**		
BALL IN COURT: Allen Schmidt **(DLR Group)**, Sarah Treas **(DLR Group)**			
DISTRIBUTION:			
DESCRIPTION:			
ATTACHMENTS:			

SUBMITTAL WORKFLOW

#	NAME	SUBMITTER/ APPROVER	SENT DATE	DUE DATE	RETURNED DATE	RESPONSE	ATTACHMENTS	COMMENTS
1	Damon Baxter	Submitter		1/8/2024		Pending		
2	Gus Carvajal	Submitter		1/8/2024		Pending		
3	Julianna LoPriore	Submitter		1/8/2024	4/25/2023	Submitted	260570-2-Upstate Switchgear.pdf	Switchgear for multiple spec sections
4	Allen Schmidt	Approver	4/25/2023	5/9/2023		Pending		
5	Sarah Treas	Approver	4/25/2023	5/9/2023		Pending		

Submittal #260570-2.0
260570 - Overcurrent Protective Device Study

Architect/Engineer Approval:

- ☐ (A) Approved
- ☐ (A/N) Approved As Noted
- ☐ (RR) Revise and Resubmit
- ☐ (REJ) Rejected
- ☐ (SUB) Submit Specified Item

Checking is only for general compliance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for dimensions which shall be confirmed and correlated at the jobsite; fabrication processes and techniques of construction; coordination of his work with that of all other trades; and the satisfactory performance of his work.

Reviewed by: _____

Date: _____

DLRGROUP
Submittal Review

Project Name:	Dutchess Stadium Left Field Building
Project Number:	57-21113-01
Submittal ID:	260570-2
Received On:	4/25/2023
Reviewed On:	5/10/2023
Reviewed By:	Collin Wheeler
Action:	Furnish As Corrected

This review is for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Review of submittals is not for the purpose of determining the accuracy and completeness of other information such as dimensions, quantities, and installation or performance of equipment or systems, which are the Contractor's responsibility. The Architect's review shall not constitute approval of safety precautions or construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component. The Architect's comments, notes or corrections are not an authorization to proceed with Work involving a change in the Contract Sum, the Contract Time or both. If any portion of this review requires a change to the Work, an appropriate change instrument must be executed in accordance with the Contract Documents.

*** Refer to detail 6/E6.2ii for labeling requirements for each type of equipment.**

*** Phase, neutral, and ground buses shall be copper.**

*** Verify elevator power switch size and fuse size with elevator installer.**

*** Coordinate utility meter and CT with Central Hudson utility.**

BY **DATE** **COPIES TO**

SUBMITTAL COVER SHEET

From: Julianna LoPriore **Attn:** Tim Brown

Company: Piazza, Inc.

Phone/Fax #: (914)741-4435

Project: Dutchess Stadium

Project #: RFB-DCB-18-22

C&S Companies
499 Col. Eileen Collins Blvd.
Syracuse, NY 13212
(315) 455-2000; Fax: 455-9577

Reference: CSI Code: 260570, 262200, 262416, 262816, 262813 Dwg No: _____

Paragraph: _____ Other: _____

Description: Panelboards, Transformers, Safety Switches, Coordination Study, Fuses

Supplier: Upstate Electric

Manufacturer: Eaton

Item Type:
- x Product Data
- _____ Manf. Cert/Warranty
- _____ Shop Drawings
- _____ Samples
- _____ Other: _____

Contractor's Approval:

_____ Reviewed for general compliance of specifications.

_____ This submittal is a ***substitute*** to the specified product.

x For Architects / Engineers Approval

This is our 1st submittal for this item.

We are submitting _____ copies.

Contractor Submittal Review Stamp

THE ATTACHED MATERIAL HAS BEEN REVIEWED BY THE UNDERSIGNED AND IS BELIEVED TO COMPLY WITH ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS. THE UNDERSIGNED UNDERSTANDS VERIFICATION OF FIELD DIMENSIONS, AND COORDINATION WITH OTHER TRADES, REMAINS THE RESPONSIBILITY OF THE CONTRACTOR.

Submitted by: Piazza, Inc. Digitally signed by Piazza, Inc. DN: C=US, E=julianna@piazzabrothers.com, OU=Piazza, Inc.", O="Piazza, Inc.", CN="Piazza, Inc." Date: 2023.03.15 15:04:38-04'00'

Date: 4/25/2023

***Note: Provide one cover sheet for each copy of the submittal.**

Dutchess Stadium

Submittal for Approval

Negotiation Number

V0J30111X2K2

Volume 1 of 1

Equipment:

Engineering Services & Systems - 260570
Panelboards - 262416
Dry Type Transformers - 262200
Safety Switches - 262816
Fuses - 262813

Date: 4/18/2023

Main Table of Contents

Engineering Services & Systems

Powering Business Worldwide

Drawings

EESS Short Circuit and Coordination Studies

ESS Study-BidManager

SCOPE OF WORK

This quote and associated scope of work may not satisfy all requirements listed in the contract specifications. Contact your local EESS office if you need assistance interpreting the job specifications to determine whether or not the Bid Manager studies will meet the job requirements, or if the Bid Manager takeoff does not offer the types of studies being requested.

The selected options for power system studies would be detailed only for proposed equipment supplied by the Eaton sales office. New equipment supplied by others is not included. Existing or future equipment is not included. All equipment to be covered in the study must first be completely and correctly priced into Bid Manager – before the EESS Studies takeoff is selected and within the same Job Alternate as the study item.

The Bid Manager studies will be performed using SKM Systems Analysis software package Power*Tools for Windows.

This quotation does not include the following:

a. Existing equipment or new equipment supplied by others

b. On-site data collection for required information on the new & existing electrical systems

c. Settings for protective relay logic, programmable logic controllers, software configuration, metering, monitoring, or control devices

d. Field service for start-up, testing, training or adjusting protective device settings

e. Equipment modifications for conformance to the recommendations of the proposed study

f. Study software

g. On-site project meetings

The accuracy and delivery of the study are greatly dependent upon timely receipt of accurate field information provided by others. For an example of the types of information needed, see Generic Data Request near the end of this document.

SHORT CIRCUIT AND OVERCURRENT COORDINATION

Three-phase and line-to-ground short circuit currents would be calculated and compared to the proposed equipment interrupting ratings down to the low voltage panelboards. This equipment evaluation table would be based on the

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	Eaton			
APPROVED BY	DATE	JOB NAME: Dutchess Stadium			
		DESIGNATION: Study			
VERSION: 1.0.0.0		TYPE: CHESS_ST		DRAWING TYPE: Customer Appr.	
NEG-ALT Number: V0J30111X2K2-0000	REVISION:	DWG SIZE: A	G.O.	ITEM	SHEET: 1 of 6

system operating configuration that produces maximum fault currents. Protective devices will have short circuit interrupting ratings as indicated in the contract documents unless specifically listed otherwise in Eaton's Bill of Material. Load centers and safety switches will not be covered in the studies. Existing equipment or new equipment provided by others is not included. For jobs where the new equipment is being installed as part of an upgrade or addition, only existing information regarding immediately upstream available fault current and system motor contribution will be lump-sum/group-modeled to determine the adequacy of the short circuit ratings of the new equipment.

Overcurrent coordination will be based on the specific protective device frame sizes shown on the contract drawings unless specifically listed otherwise in our Bill of Material. Where only circuit breaker trip sizes and/or fuse sizes are shown on the contract drawings, Eaton's quotation is based on the minimum frame size breaker or fusible switch which can accommodate those trip sizes/fuse sizes unless specifically listed otherwise in our Bill of Material. Phase and ground overcurrent coordination plots and recommended settings would be provided for the proposed Eaton adjustable-trip protective devices.

Multi-function protective relays have many options of control, logic, metering, monitoring, virtual inputs and configuration, but this quotation includes recommended ANSI/IEEE protective device function settings (as listed on the contract single line diagrams) to provide adequate system protection and coordination with the equipment in the scope of work. The customer or local installation contractor should determine any additionally required settings, such as logic, virtual inputs and configuration. Fuses and other non-adjustable trip devices would only be shown in the Time-Current-Characteristic (TCC) plots if they are immediately upstream or immediately downstream of an Eaton adjustable-trip protective device that has been priced into Bid Manager.

Individual motor circuit protectors would only be shown in the TCC plots and settings table if they are immediately downstream of an Eaton adjustable-trip circuit breaker that has been priced into Bid Manager. The contractor is expected to use motor nameplate information to set the remaining motor circuit protectors and electronic motor overloads. For jobs where the new equipment is being installed as part of an upgrade or addition, one level of existing upstream and/or existing downstream overcurrent device information would be modeled to determine overcurrent coordination with the proposed Eaton adjustable protective devices. In order to minimize the number of short circuit bus nodes and coordination plots, similar documentation may be used for system redundancy.

SELECTIVE COORDINATION STUDY PER NEC

Selective Coordination Analysis of Elevator, Emergency Systems, Legally Required Standby Systems, and Critical Operations Power systems per applicable NEC requirements (detailed in Articles 517.26, 620.62, 700.27, 701.27 and 708.54) is included in the scope of work, but is limited to equipment downstream of the "emergency" or "legally required" generators, drawn with symbols, on the one line diagram provided. Selective coordination will be detailed only for the portions of the system equipment that is required to be selectively coordinated per the articles referenced above. Existing equipment or new equipment provided by others is not included.The study will determine if there are any situations or devices which do not comply with selective coordination requirements of the legally adopted version of the National Electric Code. If the specified overcurrent devices being provided by Eaton for the contract do not meet the chosen level of selective coordination, further investigation, outside the scope of this study, is recommended to determine an effective solution. It is the project design engineer's responsibility to propose changes needed for upgrading of protective device type or frame size to meet Selective Coordination requirements. If desired, at an appropriate price addition, Eaton can assist the design engineer in developing the most economically feasible changes to the design and/or equipment to meet code requirements. These upgraded changes in type or frame size will only be supplied at an appropriate price adder. Eaton will not be responsible for any costs associated with required additional physical space, additional equipment, or extra installation

requirements because of the increased size or required extra equipment.

ARC FLASH STUDY

The arc flash incident energy analysis will be conducted for the proposed equipment supplied by the Eaton sales office and listed in the Bill of Materials , down to the low voltage panelboards. Load centers are not included. Existing equipment or new equipment provided by others is not included. The arc flash incident energy analysis will be conducted in accordance. with the procedures stated in NFPA 70E-2018 and IEEE 1584-2018. The analysis is performed in conjunction with the short circuit and protective coordination studies. Minimum and maximum fault current duties and protective device clearing times are required to perform the arc flash incident energy analysis and will be obtained from the Short Circuit and Protective Device Coordination studies.

Results of the arc flash study are used to define the flash boundary and the incident energy at electrical distribution equipment locations as defined by the scope of work. Safe working distances will be specified for calculated fault locations based upon the calculated arc flash boundary considering an incident energy of 1.2 cal/cm2. To ensure conservative results and a consistent approach in the adoption of IEEE 1584-2018, Eaton's power systems engineering group has defined standard electrode configurations, equipment dimensions, and bus bar gaps that will be used for all equipment to be included in the arc flash incident energy analysis. If the calculated incident energy at some equipment locations is unacceptable to the customer, further investigation, outside the scope of this study, is recommended to determine the most effective means of reducing the incident energy while maintaining the highest desired degree of reliability.

ARC FLASH LABELS - STANDARD

Our standard label reflects the latest requirements listed in NFPA 70E-2018 and CSA Z462. One Arc flash warning label will be provided for each panelboard, motor control center, switchboard, switchgear, and MV switch included in the scope of work. Labels will be 4 in. x 4 in. thermal transfer type label of high adhesion polyester for each work location analyzed and will be machine printed, with no field markings. The label shall have an orange header with the wording, "WARNING: SHOCK & ARC FLASH HAZARD", and shall include the following:

* Location designation
* Nominal voltage
* Arc flash boundary
* Calculated incident energy
* Working distance
* Limited approach boundary
* Restricted approach boundary

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	Eaton			
APPROVED BY	DATE	JOB NAME: Dutchess Stadium			
		DESIGNATION: Study			
VERSION: 1.0.0.0		TYPE: CHESS_ST		DRAWING TYPE: Customer Appr.	
NEG-ALT Number: V0J30111X2K2-0000	REVISION	DWG SIZE: A	G.O.	ITEM	SHEET: 3 of 6

* Engineering report number, revision number and issue date.

STUDY LEAD TIMES

Lead time for job-specific data request = within 2 weeks of receipt of one-line, specifications,detailed bill of material, and vista order paper.Lead time for final study results = 4-6 weeks after all remaining data received, includingequipment submittals and answers to job-specific data request.

REPORT/STUDY RESULTS

Maximum of four hardcopies using permanent velo binding system or emailed report file submittal would include the following.

1. Introduction describing the background, objectives, and scope of the study

2. Executive summary with clear, concise conclusions and recommendations

3. Philosophy and basis of each analysis module that was chosen and priced within Bid manager

4. Short circuit data and calculations

5. Table comparing calculated short circuit duties and protective device interrupting ratings

6. Coordination time-current plots of protective device curves and associated single line

7. Table listing coordinated settings for adjustable-trip protective devices

8. Selective coordination evaluation summary table (if chosen and priced)

9. Arc flash incident energy analysis summary table (if chosen and priced)

10.Arc flash labels (if chosen and priced)

11.System single line diagram per latest version of SKM Power*Tools for Windows software

Report revisions that are required due to project changes or incorrect information that was provided to Eaton's Power Systems Engineering group would require an appropriate change order.

GENERIC DATA REQUEST

In order to prepare an official Data Request, need legible copy of single line diagrams, accurate Bid Manager file containing all proposed equipment, and interunit order paper for the study. Others would supply necessary data for the electrical system, for example:

EATON'S PROJECT GROUP

1. Complete and up-to-date information on Eaton equipment being provided.

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	**Eaton**			
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium			
		DESIGNATION: Study			
VERSION: 1.0.0.0		TYPE: CHESS_ST		DRAWING TYPE: Customer Appr.	
NEG-ALT Number: V0J30111X2K2-0000	REVISION:	DWG SIZE: A	G.O.:	ITEM:	SHEET: 4 of 6

2. Accurate factory drawings for all MVA, MVS, Ampgard, and LVA switchgear.

3. Legible copy of electrical single line diagrams

4. Transformer schedules

5. Motor control center horsepower schedules

UTILITY

1. Utility contact name, phone number, and email address

2. Utility three-phase & line-to-ground fault current with associated X/R ratios & system voltage

3. Utility transformer primary fuse manufacturer, type, amp rating, and speed rating

4.Utility transformer winding (delta-wye ground, etc.), kVA rating, impedance %Z, kV ratings

ELECTRICAL CONTRACTOR

1. Using contract one-line or riser diagram as reference, provide cable lengths, phase conductor sizes (AWG, MCM), # of sets per phase, types (AL or CU), whether single-conductor cable or three-conductor cable, and whether raceway is Magnetic or Non-magnetic.

2. If customer owns incoming transformer: winding (delta-wye ground, etc.), kVA rating, impedance %Z, kV ratings.

3. If customer owns incoming transformer: primary fuse manufacturer, type, amp rating, and speed rating.

4.Generator submittal including X"d reactances, current decrement curve, and withstand curve

5. Generator local-mounted breaker manufacturer, type, ampere rating, trip unit type, functions

6. Non-Eaton supplied ATS manufacturer, type, ampere rating, & short circuit withstand rating

7.If any Chillers, Elevators, AHU's, AC's, or RTU's, need motor horsepower rating, and if not indicated - where connected to system single line diagram

8. Summary of any additional motor hp that may be connected to distribution panels but not shown on single line or riser diagram

9. For other than Eaton supplied fuses: manufacturer, type, catalog number, and ampere rating

10. For existing overcurrent devices that are immediately upstream or downstream of the proposed Eaton equipment (if circuit breakers need manufacturer, type, plug rating, trip unit type, existing adjustable settings, & setting ranges, if fuses need manufacturer, type, catalog number, and ampere ratings, if relays need phase and ground overcurrent relay manufacturers, style numbers, phase and ground CT ratios, existing adjustable settings, and setting ranges)

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	**Eaton**			
APPROVED BY	DATE	JOB NAME: Dutchess Stadium			
		DESIGNATION: Study			
VERSION: 1.0.0.0		TYPE: CHESS_ST		DRAWING TYPE: Customer Appr.	
NEG-ALT Number: V0J30111X2K2-0000	REVISION	DWG SIZE: A	G.O.	ITEM	SHEET: 5 of 6

Notes:

Comments Clarifications:

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	**Eaton**			
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium			
		DESIGNATION: Study			
VERSION: 1.0.0.0		TYPE: CHESS_ST		DRAWING TYPE: Customer Appr.	
NEG-ALT Number: V0J30111X2K2-0000	REVISION:	DWG SIZE: A	G.O.:	ITEM:	SHEET: 6 of 6

Panelboards

Drawings

Pow-R-Line4X Device Specifications

Ckt #s	Nameplate	Device	Trip	Terminal	Modifications
1,3,5		PDD33G0300	300	(1) 2/0-500 kcmil (Cu/Al)	
7,9,11		PDD23F0150	150	(1) #4-4/0 (Cu/Al)	
13,15		BAB2030	30	(1) #14-#4 (Cu/Al)	
14		QB1020GF	20	(1) #14-#4 (Cu/Al)	
16		QB1020GF	20	(1) #14-#4 (Cu/Al)	
17		BAB1020	20	(1) #14-#4 (Cu/Al)	
18		BAB1020	20	(1) #14-#4 (Cu/Al)	
19		BAB1020	20	(1) #14-#4 (Cu/Al)	
20		BAB1020	20	(1) #14-#4 (Cu/Al)	
21		BAB1020	20	(1) #14-#4 (Cu/Al)	
22		BAB1020	20	(1) #14-#4 (Cu/Al)	
23		BAB1020	20	(1) #14-#4 (Cu/Al)	
24		BAB1020	20	(1) #14-#4 (Cu/Al)	
25		BAB1020	20	(1) #14-#4 (Cu/Al)	

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	**Eaton**			
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium			
		DESIGNATION: L1A1 SECTION 2			
VERSION: 1.0.0.56		TYPE: PRL4X		DRAWING TYPE: Customer Approval	
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0	DWG SIZE: A	G.O.	ITEM	SHEET: 2 of 4

Pow-R-Line4X Device Specifications

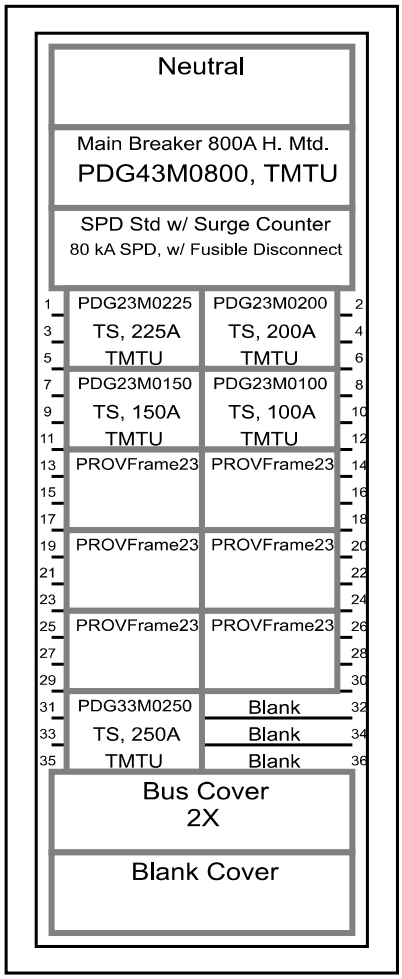
Ckt #s	Nameplate	Device	Trip	Terminal	Modifications
26		BAB1020	20	(1) #14-#4 (Cu/Al)	
27		BAB1020	20	(1) #14-#4 (Cu/Al)	
28		BAB1020	20	(1) #14-#4 (Cu/Al)	
29		BAB1020	20	(1) #14-#4 (Cu/Al)	
30		BAB1020	20	(1) #14-#4 (Cu/Al)	
31		BAB1020	20	(1) #14-#4 (Cu/Al)	
32		BAB1020	20	(1) #14-#4 (Cu/Al)	
33		BAB1020	20	(1) #14-#4 (Cu/Al)	
34		BAB1020	20	(1) #14-#4 (Cu/Al)	
35		BAB1020	20	(1) #14-#4 (Cu/Al)	
36		BAB1020	20	(1) #14-#4 (Cu/Al)	
37		BAB1020	20	(1) #14-#4 (Cu/Al)	
38		BAB1020	20	(1) #14-#4 (Cu/Al)	
39		BAB1020	20	(1) #14-#4 (Cu/Al)	

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	**Eaton**			
APPROVED BY	DATE	JOB NAME: Dutchess Stadium			
		DESIGNATION: L1A1 SECTION 2			
VERSION: 1.0.0.56		TYPE: PRL4X		DRAWING TYPE: Customer Approval	
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0	DWG SIZE: A	G.O.	ITEM	SHEET: 3 of 4

Pow-R-Line4X Device Specifications

Ckt #s	Nameplate	Device	Trip	Terminal	Modifications
40		BAB1020	20	(1) #14-#4 (Cu/Al)	
41		BAB1020	20	(1) #14-#4 (Cu/Al)	
42		BAB1020	20	(1) #14-#4 (Cu/Al)	
43		BAB1020	20	(1) #14-#4 (Cu/Al)	
44		BAB1020	20	(1) #14-#4 (Cu/Al)	
45		BAB1020	20	(1) #14-#4 (Cu/Al)	
46		BAB1020	20	(1) #14-#4 (Cu/Al)	
47		BAB1020	20	(1) #14-#4 (Cu/Al)	
48		BAB1015	15	(1) #14-#4 (Cu/Al)	
Main		600A-MLO		(2) #4-500 kcmil (Cu/Al)	

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	**Eaton**			
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium			
		DESIGNATION: L1A1 SECTION 2			
VERSION: 1.0.0.56		TYPE: PRL4X		DRAWING TYPE: Customer Approval	
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0	DWG SIZE: A	G.O.	ITEM	SHEET: 4 of 4



General Information **(Section 1 of 1)**

Service Voltage:	480Y/277V 3Ph 4W	**Enclosure:**	Type 1
Bus Rating & Type:	800A Copper	**Neutral Rating:**	800A
Ground Bar:	Std. Bolted ~~Aluminum~~ Al or Cu cable		
S.C. Rating:	65k A.I.C. Fully Rated		

COPPER

Main Device Type:	Main Breaker - Top Cable Entry
Main Terminals:	Mechanical - (2) 500-750 kcmil (Cu/Al)
Neutral Terminals:	Mechanical - (3) 1/0-750 kcmil (Cu/Al)
Box Catalog No.:	BX4490P
Trim:	Standard Covers Surface Mounted
Box Dimensions:	90.00" [2286.0mm]H x 44.00" [1117.6mm]W x 10.4" [264.2mm]D
Min. Gutter Size:	Top = 10.625" [269.9mm] Bottom = 10.625" [269.9mm] Left = 8" [203.2mm] Right = 14" [355.6mm]

Panel ID Nameplate:		**(1) MDP**
Type:	Plastic, adhesive-backed	**(2) 480Y/277V 3Ph 4W**
Color:	White with Black Letters	**(3)**
UL		
Service Entrance Label		Y

Circuit Directory: Plastic Sleeve with Card
Painted Box:ANSI 61
Main Circuit Breaker Trip Type: Thermal-Magnetic.
Seismic Label (IBC/CBC Seismic Qualified).
Heat Loss - Watts (Est.) = 435
Wire shall be based on the ampacity of 75°C rated conductors unless otherwise indicated.

Device Modifications:

Ref #	Description

Notes:

Branch Devices

Qty	Poles	Trip	Frame	Amps	kAIC
1	3	250	Frame 3	400	65
1	3	225	Frame 2	225	65
6	3		PROVFrame23		
1	3	200	Frame 2	225	65
1	3	150	Frame 2	225	65
1	3	100	Frame 2	100	65

Main Devices

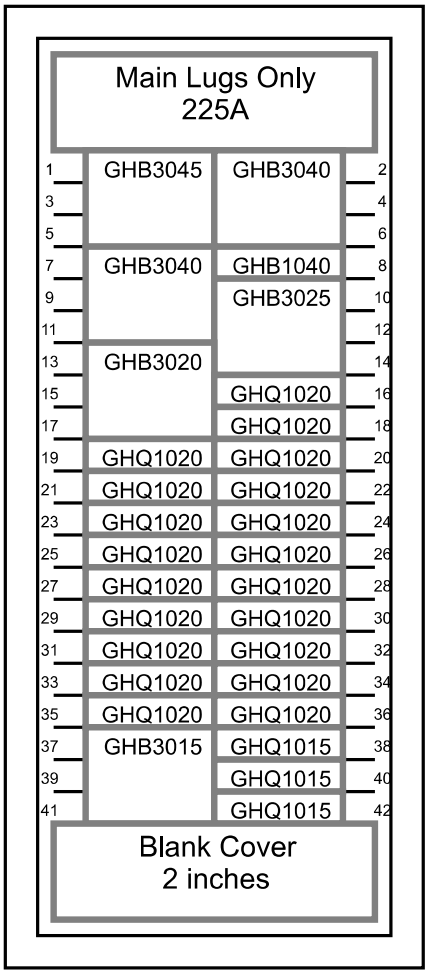
Qty	Poles	Trip	Frame	Amps	kAIC
1	3	800	Frame 4	800	65

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	**Eaton**	
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium	
		DESIGNATION: MDP	
VERSION: 1.0.0.57		TYPE: PRL4X	DRAWING TYPE: Customer Approval
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0 / DWG SIZE: A	G.O.	ITEM / SHEET: 1 of 2

Pow-R-Line4X Device Specifications

Ckt #s	Nameplate	Device	Trip	Terminal	Modifications
Main		PDG43M0800	800	(2) 500-750 kcmil (Cu/Al)	
1,3,5		PDG23M0225	225	(1) #4-4/0 (Cu/Al)	
2,4,6		PDG23M0200	200	(1) #4-4/0 (Cu/Al)	
7,9,11		PDG23M0150	150	(1) #4-4/0 (Cu/Al)	
8,10,12		PDG23M0100	100	(1) #14-1/0 (Cu/Al)	
13,15,17		PROVFrame23	100	None Available	
14,16,18		PROVFrame23	100	None Available	
19,21,23		PROVFrame23	100	None Available	
20,22,24		PROVFrame23	100	None Available	
25,27,29		PROVFrame23	100	None Available	
26,28,30		PROVFrame23	100	None Available	
31,33,35		PDG33M0250	250	(1) 2/0-500 kcmil (Cu/Al)	

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	**Eaton**			
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium			
		DESIGNATION: MDP			
	VERSION: 1.0.0.57	TYPE: PRL4X		DRAWING TYPE: Customer Approval	
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0	DWG SIZE: A	G.O.	ITEM	SHEET: 2 of 2



General Information **(Section 1 of 1)**

Service Voltage:	480Y/277V 3Ph 4W	**Enclosure:**	Type 1
Bus Rating & Type:	225A Copper	**Neutral Rating:**	225A
Ground Bar:	Std. Bolted ~~Aluminum~~ Al or Cu cable		
S.C. Rating:	14k A.I.C. Fully Rated		

COPPER

Main Device Type:	Main Lugs Only - Top Cable Entry
Main Terminals:	Mechanical - (1) #6-300 kcmil (Cu/Al)
Neutral Terminals:	Mechanical - (1) #6-300 kcmil (Cu/Al)
Box Catalog No.:	EZB2042R
Trim:	EZ Trim, Door in Door, Concealed Hardware (EZT2042S)
	Surface Mounted
Box Dimensions:	42.00" [1066.8mm]H x 20.00" [508.0mm]W x 5.75" [146.1mm]D
Min. Gutter Size:	Top = 5.5" [139.7mm] Bottom = 5.5" [139.7mm] Left = 5.75" [146.1mm] Right = 5.75" [146.1mm]

Panel ID Nameplate: **(1) H1A1**
Type: Plastic, adhesive-backed **(2) 480Y/277V 3Ph 4W**
Color: White with Black Letters **(3)**

UL ***Non-Interchangeable Main Device***

Trim Lock: Standard Lock & Key (Keyed WEM2)
Circuit Directory: Plastic Sleeve with Card
Seismic Label (IBC/CBC Seismic Qualified).
Heat Loss - Watts (Est.) = 104
Weight - lbs (Est.) = 95
Wire shall be based on the ampacity of 75°C rated conductors unless otherwise indicated.

Device Modifications:

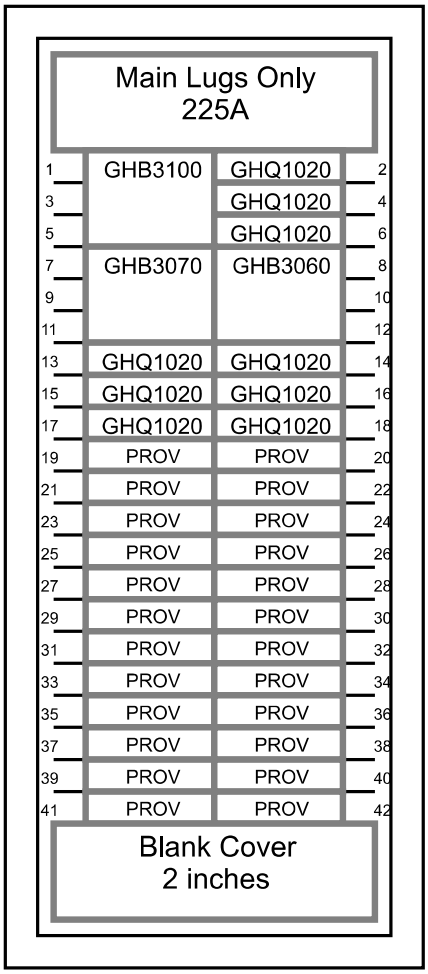
Ref #	Description

Notes:

Branch Devices

Qty	Poles	Trip	Frame	Amps	kAIC
2	3	40	GHB	100	14
1	3	15	GHB	100	14
1	3	20	GHB	100	14
1	3	45	GHB	100	14
1	3	25	GHB	100	14
3	1	15	GHQ	100	14
1	1	40	GHB	100	14
20	1	20	GHQ	100	14

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	**Eaton**			
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium			
		DESIGNATION: H1A1			
VERSION: 1.0.0.56		TYPE: PRL2X		DRAWING TYPE: Customer Approval	
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0	DWG SIZE: A	G.O.	ITEM	SHEET: 1 of 1



General Information **(Section 1 of 1)**

Service Voltage:	480Y/277V 3Ph 4W	**Enclosure:**	Type 1
Bus Rating & Type:	225A Copper	**Neutral Rating:**	225A
Ground Bar:	Std. Bolted ~~Aluminum~~ Al or Cu cable		
S.C. Rating:	14k A.I.C. Fully Rated		

COPPER

Main Device Type:	Main Lugs Only - Top Cable Entry
Main Terminals:	Mechanical - (1) #6-300 kcmil (Cu/Al)
Neutral Terminals:	Mechanical - (1) #6-300 kcmil (Cu/Al)
Box Catalog No.:	EZB2042R
Trim:	EZ Trim, Door in Door, Concealed Hardware (EZT2042S)
	Surface Mounted
Box Dimensions:	42.00" [1066.8mm]H x 20.00" [508.0mm]W x 5.75" [146.1mm]D
Min. Gutter Size:	Top = 5.5" [139.7mm] Bottom = 5.5" [139.7mm] Left = 5.75" [146.1mm] Right = 5.75" [146.1mm]

Panel ID Nameplate: **(1) H2A1**
Type: Plastic, adhesive-backed **(2) 480Y/277V 3Ph 4W**
Color: White with Black Letters **(3)**

UL ***Non-Interchangeable Main Device***

Trim Lock: Standard Lock & Key (Keyed WEM2)
Circuit Directory: Plastic Sleeve with Card
Seismic Label (IBC/CBC Seismic Qualified).
Heat Loss - Watts (Est.) = 104
Weight - lbs (Est.) = 77
Wire shall be based on the ampacity of 75°C rated conductors unless otherwise indicated.

Device Modifications:

Ref #	Description

11

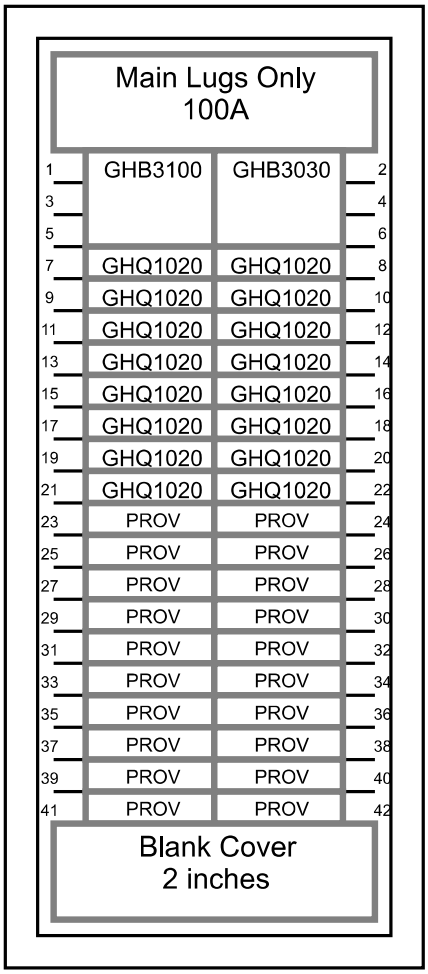
22

Branch Devices

Qty	Poles	Trip	Frame	Amps	kAIC
~~0~~	1	20	GHQ	100	14
1	3	100	GHB	100	14
1	3	70	GHB	100	14
1	3	60	GHB	100	14
~~24~~	1		PROV		

Notes:

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	**Eaton**			
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium			
		DESIGNATION: H2A1			
VERSION: 1.0.0.57		TYPE: PRL2X		DRAWING TYPE: Customer Approval	
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0	DWG SIZE: A	G.O.	ITEM	SHEET: 1 of 1



General Information **(Section 1 of 1)**

Service Voltage:	480Y/277V 3Ph 4W	**Enclosure:**	Type 1
Bus Rating & Type:	100A Copper	**Neutral Rating:**	100A
Ground Bar:	Std. Bolted ~~Aluminum~~ Al or Cu cable		
S.C. Rating:	14k A.I.C. Fully Rated		

COPPER

Main Device Type:	Main Lugs Only - Top Cable Entry
Main Terminals:	Mechanical - (1) #6-300 kcmil (Cu/Al)
Neutral Terminals:	Mechanical - (1) #6-300 kcmil (Cu/Al)
Box Catalog No.:	EZB2042R
Trim:	EZ Trim, Door in Door, Concealed Hardware (EZT2042S)
	Surface Mounted
Box Dimensions:	42.00" [1066.8mm]H x 20.00" [508.0mm]W x 5.75" [146.1mm]D
Min. Gutter Size:	Top = 5.5" [139.7mm] Bottom = 5.5" [139.7mm] Left = 5.75" [146.1mm] Right = 5.75" [146.1mm]

Panel ID Nameplate: **(1) HK1**
Type: Plastic, adhesive-backed **(2) 480Y/277V 3Ph 4W**
Color: White with Black Letters **(3)**

UL ***Non-Interchangeable Main Device***

Trim Lock: Standard Lock & Key (Keyed WEM2)
Circuit Directory: Plastic Sleeve with Card
Seismic Label (IBC/CBC Seismic Qualified).
Heat Loss - Watts (Est.) = 50
Weight - lbs (Est.) = 83
Wire shall be based on the ampacity of 75°C rated conductors unless otherwise indicated.

15A

Device Modifications:

Ref #	Description

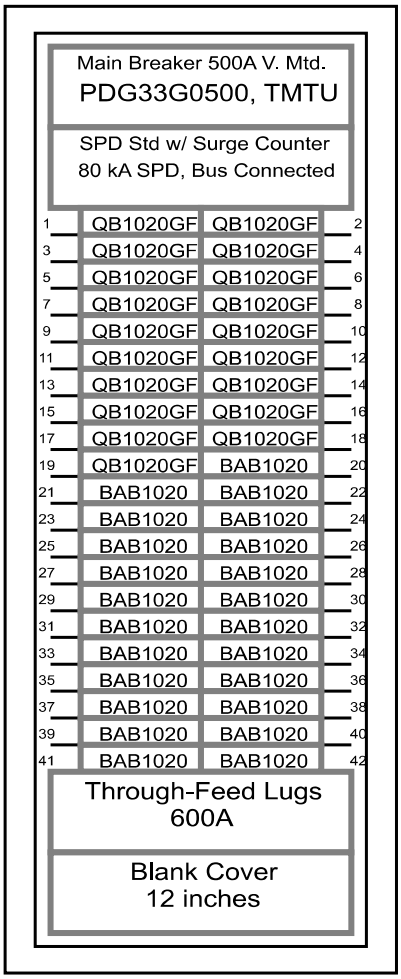
LOCKOUT BREAKER

Branch Devices

Qty	Poles	Trip	Frame	Amps	kAIC
1	3	~~100~~	GHB	100	14
1	3	30	GHB	100	14
16	1	20	GHQ	100	14
20	1		PROV		

Notes:

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	**Eaton**			
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium			
		DESIGNATION: HK1			
VERSION: 1.0.0.57		TYPE: PRL2X		DRAWING TYPE: Customer Approval	
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0	DWG SIZE: A	G.O.	ITEM	SHEET: 1 of 1



General Information **(Section 1 of 1)**

Service Voltage:	208Y/120V 3Ph 4W	**Enclosure:**	Type 1
Bus Rating & Type:	600A Copper	**Neutral Rating:**	600A
Ground Bar:	Std. Bolted ~~Aluminum~~ Al or Cu cable		
S.C. Rating:	10k A.I.C. Fully Rated		

COPPER

Main Device Type:	Main Breaker - Top Cable Entry
Main Terminals:	Mechanical - (2) #2-500 kcmil (Cu/Al)
Neutral Terminals:	Mechanical - (2) #4-500 kcmil (Cu/Al)
Through-Feed Lugs:	Mechanical - (2) #4-500 kcmil (Cu/Al)
Box Catalog No.:	EZB2090R
Trim:	EZ Trim, Door in Door, Concealed Hardware (EZT2090S)
	Surface Mounted
Box Dimensions:	90.00" [2286.0mm]H x 20.00" [508.0mm]W x 5.75" [146.1mm]D
Min. Gutter Size:	Top = 5.5" [139.7mm] Bottom = 5.5" [139.7mm] Left = 6.0" [152.4mm] Right = 6.0" [152.4mm]

Panel ID Nameplate: **(1) L1A1 SECTION 1**
Type: Plastic, adhesive-backed **(2) 208Y/120V 3Ph 4W**
Color: White with Black Letters **(3)**

UL ***Non-Interchangeable Main Device***

Trim Lock: Standard Lock & Key (Keyed WEM2)
Circuit Directory: Plastic Sleeve with Card
Main Circuit Breaker Trip Type: Thermal-Magnetic.
Seismic Label (IBC/CBC Seismic Qualified).
Heat Loss - Watts (Est.) = 430
Weight - lbs (Est.) = 246
Wire shall be based on the ampacity of 75°C rated conductors unless otherwise indicated.

Device Modifications:

Ref #	Description

Notes:

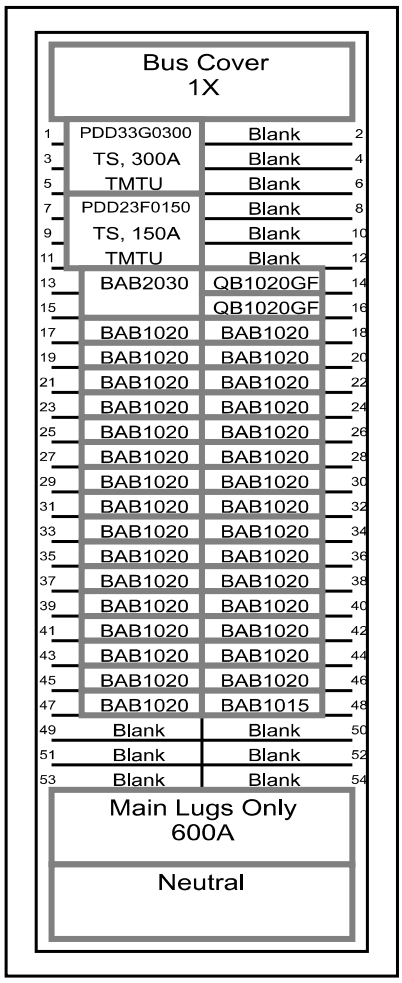
Branch Devices

Qty	Poles	Trip	Frame	Amps	kAIC
19	1	20	QB-GF	100	10
23	1	20	BAB	100	10

Main Devices

Qty	Poles	Trip	Frame	Amps	kAIC
1	3	500	Frame 3	600	10

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	Eaton	
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium	
		DESIGNATION: L1A1 SECTION 1	
VERSION: 1.0.0.56		TYPE: PRL1X	DRAWING TYPE: Customer Approval
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0 / DWG SIZE: A	G.O.	ITEM / SHEET: 1 of 1



General Information **(Section 1 of 1)**

Service Voltage:	208Y/120V 3Ph 4W	**Enclosure:**	Type 1
Bus Rating & Type:	600A Copper	**Neutral Rating:**	600A
Ground Bar:	Std. Bolted ~~Aluminum~~ Al or Cu cable		
S.C. Rating:	10k A.I.C. Fully Rated		

COPPER

Main Device Type:	Main Lugs Only - Bottom Cable Entry
Main Terminals:	Mechanical - (2) #4-500 kcmil (Cu/Al)
Neutral Terminals:	Mechanical - (2) #4-500 kcmil (Cu/Al)
Box Catalog No.:	BX4473P
Trim:	Standard Covers Surface Mounted
Box Dimensions:	73.50" [1866.9mm]H x 44.00" [1117.6mm]W x 10.4" [264.2mm]D
Min. Gutter Size:	Top = 10.625" [269.9mm] Bottom = 10.625" [269.9mm] Left = 8" [203.2mm] Right = 14" [355.6mm]

Panel ID Nameplate: **(1) L1A1 SECTION 2**
Type: Plastic, adhesive-backed **(2) 208Y/120V 3Ph 4W**
Color: White with Black Letters **(3)**

UL

Circuit Directory: Plastic Sleeve with Card
Painted Box:ANSI 61
Seismic Label (IBC/CBC Seismic Qualified).
Heat Loss - Watts (Est.) = 226
Verify neutral terminal provisions and quantity of branch devices.
Wire shall be based on the ampacity of 75°C rated conductors unless otherwise indicated.

Device Modifications:

Ref #	Description

30

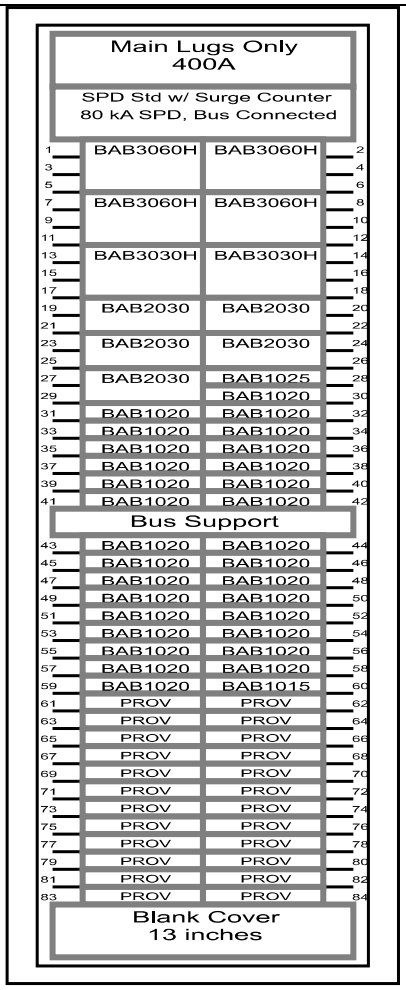
Branch Devices

Qty	Poles	Trip	Frame	Amps	kAIC
1	3	300	Frame 3	400	10
1	3	150	Frame 2	225	10
1	2	30	BAB	100	10
2	1	20	QB-GF	100	10
~~31~~	1	20	BAB	100	10
1	1	15	BAB	100	10

(1) 20/1 LOCKOUT BREAKER

Notes:

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	**Eaton**			
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium			
		DESIGNATION: L1A1 SECTION 2			
VERSION: 1.0.0.56		TYPE: PRL4X		DRAWING TYPE: Customer Approval	
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0	DWG SIZE: A	G.O.	ITEM	SHEET: 1 of 4



General Information **(Section 1 of 1)**

Service Voltage:	208Y/120V 3Ph 4W	**Enclosure:**	Type 1
Bus Rating & Type:	400A Copper	**Neutral Rating:**	400A
Ground Bar:	Std. Bolted ~~Aluminum~~ Al or Cu cable		
S.C. Rating:	10k A.I.C. Fully Rated		

COPPER

Main Device Type:	Main Lugs Only - Top Cable Entry
Main Terminals:	Mechanical - (2) #4-500 kcmil (Cu/Al)
Neutral Terminals:	Mechanical - (2) #4-500 kcmil (Cu/Al)
Box Catalog No.:	EZB2090R
Trim:	EZ Trim, Door in Door, Concealed Hardware (EZT2090S)
	Surface Mounted
Box Dimensions:	90.00" [2286.0mm]H x 20.00" [508.0mm]W x 5.75" [146.1mm]D
Min. Gutter Size:	Top = 5.5" [139.7mm] Bottom = 5.5" [139.7mm]
	Left = 6.0" [152.4mm] Right = 6.0" [152.4mm]

Panel ID Nameplate: **(1) L1A2**
Type: Plastic, adhesive-backed **(2) 208Y/120V 3Ph 4W**
Color: White with Black Letters **(3)**

UL ***Non-Interchangeable Main Device***

Trim Lock: Standard Lock & Key (Keyed WEM2)
Circuit Directory: Plastic Sleeve with Card
Seismic Label (IBC/CBC Seismic Qualified).
Heat Loss - Watts (Est.) = 247
Weight - lbs (Est.) = 308
Wire shall be based on the ampacity of 75°C rated conductors unless otherwise indicated.

Device Modifications:

Ref #	Description

29

21

Branch Devices

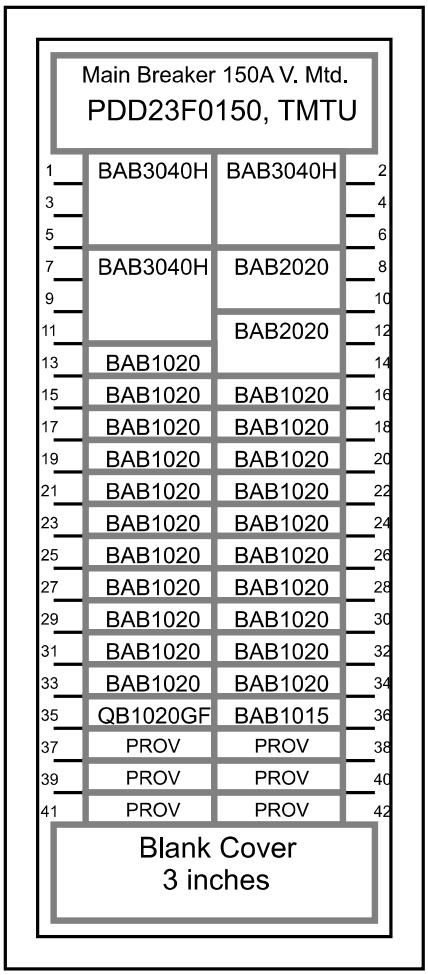
Qty	Poles	Trip	Frame	Amps	kAIC
4	3	60	BAB-H	100	10
2	3	30	BAB-H	100	10
5	2	30	BAB	100	10
1	1	15	BAB	100	10
~~30~~	1	20	BAB	100	10
1	1	25	BAB	100	10
~~24~~	1		PROV		

(3) 20/1 LOCKOUT BREAKER

(1) 20/1 GFCI BREAKER

Notes:

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	Eaton			
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium			
		DESIGNATION: L1A2			
VERSION: 1.0.0.56		TYPE: PRL1X		DRAWING TYPE: Customer Approval	
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0	DWG SIZE: A	G.O.	ITEM	SHEET: 1 of 1



General Information **(Section 1 of 1)**

Service Voltage:	208Y/120V 3Ph 4W	**Enclosure:**	Type 1
Bus Rating & Type:	225A Copper	**Neutral Rating:**	225A
Ground Bar:	Std. Bolted ~~Aluminum~~ Al or Cu cable		
S.C. Rating:	10k A.I.C. Fully Rated		

COPPER

Main Device Type:	Main Breaker - Top Cable Entry
Main Terminals:	Mechanical - (1) #14-4/0 (Cu/Al)
Neutral Terminals:	Mechanical - (1) #6-300 kcmil (Cu/Al)
Box Catalog No.:	EZB2048R
Trim:	EZ Trim, Door in Door, Concealed Hardware (EZT2048S)
	Surface Mounted
Box Dimensions:	48.00" [1219.2mm]H x 20.00" [508.0mm]W x 5.75" [146.1mm]D
Min. Gutter Size:	Top = 5.5" [139.7mm] Bottom = 5.5" [139.7mm] Left = 6.0" [152.4mm] Right = 6.0" [152.4mm]

Panel ID Nameplate: **(1) L1T1**
Type: Plastic, adhesive-backed **(2) 208Y/120V 3Ph 4W**
Color: White with Black Letters **(3)**

UL ***Non-Interchangeable Main Device***

Trim Lock: Standard Lock & Key (Keyed WEM2)
Circuit Directory: Plastic Sleeve with Card
Main Circuit Breaker Trip Type: Thermal-Magnetic.
Seismic Label (IBC/CBC Seismic Qualified).
Heat Loss - Watts (Est.) = 109
Weight - lbs (Est.) = 136
Wire shall be based on the ampacity of 75°C rated conductors unless otherwise indicated.

Device Modifications:

Ref #	Description
15	
3	

Branch Devices

Qty	Poles	Trip	Frame	Amps	kAIC
3	3	40	BAB-H	100	10
2	2	20	BAB	100	10
~~21~~	1	20	BAB	100	10
1	1	15	BAB	100	10
~~1~~	1	20	QB-GF	100	10
6	1		PROV		

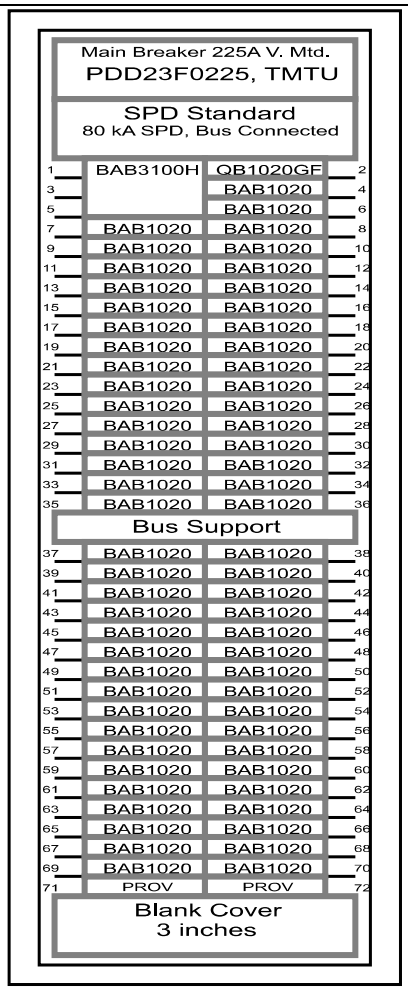
Main Devices

Qty	Poles	Trip	Frame	Amps	kAIC
1	3	150	Frame 2	225	10

(4) 20/1 LOCKOUT BREAKERS

Notes:

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	**Eaton**	
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium	
		DESIGNATION: L1T1	
VERSION: 1.0.0.57		TYPE: PRL1X	DRAWING TYPE: Customer Approval
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0 / DWG SIZE: A	G.O.	ITEM / SHEET: 1 of 1



General Information **(Section 1 of 1)**

Service Voltage:	208Y/120V 3Ph 4W	**Enclosure:**	Type 1
Bus Rating & Type:	225A Copper	**Neutral Rating:**	225A
Ground Bar:	Std. Bolted ~~Aluminum~~ Al or Cu cable		
S.C. Rating:	10k A.I.C. Fully Rated		

COPPER

Main Device Type:	Main Breaker - Top Cable Entry
Main Terminals:	Mechanical - (1) #4-4/0 (Cu/Al)
Neutral Terminals:	Mechanical - (1) #6-300 kcmil (Cu/Al)
Box Catalog No.:	EZB2072R
Trim:	EZ Trim, Door in Door, Concealed Hardware (EZT2072S)
	Surface Mounted
Box Dimensions:	72.00" [1828.8mm]H x 20.00" [508.0mm]W x 5.75" [146.1mm]D
Min. Gutter Size:	Top = 5.5" [139.7mm] Bottom = 5.5" [139.7mm]
	Left = 6.0" [152.4mm] Right = 6.0" [152.4mm]

Panel ID Nameplate: **(1) L2A1**
Type: Plastic, adhesive-backed **(2) 208Y/120V 3Ph 4W**
Color: White with Black Letters **(3)**

UL ***Non-Interchangeable Main Device***

Trim Lock: Standard Lock & Key (Keyed WEM2)
Circuit Directory: Plastic Sleeve with Card
Main Circuit Breaker Trip Type: Thermal-Magnetic.
Seismic Label (IBC/CBC Seismic Qualified).
Heat Loss - Watts (Est.) = 127
Weight - lbs (Est.) = 284
Wire shall be based on the ampacity of 75°C rated conductors unless otherwise indicated.

Device Modifications:

Ref #	Description
2	
57	
14	

Branch Devices

Qty	Poles	Trip	Frame	Amps	kAIC
1	3	100	BAB-H	100	10
~~1~~	1	20	QB-GF	100	10
~~60~~	1	20	BAB	100	10
~~2~~	1		PROV		

Main Devices

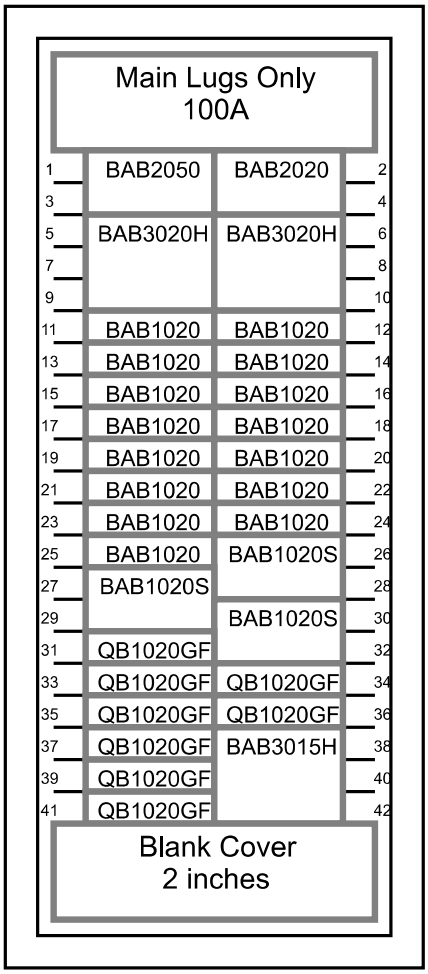
Qty	Poles	Trip	Frame	Amps	kAIC
1	3	225	Frame 2	225	10

(5) 15/1 BREAKERS

(3) 20/1 LOCKOUT BREAKERS

Notes:

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	Eaton	
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium	
		DESIGNATION: L2A1	
VERSION: 1.0.0.57		TYPE: PRL1X	DRAWING TYPE: Customer Approval
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0 / DWG SIZE: A	G.O.	ITEM / SHEET: 1 of 1



General Information **(Section 1 of 1)**

Service Voltage:	208Y/120V 3Ph 4W	**Enclosure:**	Type 1
Bus Rating & Type:	100A Copper	**Neutral Rating:**	100A
Ground Bar:	Std. Bolted ~~Aluminum~~ Al or Cu cable		
S.C. Rating:	10k A.I.C. Fully Rated		

COPPER

Main Device Type:	Main Lugs Only - Top Cable Entry
Main Terminals:	Mechanical - (1) #6-300 kcmil (Cu/Al)
Neutral Terminals:	Mechanical - (1) #6-300 kcmil (Cu/Al)
Box Catalog No.:	EZB2042R
Trim:	EZ Trim, Door in Door, Concealed Hardware (EZT2042S)
	Surface Mounted
Box Dimensions:	42.00" [1066.8mm]H x 20.00" [508.0mm]W x 5.75" [146.1mm]D
Min. Gutter Size:	Top = 5.5" [139.7mm] Bottom = 5.5" [139.7mm] Left = 6.0" [152.4mm] Right = 6.0" [152.4mm]

Panel ID Nameplate: **(1) LK1**
Type: Plastic, adhesive-backed **(2) 208Y/120V 3Ph 4W**
Color: White with Black Letters **(3)**

UL ***Non-Interchangeable Main Device***

Trim Lock: Standard Lock & Key (Keyed WEM2)
Circuit Directory: Plastic Sleeve with Card
Seismic Label (IBC/CBC Seismic Qualified).
Heat Loss - Watts (Est.) = 50
Weight - lbs (Est.) = 96
Wire shall be based on the ampacity of 75°C rated conductors unless otherwise indicated.

Device Modifications:

Ref #	Description
	SHUNT TRIP

Branch Devices

Qty	Poles	Trip	Frame	Amps	kAIC
1	2	50	BAB	100	10
1	2	20	BAB	100	10
2	3	20	BAB-H	100	10
15	1	20	BAB	100	10
3	1	20	BAB	100	10
1	3	15	BAB-H	100	10
8	1	20	QB-GF	100	10

LOADS SERVED BY SHUNT TRIP BREAKERS NEED GFCI PROTECTION AS WELL. PROVIDE GFCI PROTECTION AT BREAKER OR SEPARATE DEADFRONT GFCI DEVICE.

Notes:

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	Eaton			
APPROVED BY:	DATE:	JOB NAME: Dutchess Stadium			
		DESIGNATION: LK1			
VERSION: 1.0.0.57		TYPE: PRL1X		DRAWING TYPE: Customer Approval	
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0	DWG SIZE: A	G.O.	ITEM	SHEET: 1 of 1

Technical Documents

Panelboards

Learn Online

Product Selection Guide

Product Types

Type PRL1X

Bolt-On or Plug-On Circuit Breakers 240 Vac Maximum

Main lugs only
600 A maximum

Main Circuit breaker
600 A maximum

Branch circuit breakers
100 A maximum,
Single-, two- and three-pole

Fusible Lighting Panelboard PRL1XF

240 and 480Y/277 Vac Maximum

Main lugs only
400 A maximum

Branch overcurrent protective devices
30 A maximum,
Single-, two and three-pole utilizing Class CC fuses

Type PRL1X-LX Column Type

Bolt-On Circuit Breakers 240 Vac Maximum

Main lugs only
225 A maximum

Main circuit breaker
225 A maximum

Branch circuit breakers
100 A maximum,
Single-, two- and three-pole

Type PRL2X

Bolt-On Circuit Breakers 240 or 480Y/277 Vac; 125/250 Vdc Maximum

Main lugs only
600 A maximum

Main circuit breaker
600 A maximum

Branch circuit breakers
100 A maximum,
Single-, two- and three-pole

Fusible Lighting Panelboard PRL2XF

240 and 480Y/277 Vac Maximum

Main lugs only
400 A maximum

Branch overcurrent protective devices
30 A maximum,
Single-, two- and three-pole utilizing Class CC fuses

Type PRL2X-LX, Column Type

Bolt-On Circuit Breakers 240 or 480Y/277 Vac; 125/250 Vdc Maximum

Main lugs only
225 A maximum

Main circuit breaker
225 A maximum

Branch circuit breakers
100 A maximum,
Single-, two- and three-pole

Product Types, continued

Retrofit Panelboard PRL1RX and PRL2RX

Bolt-On Circuit Breakers 480Y/277 Vac; 240 Vac, 480Y/277 Vac

Main lugs only
225 A maximum

Main circuit breaker
225 A maximum

Branch circuit breakers
100 A maximum,
Single-, two and three-pole

Type PRL3X

Bolt-On Circuit Breakers 240, 480 or 600 Vac; 250 Vdc Maximum

Main lugs only
800 A maximum

Main circuit breaker
600 A maximum

Branch circuit breakers
225 A maximum,
Single-, two- and three-pole

Type PRL3E

Bolt-On Circuit Breakers 240, 480Y/277 or 480 Vac; 250 Vdc Maximum

Main lugs only
600 A maximum

Main circuit breaker
600 A maximum

Branch circuit breakers
125 A maximum,
Single-, two- and three-pole

Type PRL4X

Circuit Breakers or Fusible Switches 240, 480 or 600 Vac; 600 Vdc Maximum

Main lugs only
1200 A maximum

Main circuit breaker
1200 A maximum

Main fusible switch
1200 A maximum

Branch circuit breakers
1200 A maximum,
Single-, two- and three-pole

Branch fusible switches
1200 A maximum,
two- and three-pole

Product Types, continued

Pow-R-Command

Bolt-On Circuit Breakers
240 or 480Y/277 Vac

Main lugs only
400 A maximum

Main circuit breaker
400 A maximum

Branch circuit breakers
225 A maximum,
Single-, two- and three-pole

Single- and two-pole remote operated circuit breakers

Integral load switching and dimming controls

Metering Service Section

Bolt-On Circuit Breaker or Fusible Switch 240, 480 or 600 Vac

Service entrance panels combining a main disconnect with a power company metering compartment
400–1200 A

Elevator Control Panelboard

Bolt-On Fusible Switches
600 Vac Maximum

Controls for up to four elevators in a single panelboard

Main lugs only
800 A maximum

Branch overcurrent devices
15–200 A fusible switches with Class J fuse clips maximum

Designed to meet specific sections of various codes impacting elevators

Type PRL1X Panelboard

Contents

Product Description

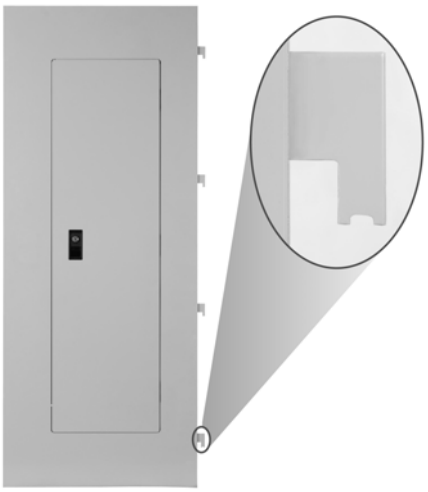
Eaton's EZ box and EZ trim represents the first significant change in panelboard box and trim designs in more than a half-century. The EZ box and EZ trim have been designed for faster, more secure and safer installations. The new EZ box and EZ trim are provided standard for Eaton's Pow-R-Line 1X and Pow-R-Line 2X lighting panelboards, as well as the Pow-R-Line 3a and Pow-R-Line 3E mid-range panelboard.

Flange Detail

Features

- Virtually eliminates sharp edges
- Trim installs in seconds rather than minutes
- Door-in-door is standard
- Ability to adjust flush box to wall irregularities
- Trim installs without the need for tools
- No exposed hardware (because there is none)

The EZ box flanges are bent and painted, which virtually eliminates the sharp edges associated with traditional boxes. Additionally, all steel panelboard chassis parts are painted. This significantly reduces potential injury for material handlers and installers. Each flange is adjustable outward up to 3/4-inch (19.1 mm). This feature allows the installer to adjust flush box applications to be level and flat with the finished wall after the wall material is installed to help correct wall irregularities. The new box flange also provides the means for attaching the EZ trim.



Standalone Trim and Bottom Flange Hanger with Notch

Corner Flange Detail

Fast Installation

The EZ trim incorporates a groundbreaking design that installs in seconds, rather than minutes. The standard trim features include door-in-door construction; no exposed hardware and no tools are required for installation.

Each EZ trim includes hangers attached on the right side. The bottom trim hanger has a notch in its base. To install, the bottom hanger is inserted into the bottom right side box flange opening, resting the notch on the flange.

Trim Hanger Inserted Into Box Flange

The balance of the hangers are aligned with the other flange openings and pushed in. When all hangers are in the box flange, the trim is lifted up slightly to clear the notch on the bottom hanger, and the trim in self-supported on the EZ box.

The installation is completed by swinging the trim to the closed position, then lifting and pushing slightly to the right. The trim will drop into place totally secured. The multi-point catches on the left side of the trim will lock into the left side box flange openings.

To prevent the trim from being removed by non-authorized persons, a unique sliding means automatically latches in place when the trim door is closed. Along with a new lock, the EZ trim offers a high degree of door security.

Trim Hanging on Surface Mounted Box

Standards and Certifications

When used with Eaton's panelboard chassis, EZ boxes and EZ trims meet the following applicable industry standards:

- UL 50 listed
- NEMA Standard PB1
- Federal specifications
- National Electrical Code

Listed

Product Selection

Boxes and Trims Only—Type 1

Types PRL1X, PRL2X

Box Dimensions—Inches (mm)	Height	YS Box Catalog Number	LT Trim Catalog Number	EZ Box ① Catalog Number	EZ Trim ① Catalog Number
20.00 W x 5.75 D (508.0 W x 146.1 D)	36.00 (914.4)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
	42.00 (1066.8)	**YS2042**	**LT2042S or F**	**EZB2042R**	**EZT2042S or F**
	48.00 (1219.2)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
	60.00 (1524.0)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
	72.00 (1828.8)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
	90.00 (2286.0)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**

Type PRL3X

Box Dimensions—Inches (mm)	Height	YS Box Catalog Number	LT Trim Catalog Number	EZ Box ① Catalog Number	EZ Trim ① Catalog Number
20.00 W x 5.75 D (508.0 W x 146.1 D)	36.00 (914.4)	**YS2036**	**LTV2036S or F**	**EZB2036R**	**EZTV2036S or F**
	48.00 (1219.2)	**YS2048**	**LTV2048S or F**	**EZB2048R**	**EZTV2048S or F**
	60.00 (1524.0)	**YS2060**	**LTV2060S or F**	**EZB2060R**	**EZTV2060S or F**
	72.00 (1828.8)	**YS2072**	**LTV2072S or F**	**EZB2072R**	**EZTV2072S or F**
	90.00 (2286.0)	**YS2090**	**LTV2090S or F**	**EZB2090R**	**EZTV2090S or F**

Type PRL3X (800 A)

Box Dimensions—Inches (mm)	Height	YS Box Catalog Number	LT Trim Catalog Number
28.00 W x 5.75 D	36.00 (914.4)	**YS2836**	**LTV2836S or F**
	48.00 (1219.2)	**YS2848**	**LTV2848S or F**
	60.00 (1524.0)	**YS2860**	**LTV2860S or F**
	72.00 (1828.8)	**YS2872**	**LTV2872S or F**
	90.00 (2286.0)	**YS2890**	**LTV2890S or F**

Note

① EZ box must be used with EZ trim.

Pow-R-Line Xpert Panelboards

Contents

Product Description

Lighting and Distribution Panelboards

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-pole) 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 or aluminum conductors.

Enclosures

Boxes are code-gauge galvanized steel, 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 indoor and special purpose applications.

All enclosures are furnished in accordance with Underwriters Laboratories 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 1/4-inch (6.4 mm).

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

Fronts

Fronts (trims) for all panelboards are made of code-gauge steel and have a high durability ANSI-61 light gray finish applied by a baked-on polyester powder coating paint system.

The fronts 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.

EZ Trim Features Standard Door-in-Door with No Exposed Hardware or Sharp Edges (no Tools are Required for Installation)

The Three-Piece Trim for Larger Power Distribution Panelboards Provides for Easy Handling and Installation

Fronts for power distribution panelboards utilize 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.

Application Description

Panelboard Selection Factors

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

- Service (voltage and frequency)
- Interrupting capacity (fully or series rated)
- Ampere rating of main
- Ampere ratings of branches
- Environment

Panelboard Short-Circuit Rating

The short-circuit rating of Eaton's assembled panelboards are test verified by, and listed with, Underwriters Laboratories (UL). 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 devices and branch breaker combinations are utilized, the series short-circuit rating of the assembled panelboard will be the same as the tested rating of the approved rated main device in series with the branches. Available main and branch breaker combinations are tabulated starting on **Page V2-T3-16**. All combinations shown are UL tested and listed.

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.

Service Entrance Equipment

The National Electrical Code (NEC) requires that:

- A panel used as service entrance equipment must be located near the point where the supply conductors enter the building
- 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
- A disconnectable electrical bond must be provided between the neutral and ground
- A service entrance type UL label must be factory installed
- Ground fault protection of equipment shall be provided for each service disconnect rated 1000 A or more if the electrical service is a solidly grounded wye system of more than 150 V to ground, but not exceeding 600 V phase-to-phase

Note: Service entrance panels must be identified as such on the order.

Panelboard Standards

In 2008, both the National Electrical Code (Article 408) and UL 67 were updated to remove the mandated 42-circuit limitation. Eaton offers panelboards with more than 42 circuits for those jurisdictions that have adopted the 2008 NEC or later.

For jurisdictions that have not adopted the 2008 or later version of the National Electrical Code, the 42-circuit limitation for Lighting and Appliance Branch Panelboards remains in place. Check with your local code officials to determine specific jurisdiction status.

Panelboard Installation

NEC requires that the operating handle of the topmost mounted device be no more than 6 feet 7 inches (2006.6 mm) above the finished floor and should be installed per NEC and manufacturer's instructions.

Additional boxes and fronts are required when the components required for one panelboard exceed the standard box dimensions.

Multi-Section Panelboards

When two or more separate enclosures are required, separate fronts for each box are standard. A common front can be furnished at additional charge.

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 included (and priced) to provide connection capability to the second section.

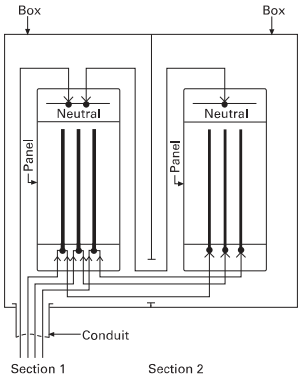
Note: Sub-feed or through-feed lugs cannot be used on any panelboard that is not protected by a single main overcurrent device either in the panelboard or immediately upstream, i.e., service entrance panelboards with main lugs only using the six disconnect rule.

Sub-Feed Lugs

Sub-feed lugs (see figure below) 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.

Sub-Feed Lugs

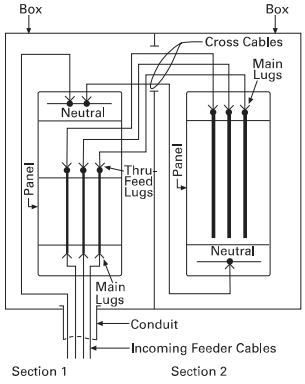


Through-Feed Lugs

Through-feed lugs (see figure below) 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.

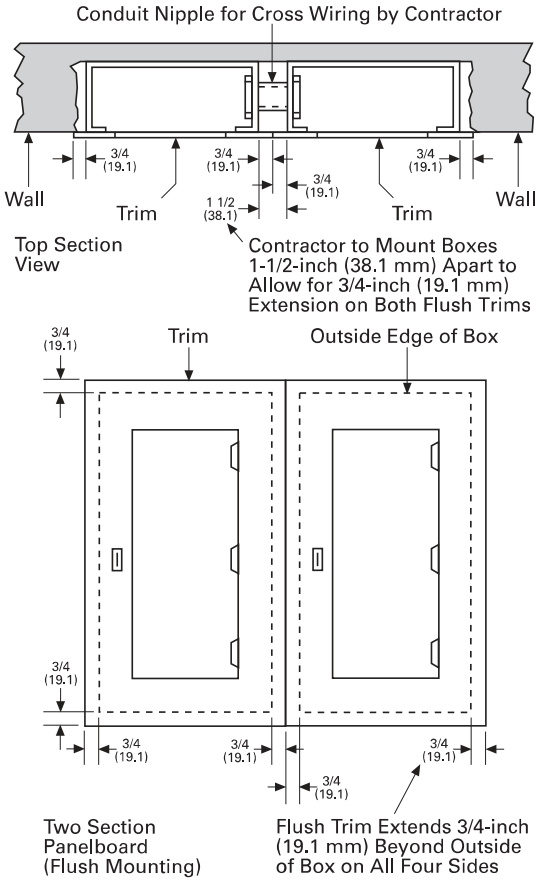
Through-Feed Lugs



Multiple Section Panelboard—Flush Mounted

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

Multiple Section Panelboard Flush Mounted—Dimensions in Inches (mm)



Overcurrent Protection

The following requirements will be found in the NEC:

Each lighting and appliance branch circuit panelboard shall be individually protected on the supply side by not more than two main circuit breakers or two sets of fuses having a combined rating not greater than that on the panelboard.

Branch Circuit Loading for Lighting Panels

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

- Motor circuits: NEC Article 430
- Diversity factor
- Provision for future loading

Exception Number 1: Individual protection for a lighting panelboard is not required when the panelboard feeder has overcurrent protection not greater than that of the panelboard.

Exception Number 2: For existing installations, individual protection for lighting panelboards is not required where such panelboards are used as service equipment in supplying an individual residential occupancy and where any bus supplying 15 or 20 A circuits is protected on the supply side by an overcurrent device.

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.

Underwriters Laboratories test procedures are based, in part, on 80% loading of panelboard branch circuit devices. 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 listed for continuous duty at 100% of its rating.

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:

- Excessive vibration or shock
- Frequencies above 60 cycles
- Altitudes above 6600 feet (2011.7 m)
- Damp environment (possible fungus growth)
- Compliance with federal, state and municipal electrical codes and standards

Seismic Considerations

The Uniform Building Code® and the International Building Code, as well as local and state building codes, place an emphasis on seismic building design requirements. Electrical distribution systems are treated as attachments to the building and therefore, fall into this category.

All Eaton panelboards are seismic qualified at the highest possible level, and have been tested in accordance with ANSI C37.81. This standard quantifies actual earthquake conditions, as well as equipment seismic capability.

Harmonic Currents

Standard panelboard neutrals are rated for 100% of the panelboard current. However, since 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 non-linear 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

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 surge protective device (SPD) is integrated into the panelboards using a "zero lead length" direct bus bar connection.

Eaton SPDs May be Integrated into Most Panelboards

The SPD protects sensitive electronic equipment from the damaging effects of high and low energy transients, as well as high frequency noise.

Standards and Certifications

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

- Underwriters Laboratories:
  - Panelboards: UL 67
  - Cabinets and Boxes: UL 50
  - CSA C22.2 No. 29

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

- National Electrical Code
- NEMA Standards: PB 1
- Federal Specification W-P-115c:
  - Circuit Breakers—Type I Class I
  - Fusible Switch—Type II Class I

Listed

Technical Data and Specifications

Panelboard Selection Guide

Panelboard Type	Device Type	Maximum Voltage Rating AC	DC	Maximum Main Rating (Amperes) MLO	Main Device	Branch Circuits Ampere Range	Sub-Feed Breaker Maximum Amperes	AC Interrupting Capacity rms Symmetrical Amperes (kA) Fully Rated	Series Rated
PRL1X	Breaker	240	—	600	600	15–100	600	10–22	22–100
PRL1R	Breaker	240	—	225	225	15–100	—	10–22	22–100
PRL1XF	Fusible	240	—	400	400	15–30	400	200	—
PRL1X-LX	Breaker	240	—	225	225	15–100	—	10–22	22–100
PRL2X	Breaker	240	250	600	600	15–100	600	65	65–200
	Breaker	480Y/277	250	600	600	15–100	600	14	22–150
PRL2RX	Breaker	240	—	225	225	15–100	—	10–22	22–200
	Breaker	480Y/277	—	225	225	15–100	—	14	22–100
PRL2XF	Fusible	480Y/277	—	400	400	15–30	400	200	—
PRL2X-LX	Breaker	240	250	225	225	15–100	—	65	65–200
	Breaker	480Y/277	250	225	225	15–100	—	14	22–150
PRL3X	Breaker	240	250	800	600	15–225	600	10–200	22–200
	Breaker	480	250	800	600	15–225	600	14–100	22–150
	Breaker	600	250	800	600	15–225	600	14–35	—
PRL3E	Breaker	240	250	600	600	15–125	400	25–100	100–200
	Breaker	480Y/277	250	600	600	15–125	400	18–65	65–100
	Breaker	480	250	600	600	15–125	400	18–65	65–100
PRL4X	Breaker	240	600	1200	1200	15–1200	—	10–200	22–200
	Breaker	480	600	1200	1200	15–1200	—	14–200	22–150
	Breaker	600	600	1200	1200	15–1200	—	14–200	—
PRL4DX	Breaker	240	—	1200	1200 ①	600	—	65–200	—
	Breaker	480	—	1200	1200 ①	600	—	35–100	—
	Breaker	600	—	1200	1200 ①	600	—	18–50	—
PRL4F	Fusible	240	250	1200	1200	30–1200	—	100–200	—
	Fusible	600	250	1200	1200	30–1200	—	100–200	—
Pow-R-Command™	Breaker	240	—	400	400	15–225	—	10–65	22–100
	Breaker	480Y/277	—	400	400	15–225	—	14	65–100
Elevator Control	Fusible	240	—	800	800	15–200	—	200	—
	Fusible	480Y/277	—	800	800	15–200	—	200	—
	Fusible	480	—	800	800	15–200	—	200	—

Note

① Fixed mounted only.

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

Note: All terminal sizes are based on wire ampacities corresponding to those shown in NEC Table 310.16 under the 75 °C insulation columns (75 °C wire). The use of smaller size, (in circular mills), regardless of insulation temperature rating, is not permitted.

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.

Check Eaton's standard terminal sizes versus customer requirements. In particular, 400 and 800 A breakers often require nonstandard lugs.

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

Standard Main Lug Terminals

	Wire Size Ranges for Ampere Capacity						
Panel Type	**100 A**	**225 A**	**250 A**	**400 A**	**600 A**	**800 A**	**1200 A**
PRL1X	#12–1/0	#6–300 kcmil	—	(2) #4–500 kcmil	(2) 4/0–500 kcmil	—	—
PRL2X	#12–1/0	#6–300 kcmil	—	(2) #4–500 kcmil	(2) 4/0–500 kcmil	—	—
PRL1RX	#12–1/0	#6–300 kcmil	—	(2) #4–500 kcmil	—	—	—
PRL2RX	#12–1/0	#6–300 kcmil	—	(2) #4–500 kcmil	—	—	—
PRL1XF	#12–1/0	#6–300 kcmil	—	(2) #4–500 kcmil	—	—	—
PRL2XF	#12–1/0	#6–300 kcmil	—	(2) #4–500 kcmil	—	—	—
PRL3X	#12–1/0	—	#6–350 kcmil	(2) #4–500 kcmil	(2) #4–500 kcmil	(3) #4–500 kcmil	—
PRL3E	#12–1/0	—	#6–350 kcmil	(2) #4–500 kcmil	(2) #4–500 kcmil	—	—
PRL4X	—	—	#4–500 kcmil	(2) #4–500 kcmil	(2) #4–500 kcmil	(3) #4–500 kcmil	(4) #4–500 kcmil
PRL1X-LX	#12–1/0	#6–300 kcmil	—	—	—	—	—
PRL2X-LX	#12–1/0	#6–300 kcmil	—	—	—	—	—
PRCE	#12–1/0	#6–300 kcmil	—	(2) #4–500 kcmil	—	—	—
PRC100	#12–1/0	—	#6–350 kcmil	(2) #4–500 kcmil	—	—	—
PRC25	#12–1/0	#6–300 kcmil	—	(2) #4–500 kcmil	—	—	—
Elevator Control	—	—	#4–500 kcmil	(2) #4/0–500 kcmil	(2) #4/0–500 kcmil	(3) #4/0–500 kcmil	—

Standard Circuit Breaker Terminals

Breaker Type	Ampere Rating	Wire Range
BAB, QBHW, BABRSP, HQP, QPHW	15–70	#14–#4
	90–100	#8–1/0
PDD2xF, PDD2xG, PDD2xM	100–225	#4–4/0 or #6–300 kcmil
EGB, EGE, EGS, EGH	15–50	#14–3/0 AL/CU
	60–125	#6–3/0 AL/CU
PDG2xF, PDG2xG, PDG2xM, PDG2xP, HFDDC ②	15–100	#14–1/0
	125–225	#4–4/0
FCL	15–100	#14–1/0
GHB, HGHB, GHQ, GHQRSP	15–30	#14–#10
	25–100	#10–1/0
EGB, EGS, EGH	15–50	#14–1/0
	60–125	#6–2/0
HJDDC ②	70–250	#4–350 kcmil
PDD3xG*	250–350	250–500 kcmil
	400	(2) 3/0–250 kcmil or (1) 3/0–500 kcmil
PDG3xG*, PDG3xM*, PDG3xP*, HKDDC, ② PDF3xG, PDF3xM	225	(1) #3–350 kcmil
	350	(2) 3/0–250 kcmil or
	400	(2) 3/0–250 kcmil or (1) 3/0–500 kcmil
LHH	150–400	#2–500 kcmil
	150–400	(2) #2–500 kcmil
	150–400	(1) 500–750 kcmil
PDG3xG*, PDG3xM*, PDG3xP*	250–400	(1) #2–500 kcmil
LHH ①	500–600	(2) #2–500 kcmil
CLD	300–500	(2) 250–350 kcmil
	600	(2) 400–500 kcmil
PDG4xG, PDG4xM, HMDLDC ② PDF4xG, PDF4xM	400–600	(2) #1–500 kcmil
	700–800	(3) 3/0–400 kcmil
PDG5xM, CND, PDG5xP	800–1000	(3) 3/0–400 kcmil
	1200	(4) 4/0–500 kcmil
LCL	125–225	(1) #6–350 kcmil
	250–400	(1) #4–250 kcmil and (1) 3/0–600 kcmil
FB-P	15–100	#14–1/0
LA-P	70–225	#6–350 kcmil
	250–400	(1) #4–250 kcmil and (1) 3/0–600 kcmil
NB-P, NBDC ②	300–700	(2) #1–500 kcmil
	800	(3) 3/0–400 kcmil
NGS, PDG5xM, PDG5xP, NGS-C, PDF5xM, PDF5xP	400–1200	(4) 4/0–500 kcmil (Cu/Al)

FDPW Switch Terminals

Ampere Rating	Wire Range
30	#14–1/0
60	#14–1/0
100	#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

Elevator Control Panel Feeder Terminals

Ampere Rating	Wire Range
30	#14–1/0
60	#14–1/0
100	#14–1/0
200	#4–300 kcmil

Notes

① LHH is 400 A maximum.

② Suitable for DC applications only.

Selection Guide

Molded Case Circuit Breaker Ratings

Note: Circuit breakers equal or exceed Federal Specification W-C-375b requirements for the particular class associated with each circuit breaker type.

Breaker Type	Continuous Ampere Rating	Number of Poles	Maximum Voltage AC	UL Listed Interrupting Ratings—kA Symmetrical Amperes AC Rating Volts 120/240	240	277	480	600	DC Rating Volts ① 125	250
BAB ②③, HQP ②③	15–70	1	120	10	—	—	—	—	—	—
	15–100	2	120/240	10	—	—	—	—	—	—
	15–100	2, 3	240	—	10	—	—	—	—	—
BABRP, BABRSP ②	15–30	1	120	10	—	—	—	—	—	—
	15–30	2	120/240	10	—	—	—	—	—	—
QBGF, QBGFEP, QPGF, QPGFEP, QBAF, QBAG	15–40	1	120	10	—	—	—	—	—	—
	15–50	2	120/240	10	—	—	—	—	—	—
	15–20	1	120	10	—	—	—	—	—	—
	15–20	2	120/240	10	—	—	—	—	—	—
QBHW ②③, QPHW ②③	15–70	1	120	22	—	—	—	—	—	—
	15–100	2	120/240	22	—	—	—	—	—	—
	15–100	2, 3	240	—	22	—	—	—	—	—
QBHGF, QBHGFEP, QPHGF, QPHGFEP	15–30	1	120	22	—	—	—	—	—	—
	15–30	2	120/240	22	—	—	—	—	—	—
GQ, GHQ ②, GHQRD, GHQRSP, GHB ②③	15–30	1, 2	277	65	—	14	—	—	—	—
	15–100 ④	1	277	65	—	14	—	—	14	—
	15–100 ④	2, 3	480Y/277	—	65	—	14	—	—	14
HGHB ②, GHBGFEP	15–30	1	277	65	—	25	—	—	—	—
	15–60	1	277	—	—	14	—	—	—	—
PDG2xF ②③	15–100	1	277	—	—	25	—	—	10	—
	15–100	2, 3	480	—	35	—	25	—	—	10
EGB	15–125	1	277	35	35	18	—	—	10	—
	15–125	2, 3	480	—	35	—	18	—	—	10
EGS	15–125	1	277	100	—	35	—	—	35	—
	15–125	2, 3	480	—	100	—	35	—	—	35
EGH	15–125	1	277	200	—	65	—	—	42	—
	15–125	2, 3	480	—	200	—	65	—	—	42
PDG2xG ②③	15–150	2, 3	600	—	65	—	35	18	—	10
	15–150	1	277	—	—	35	—	—	10	—
	15–225	2, 3	600	—	65	—	35	18	—	10
PDG2xM ②③	15–150	1	277	—	—	65	—	—	10	—
	15–225	2, 3	600	—	100	—	65	25	—	22

Notes

① DC ratings apply to substantially non-inductive circuits.
② 15 and 20 A single-pole switching duty rated for fluorescent applications.
③ Single-, two- and three-pole HACR rated.
④ DC rated single-pole, 15–70 A only.

Selection Guide, continued

Molded Case Circuit Breaker Ratings, continued

Note: Circuit breakers equal or exceed Federal Specification W-C-375b requirements for the particular class associated with each circuit breaker type.

Breaker Type	Continuous Ampere Rating	Number of Poles	Volts AC	UL Listed Interrupting Ratings—kA Symmetrical Amperes AC Rating Volts 120/240	240	277	480	600	DC Rating Volts ① 125	250
PDG2xP ②	15–225	2, 3	600	—	200	—	100	35	—	22
FCL	15–100	2, 3	480	—	200	—	150	—	—	—
PDD2xF ②	100–225	2, 3	240	—	22	—	—	—	10	—
PDD2xG ②	100–225	2, 3	240	—	65	—	—	—	10	—
PDD2xM ②	100–225	2, 3	240	—	100	—	—	—	10	—
PDD2xP ②	100–225	2, 3	240	—	200	—	—	—	10	—
EGB ②	15–125	1, 2, 3	240	—	25	—	18	—	—	—
EGE ②	15–125	1, 2, 3	240	—	—	—	—	18	—	—
EGS ②	15–125	1, 2, 3	240	—	85	—	35	22	—	—
EGH ②	15–125	1, 2, 3	240	—	100	—	65	25	—	—
PDD3xG ⑦	250–400	2, 3	240	—	65	—	—	—	—	10
PDG3xG*, PDF3xG ③⑦	100–400	2, 3	600	—	65	—	35	18	—	10 ④
PDG3xM*⑦, PDF3xM ③	100–400	2, 3	600	—	100	—	65	35	—	22 ④
LHH ⑤	150–400	2, 3	480	—	100	—	65	35	—	42
PDG3xP* ⑦	100–400	2, 3	600	—	200	—	100	65	—	22 ④
LCL ⑤	125–400	2, 3	600	—	200	—	200	100	—	—
PDG3xG*⑦	250–600	3	600	—	65	—	35	18	—	22
PDG3xP ⑤⑦	250–600	2, 3	600	—	200	—	100	50	—	42
CLD ③⑤	300–600	2, 3	600	—	65	—	35	25	—	22 ④
PDG3xM*⑦	250–600	3	600	—	100	—	65	35	—	22
PDG4xG ⑤, PDF4xG ③⑤	400–800	2, 3	600	—	65	—	50	25	—	22 ④
PDG4xM ⑤, PDF4xM ③⑤	400–800	2, 3	600	—	100	—	65	35	—	25 ④
CND ③⑤	600–1200	2, 3	600	—	65	—	50	25	—	—
PDG5xM ⑤	600–1200	2, 3	600	—	100	—	65	35	—	—
PDG5xP ⑤	600–1200	2, 3	600	—	200	—	100	65	—	—
PDG5xK, PDF5xK	400–1200	2, 3	600	—	85	—	50	25	—	—
PDG5xM, CNGH	400–1200	2, 3	600	—	100	—	65	35	—	—
PDG5xP, CNGC	400–1200	2, 3	600	—	200	—	100	65	—	—
Integrally Fused, Current Limiting Circuit Breakers										
FB-P	15–100	2, 3	600	—	200	—	200	200	—	⑥
LA-P	70–400	2, 3	600	—	200	—	200	200	—	⑥
NB-P	300–800	2, 3	600	—	200	—	200	200	—	⑥

Notes

① DC ratings apply to substantially non-inductive circuits.
② Two- and three-pole HACR rated.
③ 100% rated circuit breaker.
④ DC rating not available with electronic trip.
⑤ Available with integral ground fault protection.
⑥ 100k based on NEMA test procedure.
⑦ The 400 A frame must use trip units of ratings 0100–0400, while the 600 A frame must use trip units of ratings 0500, 0600 or designated by H, such as H250. The H as the leading character of the ampacity indicates a high instantaneous version of the breaker for coordination purposes. H ratings must use 600 A frame.

Series Rated Combinations

Underwriters Laboratories permits panelboards to be labeled with a short-circuit rating of up to 200 kA symmetrical where UL listed combinations of main and branch circuit breakers are used.

These combinations consist of main breakers or fusible devices connected ahead of, and in series with approved conventional breakers used as branch devices.

Two arrangements are acceptable and comply with UL standards for panelboards. **The main circuit breaker or fusible switch may be installed in the panel as a main device, or it may be mounted remote, (directly upstream) from the panel.** In either case, the approved main and branch combinations must be followed. These arrangements are acceptable and are UL listed having been tested in accordance with UL 67 standards.

From the tables that follow, specific combinations of main devices (upstream) and branch devices (downstream), series connected and electrically adjacent in the system, may be selected to qualify the assembled panelboard for the short-circuit ratings shown.

Applying Series Ratings

The following is provided to use the series rating tables on the following pages.

1. Determine the available system voltage and fault current.
2. Select the appropriate table using the system voltage.
3. Use the appropriate "Series Equipment Rating" column equal to, or greater than, the available fault current, to determine the allowable UL recognized combinations of main (upstream) and branch (downstream) overcurrent devices. Main devices are shown in bold/shaded areas. Respective branch breakers are shown directly below their associated main device. If a rating is not initially found in a column, first look to the columns to the right for higher "Series Equipment Ratings" within the same table. If still not found, use ratings from table of a higher system voltage (higher numbered table(s).

Series Rating Tables

120/240 Volts AC—Breaker/Breakers Series Ratings

Main devices shown in shaded area, centered at top. Respective branch devices shown directly below.
For 240 Volts AC branch breakers, see **Page V2-T3-21**.

Main Breaker Maximum Amperes	Series Equipment Rating—kA Symmetrical						
	18	22	42	65		100	200
100	**EHD, PDG2xF** ①	**QBHW QPHW**		**GB, GHB**	**GHB**	**FB-P**	**FCL**
	BAB ② BABRP BABRSP HQP ② QBGF QBAF QBAG QBGFT QBCAF	BAB ② HQP ② QBGF QPGF QBAF QBAG QBGFT QPGFT **QBHW** QB–AFGF (15–20 A) ⑤ QB–CAF (15–20 A) ⑤ QB–EP (15–20 A) ⑤ QB–GF (15–20 A) ⑤ QBH–AFGF (15–20 A) ⑤ QBH–CAF (15–20 A) ⑤ QBH–EP (15–20 A) ⑤ QBH–GF (15–20 A) ⑥		BAB ② BABRP BABRSP HQP ② QBGF QPGF QBAF QBAG QBHW QPHW QBGFT QPGFT QBCAF	QB–AFGF (15–20 A) ⑤ QB–CAF (15–20 A) ⑤ QB–EP (15–20 A) ⑤ QB–GF (15–20 A) ⑤ QBH–AFGF (15–20 A) ⑤ QBH–CAF (15–20 A) ⑤ QBH–EP (15–20 A) ⑤ QBH–GF (15–20 A) ⑥	BAB ② BABRP BABRSP HQP ② QBGF QPGF QBAF QBAG QBHW ② QPHW ② EHD (15–100 A) PDG2yF (15–100 A) ③ FD (15–100 A) PDG2yG (15–100 A) ③ QBGFT QPGFT	BAB ② BABRP BABRSP HQP ② QBGF QPGF QBAF QBAG QBHW QPHW GB, GHB GHQ (15–20 A) ⑥ EHD (15–100 A), PDG2yF (15–100 A) ③ FD (15–100 A) PDG2yG (15–100 A) ③ HFD (15–100 A) PDG2yM (15–100 A) ③ QBGFT QPGFT QBCAF
125				**BRX**		**EGH**	
				BAB HQP (2-pole only)		GHQ (15–20 A) ⑥ GHB	
150	**FDB, PDG2xF** ①			**FDE, PDG2xG** ①**, PDD2xG** ①	**FD, HFD, FDC, PDG2xG** ①**, PDG2xM** ①**, PDG2xP** ①	**HFDE, PDG2xM** ①	
	BAB HQP QBGF QBAF QBAG QBGFT QBCAF			BAB HQP QBHW QPHW	QB–AFGF (15–20 A) ⑤ QB–CAF (15–20 A) ⑤ QB–EP (15–20 A) ⑤ QB–GF (15–20 A) ⑤ QBH–AFGF (15–20 A) ⑤ QBH–CAF (15–20 A) ⑤ QBH–EP (15–20 A) ⑤ QBH–GF (15–20 A) ⑤	BAB HQP GHB EHD (15–100 A), PDG2yF (15–100 A) ③ FD (15–100 A) PDG2yG (15–100 A) ③ QBHW QPHW	
200						**LA-P**	
						BAB ② HQP ② QBHW ② QPHW ② EHD FD (15–100 A) PDG2yF (15–100 A) ③ PDG2yG (15–100 A) ③	

Notes

① Where x = 2 or 3.
② Single-pole version is restricted to 15–70 A.
③ Where y = 1 or 2.
④ Not valid with CHKD or PDF3xM.
⑤ Type ETN02 only.
⑥ 1 pole only.

120/240 Volts AC—Breaker/Breakers Series Ratings, continued

Main devices shown in shaded area, centered at top. Respective branch devices shown directly below.
For 240 Volts AC branch breakers, see **Page V2-T3-21**.

Main Breaker Maximum Amperes	Series Equipment Rating—kA Symmetrical									
	18	22	42	65			100			200
225		**EDB, PDD2xF** ①	**EDS, PDD2xG** ①	**ED, FD, PDD2xG** ①**, PDG2xG** ①	**FDE**	**HFDE, PDG2xM** ①	**EDH, EDC, PDD2xM** ①**, PDD2xP** ①	**HFD, PDG2xM** ①	**FDC, PDG2xP** ①	**FDC, FDCE, PDG2xP** ①
		BAB ② BABRP BABRSP HQP ② QBGF QPGF QBHGF QPHGF QBHW QPHW QBAF QBAG QBGFT QPGFT QBHGFT QPHGFT QB–AFGF (15–20 A) ⑤ QB–CAF (15–20 A) ⑤ QB–EP (15–20 A) ⑤ QB–GF (15–20 A) ⑤ QBH–AFGF (15–20 A) ⑤ QBH–CAF (15–20 A) ⑤ QBH–EP (15–20 A) ⑤ QBH–GF (15–20 A) ⑤	BAB BABRP BABRSP HQP ② QBGF QPGF QBHGF QPHGF QBHW QPHW QBAF QBAG QBGFT QPGFT QBHGFT QPHGFT QBCAF QB–AFGF (15–20 A) ⑤ QB–CAF (15–20 A) ⑤ QB–EP (15–20 A) ⑤ QB–GF (15–20 A) ⑤ QBH–AFGF (15–20 A) ⑤ QBH–CAF (15–20 A) ⑤ QBH–EP (15–20 A) ⑤ QBH–GF (15–20 A) ⑤	BAB ② BABRP BABRSP HQP (2-pole only) QBGF QPGF QBAF QBAG QBHW QBHGF QBGFT QPGFT QBHGFT QBCAF QPHW QPHGF	QBGF QPGF QBAF QBAG QBHGF QBGFT QPGFT QBHGFT QBCAF QPHGF QPHGFT	BAB ② HQP ② QBHW ② QPHW ②	BAB ② BABRP BABRSP HQP ② QBGF QPGF QBAF QBAG QBGFT QBCAF QB–AFGF (15–20 A) ⑤ QB–CAF (15–20 A) ⑤ QB–EP (15–20 A) ⑤ QB–GF (15–20 A) ⑤ QBH–AFGF (15–20 A) ⑤ QBH–CAF (15–20 A) ⑤ QBH–EP (15–20 A) ⑤ QBH–GF (15–20 A) ⑤	BAB HQP QBGF QBAF QBAG QBHW QPHW QBHGF GB, GHB GHQ (15–20 A) ⑥ GHQRSP EHD FD, EGS QBGFT QBHGFT QBCAF QPHGF PDG2yF (15–100 A) ③ PDG2yG (15–150 A) ③	BAB ② HQP ② QBHW ② QPHW ②	GB, GHB GHQ (15–20 A) ⑥ GHQRSP EHD FD, FDE (15–150 A) HFD, HFDE (15–150 A) EGS EGH HGHB PDG2yF (15–100 A) ③ PDG2yG (15–150 A) ③
				ED, PDD2xG ①			**CVH**	**HFDE, PDG2xM** ①		
				QB–AFGF (15–20 A) ⑤ QB–CAF (15–20 A) ⑤ QB–EP (15–20 A) ⑤ QB–GF (15–20 A) ⑤ QBH–AFGF (15–20 A) ⑤ QBH–CAF (15–20 A) ⑤ QBH–EP (15–20 A) ⑤ QBH–GF (15–20 A) ⑤			BAB ② HQP ② QBGF QPGF QBAF QBAG QBCAF	BAB HQP QBGF QBAF QBAG QBHW QPHW QBHGF GHB, EHD FD (15–150 A) QBGFT QBHGFT EGS FDE (15–150 A) QPGF QPHGF QBCAF QPGFT QPHGFT PDG2yF (15–100 A) ③ PDG2yG (15–150 A) ③		

Notes

① Where x = 2 or 3.
② Single-pole version is restricted to 15–70 A.
③ Where y = 1 or 2.
④ Not valid with CHKD or PDF3xM.
⑤ Type ETN02 only.
⑥ 1 pole only.

120/240 Volts AC—Breaker/Breakers Series Ratings, continued

Main devices shown in shaded area, centered at top. Respective branch devices shown directly below.
For 240 Volts AC branch breakers, see **Page V2-T3-21**.

Main Breaker Maximum Amperes	Series Equipment Rating—kA Symmetrical									
	18	22	42	65			100		200	
250				**JD, JDB**	**HJD**	**JDC**	**HJD**	**JDC**		**JDC**
				BAB ②	BAB	QBGF	GB, GHB	BAB ②		GB, GHB
				HQP ②	HQP	QPGF	EHD	HQP ②		EHD
				QBHW ②	QBHW ②	QBAF	FD	QBHW ②		FD, FDE
				QPHW ②	QPHW ②	QBAG	(15–150 A)	QPHW ②		(15–150 A)
				EHD		QPGFT	EGS			HFD, HFDE
				FD (15–150 A)		QBCAF	PDG2yF			(15–150 A)
				PDG2yF		**JD, JDC**	(15–100 A) ③			EGS
				(15–100 A) ③		QB–AFGF	PDG2yG			EGH
				PDG2yG		(15–20 A) ⑤	(15–150 A) ③			PDG2yF
				(15–150 A) ③		QB–CAF				(15–100 A) ③
						(15–20 A) ⑤				PDG2yG
						QB–EP				(15–150 A) ③
						(15–20 A) ⑤				PDG2yM
						QB–GF				(15–150 A) ③
						(15–20 A) ⑤				
						QBH–AFGF				
						(15–20 A) ⑤				
						QBH–CAF				
						(15–20 A) ⑤				
						QBH–EP				
						(15–20 A) ⑤				
						QBH–GF				
						(15–20 A) ⑤				
400		**DK, KD, KDB, PDD3xG ①, PDG3xG ①**	**DK, KD, KDB, CKD, PDD3xG ①, PDG3xG ①, PDF3xG ①**	**HKD, CHKD, PDG3xM ①, PDF3xM ①**	**DK, KD, KDB, CKD, PDD3xG ①, PDG3xG ①, PDF3xG ①**	**KDC, PDG3xP ①**	**HKD, CHKD, PDG3xM ①, PDF3xM ①**	**KDC, PDG3xP ①**	**KDC, PDG3xP ①**	**LCL**
		BAB ②	BAB ②	BAB ②	EHD	BAB ②	GB, GHB	QBHW ②	GB, GHB	BAB ②
		BABRP	BABRP	BABRP	EDS	HQP ②	EHD	QPHW ②	EHD	HQP ②
		BABRSP	BABRSP	BABRSP	EDB		FD (15–150 A)		FD, FDE	QBGF
		HQP ②	HQP ②	HQP ②	BAB ②		EGS ④		(15–150 A)	QBHW ②
		QBGF	QBHW ②	QBHW ②	HQP ②		PDG2yF		HFD	QPHW ②
		QPGF	QPHW ②	QPHW ②	QBHW ②		(15–100 A) ③		HFDE (15–150 A)	GB, GHB
		QBAF			QPHW ②		PDG2yG		EGS	EHD
		QBAG			PDG2yF		(15–150 A) ③		EGH	FD, FDE
		QBGFT			(15–100 A) ③				PDG2yF	15–150 A)
		QPGFT			PDD2yF ③				(15–100 A) ③	HFD, HFDE
					PDD2yG ③				PDG2yG	(15–150 A)
									(15–150 A) ③	QBGFT
									PDG2yM	QPGFT
									(15–150 A) ③	PDG2yF
										(15–100 A) ③
										PDG2yG
										(15–150 A) ③
										PDG2yM
										(15–150 A) ③

Notes

① Where x = 2 or 3.
② Single-pole version is restricted to 15–70 A.
③ Where y = 1 or 2.
④ Not valid with CHKD or PDF3xM.
⑤ Type ETN02 only.
⑥ 1 pole only.

120/240 Volts AC—Breaker/Breakers Series Ratings, continued

Main devices shown in shaded area, centered at top. Respective branch devices shown directly below.
For 240 Volts AC branch breakers, see **Page V2-T3-21**.

Main Breaker Maximum Amperes	Series Equipment Rating—kA Symmetrical							
	18	22	42	65			100	200
600				**LGE, LGH**	**LGS**	**LGC, PDG3xP** ①	**CHLD, HLD**	
				FD, FDE JD, JDB PDG2xG ①	FD, FDE JD	QBHW (15–20 A)	FD PDG2yG ③	
				PDG3xG, ① **PDG3xM** ①				
				JD, JDB PDG2xG ①				
800							**HMDL, CHMDL, PDG4xM** ①**, PDF4xM** ①	
							EHD FD PDG2yF (15–100 A) ③ PDG2yG ③	
1200							**HND, CHND, NGH, NGH-C, PDG5xM** ①**, PDF5xM** ①	
							EHD PDG2yF (15–100 A) ③	

Notes

① Where x = 2 or 3.
② Single-pole version is restricted to 15–70 A.
③ Where y = 1 or 2.
④ Not valid with CHKD or PDF3xM.
⑤ Type ETN02 only.
⑥ 1 pole only.

240 Volts AC—Breaker/Breaker Series Ratings

Main devices shown in shaded area, centered at top. Respective branch devices shown directly below.
For 120/240 Volts AC branch breakers, see **Page V2-T3-17**.

Main Breaker Maximum Amperes	Series Equipment Rating – kA Symmetrical							
	18	22	42	65	100			200
100	**EHD, PDG2xF** ①	**QBHW-H, QPHW-H**		**GB, GHB**	**FB-P**			**FCL**
	BAB-H HQP-H	BAB-H HQP-H		BAB-H HQP-H QBHW-H QPHW-H	BAB-H HQP-H EHD FDB FD, FDE (15–100 A) QBHW QPHW PDG2xF (15–100 A) ① PDG2xG (15–100 A) ①			BAB-H HQP-H QBHW-H QPHW-H GB, GHB EHD FD, FDE (15–100 A) FDB HFD HFDE (15–100 A) PDG2xF (15–100 A) ① PDG2xG (15–100 A) ① PDG2xM (15–100 A) ①
125					**EGH**			
					GHB HQP-H			
150	**FDB, PDG2xF** ①							
	BAB-H HQP-H							
200					**LA-P**			
					BAB-H HQP-H QBHW-H QPHW-H EHD FDB FD, FDE (15–200 A) JD, JDB PDG2xF (15–200 A) ① PDG2xG (15–200 A) ①			
225	**EDB, PDD2xF** ①	**EDS, PDD2xG** ①	**ED, PDD2xG** ①	**FD, FDE, PDG2xG** ①	**EDH, EDC, PDD2xM** ①, **PDD2xP** ①	**HFD, HFDE, PDG2xM** ①	**FDC, PDG2xP** ①	**FDC, FDCE, PDG2xP** ①
	HQP-H BAB-H QBHW-H QPHW-H	HQP-H BAB-H QBHW-H QPHW-H	BAB-H HQP-H QBHW-H QPHW-H	BAB-H HQP-H QBHW-H QPHW-H EHD ② FDB PDG2xF ①	BAB-H HQP-H **CVH** BAB-H HQP-H	BAB-H HQP-H QBHW-H QPHW-H GB, GHB EHD FDB FD, FDE EGS PDG2xF (15–150 A) ① PDG2xG ①	BAB-H HQP-H QBHW-H QPHW-H	GB, GHB EHD FDB FD, FDE HFD, HFDE PDG2xF ① PDG2xG ① PDG2xM ①

Notes

① Where x = 2 or 3.
② Valid on 2- and 3-pole breakers only. Not valid for single-pole.
③ Not valid with CHKD or PDF3xM.

240 Volts AC—Breaker/Breaker Series Ratings, continued

Main devices shown in shaded area, centered at top. Respective branch devices shown directly below.
For 120/240 Volts AC branch breakers, see **Page V2-T3-17**.

Main Breaker Maximum Amperes	Series Equipment Rating – kA Symmetrical									
	18	22	42	65		100		200		
250				**JD, JDB**	**HJD**	**HJD**	**JDC**	**JDC**		
				BAB-H (15–70 A) HQP-H (15–70 A) QBHW-H QPHW-H EHD FDB PDG2xF (15–150 A) [1]	BAB-H (15–70 A) HQP-H (15–70 A) QBHW-H QPHW-H	GB, GHB EHD FD, FDE FDB ED JD, JDB EGS PDG2xF [1] PDG2xG [1] PDD2xG [1]	BAB-H HQP-H QBHW-H QPHW-H	GB, GHB EHD FD, FDE FDB HFD, EDB, EDS ED, HFDE EDH JD, JDB HJD, EGS, EGH PDG2xF [1] PDG2xG [1] PDG2xM [1] PDD2xF [1] PDD2xG [1] PDD2xM [1]	
400				**DK, KD, KDB, CKD, PDD3xG [1], PDG3xG [1], PDF3xG [1]**		**HKD, CHKD, PDG3xM [1], PDF3xM [1]**	**KDC, PDG3xP [1]**	**KDC, PDG3xP [1]**	**LCL**	
				BAB-H HQP-H QBHW-H QPHW-H EHD FDB EDS EDB PDG2xF (15–150 A) [1] PDD2xF [1] PDD2xG [1]		QBHW-H QPHW-H GB, GHB EHD FDB FD, FDE ED, EDB, EDS JD, JDB DK, KD, KDB, CKD EGS [3] PDG2xF [1] PDG2xG [1] PDD2xF [1] PDD2xG [1] PDD3xG [1] PDG3xG [1] PDF3xG [1]	QBHW-H QPHW-H	GB, GHB EHD FDB FD, FDE HFD, HFDE ED, EDB, EDS, EDH JD, JDB HJD DK, KD, KDB HKD EGS, EGH PDG2xF [1] PDG2xG [1] PDG2xM [1] PDD2xF [1] PDD2xG [1] PDD2xM [1] PDD3xG [1] PDG3xG [1] PDG3xM [1]	BAB-H HQP-H QBHW-H QPHW-H GB, GHB EHD FDB FD, FDE HFD, HFDE ED, EDB, EDS, EDH JD, JDB HJD DK, KD, KDB HKD PDG2xF [1] PDG2xG [1] PDG2xM [1] PDD2xF [1] PDD2xG [1] PDD2xM [1] PDD3xG [1] PDG3xG [1] PDG3xM [1]
500						**NB-P**				
						JD, JDB DK, KD, KDB, CKD PDD3xG [1] PDG3xG [1] PDF3xG [1]				

Notes

[1] Where x = 2 or 3.
[2] Valid on 2- and 3-pole breakers only. Not valid for single-pole.
[3] Not valid with CHKD or PDF3xM.

240 Volts AC—Breaker/Breaker Series Ratings, continued

Main devices shown in shaded area, centered at top. Respective branch devices shown directly below.
For 120/240 Volts AC branch breakers, see **Page V2-T3-17**.

Main Breaker Maximum Amperes	Series Equipment Rating – kA Symmetrical											
	18	22	42	65		100			200			
600				**LGH, LGC**	**LGU**	**HLD, HLDB, CHLD**		**LGU**	**LDC**	**LGC**		
				EHD ② FDB ED (15–100 A) FD ②, FDE	EHD ② FDB ED (15–100 A) FD ②, FDE	GB ②, GHB ② EHD FD, FDE ED, EDB, EDS JD, JDB DK, KD, KDB, CKD LD, LDB, CLD PDG2xF (15–100 A) ① PDG2xG ① PDD2xF ① PDD2xG ① PDD3xG ① PDG3xG ① PDF3xG ①		ED, EDB, EDS, EDH PDD2xF ① PDD2xG ① PDD2xM ①	ED, EDB, EDS, EDH PDD2xF ① PDD2xG ① PDD2xM ①	ED, EDB, EDS, EDH	
				PDG3xM ①, PDG3xP ①	PDD2xG (15–100 A) ① PDG2xF ① PDG2xG ①					**PDG3xP ①**	PDD2xG ① PDD2xM ①	
800						**NB-P**	**HMDL, CHMDL, PDG4xM ①, PDF4xM ①**					
						DK, KD, KDB, CKD PDD3xG ① PDG3xG ① PDF3xG ①	EHD FD, FDE PDG2xF (15–100 A) ① PDG2xG ①					
1200						**HND, CHND, NGH, NGH-C, PDG5xM ①, PDF5xM ①**			**NDC, NGC, PDG5xP ①**			
						EHD ED, EDB, EDS PDG2xF (15–100 A) ① PDD2xF ① PDD2xG ①			ED, EDB, EDS, EDH PDD2xF ① PDD2xG ① PDD2xM ①		
2500						**RD, PDG6xM ①**			**RDC, RGC, PDG6xP ①**			
						ED, EDB, EDS PDD2xF ① PDD2xG ①			ED, EDB, EDS, EDH PDD2xF ① PDD2xG ① PDD2xM ①			

Notes

① Where x = 2 or 3.
② Valid on 2- and 3-pole breakers only. Not valid for single-pole.
③ Not valid with CHKD or PDF3xM.

277 Volts AC—Breaker/Breaker Series Ratings

Main devices shown in shaded area, centered at top. Respective branch devices shown directly below. All ratings in this table apply to single-pole branch devices only. For 277/480 Volts AC branch breakers, see **Page V2-T3-25**.

Main Breaker Maximum Amperes	Series Equipment Rating—kA Symmetrical						
	22	25	35	65	100		150
100							**FCL** GHB GHQ (15–20 A) ⑥, GHQRSP EHD FD (15–100 A) HFD (15–100 A) PDG2yF (15–100 A) ① PDG2yG (15–100 A) ① PDG2yM (15–100 A) ①
125			**EGS** GHB GHQ (15–20 A) ⑥	**EGH** GHB GHQ (15–20 A) ⑥			
225			**FD, FDE, PDG2xG** ② GHB GHQ (15–20 A) ⑥ GHQRSP GHBGFEP ③	**HFD, HFDE, PDG2xM** ② GHB GHQ (15–20 A) ⑥ GHQRSP GHBGFEP EHD FD (15–150 A) PDG2yF (15–100 A) ① PDG2yG (15–150 A) ①	**FDC, FDCE, PDG2xP** ② GHB EHD FD (15–150 A) HFD (15–150 A) PDG2yF (15–100 A) ① PDG2yG (15–150 A) ① PDG2yM (15–150 A) ①		
250	**JD, JDB** GHB		**JD, JDB** GHB GHBGFEP ④	**HJD** GHB GHBGFEP EHD FD (15–150 A) PDG2yF (15–100 A) ① PDG2yG (15–150 A) ①	**LCL** GHBS GHQRSP	**JDC** GHB EHD FD (15–150 A) HFD (15–150 A) PDG2yF (15–100 A) ① PDG2yG (15–150 A) ① PDG2yM (15–150 A) ①	
400	**KD, KDB, CKD, PDG3xG** ②, **PDF3xG** ② GHB	**KD, KDB, CKD, HKD, CHKD, PDG3xG** ②, **PDG3xM** ②, **PDF3xG** ②, **PDF3xM** ② GHB ⑤	**KD, KDB, CKD, PDG3xG** ②, **PDF3xG** ② GHB EHD FD (15–150 A) PDG2yF (15–100 A) ① PDG2yG (15–150 A) ①	**HKD, CHKD, PDG3xM** ②, **PDF3xM** ② GHB GHQ (15–20 A) ⑥ EHD FD (15–150 A) PDG2yF (15–100 A) ① PDG2yG (15–150 A) ①	**KDC, PDG3xP** ② GHB EHD FD (15–150 A) HFD (15–150 A) PDG2yF (15–100 A) ① PDG2yG (15–150 A) ① PDG2yM (15–150 A) ①		**LCL** GHB EHD FD (15–150 A) HFD (15–150 A) PDG2yF (15–100 A) ① PDG2yG (15–150 A) ① PDG2yM (15–150 A) ①

Notes

① Where y = 1 or 2.
② Where x = 2 or 3.
③ Not valid with FDE.
④ Not valid with JDB.
⑤ Valid on 2- and 3-pole breakers only. Not valid for single-pole.
⑥ 1 pole only.

277/480 Volts AC—Breaker/Breaker Series Ratings

Main devices shown in shaded area, centered at top. Respective branch devices shown directly below.
For 277 Volts AC branch breakers, see **Page V2-T3-24**.

Main Breaker Maximum Amperes	Series Equipment Rating—kA Symmetrical					
	22	25	35	65	100	150
100						**FCL** GHB GHQRSP EHD FD (15–100 A) HFD (15–100 A) PDG2yF (15–100 A) ① PDG2yG (15–100 A) ① PDG2yM (15–100 A) ①
125			**EGS**	**EGH**		
			GHB	GHB		
225			**FD, FDE, PDG2xG** ②	**HFD, HFDE, PDG2xM** ②	**FDC, FDCE, PDG2xP** ②	
			GHB, GHQRSP	GHB, GHQRSP	GHB	
250	**JD, JDB**		**JD, JDB**	**HJD**	**JDC**	
	GHB		GHB (15–50 A)	GHB (15–50 A)	GHB	
400	**KD, KDB, CKD, PDG3xG** ②, **PDF3xG** ②	**KD, KDB, CKD, HKD, CHKD, PDG3xG** ②, **PDG3xM** ②, **PDF3xG** ②, **PDF3xM** ②	**KD, KDB, CKD, PDG3xG** ②, **PDF3xG** ②	**HKD, CHKD, PDG3xM** ②, **PDF3xM** ②	**KDC, PDG3xP** ②	**LCL**
	GHB	GHB	GHB (15–50 A)	GHB (15–50 A)	GHB	GHB

Notes

① Where y = 1 or 2.
② Where x = 2 or 3.

480 Volts AC—Breaker/Breaker Series Ratings

Main devices shown in shaded area, centered at top. Respective branch devices shown directly below. All ratings in this table apply to 2- and 3-pole branch devices only. For 277/480 Volts AC branch breakers, see **Page V2-T3-25**.

Main Breaker Maximum Amperes	Series Equipment Rating—kA Symmetrical				
	25	35	65	100	150
100				**FB-P** EHD FDB FD, FDE (15–100 A) HFD, HFDE (15–100 A) PDG2xF (15–100 A) ① PDG2xG (15–100 A) ① PDG2xM (15–100 A) ①	**FCL** EHD FDB FD, FDE (15–100 A) HFD, HFDE (15–100 A) PDG2xF (15–100 A) ① PDG2xG (15–100 A) ① PDG2xM (15–100 A) ①
200				**LA-P** EHD FDB FD, FDE (15–200 A) HFD, HFDE (15–200 A) JD, JDB HJD PDG2xF (15–200 A) ① PDG2xG (15–200 A) ① PDG2xM (15–200 A) ①	
225		**FD, FDE, PDG2xG** ① EHD FDB PDG2xF (15–150 A) ①	**HFD, HFDE, PDG2xM** ① EHD FDB FD, FDE EGS PDG2xF (15–150 A) ① PDG2xG ①	**FDC, FDCE, PDG2xP** ① EHD FDB FD HFD, HFDE EGS, EGH ② PDG2xF (15–150 A) ① PDG2xG ① PDG2xM ①	
250	**JD, JDB** FDB PDG2xF (15–150 A) ①		**HJD** EHD FDB FD, FDE JD, JDB EGS PDG2xF ① PDG2xG ①	**JDC** EHD FDB FD, FDE HFD, HFDE JD, JDB HJD EGS, EGH PDG2xF ① PDG2xG ① PDG2xM ①	**LCL** EHD FDB FD, FDE HFD, HFDE FDC, FDCE JD, JDB HJD PDG2xF ① PDG2xG ① PDG2xM ① PDG2xP ①

Notes

① Where x = 2 or 3.
② Not valid with FDCE.
③ Not valid with CHKD or PDF3xM.
④ Valid on 2- and 3-pole breakers only. Not valid for single-pole.

480 Volts AC—Breaker/Breaker Series Ratings, continued

Main devices shown in shaded area, centered at top. Respective branch devices shown directly below. All ratings in this table apply to 2- and 3-pole branch devices only. For 277/480 Volts AC branch breakers, see **Page V2-T3-25**.

Main Breaker Maximum Amperes	Series Equipment Rating—kA Symmetrical								
	25	35		65			100		150
400		**KD, KDB, CKD, PDG3xG ①, PDF3xG ①**		**HKD, CHKD, PDG3xM ①, PDF3xM ①**			**KDC, PDG3xP ①**	**LA-P**	**LCL**
		EHD FDB FD, FDE PDG2xF ① PDG2xG ①		EHD FDB FD, FDE JD, JDB KD, KDB CKD EGS ③ PDG2xF ① PDG2xG ① PDG3xG ① PDF3xG ①			EHD FDB FD, FDE HFD, HFDE JD, JDB HJD KD, KDB HKD EGS, EGH CKD CHKD PDG2xF ① PDG2xG ① PDG2xM ① PDG3xG ① PDG3xM ① PDF3xG ① PDF3xM ①	JD, JDB HJD KD, KDB HKD CKD CHKD PDG3xG ① PDG3xM ① PDF3xG ① PDF3xM ①	EHD FDB FD, FDE HFD, HFDE FDC, FDCE JD, JDB HJD KD, KDB HKD CKD CHKD PDG2xF ① PDG2xG ① PDG2xM ① PDG2xP ① PDG3xG ① PDG3xM ① PDF3xG ① PDF3xM ①
500							**NB-P**		
							JD, JDB HJD KD, KDB HKD CKD CHKD PDG3xG ① PDG3xM ① PDF3xG ① PDF3xM ①		
600		**LD, LDB, CLD**	**LGE, LGS, LGH**	**HLD, HLDB, CHLD, PDG3xG ①, PDG3xK ①**	**LGH**	**PDG3xM ①**			
		FD, FDE JD, JDB PDG2xG ①	FD ④, FDE JD, JDB	KD, KDB LD, LDB CKD CLD PDG3xG ① PDF3xG ①	KD, KDB LD, LDB CKD CLD	LD, LDB CLD PDG3xG ① PDF3xG ①			
		PDG3xG ①, PDG3xK ①, PDG3xM ①	**PDG3xG ①, PDG3xM ①**	**PDG3xM ①**					
		PDG2xG ① JD, JDB	JD, JDB PDG2xG ①	JD, JDB LD, LDB CLD PDG2xF ① PDG2xG ① PDG3xG ① PDF3xG ①					

Notes

① Where x = 2 or 3.
② Not valid with FDCE.
③ Not valid with CHKD or PDF3xM.
④ Valid on 2- and 3-pole breakers only. Not valid for single-pole.

600 Volts AC—Breaker/Breaker Series Ratings

Main devices shown in shaded area, centered at top. Respective branch devices shown directly below.
All ratings in this table apply to 2- and 3-pole branch devices only.

Main Breaker Maximum Amperes	Series Equipment Rating—kA Symmetrical					
	18	25	35	42	50	100
225	**FD, FDE, PDG2xG** ①		**FDC**			
	FDB PDG2xF (15–150 A) ①		FDB FD, FDE HFD, HFDE			
250	**JD, JDB**		**JDC**			**LCL**
	FDB PDG2xF (15–100 A) ①		FDB FD, FDE (15–150 A) HFD, HFDE (15–150 A) JD, JDB HJD PDG2xF (15–150 A) ① PDG2xG (15–150 A) ① PDG2xM (15–150 A) ①			FDB FD, FDE HFD, HFDE FDC JD, JDB HJD PDG2xF ① PDG2xG ① PDG2xM ① PDG2xP ①
400			**HKD, CHKD, PDG3xM ①, PDF3xM ①**	**KDC, PDG3xP ①**	**KDC, PDG3xP ①**	**LCL**
			FDB FD, FDE (15–150 A) HFD, HFDE (15–150 A) JD, JDB HJD PDG2xF (15–150 A) ① PDG2xG (15–150 A) ① PDG2xM (15–150 A) ① **KD** JD, JDB	FDB FD, FDE (15–150 A) HFD, HFDE (15–150 A) PDG2xF (15–150 A) ① PDG2xG (15– 150 A ① PDG2xM (15–150 A) ①	FD, FDE HFD, HFDE HJD KD, KDB HKD CKD CHKD PDG2xG ① PDG2xM ① PDG3xG ① PDG3xM ① PDF3xG ① PDF3xM ①	FDB FD, FDE HFD, HFDE FDC JD, JDB HJD JDC KD, KDB HKD KDC CKD CHKD PDG2xF ① PDG2xG ① PDG2xM ① PDG2xP ① PDG3xG ① PDG3xM ① PDG3xP ① PDF3xG ① PDF3xM ①
600		**CLD**	**HLD, HLDB, CHLD**	**LGH, LGC**		
		JD, JDB KD CKD PDF3xG ①	KD, KDB CKD LD, LDB CLD PDG3xG ① PDF3xG ① **PDG3xM ①, PDG3xP ①** PDG3xG ① PDF3xG ①	KD, KDB CKD **LGU** KD, KDB CKD PDG3xG ① PDF3xG ①		

Note

① Where x = 2 or 3.

120/240 Volts AC—Fuse/Breaker Series Ratings

Main fuse class shown in shaded area, centered at top. Respective branch devices shown directly below.

Main Fuse Maximum Amperes	Series Equipment Rating—kA Symmetrical									
	65			100			200			
100									**R**	
									BAB HQP QBHW QPHW GB GHB	
200	**J**		**T**			**R**	**J**		**T**	
	QB–AFGF (15–20 A) ① QB–CAF (15–20 A) ① QB–EP (15–20 A) ① QB–GF (15–20 A) ① QBH–AFGF (15–20 A) ① QBH–CAF (15–20 A) ① QBH–EP (15–20 A) ① QBH–GF (15–20 A) ①		QB–AFGF (15–20 A) ① QB–CAF (15–20 A) ① QB–EP (15–20 A) ① QB–GF (15–20 A) ① QBH–AFGF (15–20 A) ① QBH–CAF (15–20 A) ① QBH–EP (15–20 A) ① QBH–GF (15–20 A) ①			GB GHB	BAB HQP QBHW QPHW		BAB HQP QBHW QPHW	
400				**J**	**T**			**J**		**T**
				BAB HQP QBHW QPHW	BAB HQP QBHW QPHW			GB GHB		GB GHB

Note

① Type ETN02 only.

240 Volts AC—Fuse/Breaker Series Ratings

Main fuse class shown in shaded area, centered at top. Respective branch devices shown directly below.
For 120/240 Volts AC branch breakers, see **Page V2-T3-29**.

Main Fuse Maximum Amperes	Series Equipment Rating—kA Symmetrical								
	100				200				
100								**R**	
								BAB-H HQP-H QBHW-H QPHW-H GHB	
200					**J**		**T**	**R**	
					BAB-H HQP-H QBHW-H QPHW-H		BAB-H HQP-H QBHW-H QPHW-H	GHB ①	
400					**J**		**T**		
					GHB		GHB		
6000			**L**						
			EHD FDB FD, FDE (15–150 A) JD, JDB DK, KD, KDB PDG2xF (15–100 A) ② PDG2xG (15–150 A) ② PDG3xG ② PDD3xG ②						

Notes

① Valid on 2- and 3-pole breakers only. Not valid for single-pole.
② Where x = 2 or 3.

277 Volts AC—Fuse/Breaker Series Ratings

Main fuse class shown in shaded area, centered at top. Respective branch devices shown directly below.
All ratings in this table apply to single-pole branch breakers only. For 2- and 3-pole branch breakers, consult other tables.

Main Fuse Maximum Amperes	Series Equipment Rating—kA Symmetrical									
	65			100				200		
100				**J**	**T**			**R**		
				GHBS GHQ (15–20 A) ② GHQRSP	GHBS GHQ (15–20 A) ② GHQRSP			GHB GHQ (15–20 A) ②		
200	**J**	**T**		**J**	**T**	**R**				
	GHBS GHQ (15–20 A) ② GHQRSP	GHBS GHQ (15–20 A) ② GHQRSP		EHD FD, FDE (15–150 A) HFD, HFDE (15–150 A) FDC, FDCE (15–150 A) PDG2xF (15–100 A) ① PDG2xG (15–150 A) ① PDG2xM (15–150 A) ① PDG2xP (15–150 A) ①	EHD FD, FDE (15–150 A) HFD, HFDE (15–150 A) FDC, FDCE (15–150 A) PDG2xF (15–100 A) ① PDG2xG (15–150 A) ① PDG2xM (15–150 A) ① PDG2xP (15–150 A) ①	GHB				
400								**J**	**T**	
								GHB	GHB	

Notes

① Where x = 2 or 3.
② 1 pole only.

277/480 Volts AC—Fuse/Breaker Series Ratings

Main fuse class shown in shaded area, centered at top. Respective branch devices shown directly below. All ratings in this table apply to 2- and 3-pole branch devices only. For single-pole, 277 Volts AC branch breakers, see **Page V2-T3-30**.

Main Fuse Maximum Amperes	Series Equipment Rating—kA Symmetrical									
	65			100			200			
100				**J**	**T**					**R**
				GHBS	GHBS					GHB
200	**J**	**T**			**R**					
	GHBS	GHBS			GHB					
400							**J**	**T**		
							GHB	GHB		
600				**J**	**T**					
				EHD FD, FDE (15–150 A) HFD, HFDE (15–150 A) FDC, FDCE (15–150 A) PDG2xF (15–100 A) ① PDG2xG (15–150 A) ① PDG2xM (15–150 A) ① PDG2xP (15–150 A) ①	GHB EHD FD, FDE (15–150 A) HFD, HFDE (15–150 A) FDC, FDCE (15–150 A) JD HJD JDC PDG2xF (15–100 A) ① PDG2xG (15–150 A) ① PDG2xM (15–150 A) ① PDG2xP (15–150 A) ①				

Note

① Where x = 2 or 3.

480 Volts AC—Fuse/Breaker Series Ratings

Main fuse class shown in shaded area, centered at top. Respective branch devices shown directly below.
All ratings in this table apply to 2- and 3-pole branch breakers only. Not valid for single-pole branch breakers.

Main Fuse Maximum Amperes	Series Equipment Rating—kA Symmetrical	
	100	200
100	**R**	
	EHD PDG2xF (15–100 A) ①	
200	**J**	**T**
	EHD PDG2xF (15–100 A) ①	EHD PDG2xF (15–100 A) ①

Note

① Where x = 2 or 3.

600 Volts AC—Fuse/Breaker Series Ratings

Main fuse class shown in shaded area, centered at top. Respective branch devices shown directly below.
All ratings in this table apply to 2- and 3-pole branch devices only.

Main Fuse Maximum Amperes	Series Equipment Rating—kA Symmetrical				
	100			200	
100	**R**				
	FD, FDE (15–150 A) HFD, HFDE (15–150 A) FDC (15–150 A) PDG2xG (15–150 A) ① PDG2xM (15–150 A) ① PDG2xP (15–150 A) ①				
200	**J**	**T**	**R**		
	FD, FDE (15–150 A) HFD, HFDE (15–150 A) FDC (15–150 A) PDG2xG (15–150 A) ① PDG2xM (15–150 A) ① PDG2xP (15–150 A) ①	FD, FDE (15–150 A) HFD, HFDE (15–150 A) FDC (15–150 A) PDG2xG (15–150 A) ① PDG2xM (15–150 A) ① PDG2xP (15–150 A) ①	JD HJD JDC		
400	**J**	**T**	**R**		
	JD HJD JDC	JD HJD JDC	KD HKD KDC PDG3xG ① PDG3xM ① PDG3xP ①		
600				**J**	**T**
				KD HKD KDC PDG3xG ① PDG3xM ① PDG3xP ①	KD HKD KDC PDG3xG ① PDG3xM ① PDG3xP ①

Note

① Where x = 2 or 3.

Triple Series Ratings—Main Fuse

Main Fuse Class and Maximum Amperes	Tenant Main Type	Branch Type	System Voltage	Short-Circuit Series Rating (kA, Sym.)
T-600	BRH	QB–AFGF ④, QB–CAF ④ ⑤, QB–EP ④ ⑤, QB–GF ④, QBH–AFGF ④, QBH–CAF ④ ⑤, QBH–EP ④ ⑤, QBH–GF ④	120/240	100
T-1200	BRHX, BRHH	QB–AFGF ④, QB–CAF ④ ⑤, QB–EP ④ ⑤, QB–GF ④, QBH–AFGF ④, QBH–CAF ④ ⑤, QBH–EP ④ ⑤, QBH–GF ④	120/240	100
L-6000	DK, KD, KDB	EHD ①, PDG2xF (15–100 A) ②	240	100
L-6000	DK, KD, KDB, PDD3xG ②, PDG3xG ②	GB, GHB	120/240	100
L-6000	DK, KD, KDB, PDD3xG ②, PDG3xG ②	FD ①, FDE ①, FDB ①, PDG2xF (15–100 A) ②, PDG2xG (15–150 A) ②	240	100
L-6000	DK, KD, KDB, PDD3xG ②, PDG3xG ②	JD, JDB	240	100
L-6000	JD, JDB	GB, GHB	240	100
L-6000	JD, JDB	GB, GHB	120/240	100
L-6000	FD (15–150 A)	GB, GHB	240	100
L-6000	FD (15–150 A), PDG2xG (15–150 A) ②	GB, GHB	120/240	100
L-6000	FD (15–150 A)	BAB-H, HQP-H, QBHW-H, QPHW-H	240	100
L-6000	FDB	BAB-H, HQP-H	240	100
L-6000	FD (15–150 A), PDG2xG (15–150 A) ②	BAB ③, HQP ③, QBHW ③, QPHW ③	120/240	100
L-6000	FDB, PDG2xF (15–100 A) ②	BAB ③, HQP ③	120/240	100
L-6000	EHD	BAB-H, HQP-H	240	100
L-6000	EHD, PDG2xF (15–100 A) ②	BAB, HQP ③	120/240	100

Notes

① Valid on 2- and 3-pole breakers only. Not valid for single-pole.
② Where x = 2 or 3.
③ 1-pole restricted to 15–70 A.
④ Type ETN02 only.
⑤ 20 A maximum.

Triple Series Ratings—Main Breaker

Main Type	Tenant Main Type	Branch Type	System Voltage	Short-Circuit Series Rating (kA, Sym.)
LGE. LGS, LGH, PDG3xG ①, PDG3xM ①	BRHX	BAB	120/240	65
LGE, LGS, LGH, PDG3xG ①, PDG3xM ①	BRHX	QB–AFGF ②, QB–CAF ② ③, QB–EP ② ③, QB–GF ②, QBH–AFGF ②, QBH–CAF ② ③, QBH–EP ② ③, QBH–GF ②	120/240	65

Notes

① Where x = 2 or 3.
② Type ETN02 only.
③ 20 A maximum.

Type PRL1X

Contents

Type PRL1X

Product Description

- 240 Vac maximum
- Three-phase four-wire, three-phase three-wire, single-phase three-wire, single-phase two-wire
- 600 A maximum mains
- 100 A maximum branch breakers
- Bolt-on or plug-on branch breakers
- Each branch connector is capable of up to a total of 140 A maximum by breaker ampere rating
- Factory assembled
- Refer to **Page V2-T3-7** for additional information

Application Description

- Lighting branch panelboard
- Fully rated or series rated
- Interrupting ratings up to 200 kA symmetrical
- Suitable for use as Service Entrance Equipment, when specified on the order
- See **Pages V2-T3-7** through **V2-T3-32** for additional information

Standards and Certifications

- UL 67, UL 50
- CSA C22.2 No. 29
- Federal Specification W-P-115c
- Refer to **Page V2-T3-10** for additional information

Listed

Product Selection

Type PRL1X

3

PRL1X

Ampere Rating	Interrupting Rating (kA Sym.) 240 Vac	Breaker Type
Main Lug Only		
100	—	—
225	—	—
400	—	—
600	—	—
Main Breaker		
100	10	BAB
100	35	PDG2xF
100	22	QBHW
100	35	PDD2xF
100	65	PDD2xG
100	65	PDG2xG
100	100	PDD2xM
100	100	PDG2xM
225	35	PDD2xF
225	65	PDD2xG
225	100	PDD2xM
400	65	PDD3xG ⑨
400	65	PDG3xG* ⑨
400	100	PDG3xM* ⑨
400	100	LHH
400	200	PDG3xP* ⑨
600	65	PDG3xG* ⑨
600	85	LGS
600	100	PDG3xM* ⑨
600	200	PDG3xP* ⑨

PRL1X Branch Circuit Breakers

Bolt-on = BAB, QBHW, QBGF, QBHGF, QBGFEP, QBHGFEP, QBAF, QBAG, QBHAF, QBHAG
Plug-on = HQP, QPHW, QPGF, QPHGF, QPGFEP, QPHGFEP

Ampere Rating	Interrupting Rating (kA Sym.) 240 Vac ①	Breaker Type
15–60	10	BAB, HQP
70	10	BAB, HQP
80–100	10	BAB, HQP
15–50 ②	10	QBGF, QPGF ③
15–50 ②	10	QBGFEP, QPGFEP ④
15–20	10	QBCAF ⑤
15–60	10	BAB-D, HQP-D ⑥
15–30	10	BAB-C, HQP-B ⑦
15–30	10	BABRP ⑧
15–30	10	BABRSP ⑧
15–60	22	QBHW, QPHW
70	22	QBHW, QPHW
80–100	22	QBHW, QPHW
15–30	22	QBHGF, QPHGF ③
15–30	22	QBHGFEP, QPHGFEP ④
15–20	22	QBHCAF ⑤
Provision	—	—

Notes

① Single-pole breakers are rated 120 Vac maximum.
② 50 A devices are available as two-pole only.
③ GFCI for 5 mA personnel protection.
④ GFP for 30 mA equipment protection.
⑤ Arc fault circuit breaker.
⑥ HID (High Intensity Discharge) rated breaker.
⑦ Switching Neutral Breaker. single-pole device requires two-pole space, two-pole device requires three-pole space.
⑧ Remote operated circuit breaker.
⑨ The 400 A frame must use trip units of ratings 0100–0400, while the 600 A frame must use trip units of ratings 0500, 0600 or designated by H, such as H250. The H as the leading character of the ampacity indicates a high instantaneous version of the breaker for coordination purposes. H ratings must use 600 A frame.

Box Sizing and Selection

Approximate Dimensions in Inches (mm)

Assembled Circuit Breaker Panelboards and Lighting Controls

Box size and box and trim catalog numbers for all standard panelboard types are found on **Page V2-T3-36**.

Instructions

1. Using description of the required panelboard, select the rating and type of main required.
2. Count the total number of branch circuit poles, including provisions, required in the panelboard. Do not count main breaker poles. Convert two- or three-pole branch breaker to single-poles, i.e., three-pole breaker, count as three poles. Determine sub-feed breaker or through-feed lug requirements.
3. Select the main ampere rating section from table on **Page V2-T3-36**.
4. Select panelboard type from first column, main breaker frame, if applicable, from second column, and sub-feed breaker frame, if applicable, from the third column.
5. From Step #2, determine the number of branch circuits in Column 4.
6. Read box size, box and trim catalog numbers across columns to the right. Specify surface or flush mounting on the order.

Cabinets

Fronts are code-gauge steel, ANSI-61 light gray painted finish.

Boxes are code-gauge galvanized steel without knockouts. Standard depth is 5-3/4 inches (146.1 mm). Standard width is 20 inches (508.0 mm). An optional 28-inch (711.2 mm) wide box is available.

Top and Bottom Gutters

5-1/2 inches (139.7 mm) minimum.

Approximate Dimensions in Inches (mm)

PRL1X Panelboard Sizing

Panelboard Types	Main Breaker Types and Mounting Position (H) = Horizontal (V) = Vertical	Sub-Feed Breaker Types and Mounting Position (H) = Horizontal (V) = Vertical	Maximum No. of Branch Circuits Including Provisions	Box Dimensions ① Height	Width	Depth	YS Box Catalog Number	LT Trim Catalog Number	EZ Box Catalog Number	EZ Trim Catalog Number
100 A										
Main breaker	BAB, QBHW (H)	—	15	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		—	27	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		—	39	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		—	42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
Main lugs or main breaker	PDG2xF PDG2xG, PDG2xM (V)	—	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		—	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		—	42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
Main lugs or main breaker with 100 A through-feed lugs or sub-feed breaker	PDG2xF PDG2xG PDG2xM (V)	PDG2xF PDG2xG PDG2xM (V)	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
			30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
			42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
225 A										
Main lugs or main breaker	PDD2xF, PDD2xG, PDD2xM, PDG2xG, PDG2xM (V)	—	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		—	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		—	42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
Main lugs or main breaker with 225 A throughfeed lugs or sub-feed breaker	PDG2xG, PDG2xM, PDD2xG PDD2xM (V)	PDG2xG, PDG2xM, PDD2xG PDD2xM (V)	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
			30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
			42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
400 A										
Main breaker	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP*, LHH (V)	—	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		—	30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		—	42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
Main lugs or main breaker with 225 A through-feed lugs or sub-feed breaker	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP*, LHH (V)	PDG2xG, PDG2xM, PDD2xG PDD2xM (V)	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
			30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
			42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
Main breaker with 400 A through-feed lugs or sub-feed breaker	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP*, LHH (V)	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP* (V)	18	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			30	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			42	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**
600 A										
Main breaker	PDG3xG* LGS, PDG3xM* PDG3xP* (V)	—	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		—	30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		—	42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
Main lugs or main breaker with 225 A through-feed lugs or sub-feed breaker	PDG3xG*, LGS PDG3xM*, PDG3xP*, (V)	PDG2xG, PDG2xM PDD2xG, PDD2xM (V)	18	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			30	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			42	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**
Main breaker with 400 A through-feed lugs or sub-feed breaker	PDG3xG*, LGS, PDG3xM*, PDG3xP*, (V)	PDD3xG*, PDG3xG* PDG3xM* PDG3xP* (V)	18	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			30	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**
			42	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**
Main breaker with 600 A through-feed lugs or sub-feed breaker	PDG3xG*, LGS PDG3xM*, PDG3xP* (V)	PDG3xG*, LGS PDG3xM*, PDG3xP (V)	18	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			30	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**
			42	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**

Note

① Smaller panelboard box sizes are available if required. Contact Eaton for application information.

Type PRL1XF

Contents

Type PRL1XF

Product Description

- 240 Vac maximum
- 400 A maximum mains
- Three-phase four-wire, single-phase three-wire
- 30 A maximum branch devices
- Factory assembled

Application Description

- Lighting branch panelboards
- Instrument protection
- Fully rated
- Interrupting ratings up to 200 kA symmetrical when protected by fuse

Standards and Certifications

- UL 67, UL 50

UL Listed

Product Selection

Type PRL1XF

PRL1XF

Ampere Rating	Interrupting Rating (kA Sym.) 240 Vac	Breaker Type
Main Lug Only		
100	—	—
225	—	—
400	—	—
Main Breaker		
100	18	PDG2xF
100	35	PDD2xF
100	65	PDD2xG
100	65	PDG2xG
100	100	PDD2xM
100	100	PDG2xM
225	35	PDD2xF
225	65	PDD2xG
225	65	PDG2xG
225	100	PDD2xM
225	100	PDG2xM
400	65	PDD3xG*
400	65	PDG3xG*
400	100	PDG3xM*
400	200	PDG3xP*
400	200	LHH

PRL1XF—Branch Overcurrent Devices

Hybrid breaker/fuse (Class CC) branch device

Ampere Rating	Interrupting Rating	Breaker Type
30	200	Hybrid

Box Sizing and Selection

Approximate Dimensions in Inches (mm)

Assembled Circuit Breaker Panelboards

Box size and box and trim catalog numbers for all standard panelboard types are found on **Page V2-T3-39**.

Instructions

1. Using description of the required panelboard, select the rating and type of main required.
2. Count the total number of branch circuit poles, including provisions, required in the panelboard.

   Determine through-feed lug requirements.
3. Select the main ampere rating section from table on **Page V2-T3-39**.
4. Select panelboard type from first column, main breaker frame.
5. From Step #2, determine the number of branch circuits in Column 4.
6. Read box size, box and trim catalog numbers across columns to the right. Specify surface or flush mounting on the order.

Cabinets

Fronts are code-gauge steel, ANSI-61 light gray painted finish.

Boxes are code-gauge galvanized steel without knockouts. Standard depth is 5-3/4 inches (146.1 mm). Standard width is 20 inches (508.0 mm). An optional 28-inch (711.2 mm) wide box is available.

Top and Bottom Gutters

5-1/2 inches (139.7 mm) minimum.

Approximate Dimensions in Inches (mm)

PRL1XF Panelboard Sizing

Panelboard Types	Main Breaker Types and Mounting Position (H) = Horizontal (V) = Vertical	Maximum No. of Branch Circuits Including Provisions	Box Dimensions ① Height	Width	Depth	YS Box Catalog Number	LT Trim Catalog Number	EZ Box Catalog Number	EZ Trim Catalog Number
100 A									
Main lugs or main breaker	PDG2xF PDG2xG, PDG2xM (V)	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
Main lugs or main breaker with 100 A through-feed lugs	PDG2xF PDG2xG PDG2xM (V)	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
225 A									
Main lugs or main breaker	PDD2xF, PDD2xG, PDD2xM, PDG2xG, PDG2xM (V)	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
Main lugs or main breaker with 225 A through-feed lugs	PDG2xG, PDG2xM, PDD2xG, PDD2xM (V)	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
400 A									
Main breaker	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP*, LHH (V)	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
Main lugs or main breaker with 225 A through-feed lugs	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP*, LHH (V)	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
Main breaker with 400 A through-feed lugs	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP*, LHH (V)	18	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
		30	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
		42	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**

Note

① Smaller panelboard box sizes are available if required. Contact Eaton for application information.

Type PRL1X-LX, Column Type

Contents

Type PRL1X-LX

Product Description

- 240 Vac maximum
- Three-phase four-wire, three-phase three-wire, single-phase three-wire, single-phase two-wire
- 225 A maximum mains
- 100 A maximum branch breakers
- Bolt-on branch breakers
- Factory assembled
- Refer to **Page V2-T3-7** for additional information

Application Description

- Lighting branch panelboard
- Column mounting width
- Fully rated or series rated
- Interrupting ratings up to 200 kA symmetrical
- See **Pages V2-T3-7** through **V2-T3-32** for additional information

Standards and Certifications

- UL 67, UL 50
- CSA C22.2 No. 29
- Federal Specification W-P-115c
- Refer to **Page V2-T3-10** for additional information

Listed

Product Selection

Type PRL1X-LX

PRL1X-LX

Ampere Rating	Interrupting Rating (kA Sym.) 240 Vac	Breaker Type
Main Lug Only		
100	—	—
225	—	—
Main Breaker		
100	10	BAB
100	35	PDG2xF
100	22	QBHW
100	35	PDD2xF
100	65	PDD2xG
100	65	PDG2xG
100	100	PDD2xM
100	100	PDG2xM
255	35	PDD2xF
225	65	PDD2xG
225	100	PDD2xM

Branch Circuit Breakers—PRL1X-LX ①

Ampere Rating	Interrupting Rating (kA Sym.) 240 Vac ②	Breaker Type
15–60	10	BAB
70	10	BAB
80–100	10	BAB
15–50 ③	10	QBGF ④
15–50 ③	10	QBGFEP ⑤
15–20	10	QBCAF ⑥
15–30	10	BABRP ⑦
15–30	10	BABRSP ⑦
15–60	22	QBHW
70	22	QBHW
80–100	22	QBHW
15–30	22	QBHGF ④
15–30	22	QBHGFEP ⑤
15–20	22	QBHCAF ⑥
Provision	—	—

Pull Box With Extension Trough

Includes pull box with trough extension. For additional trough extensions, refer to table below.

Description	Catalog Number
Pullbox with 36-inch trough	**XCTXB036**
Pullbox with 48-inch trough	**XCTXB048**
Pullbox with 60-inch trough	**XCTXB060**
Pullbox with 72-inch trough	**XCTXB072**
Pullbox with 84-inch trough	**XCTXB084**

Neutral Bars

When Column Type panels are furnished with trough extensions and pull box, the neutral bar will be placed in the pull box unless otherwise specified.

When troughs and pull box are not furnished, the neutral bar will be located on the panel at the same end as the main.

Additional Trough Extensions

Width and depth are the same as the panelboard.

Length Inches (mm)	Catalog Number
36.00 (914.4)	**CTXB036**
48.00 (1219.2)	**CTXB048**
60.00 (1524.0)	**CTXB060**
72.00 (1828.8)	**CTXB072**
84.00 (2133.6)	**CTXB084**

Notes

① 240 V breakers must be used on three-phase, three-wire, 240 V delta systems or on the high leg of a midpoint delta grounded system.
② Single-pole breakers are rated 120 Vac maximum.
③ 50 A devices are available as two-pole only.
④ GFCI for 5 mA personnel protection.
⑤ GFP for 30 mA equipment protection.
⑥ Arc fault circuit breaker.
⑦ Remote operated circuit breaker.

Box Sizing and Selection

Approximate Dimensions in Inches (mm)

Assembled Circuit Breaker Panelboards

Box size, box and trim catalog numbers for standard Column Type panelboards listed are available from tables on **Page V2-T3-43**.

Instructions

1. Using description of the required panelboard, select the rating and type of main required.
   a. 100 A panelboards—**Page V2-T3-43**.
   b. 225 A panelboards—**Page V2-T3-43**.
2. Count the total number of branch circuit poles, including provisions, required in the panelboard. Do not count main breaker poles. Convert two- or three-pole branch breaker to single poles, i.e., three-pole breaker, count as three poles. Determine sub-feed breaker or through-feed lug requirements.
3. Select the panelboard main ampere rating from tables on **Page V2-T3-43**.
4. Panelboard Type from first column, main breaker Frame and Designation, if applicable from second column, and sub-feed breaker Frame and Designation, if applicable, from the third column.
5. From Step #2, determine the number of branch circuits in Column 4.
6. Read box size, box and trim catalog numbers across columns to the right. All panels are surface mounted.

Cabinets

Boxes and trims are code-gauge steel, ANSI-61 light gray painted finish.

Boxes are furnished without knockouts. Standard depth is 6.00 inches (152.4 mm). Standard width is 8.63 inches (219.1 mm).

Top and Bottom Gutters

4.50 inches (114.3 mm) minimum.

Left Side Gutter

4.38 inches (111.2 mm) minimum.

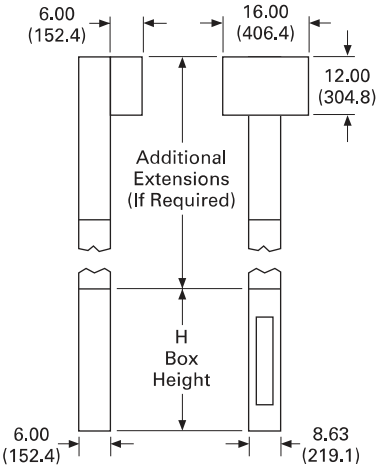
Pull Box

Pull box is furnished without knockouts. Standard dimensions:

Pull Box Dimensions

Height	Width	Depth
12.00 (304.8)	16.00 (406.4)	6.00 (152.4)

PRL1X-LX Trough Extension



Trough Extension

When extension troughs are used, Section 376 of the National Electrical Code, reading as follows, should be observed: 376. Number of Conductors. Wireways shall not contain more than 30 conductors at any cross section, unless the conductors are for signal circuits or are control conductors between a motor and its starter and used only for starting duty. The sum of the cross-sectional areas of all contained conductors at any cross section of a wireway shall not exceed 20% of the interior cross-sectional area of the wireway.

Approximate Dimensions in Inches (mm)

100 A Maximum PRL1X-LX Column Type Panelboard Sizing

Panelboard Types	Main Breaker Types Mounting: (H) = Horizontal (V) = Vertical	Sub-Feed Breaker Types Vertical Mounting	Maximum Number of Branch Circuits Including Provisions	Box Dimensions Height	Width	Depth	Box Catalog Number	Trim Catalog Number ①
Main breaker	BAB, QBHW (H)	—	27	69.00 (1752.6)	8.63 (219.2)	6.00 (152.4)	**YSC969**	**LTC969S**
		—	39	81.00 (2057.4)	8.63 (219.2)	6.00 (152.4)	**YSC981**	**LTC981S**
Main lugs or main breaker	PDG2xF, PDD2xF PDD2xG, PDG2xG, PDG2xM (V)	—	30	69.00 (1752.6)	8.63 (219.2)	6.00 (152.4)	**YSC969**	**LTC969S**
		—	42	81.00 (2057.4)	8.63 (219.2)	6.00 (152.4)	**YSC981**	**LTC981S**
Main lugs or main breaker with 100 A through-feed lugs or sub-feed breaker	PDG2xF, PDD2xF PDD2xG, PDG2xG, PDG2xM (V)	PDG2xF, PDG2xG, PDG2xM	30	78.00 (1981.2)	8.63 (219.2)	6.00 (152.4)	**YSC978**	**LTC978S**
			42	90.00 (2286.0)	8.63 (219.2)	6.00 (152.4)	**YSC990**	**LTC990S**

225 A Maximum PRL1X-LX Column Type Panelboard Sizing

Panelboard Types	Main Breaker Types Vertical Mounting	Sub-Feed Breaker Types	Maximum Number of Branch Circuits Including Provisions	Box Dimensions Inches Height	Width	Depth	Box Catalog Number	Trim Catalog Number ①
Main lugs or main breaker	PDD2xF PDD2xG, PDD2xM	—	30	69.00 (1752.6)	8.63 (219.2)	6.00 (152.4)	**YSC969**	**LTC969S**
		—	42	81.00 (2057.4)	8.63 (219.2)	6.00 (152.4)	**YSC981**	**LTC981S**
Main lugs or main breaker with 225 A through-feed lugs or sub-feed breaker	PDD2xF PDD2xG, PDD2xM	PDG2xF, PDG2xG, PDG2xM, PDD2xF, PDD2xG, PDD2xM	30	78.00 (1981.2)	8.63 (219.2)	6.00 (152.4)	**YSC978**	**LTC978S**
			42	90.00 (2286.0)	8.63 (219.2)	6.00 (152.4)	**YSC990**	**LTC990S**

Note

① Add suffix B to trim catalog number for bottom fed panelboards (i.e., LTC969SB).

Type PRL2X

Contents

Type PRL2X

Product Description

- 480Y/277 Vac maximum (125 Vdc)
- Three-phase four-wire, three-phase three-wire, single-phase three-wire, single-phase two-wire
- 600 A maximum mains
- 100 A maximum branch breakers
- Bolt-on branch breakers
- Each branch connector is capable of up to a total of 140 A maximum by breaker ampere rating
- Factory assembled
- Refer to **Page V2-T3-7** for additional information

Application Description

- Lighting branch panelboard
- Fully rated or series rated
- Interrupting ratings up to 200 kA symmetrical
- Suitable for use as Service Entrance Equipment, when specified on the order
- See **Pages V2-T3-7** through **V2-T3-32** for additional information

Standards and Certifications

- UL 67, UL 50
- CSA C22.2 No. 29
- Federal Specification W-P-115c
- Refer to **Page V2-T3-10** for additional information

Listed

Product Selection

Type PRL2X

PRL2X

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480Y/277 Vac	125/250 Vdc	Breaker Type
Main Lug Only				
100	—	—	—	—
225	—	—	—	—
400	—	—	—	—
600	—	—	—	—
Main Breaker				
100	65	14	14	GHB
100	35	25	10	PDG2xF
100	65	35	10	PDG2xG
100	100	65	22	PDG2xM
100	200	100	22	PDG2xP
225	65	—	—	PDD2xG
225	65	35	10	PDG2xG
225	100	65	22	PDG2xM
225	200	100	22	PDG2xP
400	65	35	10	PDG3xG* ⑥
400	100	65	22	PDG3xM* ⑥
400	100	65	—	LHH
400	200	100	22	PDG3xP* ⑥
600	65	35	22	PDG3xG*⑥
600	85	50	22	LGS
600	100	65	42	PDG3xM* ⑥
600	200	100	42	PDG3xP* ⑥

PRL2X Branch Circuit Breakers

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac ①	480Y/277 Vac	125/250 Vdc	Breaker Type
15–30	65	14	—	GHQ ②
15–20	65	14	14	GHB ②
25–60	65	14	14	GHB ②
70–100	65	14	14	GHB ②
15–30	65	25	—	HGHB ②
15–20	65	14	—	GHQRD
15–20	65	14	—	GHQRSP ③
15–60	—	14	—	GHBGFEP ②④
15–20	—	14	—	GHBHID ②⑤
Provision	—	—	—	—

Notes

① Interrupting ratings in this column are applicable to 120 Vac for single-pole breakers.
② Must be used on 480Y/277 V grounded wye systems only.
③ Remote operated circuit breaker.
④ GFP for 30 mA equipment protection. Requires two-pole spaces. 277 Vac only.
⑤ HID (High Intensity Discharge) rated breaker.
⑥ The 400 A frame must use trip units of ratings 0100–0400, while the 600 A frame must use trip units of ratings 0500, 0600 or designated by H, such as H250. The H as the leading character of the ampacity indicates a high instantaneous version of the breaker for coordination purposes. H ratings must use 600 A frame.

Box Sizing and Selection

Approximate Dimensions in Inches (mm)

Assembled Circuit Breaker Panelboards and Lighting Controls

Box size and box and trim catalog numbers for all standard panelboard types are found on **Page V2-T3-47**.

Instructions

1. Using description of the required panelboard, select the rating and type of main required.
2. Count the total number of branch circuit poles, including provisions, required in the panelboard. Do not count main breaker poles. Convert two- or three-pole branch breaker to single-poles, i.e., three-pole breaker, count as three poles.

   Determine sub-feed breaker or through-feed lug requirements.
3. Select the main ampere rating section from table on **Page V2-T3-47**.
4. Select panelboard type from first column, main breaker frame, if applicable, from second column, and sub-feed breaker frame, if applicable, from the third column.
5. From Step #2, determine the number of branch circuits in Column 4.
6. Read box size, box and trim catalog numbers across columns to the right. Specify surface or flush mounting on the order.

Cabinets

Fronts are code-gauge steel, ANSI-61 light gray painted finish.

Boxes are code-gauge galvanized steel without knockouts. Standard depth is 5-3/4 inches (146.1 mm). Standard width is 20 inches (508.0 mm). An optional 28-inch (711.2 mm) wide box is available.

Top and Bottom Gutters

5-1/2 inches (139.7 mm) minimum.

Approximate Dimensions in Inches (mm)

PRL2X Panelboard Sizing

Panelboard Types	Main Breaker Types and Mounting Position (H) = Horizontal (V) = Vertical	Sub-Feed Breaker Types and Mounting Position (H) = Horizontal (V) = Vertical	Maximum No. of Branch Circuits Including Provisions	Box Dimensions ① Height	Width	Depth	YS Box Catalog Number	LT Trim Catalog Number	EZ Box Catalog Number	EZ Trim Catalog Number
100 A										
Main breaker	GHB (H)	—	15	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		—	27	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		—	39	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		—	42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
Main lugs or main breaker	PDG2xF PDG2xG, PDG2xM (V)	—	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		—	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		—	42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
Main lugs or main breaker with 100 A through-feed lugs or sub-feed breaker	PDG2xF PDG2xG PDG2xM (V)	PDG2xF PDG2xG PDG2xM (V)	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
			30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
			42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
225 A										
Main lugs or main breaker	PDD2xF, PDD2xG, PDD2xM, PDG2xG, PDG2xM (V)	—	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		—	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		—	42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
Main lugs or main breaker with 225 A through-feed lugs or sub-feed breaker	PDG2xF, PDG2xG, PDG2xM, PDD2xF, PDD2xG, PDD2xM (V)	PDG2xF, PDG2xG, PDG2xM, PDD2xF, PDD2xG, PDD2xM (V)	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
			30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
			42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
	(V)	PDG2xF, PDG2xG, PDG2xM, PDD2xF, PDD2xG, PDD2xM (V)	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
			30	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
400 A										
Main lugs or main breaker	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP*, LHH (V)	—	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		—	30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		—	42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
Main lugs or main breaker with 225 A through-feed lugs or sub-feed breaker	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP*, LHH (V)	PDG2xF, PDG2xG, PDG2xM, PDD2xF, PDD2xG, PDD2xM (V)	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
			30	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
Main lugs or main breaker with 400 A through-feed lugs or sub-feed breaker	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP*, LHH (V)	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP* (V)	18	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			30	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**
			42	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**
600 A										
Main breaker	PDG3xG*, LGS, PDG3xM*, PDG3xP* (V)	—	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		—	30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		—	42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
Main lugs or main breaker with 225 A through-feed lugs or sub-feed breaker	PDG3xG*, LGS, PDG3xM*, PDG3xP* (V)	PDG2xG, PDG2xM, PDD2xG, PDD2xM (V)	18	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			30	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			42	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**
Main breaker with 400 A through-feed lugs or sub-feed breaker	PDG3xG*, LGS, PDG3xM*, PDG3xP* (V)	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP* (V)	18	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			30	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**
			42	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**
Main breaker with 600 A through-feed lugs or sub-feed breaker	PDG3xG*, LGS, PDG3xM*, PDG3xP* (V)	PDG3xG*, LGS, PDG3xM*, PDG3xP* (V)	18	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			30	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**
			42	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**

Note

① Smaller panelboard box sizes are available if required. Contact Eaton for application information.

Type PRL2XF

Contents

Type PRL2XF

Product Description

- 240 Vac maximum
- 400 A maximum mains
- Three-phase four-wire, single-phase three-wire
- 30 A maximum branch devices
- Factory assembled

Application Description

- Lighting branch panelboard
- Instrument protection
- Fully rated
- Interrupting ratings up to 200 kA symmetrical when protected by fuse

Standards and Certifications

- UL 67, UL 50

UL Listed

Product Selection

Type PRL2XF

PRL2XF

Ampere Rating	Interrupting Rating (kA Sym.) 480Y/277 Vac	Breaker Type
Main Lug Only		
100	—	—
225	—	—
400	—	—
Main Breaker		
100	25	PDG2xF
100	35	PDG2xG
100	65	PDG2xM
225	35	PDG2xG
225	65	PDG2xM
400	35	PDG3xG*
400	65	PDG3xM*
400	100	PDG3xP*
400	100	LHH

PRL2XF Branch Overcurrent Devices

Hybrid breaker/fuse (Class CC) branch device

Ampere Rating	Interrupting Rating (kA Sym.) 480Y/277 Vac	Breaker Type
30	200	Hybrid

Box Sizing and Selection

Approximate Dimensions in Inches (mm)

Assembled Circuit Breaker Panelboards

Box size and box and trim catalog numbers for all standard panelboard types are found on **Page V2-T3-50**.

Instructions

1. Using description of the required panelboard, select the rating and type of main required.
2. Count the total number of branch circuit poles, including provisions, required in the panelboard.

   Determine through-feed lug requirements.
3. Select the main ampere rating section from table on **Page V2-T3-50**.
4. Select panelboard type from first column, main breaker frame, if applicable, from second column.
5. From Step #2, determine the number of branch circuits in Column 4.
6. Read box size, box and trim catalog numbers across columns to the right. Specify surface or flush mounting on the order.

Cabinets

Fronts are code-gauge steel, ANSI-61 light gray painted finish.

Boxes are code-gauge galvanized steel without knockouts. Standard depth is 5-3/4 inches (146.1 mm). Standard width is 20 inches (508.0 mm). An optional 28-inch (711.2 mm) wide box is available.

Top and Bottom Gutters

5-1/2 inches (139.7 mm) minimum.

Approximate Dimensions in Inches (mm)

PRL2XF Panelboard Sizing

Panelboard Types	Main Breaker Types and Mounting Position (H) = Horizontal (V) = Vertical	Maximum No. of Branch Circuits Including Provisions	Box Dimensions ① Height	Width	Depth	YS Box Catalog Number	LT Trim Catalog Number	EZ Box Catalog Number	EZ Trim Catalog Number
100 A									
Main lugs or main breaker	PDG2xF PDG2xG, PDG2xM (V)	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
Main lugs or main breaker with 100 A through-feed lugs or sub-feed breaker	PDG2xF PDG2xG PDG2xM (V)	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
225 A									
Main lugs or main breaker	PDD2xF, PDD2xG, PDD2xM, PDG2xG, PDG2xM (V)	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
Main lugs or main breaker with 225 A through-feed lugs	PDG2xF, PDG2xG, PDG2xM, PDD2xF, PDD2xG, PDD2xM (V)	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
400 A									
Main lugs or main breaker	PDG3xG*, PDG3xM*, PDG3xP*, LHH (V)	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
Main lugs or main reaker with 225 A through-feed lugs	PDG3xG*, PDG3xM*, PDG3xP*, LHH (V)	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		30	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
		42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
Main lugs or main breaker with 400 A through-feed lugs	PDG3xG*, PDG3xM*, PDG3xP*, LHH (V)	18	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
		30	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**
		42	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**

Note

① Smaller panelboard box sizes are available if required. Contact Eaton for application information.

Type PRL2X-LX, Column Type

Contents

Type PRL2X-LX

Product Description

- 480Y/277 Vac maximum (125 Vdc)
- Three-phase four-wire, three-phase three-wire, single-phase three-wire, single-phase two-wire
- 225 A maximum mains
- 100 A maximum branch breakers
- Bolt-on branch breakers
- Factory assembled
- Refer to Refer to **Page V2-T3-7** for additional information

Application Description

- Lighting branch panelboard
- Column mounting width
- Fully rated or series rated
- Interrupting ratings up to 200 kA symmetrical
- See **Pages V2-T3-7** through **V2-T3-32** for additional information

Standards and Certifications

- UL 67, UL 50
- Federal Specification W-P-115c
- Refer to **Page V2-T3-10** for additional information

Listed

Product Selection

Type PRL2X-LX

3

PRL2X-LX

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480Y/277 Vac	125/250 Vdc	Breaker Type
Main Lug Only				
100	—	—	—	—
225	—	—	—	—
Main Breaker				
100	65	14	14	GHB
100	35	25	10	PDG2xF
100	65	35	10	PDG2xG
100	100	65	22	PDG2xM
100	200	100	22	PDG2xP
225	65	—	—	PDD2xG
225	65	35	10	PDG2xG
225	100	65	22	PDG2xM
225	200	100	22	PDG2xP

Branch Circuit Breakers—PRL2X-LX

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac ①	480Y/277 Vac	125/250 Vdc	Breaker Type
15–30	65	14	—	GHQ ②
15–20	65	14	14	GHB ②
25–60	65	14	14	GHB ②
70–100	65	14	14	GHB ②
15–30	65	25	—	HGHB ②
15–20	65	14	—	GHQRD
15–20	65	14	—	GHQRSP ③
15–60	—	14	—	GHBGFEP ②④
Provision	—	—	—	—

Pull Box With Extension Trough

Includes pull box with trough extension. For additional trough extensions, refer to table below.

Description	Catalog Number
Pullbox with 36-inch trough	**XCTXB036**
Pullbox with 48-inch trough	**XCTXB048**
Pullbox with 60-inch trough	**XCTXB060**
Pullbox with 72-inch trough	**XCTXB072**
Pullbox with 84-inch trough	**XCTXB084**

Neutral Bars

When Column Type panels are furnished with trough extensions and pull box, the neutral bar will be placed in the pull box unless otherwise specified.

When troughs and pull box are not furnished, the neutral bar will be located on the panel at the same end as the main.

Additional Trough Extensions

Width and depth are the same as the panelboard.

Length Inches (mm)	Catalog Number
36.00 (914.4)	**CTXB036**
48.00 (1219.2)	**CTXB048**
60.00 (1524.0)	**CTXB060**
72.00 (1828.8)	**CTXB072**
84.00 (2133.6)	**CTXB084**

Notes

① Interrupting ratings in this column are applicable to 120 Vac for single-pole breakers.
② At 480 V, must be used on 480Y/277 V grounded wye systems only.
③ Remote operated circuit breaker.
④ GFP for 30 mA equipment protection. Requires two pole spaces.

Box Sizing and Selection

Approximate Dimensions in Inches (mm)

Assembled Circuit Breaker Panelboards

Box size, box and trim catalog numbers for standard column type panelboards listed are available from tables on **Page V2-T3-54**.

Instructions

1. Using description of the required panelboard, select the rating and type of main required.
   a. 100 A panelboards—**Page V2-T3-54**.
   b. 225 A panelboards—**Page V2-T3-54**.
2. Count the total number of branch circuit poles, including provisions, required in the panelboard. Do not count main breaker poles. Convert two- or three-pole branch breaker to single poles, i.e., three-pole breaker, count as three poles.

   Determine sub-feed breaker or through-feed lug requirements.
3. Select the panelboard main ampere rating from tables on **Page V2-T3-54**.
4. Panelboard Type from first column, main breaker Frame and Designation, if applicable from second column, and sub-feed breaker Frame and Designation, if applicable, from the third column.
5. From Step #2, determine the number of branch circuits in Column 4.
6. Read box size, box and trim catalog numbers across columns to the right. All panels are surface mounted.

Cabinets

Boxes and trims are code-gauge steel, ANSI-61 light gray painted finish.

Boxes are furnished without knockouts. Standard depth is 6.00 inches (152.4 mm). Standard width is 8.63 inches (219.1 mm).

Top and Bottom Gutters

4.50 inches (114.3 mm) minimum.

Left Side Gutter

3.31 inches (84.2 mm) minimum.

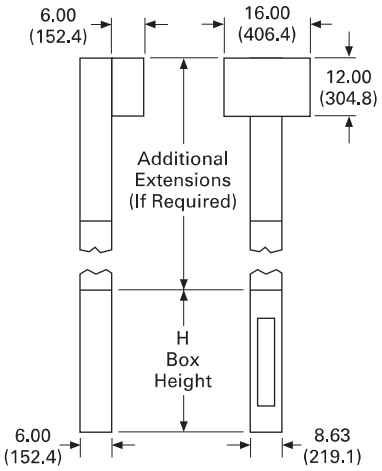
Pull Box

Pull box is furnished without knockouts. Standard dimensions:

Pull Box Dimensions

Height	Width	Depth
12.00 (304.8)	16.00 (406.4)	6.00 (152.4)

PRL2X-LX Trough Extension



Trough Extension

When extension troughs are used, Section 376 of the National Electrical Code, reading as follows, should be observed: 376. Number of Conductors. Wireways shall not contain more than 30 conductors at any cross section, unless the conductors are for signal circuits or are control conductors between a motor and its starter and used only for starting duty. The sum of the cross-sectional areas of all contained conductors at any cross section of a wireway shall not exceed 20% of the interior cross-sectional area of the wireway.

Approximate Dimensions in Inches (mm)

100 A Maximum PRL2X-LX Column Type Panelboard Sizing

Panelboard Types	Main Breaker Types Mounting: (H) = Horizontal (V) = Vertical	Sub-Feed Breaker Types Vertical Mounting	Maximum Number of Branch Circuits Including Provisions	Box Dimensions Height	Width	Depth	Box Catalog Number	Trim Catalog Number ①
Main breaker	GHB (H)	—	27	69.00 (1752.6)	8.63 (219.2)	6.00 (152.4)	**YSC969**	**LTC969S**
		—	39	81.00 (2057.7)	8.63 (219.2)	6.00 (152.4)	**YSC981**	**LTC981S**
Main lugs or main breaker	PDG2xF, PDG2xG PDG2xM, PDG2xP (V)	—	30	69.00 (1752.6)	8.63 (219.2)	6.00 (152.4)	**YSC969**	**LTC969S**
		—	42	81.00 (2057.7)	8.63 (219.2)	6.00 (152.4)	**YSC981**	**LTC981S**
Main lugs or main breaker with 100 A through-feed lugs or sub-feed breaker	PDG2xF, PDG2xG PDG2xM, PDG2xP (V)	PDG2xF, PDG2xG, PDG2xM	30	78.00 (1981.2)	8.63 (219.2)	6.00 (152.4)	**YSC978**	**LTC978S**
			42	90.00 (2286.0)	8.63 (219.2)	6.00 (152.4)	**YSC990**	**LTC990S**

225 A Maximum PRL2X-LX Column Type Panelboard Sizing

Panelboard Types	Main Breaker Types Vertical Mounting	Sub-Feed Breaker Types	Maximum Number of Branch Circuits Including Provisions	Box Dimensions Height	Width	Depth	Box Catalog Number	Trim Catalog Number ①
Main lugs or main breaker	PDD2xG, PDG2xG PDG2xM, PDG2xP	—	30	69.00 (1752.6)	8.63 (219.2)	6.00 (152.4)	**YSC969**	**LTC969S**
		—	42	81.00 (2057.7)	8.63 (219.2)	6.00 (152.4)	**YSC981**	**LTC981S**
Main lugs or main breaker with 225 A through-feed lugs or sub-feed breaker	PDD2xG, PDG2xG PDG2xM, PDG2xP	PDG2xF, PDG2xG, PDG2xM, PDD2xG, PDD2xM	30	78.00 (1981.2)	8.63 (219.2)	6.00 (152.4)	**YSC978**	**LTC978S**
			42	90.00 (2286.0)	8.63 (219.2)	6.00 (152.4)	**YSC990**	**LTC990S**

Note

① Add suffix B to trim catalog number for bottom fed panelboards (i.e., LTC969SB).

Retrofit Panelboard

Contents

Retrofit Panelboard

Product Description

- PRL1RX—240 Vac; PRL2RX—480Y/277 V
- Single-phase three-wire or single-phase two-wire
- Three-phase three-wire or three-phase four-wire
- 225 A maximum
- 100 A maximum branch breakers
- Standard PRL1RX fits existing box depths from 4.50–6.00 inches deep; Standard PRL2RX fits existing box depths from 4.75–6.00 inches deep (without additional accessories)
- Integrally mounted neutral assembly
- Grounding lug included
- Neutral and ground convertible from left-right
- Bolt-on branch breakers
- Factory assembled

Application Description

- Lighting branch panelboard
- Fully rated or series rated
- Interrupting capacities to 100 kA symmetrical
- Suitable for use as Service Entrance Equipment where specified on the order

Standards and Certifications

- UL 67
- Federal Specification W-P-115c
- CSA C22.2 No. 29

Listed

Catalog Number Selection

Retrofit Panelboard

3

P1R B 1 C 1 30 BAB 100 TL B

Panelboard Type
P1R = ≤240 V
P2R = > 480Y/277 V

Main Device
L =MLO
B = Main breaker

System Type
1 = Single-phase (three-wire)
3 = Three-phase (three- or four-wire)

Bus Type
A = Aluminum
C = Copper

Bus Ampere Rating
1 = 100 A
2 = 225 A

Circuits
18 = 18
30 = 30
42 = 42

Main Breaker
Blank =MLO
BAB
GHB ①
PDD2xG
PDG2xG
PDG2xF ①
PDG2xG ①

Main Breaker Amperes
Blank = MLO
30 = 30 A
60 = 60 A
100 = 100 A
125 = 125 A
150 = 150 A
175 = 175 A
200 = 200 A
225 = 225 A

Sub-Feed Device
Blank = None
TL = Through-feed lugs

Feed
B = Bottom fed
T = Top fed

Trim Selection

RCT B 20 00 36 50 F S

Renovation Panelboard Custom Trim
RCT

Door Style
A = 18-circuit MLO/ branch-mounted MCB
B = 30-circuit MLO/ branch-mounted MCB; 18-circuit F-Frame MCB
C = 42-circuit MLO/ branch-mounted MCB
D = 30-circuit F-Frame MCB
E = 42-circuit F-Frame MCB

Existing Box Width (Inches)

Existing Box Width (Fraction)
00 = None
13 = 1/8
25 = 1/4
38 = 3/8
50 = 1/2
63 = 5/8
75 = 3/4
88 = 7/8

Existing Box Height (Inches)

Existing Box Height (Fraction)
00 = None
13 = 1/8
25 = 1/4
38 = 3/8
50 = 1/2
63 = 5/8
75 = 3/4
88 = 7/8

Trim Style
S = Surface
F = Flush ②

Trim Finish Option ③
Blank = ANSI 61 painted steel
S = Brushed stainless steel ④
P = Custom painted steel
C = Custom painted stainless steel

Notes
① P2R only.
② Flush trims include 1-inch overlap per side.
③ Standard trim includes 12-gauge steel painted ANSI 61 grey.
④ Stainless trims provided as 304 standard. Optional 316 available.

Product Selection

Retrofit Panelboard

P1R—Aluminum Bus, Single-Phase or Three-Phase ①

Ampere Rating	Number of Circuits	Interrupting Rating (kA Sym.) 240 Vac	Main Breaker Type	Single-Phase Three-Wire—Single-Phase Two-Wire Catalog Number	Three-Phase Three-Wire—Three-Phase Four-Wire Catalog Number
Main Lug Only					
100	18	—	MLO	**P1RL1A118**	**P1RL3A118**
	30	—	MLO	**P1RL1A130**	**P1RL3A130**
	42	—	MLO	**P1RL1A142**	**P1RL3A142**
225	18	—	MLO	**P1RL1A218**	**P1RL3A218**
	30	—	MLO	**P1RL1A230**	**P1RL3A230**
	42	—	MLO	**P1RL1A242**	**P1RL3A242**
Main Breaker					
100	18	10	BAB ②	**P1RB1A118BAB** ③	**P1RB3A118BAB** ③
	30	10	BAB ②	**P1RB1A130BAB** ③	**P1RB3A130BAB** ③
	42	10	BAB ②	**P1RB1A142BAB** ③	**P1RB3A142BAB** ③
	18	35	PDG2xF	**P1RB1A118EHD** ③	**P1RB3A118EHD** ③
	30	35	PDG2xF	**P1RB1A130EHD** ③	**P1RB3A130EHD** ③
	42	35	PDG2xF	**P1RB1A142EHD** ③	**P1RB3A142EHD** ③
	18	22	QBHW ②	**P1RB1A118QBHW** ③	**P1RB3A118QBHW** ③
	30	22	QBHW ②	**P1RB1A130QBHW** ③	**P1RB3A130QBHW** ③
	42	22	QBHW ②	**P1RB1A142QBHW** ③	**P1RB3A142QBHW** ③
	18	65	PDD2xG	**P1RB1A118ED** ③	**P1RB3A118ED** ③
	30	65	PDD2xG	**P1RB1A130ED** ③	**P1RB3A130ED** ③
	42	65	PDD2xG	**P1RB1A142ED** ③	**P1RB3A142ED** ③
	18	100	PDD2xM	**P1RB1A118EDH** ③	**P1RB3A1-8EDH** ③
	30	100	PDD2xM	**P1RB1A130EDH** ③	**P1RB3A130EDH** ③
	42	100	PDD2xM	**P1RB1A142EDH** ③	**P1RB3A142EDH** ③
225	18	65	PDD2xG	**P1RB1A218ED** ③	**P1RB3A218ED** ③
	30	65	PDD2xG	**P1RB1A230ED** ③	**P1RB3A230ED** ③
	42	65	PDD2xG	**P1RB1A242ED** ③	**P1RB3A242ED** ③
	18	100	PDD2xM	**P1RB1A218EDH** ③	**P1RB3A218EDH** ③
	30	100	PDD2xM	**P1RB1A230EDH** ③	**P1RB3A230EDH** ③
	42	100	PDD2xM	**P1RB1A242EDH** ③	**P1RB3A242EDH** ③

Notes

① Standard trim included. Select standard trim from **Page V2-T3-59**. Custom trims are available for an additional charge. Contact your local Satellite for more information about custom trims.

② BAB and QBHW main devices consume available circuit space positions. (Two circuits for single-phase; three circuits for three-phase.)

③ Add main breaker ampere rating suffix. May NOT exceed main bus rating.

A neutral assembly is included with the base chassis. For single-phase two-wire systems or for three-phase, three-wire systems, do not connect.

Sum of branch circuit amperes not to exceed 140 A.

Retrofit Panelboard

P2R—Aluminum Bus, Three-Phase

Ampere Rating	Number of Circuits	Main Breaker Interrupting Rating (kA Sym.) 480Y/277 Vac	Main Breaker Type	Three-Phase Four-Wire Catalog Number
Main Lug Only				
100	18	—	MLO	**P2RL3A118**
	30	—	MLO	**P2RL3A130**
	42	—	MLO	**P2RL3A142**
225	18	—	MLO	**P2RL3A218**
	30	—	MLO	**P2RL3A230**
	42	—	MLO	**P2RL3A242**
Main Breaker				
100	18	14	GHB ①	**P2RB3A118GHB** ②
	30	14	GHB ①	**P2RB3A130GHB** ②
	42	14	GHB ①	**P2RB3A142GHB** ②
	18	25	PDG2xF	**P2RB3A118EHD** ②
	30	25	PDG2xF	**P2RB3A130EHD** ②
	42	25	PDG2xF	**P2RB3A142EHD** ②
	18	35	PDG2xG	**P2RB3A118FD** ②
	30	35	PDG2xG	**P2RB3A130FD** ②
	42	35	PDG2xG	**P2RB3A142FD** ②
	18	65	PDG2xM	**P2RB3A118HFD** ②
	30	65	PDG2xM	**P2RB3A130HFD** ②
	42	65	PDG2xM	**P2RB3A142HFD** ②
	18	100	PDG2xP	**P2RB3A118FDC** ②
	30	100	PDG2xP	**P2RB3A130FDC** ②
	42	100	PDG2xP	**P2RB3A142FDC** ②
225	18	35	PDG2xG	**P2RB3A218FD** ②
	30	35	PDG2xG	**P2RB3A230FD** ②
	42	35	PDG2xG	**P2RB3A242FD** ②
	18	65	PDG2xM	**P2RB3A218HFD** ②
	30	65	PDG2xM	**P2RB3A230HFD** ②
	42	65	PDG2xM	**P2RB3A242HFD** ②
	18	100	PDG2xP	**P2RB3A218FDC** ②
	30	100	PDG2xP	**P2RB3A230FDC** ②
	42	100	PDG2xP	**P2RB3A242FDC** ②

Notes

① GHB main devices consume available circuit space positions. (Three circuits for three-phase.)

② Add main breaker ampere rating suffix. May NOT exceed main bus rating.

A neutral assembly is included with the base chassis.

Trim Selection

Instructions

- In order to meet minimum wire bending space requirements and to ensure ease of installation, minimum enclosure space dimensions have been defined for each chassis. In order to ensure a proper fit, every panelboard to be renovated must be carefully surveyed prior to installation
- Determine the electrical requirements of the panelboard to be renovated (i.e., main breaker or main lugs, amperes, interrupting rating, circuit space, branch breakers, accessories)
- Using the electrical requirement data, select a base chassis and any required breakers, options and accessories
- **Page V2-T3-61** provides the minimum dimensions of the enclosure, in which each base chassis may be installed. These dimensions assume that the chassis is mounted in the center of the existing box, both vertically and horizontally. Where site conditions require the chassis to be offset from this centrally mounted position, it is the installer's responsibility to ensure wire bending space and electrical clearance requirements are met
- **Page V2-T3-61** provides a "Trim Door Size Code." Using this code, select a standard trim from the tables that will fit the outside dimensions of the existing box. Refer to **Page V2-T3-60** to define non-standard trim requirements

Standard Trim Selection—20-Inch (508.0 mm) Wide Enclosure

		Surface Type			Flush Type		
Trim Door Size Code	Enclosure Height—Inches (mm)	Catalog Number	Trim Dimensions—Inches (mm) Height	Width	Catalog Number	Trim Dimensions—Inches (mm) Height	Width
A	24.00 (609.6)	**RTA2024**	24.00 (609.6)	20.00 (508.0)	**RTA2226**	26.00 (660.4)	22.00 (558.8)
A	30.00 (762.0)	**RTA2030**	30.00 (762.0)	20.00 (508.0)	**RTA2232**	32.00 (812.8)	22.00 (558.8)
A	36.00 (914.4)	**RTA2036**	36.00 (914.4)	20.00 (508.0)	**RTA2238**	38.00 (965.2)	22.00 (558.8)
B	30.00 (762.0)	**RTB2030**	30.00 (762.0)	20.00 (508.0)	**RTB2232**	32.00 (812.8)	22.00 (558.8)
B	36.00 (914.4)	**RTB2036**	36.00 (914.4)	20.00 (508.0)	**RTB2238**	38.00 (965.2)	22.00 (558.8)
B	42.00 (1066.8)	**RTB2042**	42.00 (1066.8)	20.00 (508.0)	**RTB2244**	44.00 (1117.6)	22.00 (558.8)
C	36.00 (914.4)	**RTC2036**	36.00 (914.4)	20.00 (508.0)	**RTC2238**	38.00 (965.2)	22.00 (558.8)
C	42.00 (1066.8)	**RTC2042**	42.00 (1066.8)	20.00 (508.0)	**RTC2244**	44.00 (1117.6)	22.00 (558.8)
C	48.00 (1219.2)	**RTC2048**	48.00 (1219.2)	20.00 (508.0)	**RTC2250**	50.00 (1270.0)	22.00 (558.8)
D	30.00 (762.0)	**RTD2030**	30.00 (762.0)	20.00 (508.0)	**RTD2232**	32.00 (812.8)	22.00 (558.8)
D	36.00 (914.4)	**RTD2036**	36.00 (914.4)	20.00 (508.0)	**RTD2238**	38.00 (965.2)	22.00 (558.8)
D	42.00 (1066.8)	**RTD2042**	42.00 (1066.8)	20.00 (508.0)	**RTD2244**	44.00 (1117.6)	22.00 (558.8)
E	36.00 (914.4)	**RTE2036**	36.00 (914.4)	20.00 (508.0)	**RTE2238**	38.00 (965.2)	22.00 (558.8)
E	42.00 (1066.8)	**RTE2042**	42.00 (1066.8)	20.00 (508.0)	**RTE2244**	44.00 (1117.6)	22.00 (558.8)
E	48.00 (1219.2)	**RTE2048**	48.00 (219.2)	20.00 (508.0)	**RTE2250**	50.00 (1270.0)	22.00 (558.8)

Standard Trim Selection—14-Inch (355.6 mm) Wide Enclosure

		Surface Type			Flush Type		
Trim Door Size Code	Enclosure Height—Inches (mm)	Catalog Number	Trim Dimensions—Inches (mm) Height	Width	Catalog Number	Trim Dimensions—Inches (mm) Height	Width
A	24.00 (609.6)	**RTA1424**	24.00 (609.6)	14.00 (355.6)	**RTA1626**	26.00 (660.4)	16.00 (406.4)
A	30.00 (762.0)	**RTA1430**	30.00 (762.0)	14.00 (355.6)	**RTA1632**	32.00 (812.8)	16.00 (406.4)
A	36.00 (914.4)	**RTA1436**	36.00 (914.4)	14.00 (355.6)	**RTA1638**	38.00 (965.2)	16.00 (406.4)
B	30.00 (762.0)	**RTB1430**	30.00 (762.0)	14.00 (355.6)	**RTB1632**	32.00 (812.8)	16.00 (406.4)
B	36.00 (914.4)	**RTB1436**	36.00 (914.4)	14.00 (355.6)	**RTB1638**	38.00 (965.2)	16.00 (406.4)
B	42.00 (1066.8)	**RTB1442**	42.00 (1066.8)	14.00 (355.6)	**RTB1644**	44.00 (1117.6)	16.00 (406.4)
C	36.00 (914.4)	**RTC1436**	36.00 (914.4)	14.00 (355.6)	**RTC1638**	38.00 (965.2)	16.00 (406.4)
C	42.00 (1066.8)	**RTC1442**	42.00 (1066.8)	14.00 (355.6)	**RTC1644**	44.00 (1117.6)	16.00 (406.4)
C	48.00 (1219.2)	**RTC1448**	48.00 (1219.2)	14.00 (355.6)	**RTC1650**	50.00 (1270.0)	16.00 (406.4)
D	30.00 (762.0)	**RTD1430**	30.00 (762.0)	14.00 (355.6)	**RTD1632**	32.00 (812.8)	16.00 (406.4)
D	36.00 (914.4)	**RTD1436**	36.00 (914.4)	14.00 (355.6)	**RTD1638**	38.00 (965.2)	16.00 (406.4)
D	42.00 (1066.8)	**RTD1442**	42.00 (1066.8)	14.00 (355.6)	**RTD1644**	44.00 (1117.6)	16.00 (406.4)
E	36.00 (914.4)	**RTE1436**	36.00 (914.4)	14.00 (355.6)	**RTE1638**	38.00 (965.2)	16.00 (406.4)
E	42.00 (1066.8)	**RTE1442**	42.00 (1066.8)	14.00 (355.6)	**RTE1644**	44.00 (1117.6)	16.00 (406.4)
E	48.00 (1219.2)	**RTE1448**	48.00 (1219.2)	14.00 (355.6)	**RTE1650**	50.00 (1270.0)	16.00 (406.4)

Custom Trim Selection

Instructions

In order to accommodate instances where the standard trims do not suit an installation, custom-sized trims may be ordered. Since the trim mounts to the retrofit chassis, and not the existing enclosure, custom trims can solve many problems encountered with differing enclosure sizes and configurations. Contact your local satellite plant to ensure manufacturability and determine lead time required.

Outer Dimensions

The outer dimensions are the overall OUTSIDE dimensions of the trim. In surface-mounted applications, this is usually the same as the outside dimensions of the enclosure to be renovated. For flush-mounted applications, an additional amount of trim material extends beyond the outer edge of the box, in order to cover any gap between the wall material and the box. Extending the outer dimensions can cover larger than normal wall gaps or imperfections that may be encountered.

Application Guidelines

Instructions

- In order to meet minimum wire bending space requirements and to ensure ease of installation, minimum enclosure space dimensions have been defined for each chassis. In order to ensure a proper fit, every panelboard to be renovated must be carefully surveyed prior to installation
- Determine the electrical requirements of the panelboard to be renovated (i.e., main breaker or main lugs, amperes, interrupting rating, circuit space, branch breakers, accessories)
- Using the electrical requirement data, select a base chassis and any required breakers, options and accessories
- This page provides the minimum dimensions of the enclosure, in which each base chassis may be installed. These dimensions assume that the chassis is mounted in the center of the existing box, both vertically and horizontally. Where site conditions require the chassis to be offset from this centrally mounted position, it is the installer's responsibility to ensure wire bending space and electrical clearance requirements are met. Installing chassis offset from the central position requires a custom offset trim. Contact your local Satellite for pricing and ordering details
- The table below provides a "Trim Door Size Code." Using this code, select a standard trim from the tables that will fit the outside dimensions of the existing box. Refer to **Page V2-T3-60** to define non-standard trim requirements

Minimum Enclosure Sizing

Ampere Rating	Number of Circuits	Main Device Type	Trim Door Size Code	Minimum Enclosure Dimensions—Inches (mm) Height	Width	Depth
Main Lug Only						
100	18	MLO	A	19.50 (495.3)	14.00 (355.6)	4.50 (114.3)
	30	MLO	B	26.50 (673.1)	14.00 (355.6)	4.50 (114.3)
	42	MLO	C	33.50 (850.9)	14.00 (355.6)	4.50 (114.3)
225	18	MLO	A	19.50 (495.3)	14.00 (355.6)	4.50 (114.3)
	30	MLO	B	26.50 (673.1)	14.00 (355.6)	4.50 (114.3)
	42	MLO	C	33.50 (850.9)	14.00 (355.6)	4.50 (114.3)
Main Breaker						
100	18	BAB, GHB	A	19.50 (495.3)	14.00 (355.6)	4.50 (114.3)
	30	BAB, GHB	B	26.50 (673.1)	14.00 (355.6)	4.50 (114.3)
	42	BAB, GHB	C	33.50 (850.9)	14.00 (355.6)	4.50 (114.3)
	18	PDG2xF	B	30.00 (762.0)	14.00 (355.6)	4.50 (114.3)
	30	PDG2xF	D	36.00 (914.4)	14.00 (355.6)	4.50 (114.3)
	42	PDG2xF	E	42.00 (1066.8)	14.00 (355.6)	4.50 (114.3)
	18	QBHW	A	19.50 (195.3)	14.00 (355.6)	4.50 (114.3)
	30	QBHW	B	26.50 (673.1)	14.00 (355.6)	4.50 (114.3)
	42	QBHW	C	33.50 (850.9)	14.00 (355.6)	4.50 (114.3)
	18	PDD2xG, PDG2xG	B	30.00 (762.0)	14.00 (355.6)	4.50 (114.3)
	30	PDD2xG, PDG2xG	D	36.00 (914.4)	14.00 (355.6)	4.50 (114.3)
	42	PDD2xG, PDG2xG	E	42.00 (1066.8)	14.00 (355.6)	4.50 (114.3)
	18	PDD2xM, PDG2xM, PDG2xP	B	30.00 (762.0)	14.00 (355.6)	4.50 (114.3)
	30	PDD2xM, PDG2xM, PDG2xP	D	36.00 (914.4)	14.00 (355.6)	4.50 (114.3)
	42	PDD2xM, PDG2xM, PDG2xP	E	42.00 (1066.8)	14.00 (355.6)	4.50 (114.3)
225	18	PDD2xG, PDG2xG	B	30.00 (762.0)	14.00 (355.6)	4.50 (114.3)
	30	PDD2xG, PDG2xG	D	36.00 (914.4)	14.00 (355.6)	4.50 (114.3)
	42	PDD2xG, PDG2xG	E	42.00 (1066.8)	14.00 (355.6)	4.50 (114.3)
	18	PDD2xM, PDG2xM, PDG2xP	B	30.00 (762.0)	14.00 (355.6)	4.50 (114.3)
	30	PDD2xM, PDG2xM, PDG2xP	D	36.00 (914.4)	14.00 (355.6)	4.50 (114.3)
	42	PDD2xM, PDG2xM, PDG2xP	E	42.00 (1066.8)	14.00 (355.6)	4.50 (114.3)

Options and Accessories

Branch Circuit Breakers—P1R

Ampere Rating	Interrupting Rating (kA Sym.) 240 Vac ①	Breaker Type
15–60	10	BAB
70	10	BAB
80–100	10	BAB
15–30	10	BABRP ③
15–30	10	BABRSP ③
15–50 ②	10	QBGF ④
15–50 ②	10	QBGFEP ⑤
15–20	10	QBCAF ⑥
15–60	10	BAB-D ⑦
15–30	10	BAB-C ⑧
15–60	22	QBHW
70	22	QBHW
80–100	22	QBHW
15–30	22	QBHGF
15–30	22	QBHGFEP
15–20	22	QBHCAF ⑥
Provision	—	—

Branch Breakers—P2R

Ampere Rating	Interrupting Rating (kA Sym.) 480Y/277 Vac	Breaker Type Rating (kA Sym.)
15–30	14	GHQ
15–20	14	GHB
25–60	14	GHB
70–100	14	GHB
15–60	14	GHBGFEP ⑨
15–20	14	GHB-HID ⑩
15–30	25	HGHB
Provision	—	—

Copper Main Bus Adder

Main Bus Ampere Rating	Catalog Number
100	⑪
225	⑪

Copper Terminal Ground Bar for Copper Cable Only

Catalog Number
P1RGBC

Insulated/Isolated Ground Bus (Separately Mounted)

Aluminum Catalog Number	Copper Catalog Number
P1RGKA	**P1RNKC**

Neutral Kit (Separately Mounted) ⑫

Number of Termination Points	Aluminum Catalog Number	Copper Catalog Number
18	**P1RNKA18**	**P1RNKC18**
30	**P1RNKA30**	**P1RNKC30**
42	**P1RNKA42**	**P1RNKC42**

Depth Adder Kits ⑬

Standard Pow-R-Line 1R—Fits 4.50 to 6.00 inches
Standard Pow-R-Line 2R—Fits 4.75 to 6.00 inches

Accessory/Kits	For Use With Box Depth—Inches (mm)	Part Number
1.50 depth adder	6.00–7.50 (152.4–190.5)	**P1RDA15**
3.00 depth adder	7.50–9.00 (190.5–228.6)	**P1RDA30**
4.50 depth adder	9.00–10.50 (228.6–266.7)	**P1RDA45**
6.00 depth adder	10.50–12.00 (266.7–304.8)	**P1RDA60**

Box Collar Kits ⑭

Accessory/Kits	For Use With Box Depth—Inches (mm)	Part Number
Box collar	3.50–4.50 (88.9–114.3)	**P1RBC10**

Notes

① Single-pole breakers are rated 120 Vac maximum.
② 50 A devices available as two-pole only.
③ Remote operated circuit breaker.
④ GFCI for 5 mA personnel protection.
⑤ GFP for 30 mA equipment protection.
⑥ Arc fault circuit breaker.
⑦ HID (High Intensity Discharge) rated breaker.
⑧ Switching neutral breaker. Single-pole device requires two pole spaces; two-pole device requires three pole spaces.
⑨ GFP for 30 mA equipment protection. Requires two-pole spaces. 277 Vac only.
⑩ HID (High Intensity Discharge) rated breaker.
⑪ To convert base chassis catalog number from aluminum main bus to copper main bus, change the 6th digit of the aluminum base chassis catalog number to "C" (e.g., P1RL1A1-42 becomes P1RL1C1-42).
⑫ Each base chassis includes a neutral bar that contains one connection point for every circuit space available. Use this kit when additional connection points are required or the neutral must be separately mounted to meet existing cable locations.
⑬ Allows for panel to be used in boxes deeper than 6.00 inches.
⑭ Allows for panel to be used in boxes less than 4.50 inches.

Type PRL3X

Contents

Type PRL3X

Product Description

- 600 Vac maximum (250 Vdc)
- Three-phase four-wire, three-phase three-wire, single-phase three-wire, single-phase two-wire
- 800 A maximum main lugs
- 600 A maximum main breaker
- 225 A maximum branch breakers
- Bolt-on branch breakers
- Factory assembled
- Refer to **Page V2-T3-7** for additional information

Application Description

- Lighting panelboard or power distribution panelboard
- Fully rated or series rated
- Interrupting ratings up to 200 kA symmetrical
- Suitable for use as Service Entrance Equipment, when specified on the order
- See **Pages V2-T3-7** through **V2-T3-32** for additional information

Standards and Certifications

- UL 67, UL 50
- CSA C22.2 No. 29
- Federal Specification W-P-115c
- Refer to **Page V2-T3-10** for additional information

Listed

Product Selection

Type PRL3X

3

PRL3X

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480 Vac	600 Vac	250 Vdc	Breaker Type
Main Lug Only					
100	—	—	—	—	—
250	—	—	—	—	—
400	—	—	—	—	—
600	—	—	—	—	—
800 ①	—	—	—	—	—
Main Breaker					
100	35	25	14	10	PDG2xF
100	35	—	—	—	PDD2xF
100	65	—	—	—	PDD2xG
100	100	—	—	—	PDD2xM
100	65	35	18	10	PDG2xG
100	100	65	25	22	PDG2xM
100	200	100	35	22	PDG2xP
100	200	150	—	—	FCL
100	200	200	200	100 ②	FB-P ③
225	35	—	—	—	PDD2xF
225	65	—	—	—	PDD2xG
225	100	—	—	—	PDD2xM
225	200	—	—	—	PDD2xP
225	65	35	18	10	PDG2xG
225	100	65	25	22	PDG2xM
225	200	100	35	22	PDG2xP
400	65	—	—	10	PDD3xG ⑥
400	65	35	18	10	PDG3xG* ⑥
400	100	65	35	22	PDG3xM* ⑥
400	100	65	—	—	LHH
400	200	100	65	22	PDG3xP* ⑥
400	65	—	—	—	LCL ④
400	200	200	200	100 ②	LA-P ③④
600	65	35	18	22	PDG3xG* ⑥
600	100	65	35	22	PDG3xM* ⑥
600	200	100	65	42	PDG3xP* ⑥
600	65	35	25	22	CLD ⑤

Notes

① 800 A MLO requires 28-inch (711.2 mm) wide box.
② 100,000 based on NEMA test procedure.
③ Top feed only.
④ Requires 6.50-inch (165.1 mm) deep box. Not available in Type 3R, 12, 4 and 4X enclosures.
⑤ 100% rated circuit breaker. Requires copper bus. Not available in Type 12, 4 and 4X enclosures.
⑥ The 400 A frame must use trip units of ratings 0100–0400, while the 600 A frame must use trip units of ratings 0500, 0600 or designated by H, such as H250. The H as the leading character of the ampacity indicates a high instantaneous version of the breaker for coordination purposes. H ratings must use 600 A frame.

PRL3X Branch Circuit Breakers

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480 Vac	600 Vac	250 Vdc	Breaker Type
15–60	10 ②③	—	—	—	BAB
15–60	10	—	—	—	BAB-H
70	10 ②③	—	—	—	BAB
70	10	—	—	—	BAB-H
80–100	10 ②③	—	—	—	BAB
80–100	10	—	—	—	BAB-H
15–50 ①	10 ②③	—	—	—	QBGF
15–50 ①	10	—	—	—	QBGFEP
15–20	10 ②③	—	—	—	QBCAF ④
15–60	10 ②③	—	—	—	BAB-D ⑤
15–30	10 ②③	—	—	—	BAB-C ⑥
15–30	10 ②	—	—	—	BABRP ⑦
15–30	10 ②	—	—	—	BABRSP ⑦
15–60	22 ②③	—	—	—	QBHW
15–60	22	—	—	—	QBHW-H
70	22 ②③	—	—	—	QBHW
70	22	—	—	—	QBHW-H
80–100	22 ②③	—	—	—	QBHW
80–100	22	—	—	—	QBHW-H
15–30	22	—	—	—	QBHGF
15–30	22	—	—	—	QBHGFEP
15–20	22 ②③	—	—	—	QBHCAF ④
15–30	65	14 ⑧⑨	—	—	GHQ
15–20	65	14 ⑧⑨	—	14	GHB

PRL3X Branch Circuit Breakers, continued

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480 Vac	600 Vac	250 Vdc	Breaker Type
25–60	65	14 ⑧⑨	—	14	GHB
70–100	65	14 ⑧⑨	—	14	GHB
15–30	65	25 ⑧⑨	—	—	HGHB
15–20	65	14	—	—	GHQRD
15–20	65	14 ⑧⑨	—	14	GHQRSP ⑦
15–60	—	14 ⑧⑨	—	—	GHBGFEP
15–20	—	14 ⑧⑨	—	—	GHBHID ⑤
15–60	35 ⑩	25 ⑧	—	10	PDG2xF
70–100	35 ⑩	25 ⑧	—	10	PDG2xF
15–60	65 ⑩	35 ⑧	18	10	PDG2xG
70–100	65 ⑩	35 ⑧	18	10	PDG2xG
110–225	65 ⑩	35	18	10	PDG2xG ⑪
15–60	100 ⑩	65 ⑧	25	22	PDG2xM
70–100	100 ⑩	65 ⑧	25	22	PDG2xM
110–225	100 ⑩	65	25	22	PDG2xM ⑪
15–60	200	100	35	22	PDG2xP
70–100	200	100	35	22	PDG2xP
110–225	200	100	35	22	PDG2xP ⑪
100–225	35	—	—	—	PDD2xF ⑪
100–225	65	—	—	—	PDD2xG ⑪
100–225	100	—	—	—	PDD2xM ⑪
100–225	200	—	—	—	PDD2xP ⑪

Notes

① 50 A devices are available as two-pole only.
② Single-pole breaker rated 120 Vac.
③ Two-pole breaker rated 120/240 Vac.
④ Arc fault circuit breaker.
⑤ HID (High Intensity Discharge) rated breaker.
⑥ Switching Neutral Breaker. single-pole device requires two-pole space, two-pole device requires three-pole space.
⑦ Remote operated circuit breaker.
⑧ Single-pole breaker rated 277 Vac.
⑨ For use on 480Y/277 V systems only.
⑩ AIC rating for two- and three-pole breakers only.
⑪ Maximum of six breakers per panel, 175–225 A.

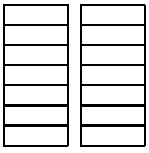
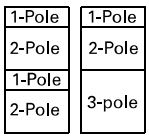
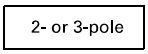
Box Sizing and Selection

Approximate Dimensions in Inches (mm)

Panel Layout Instructions

1. Select:
   a. Required mains (lugs or breaker).
   b. Neutral where required.
   c. Branch circuits as required.
2. Layout panel as shown below, using appropriate "X" dimensions.
3. Using total X units (panel height) find box height in inches (mm) and box catalog number from table below. (When total X units come out to an uneven number, use next highest number; i.e., if total X comes out 25X, use 31X.)

Layout—PRL3X

		Poles	
		6 - 3X 12 - 5X 18 - 8X 24 - 10X 30 - 13X 36 - 15X 42 - 18X	BAB, QBHW, QBCAF, BABRP, BABRSP, QBHCAF GHQ, GHQRD, GHQRSP, GHB, HGHB ①
		1X 2X 3X	PDD2xF, PDD2xG, PDD2xM, PDD2xP PDG2xF, PDG2xG, PDG2xM, PDG2xP 150 A max. per branch breaker (300 A max. per connector)
		2X 2-Pole 3X three-pole	PDD2xF, PDD2xG, PDD2xM, PDD2xP, PDG2xG, PDG2xM, PDG2xP ②
Neutral Section		5X 8X 11X	100–250 A 400–800 A 800 A with through-feed lug
Main Lug Section		2X 5X 8X 14X	100 A 250 A 400–600 A 800 A
Main Breaker Section	Horizontal Mounting	2X 2-Pole 3X three-pole	PDG2xF, PDG2xG, PDG2xM, PDG2xP PDD2xF, PDD2xG, PDD2xM, PDD2xP ③
	Vertical Mounting	7X 9X 15X 17X 18X 21X	PDG2xF, PDG2xG, PDG2xM, PDG2xP, PDD2xF, PDD2xG, PDD2xM, PDD2xP ④ FCL, FB-P ⑤ PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP*, LHH CLD PDG3xG*, PDG3xM*, PDG3xP* LCL, LA-P ⑤⑥

Notes

① GHB, HGHB, GHQ, GHQRD and GHQRSP breakers cannot be mixed on same connector as BAB, QBHW, BABRP and BABRSP.
② Maximum of six breakers per panel.
③ Horizontal mounted 15–150 A main breakers PDG2xF, PDG2xG, PDG2xM and PDG2xP, will be furnished as branch breaker construction. Branch breakers single-, two- or three-pole as required, may be located opposite these main breakers.
④ If optional terminal kit 3TA225FDK is required, use 10X.
⑤ FB-P and LA-P top mounting only.
⑥ LCL or LA-P main breaker requires 6-1/2-inch (165.1 mm) deep box.

Layout Example

1. Description of Panel
   Type PRL3X three-phase, four-wire, 120/208 Vac flush mounting. Panel to have short-circuit rating of 22,000 symmetrical amperes. Main breaker 400 A, three-pole, bottom mounting. Branch circuits bolt-on as follows:
   12–200 A single-pole QBHW
   1–200 A three-pole PDD2xG
   1–225 A three-pole PDD2xG
2. Layout Information from **Layout—PRL3X** table (left):
   a. 400 A Neutral . . . . . = 8X
   b. 12-poles of QBHW . . . . . = 5X
   c. Two three-pole PDD2xG breakers . . . . = 6X
   d. Main breaker, 400 A,
      Three-pole PDD3xG* . . . . . = 15X
      Total Height. . . . . = 34X
3. From **Box Tabulation—PRL3X** table (below):
   a. 34X Height (use 40X box)
   b. Box Height 72 inches (1828.8 mm)
   c. Box Catalog Number. . . . . **YS2072** or **EZB2072R**

Box Tabulation—PRL3X

"X" Units	Box Height	YS Box Catalog Number	LT Trim Catalog Number	EZ Box Catalog Number	EZ Trim Catalog Number
100–400 A					
14X	36.00 (914.4)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
23X	48.00 (1219.2)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
31X	60.00 (1524.0)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
40X	72.00 (1524.0)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
53X	90.00 (2286.0)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**
600 A					
23X	48.00 (1219.2)	**YS2048**	**LTV2048S or F**	**EZB2048R**	**EZTV2048S or F**
31X	60.00 (1524.0)	**YS2060**	**LTV2060S or F**	**EZB2060R**	**EZTV2060S or F**
40X	72.00 (1524.0)	**YS2072**	**LTV2072S or F**	**EZB2072R**	**EZTV2072S or F**
53X	90.00 (2286.0)	**YS2090**	**LTV2090S or F**	**EZB2090R**	**EZTV2090S or F**
800 A					
23X	48.00 (1219.2)	**YS2848**	**LTV2848S or F**	—	—
31X	60.00 (1524.0)	**YS2860**	**LTV2860S or F**	—	—
40X	72.00 (1524.0)	**YS2872**	**LTV2872S or F**	—	—
53X	90.00 (2286.0)	**YS2890**	**LTV2890S or F**	—	—

Cabinets

Fronts are code-gauge steel, ANSI-61 light gray painted finish.

Boxes are code-gauge galvanized steel without knockouts. Standard depth is 5-3/4 inches (146.1 mm).

Standard widths are:
20-inch (508.0 mm)
100–600 A.
28-inch (711.2 mm)
800 A.

Standard Depth

5-3/4 inches (146.1 mm).

Top and Bottom Gutters

5-1/2 inches (139.7 mm) minimum.

Side Gutters

4 inches (101.6 mm) minimum.

Type PRL3E

Contents

Type PRL3E

Product Description

- 480 Vac maximum (250 Vdc)
- Three-phase four-wire, three-phase three-wire, single-phase three-wire, single-phase two-wire
- 600 A main lugs
- 600 A main breaker
- 125 A maximum branch breakers
- Bolt-on branch breakers
- Factory assembled
- Refer to **Page V2-T3-7** for additional information

Application Description

- Lighting and appliance branch panelboard
- Fully rated or series rated
- Interrupting ratings up to 200 kA symmetrical
- Suitable for use as Service Entrance Equipment, when specified on the order
- See **Pages V2-T3-7** through **V2-T3-32** for additional information

Standards and Certifications

- UL 67, UL 50
- CSA C22.2 No. 29
- Federal Specification W-P-115c
- Refer to **Page V2-T3-10** for additional information

UL Listed

Product Selection

Type PRL3E

PRL3E

Ampere Rating	Breaker Type	Interrupting Rating (kA Symmetrical) 240 Vac	480 Vac	250 Vdc
Main Lug Only				
100	—	—	—	—
250	—	—	—	—
400	—	—	—	—
600	—	—	—	—
Main Breaker				
125	EGB	35	18	10
125	EGS	100	35	35
125	EGH	200	65	42
225	PDD2xF	35	—	—
225	PDD2xG	65	—	—
225	PDD2xM	100	—	—
225	PDD2xP	200	—	—
225	PDG2xG	65	35	10
225	PDG2xM	100	65	22
225	PDG2xP	200	100	22
400	PDD3xG ①	65	—	—
400	PDG3xG* ①	65	35	10
400	PDG3xM* ①	100	65	22
400	LHH	100	65	—
400	PDG3xP* ①	200	100	22
600	PDG3xG* ①	65	35	22
600	PDG3xM* ①	100	65	22

Note

① The 400 A frame must use trip units of ratings 0100–0400, while the 600 A frame must use trip units of ratings 0500, 0600 or designated by H, such as H250. The H as the leading character of the ampacity indicates a high instantaneous version of the breaker for coordination purposes. H ratings must use 600 A frame.

Box Sizing and Selection

Approximate Dimensions in Inches (mm)

Assembled Circuit Breaker Panelboards and Lighting Controls

Box size and box and trim catalog numbers for all standard panelboard types are found on **Page V2-T3-70**.

Instructions

1. Using description of the required panelboard, select the rating and type of main required.
2. Count the total number of branch circuit poles, including provisions, required in the panelboard. Do not count main breaker poles. Convert two- or three-pole branch breaker to single-poles, i.e., three-pole breaker, count as three poles. Determine sub-feed breaker or through-feed lug requirements.
3. Select the main ampere rating section from **Page V2-T3-70**.
4. Select panelboard type from first column, main breaker frame, if applicable, from second column, and sub-feed breaker frame, if applicable, from the third column.
5. From Step #2, determine the number of branch circuits in Column 4.
6. Read box size, box and trim catalog numbers across columns to the right. Specify surface or flush mounting on the order.

Cabinets

Fronts are code-gauge steel, ANSI-61 light gray painted finish.

Boxes are code-gauge galvanized steel without knockouts. Standard depth is 5-3/4 inches (146.1 mm). Standard width is 20 inches (508.0 mm). An optional 28-inch (711.2 mm) wide box is available.

Top and Bottom Gutters

5-1/2 inches (139.7 mm) minimum.

Approximate Dimensions in Inches (mm)

PRL3E Panelboard Sizing

Panelboard Types	Main Breaker Types and Mounting Position (H) = Horizontal (V) = Vertical	Sub-Feed Breaker Types and Mounting Position (H) = Horizontal (V) = Vertical	Maximum No. of Branch Circuits Including Provisions	Box Dimensions ① Height	Width	Depth	YS Box Catalog Number	LT Trim Catalog Number	EZ Box Catalog Number	EZ Trim Catalog Number
125 A										
Main breaker	EG, EGS, EGH (H)	—	12	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		—	24	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		—	36	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		—	42	42.00 (1066.8)	20.00 (508.0)	5.75 (146.1)	**YS2042**	**LT2042S or F**	**EZB2042R**	**EZT2042S or F**
Main lugs or main breaker	PDG2xG, PDG2xM (V)	—	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		—	30	42.00 (1066.8)	20.00 (508.0)	5.75 (146.1)	**YS2042**	**LT2042S or F**	**EZB2042R**	**EZT2042S or F**
		—	42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
Main lugs or main breaker with 125 A through-feed lugs or sub-feed breaker	PDG2xG PDG2xM (V)	PDG2xF PDG2xG PDG2xM TFL (V)	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
			30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
			42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
250 A										
Main lugs or main breaker	PDD2xG, PDD2xM, PDG2xG, PDG2xM (V)	—	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	**YS2036**	**LT2036S or F**	**EZB2036R**	**EZT2036S or F**
		—	30	42.00 (1066.8)	20.00 (508.0)	5.75 (146.1)	**YS2042**	**LT2042S or F**	**EZB2042R**	**EZT2042S or F**
		—	42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
Main lugs or main breaker with 225 A through-feed lugs or sub-feed breaker	PDG2xG, PDG2xM, PDD2xG, PDD2xM (V)	PDG2xG, PDG2xM, PDD2xG, PDD2xM (V)	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
			30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
			42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
400 A										
Main breaker	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP* (V)	—	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	**YS2048**	**LT2048S or F**	**EZB2048R**	**EZT2048S or F**
		—	30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
		—	42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
Main breaker with 225 A through-feed lugs or sub-feed breaker	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP* (V)	PDG2xF, PDG2xG, PDG2xM, PDD2xF, PDD2xG, PDD2xM (V)	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	**YS2060**	**LT2060S or F**	**EZB2060R**	**EZT2060S or F**
			30	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
Main lugs or main breaker with 400 A through-feed lugs or sub-feed breaker	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP* (V)	PDD3xG*, PDG3xG*, PDG3xM*, PDG3xP* (V)	18	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			30	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	**YS2072**	**LT2072S or F**	**EZB2072R**	**EZT2072S or F**
			42	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	**YS2090**	**LT2090S or F**	**EZB2090R**	**EZT2090S or F**

PRL3E Branch Circuit Breakers

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480 Vac	250 Vdc	Breaker Type
15–125	25	18	10	EGB
15–125	85	35	35	EGS
15–125	100	65	42	EGH

Note

① Smaller panelboard box sizes are available if required. Contact Eaton for application information.

Type PRL3FQS

Contents

Type PRL3FQS

Product Description

The Pow-R-Line 3FQS is a fusible lighting panel designed for high fault current applications where circuit breakers may not meet the application. This panel is ideal when the selective coordination mandates apply. Designed for use with Eaton's Bussmann CUBEFuse®, the panel will selectively coordinate with the maximum available fault current. The PRL3FQS is ideal for control circuits below 15 A.

Panelboard Ratings

Voltage

- 600 Vac maximum
- 125 Vdc maximum (80 A maximum branch)

Mains

- Main lugs: 30–400 A
- Main fusible switch: 30–400 A
- Main non-fused switch: 30–400 A

Voltage Systems

- 120 V, single-phase, two-wire
- 240 V, single-phase, two-wire
- 240 V, single-phase, two-wire—no neutral
- 277 V, single-phase, two-wire
- 120/240 V, single-phase, three-wire
- 208/120 V, single-phase, three-wire
- 480/240 V, single-phase, three-wire
- 277/480 V, single-phase, three-wire
- 480 V, single-phase, two-wire—no neutral
- 240 V, three-phase, three-wire
- 480 V, three-phase, three-wire
- 600 V, three-phase, three-wire
- 208/120 V, three-phase, four-wire
- 480/277 V, three-phase, four-wire
- 600/347 V, three-phase, four-wire
- 240/120 V, three-phase, four-wire
- 480/240 V, three-phase, four-wire
- 120/240 Vac, single-phase, three-wire
- 208Y/120 Vac, three-phase, four-wire
- 240 delta/120 Vac, three-phase, four-wire
- 480Y/277 Vac, three-phase, four-wire
- 600Y/347 Vac, three-phase, four-wire
- 240 delta Vac, three-phase, three-wire
- 480 delta Vac, three-phase, three-wire
- 600 delta Vac, three-phase, three-wire
- 25 Vdc

Branch Overcurrent Devices

- Eaton Bussmann Type CCPB (compact circuit protector base)
- 15–100 A
- Single-, two- and three-pole
- Branch fuses: Bussmann TCF or FCF CUBEFuse

Short-Circuit Current Ratings

- 50 kAIC symmetrical standard
- Up to 200 kAIC symmetrical when appropriate upstream overcurrent device is applied

Main Bus and Branch Connectors

- Tin plated, copper bus and branch connectors

Enclosures

- NEMA Type 1
- NEMA Type 3R

Branch Circuit Spaces

- 18, 30 and 42 circuit chassis

Incoming Line

- Top or bottom

Spare Fuse Compartment

- Provisions for six spare CUBEFuses, standard

Application Description

- Hospitals
- Surgery centers
- Emergency systems
- Fire stations
- Police stations
- Laboratories
- Communication systems
- Ventilation and smoke removal systems
- Critical industrial processes
- Data centers
- Other critical or sensitive loads

Standards and Certifications

- UL 67 panelboard chassis
- UL 50 listed box and trim
- UL 98 listed fusible switches

Listed

Seismic Qualifications

- Qualified for International Building Code (IBC) categories and site class A, B, C and D

Options

Loadside Chassis

- Feed-thru lugs
- Sub-feed lugs
- Sub-feed fused switch
- Surge protective device

Service Equipment

- Labeled suitable for use as service equipment (bonded neutral)

Neutrals

- Isolated neutral
- Bonded neutral
- 200% rated neutrals

Ground Bars

- Bonded neutral
- Isolated neutral

Special Trims

- Door-in-door
- No trim

NEMA Type 1 Box Options

- No knockouts (standard)
- Knockouts, both top and bottom (optional)
- Knockouts, top or bottom (optional)

Replacement Fuses

- Replace only with Bussmann fuses of the same type and size
- Contact your authorized Eaton Bussmann distributor for replacement fuses
- Nameplates
- Permanent circuit numbering

Product Selection

Branch Circuit Disconnects Compact Circuit Protector Base (CCPB)

CCPB ① Part Number	Number of Poles	Fuse Ampere Range	Maximum CCPB Ampacity	Non-Indicating Fuses (Standard)	Indicating Fuses (Optional) ②
CCPB-1-15CF	1	1–15	15	TCF1RN, TCF3RN, TCF6RN, TCF10RN, TCF15RN	TCF6, TCF10, TCF15
CCPB-2-15CF	2	1–15	15		
CCPB-3-15CF	3	1–15	15		
CCPB-1-20CF	1	17.5–20	20	TCF17-1/2RN, TCF20RN	TCF17-1/2, TCF20
CCPB-2-20CF	2	17.5–20	20		
CCPB-3-20CF	3	17.5–20	20		
CCPB-1-30CF	1	25–30	30	TCF25RN, TCF30RN	TCF25, TCF30
CCPB-2-30CF	2	25–30	30		
CCPB-3-30CF	3	25–30	30		
CCPB-1-40CF	1	35–40	40	TCF35RN, TCF40RN	TCF35, TCF40
CCPB-2-40CF	2	35–40	40		
CCPB-3-40CF	3	35–40	40		
CCPB-1-50CF	1	45–50	50	TCF45RN, TCF50RN	TCF45, TCF50
CCPB-2-50CF	2	45–50	50		
CCPB-3-50CF	3	45–50	50		
CCPB-1-60CF	1	60	60	TCF60RN	TCF60
CCPB-2-60CF	2	60	60		
CCPB-3-60CF	3	60	60		
CCPB-1-70CF 1	1	70	70	TCF70RN	TCF70
CCPB-2-70CF 2	2	70	70		
CCPB-3-70CF 3†	3	70	70		
CCPB-1-90CF	1	80–90	90	TCF80RN, TCF90RN	TCF80, TCF90
CCPB-2-90CF	2	80–90	90		
CCPB-3-90CF	3	80–90	90		
CCPB-1-100CF	1	100	100	TCF100RN	TCF100
CCPB-2-100CF	2	100	100		
CCPB-3-100CF	3	100	100		

① CCPB disconnect can accept CUBEFuses with ampere ratings less than or equal to the ampere rating of the CCPB disconnect.

② Correct fit with CCPB disconnect requires indicating CUBEFuses with date code R38 or later.

Note: Spare or replacement CCPB available only from authorized Eaton Bussmann distributors.

Technical Data and Specifications

Main Lugs Only

Ampere Rating	Standard Mechanical Lug Wire Range
100	(1) #1–300 kcmil
200	(1) #1–300 kcmil
400	(1) #4–600 kcmil

Main Non-Fused Switch

Ampere Rating	Standard Mechanical Lug Wire Range
100	(1) #1–300 kcmil
200	(1) #1–300 kcmil
400	(1) #4–600 kcmil

Main Fused Switch (Class J Fuses Only)

Ampere Rating	Standard Mechanical Lug Wire Range
100	(1) #1–300 kcmil
200	(1) #1–300 kcmil
400	(1) #4–600 kcmil

Branch Disconnects

CCCPB Horsepower Ratings

CCPB Disconnect	Ampere Rating	Horsepower Rating at Vac			
		120	240	480	600
CCPB–(Poles)-15CF	15	0.5	3	5	7.5
CCPB–(Poles)-20CF	20	0.75	3	7.5	10
CCPB–(Poles)-30CF	30	1.5	5	15	10
CCPB–(Poles)-40CF	40	2	7.5	20	10
CCPB–(Poles)-50CF	50	3	7.5	20	10
CCPB–(Poles)-60CF	60	3	7.5	20	10
CCPB–(Poles)-70CF	70	3	15	30	40
CCPB–(Poles)-90CF	80	5	20	40	50
CCPB–(Poles)-100CF	100	5	20	50	50

Box Sizing and Selection

Approximate Dimensions in Inches (mm)

Enclosures

NEMA Type 1 Indoor

- Flush mount or surface mount
- Galvanized steel with removable end walls—blank or with knockouts (specify on order)
- Chassis mounts directly onto enclosure studs in the enclosure
- Trim finished with gray powder coat paint over phosphatized steel (ANSI 61) with door
- Circuit directory card is located on the inside of the door
- Concealed trim screws

NEMA Type 3R Outdoor (Optional)

- Surface mount only
- Finished with gray powder coat paint over phosphatized steel (ANSI 61)
- Bottom feed only, no knockouts
- hassis mounts directly onto studs in the enclosure
- Gasketed door has vault handle with lock
- Circuit directory card is located on the inside of the door
- Contact Eaton for other enclosure types

NEMA Type 1 Box Sizes

Width	Depth	Height
20.00 (508.0)	5.75 (146.1)	33.00 (838.2)
20.00 (508.0)	5.75 (146.1)	50.00 (1270.0)
20.00 (508.0)	5.75 (146.1)	59.00 (1498.6)
20.00 (508.0)	5.75 (146.1)	69.00 (1752.6)

NEMA Type 3R Outdoor Box Sizes

Width	Depth	Height
20.00 (508.0)	7.75 (196.9)	34.50 (876.3)
20.00 (508.0)	7.75 (196.9)	51.50 (1308.1)
20.00 (508.0)	7.75 (196.9)	60.50 (1536.7)
20.00 (508.0)	7.75 (196.9)	70.50 (1790.7)

Type PRL4X

Type PRL4X Circuit Breaker and Type PRL4F Fusible Panelboards

Contents

Type PRL4X

Product Description

- 600 Vac maximum (600 Vdc)
- Three-phase, four-wire, three-phase three-wire, single-phase three-wire, single-phase two-wire
- PRL4X circuit breaker panelboard
- PRL4F fusible switch panelboard
- 1200 A maximum mains
- 1200 A maximum branch devices
- Bolt-on branch devices
- Factory assembled
- Refer to **Page V2-T3-7** for additional information

Application Description

- Power distribution panelboard
- Fully rated or series rated
- Interrupting ratings up to 200 kA symmetrical
- Suitable for use as Service Entrance Equipment, when specified on the order
- See **Pages V2-T3-7** through **V2-T3-32** for additional information

Standards and Certifications

- UL 67, UL 50
- CSA C22.2 No. 29
- Federal Specification
- W-P-115c
- Refer to **Page V2-T3-10** for additional information

Listed

Product Selection

Type PRL4X

PRL4X Main Lugs and Main Breakers

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480 Vac	600 Vac	250 Vdc	600 Vdc	Breaker Type
Main Lug Only						
250	—	—	—	—	—	—
400	—	—	—	—	—	—
600	—	—	—	—	—	—
800	—	—	—	—	—	—
1200	—	—	—	—	—	—
Main Breaker ①						
250	—	—	—	42	35	HJDDC ②
250	200	200	—	—	—	LCL
400	65	—	—	10	—	PDD3xG ⑩
400	65	35	25	10	—	PDG3xG* ⑩
400	65	35	25	—	—	PDF3xG ③④
400	100	65	35	22	—	PDG3xM* ⑩
400	—	—	—	42	35	HKDDC ②
400	100	65	35	42	—	LHH
400	100	65	35	—	—	PDF3xM ③④
400	200	100	65	22	—	PDG3xP* ⑩
400	200	200	—	—	—	LCL
400	200	200	200	—	—	LA-P
600	65	35	18	22	—	PDG3xG* ①⑩
600	100	65	35	22	—	PDG3xM* ①⑩
600	200	100	50	42	—	PDG3xP* ⑩
600	65	35	25	—	—	CLD ③
800	65	50	25	22	—	PDG4xG
800	100	65	35	25	—	PDG4xM
800	—	—	—	42	35	HMDLDC ②
800	65	50	25	—	—	PDF4xG ③
800	100	65	35	—	—	PDF4xM ③
800	200	200	200	—	—	NB-P
800	100	65	35	—	—	PDG5xM
800	200	100	65	—	—	PDG5xP
800	200	100	65	—	—	PDG5xP
800	100	65	35	—	—	PDG5xM
800	85	50	25	—	—	NGS
800	65	50	25	—	—	CND ③⑤
800	200	100	65	—	—	CNGC ③⑤
800	100	65	35	—	—	CNGH ③⑤
800	85	50	25	—	—	CNGS ③⑤
1200	100	65	35	—	—	PDG5xM
1200	200	100	65	—	—	PDG5xP
1200	85	50	25	—	—	NGS
1200	65	50	25	—	—	CND ③⑤
1200	200	100	65	—	—	CNGC ③⑤
1200	100	65	35	—	—	CNGH ③⑤
1200	85	50	25	—	—	CNGS ③⑤
1200	—	—	—	42	50	NBDC ②

PRL4X Main Fusible Switches

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480 Vac	Device Type
Main Fusible Switch 240 Vac, 250 Vdc ⑥⑦⑧			
200	See **Page V2-T3-77**		FDPB
400			FDPW
600 ⑨			FDPW
800 ⑨			FDPW
1200 ⑨			FDPW
Main Fusible Switch 600 Vac ⑥⑦			
200	See **Page V2-T3-77**		FDPB
400			FDPW
600 ⑨			FDPW
800 ⑨			FDPW
1200 ⑨			FDPW

Notes

① For ground fault protection on main devices, see **Modification 14—Applies to 310 and 310+ Trip Units on Page V2-T3-105** or **Modification 15 on Page V2-T3-105**.
② For use on DC systems only.
③ 100% rated breaker. Requires copper bus. Not available in Type 12, 4 and 4X enclosures.
④ Breaker only available in three-pole frame.
⑤ Requires 44-inch (1117.6 mm) wide box.
⑥ For ground fault protection on main devices, see **Modification 15 on Page V2-T3-105**.
⑦ Fuses not included. **Specify required fuse clips on all switches.**
⑧ Class J Fuse provisions are applicable only to 600 V units. When required, use dimensions of 600 V units for all voltages 600 and below.
⑨ No DC rating on 600, 800 and 1200 A switches.
⑩ The 400 A frame must use trip units of ratings 0100–0400, while the 600 A frame must use trip units of ratings 0500, 0600 or designated by H, such as H250. The H as the leading character of the ampacity indicates a high instantaneous version of the breaker for coordination purposes. H ratings must use 600 A frame.

PRL4X Branch Devices

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480 Vac	600 Vac	250 Vdc	600 Vdc	Breaker Type
15–60	10 ②③	—	—	—	—	BAB
15–60	10	—	—	—	—	BAB-H
70–100	10 ②③	—	—	—	—	BAB
70–100	10	—	—	—	—	BAB-H
15–50 ①	10 ②③	—	—	—	—	QBGF
15–20	10 ②③	—	—	—	—	QBCAF ④
15–60	22 ②③	—	—	—	—	QBHW
15–60	22	—	—	—	—	QBHW-H
70–100	22 ②③	—	—	—	—	QBHW
70–100	22	—	—	—	—	QBHW-H
15–30	22 ②③	—	—	—	—	QBHGF
15–20	22 ②③	—	—	—	—	QBHCAF ④
15–30	65 ②	14 ⑤	—	—	—	GHQ ⑦
15–60	65 ②	14 ⑤	—	14	—	GHB ⑦
70–100	65 ②	14 ⑤	—	14	—	GHB ⑦
15–30	65 ②	25 ⑤	—	—	—	HGHB ⑦
15–60	35 ⑧	25 ⑤	—	10	—	PDG2xF
70–100	35 ⑧	25 ⑤	—	10	—	PDG2xF
15–60	65 ⑧	35 ⑤	18	10	—	PDG2xG
70–100	65 ⑧	35 ⑤	18	10	—	PDG2xG
110–225	65 ⑧	35	18	10	—	PDG2xG
15–60	100 ⑧	65 ⑤	25	22	—	PDG2xM
70–100	100 ⑧	65 ⑤	25	22	—	PDG2xM
110–225	100 ⑧	65	25	22	—	PDG2xM
15–60	200	100	35	22	—	PDG2xP
70–100	200	100	35	22	—	PDG2xP
110–225	200	100	35	22	—	PDG2xP
15–100	200	150	—	—	—	FCL
15–150	—	—	—	42	35	HFDDC ⑥
100–225	35	—	—	—	—	PDD2xF
100–225	65	—	—	—	—	PDD2xG
100–225	100	—	—	—	—	PDD2xM
100–225	200	—	—	—	—	PDD2xP
70–250	—	—	—	42	35	HJDDC ⑥
125–250	200	200	—	—	—	LCL
250–400	65	—	—	10	—	PDD3xG ⑫

PRL4X Branch Devices, continued

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480 Vac	600 Vac	250 Vdc	600 Vdc	Breaker Type
100–400	65	35	25	10	—	PDG3xG*
100–400	65	35	25	—	—	PDF3xG ⑨⑩⑪
100–400	100	65	35	22	—	PDG3xM*
100–400	—	—	—	42	35	HKDDC ⑥
100–400	100	65	35	—	—	PDF3xM ⑨⑩⑪
125–400	100	65	35	42	—	LHH
100–400	200	100	65	22	—	PDG3xP*
200–400	200	200	—	—	—	LCL
250–600	65	35	18	22	—	PDG3xG*
300–600	65	35	25	—	—	CLD ⑨
250–600	100	65	35	22	—	PDG3xM*
300–600	—	—	—	42	35	HLDC ⑥⑨
250–600	200	100	35	42	—	PDG3xP*
400–800	65	50	18	22	—	PDG4xG
400–800	100	65	35	25	—	PDG4xM
300–800	—	—	—	42	35	HMDLDC ⑥⑨
400–800	65	50	25	—	—	PDF4xG ⑨
400–800	100	65	35	—	—	PDF4xM ⑨
320–800	85	50	25	—	—	PDG5xK
320–800	85	50	25	—	—	CNGS ⑨
320–800	100	65	35	—	—	PDG5xM
320–800	100	65	35	—	—	CNGH ⑨
320–800	200	100	65	—	—	PDG5xP
320–800	200	100	65	—	—	CNGC ⑨
500–1200	85	50	25	—	—	PDG5xK
500–1200	85	50	25	—	—	CNGS ⑨
500–1200	100	65	35	—	—	PDG5xM
500–1200	100	65	35	—	—	CNGH ⑨
500–1200	200	100	65	—	—	PDG5xP
500–1200	200	100	65	—	—	CNGC ⑨

Notes

① 50 A devices are available as two-pole only.
② Single-pole breakers rated 120 Vac.
③ Two-pole breakers rated 120/240 Vac.
④ Arc fault circuit breaker.
⑤ Single-pole breakers rated 277 Vac.
⑥ For use on DC systems only.
⑦ At 480 V, must be used on 480Y/277 V grounded wye systems only.
⑧ AIC rating for two- and three-pole breakers only.
⑨ 100% rated breaker. Requires copper bus. Not available in Type 12, 4 and 4X enclosures.
⑩ Breaker only available in three-pole frame.
⑪ Available in single branch mounting only.
⑫ The 400 A frame must use trip units of ratings 0100–0400, while the 600 A frame must use trip units of ratings 0500, 0600 or designated by H, such as H250. The H as the leading character of the ampacity indicates a high instantaneous version of the breaker for coordination purposes. H ratings must use 600 A frame.

PRL4X Branch Devices, continued

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480 Vac	600 Vac	250 Vdc	Breaker Type
Integrally Fused, Current Limiting Circuit Breaker					
15–100	200	200	200	①	FB-P
125–225	200	200	200	①	LA-P
250–400	200	200	200	①	LA-P
400–600	200	200	200	①	NB-P
700–800	200	200	200	①	NB-P
Fusible Switches 240 Vac, 250 Vdc ②					
30/30 ③	See table at the right				FDPW-Twin
60/60 ③					FDPW-Twin
100/100 ③					FDPW-Twin
200/200					FDPB-Twin
100					FDPW-Single
200					FDPB-Single
400	See table at the right				FDPW-Single
600 ④					FDPW-Single
800 ④					FDPW-Single
1200 ④					FDPW-Single
Fusible Switches 600 Vac ②					
30/30 ③	See table at the right				FDPW-Twin
60/60 ③					FDPW-Twin
100/100 ③					FDPW-Twin
200/200 ⑤					FDPB-Twin
100					FDPW-Single
200					FDPB-Single
400	See table at the right				FDPW-Single
600 ④					FDPW-Single
800 ④					FDPW-Single
1200 ④					FDPW-Single

FDPW and FDPB Switch Ratings, 240 or 600 Vac

Ampere Rating	Fuse Class Used	Short-Circuit Ratings (kA Symmetrical)
30–100	R, J ⑤	200
200 Single	R, J ⑤	200
200 Twin	R ⑥, J ⑤, T	200
400, 600 ⑦	R ⑦, J ⑤, T	200
800, 1200 ⑦	L	200

Notes

① 100 kAIC based on NEMA test procedure.

② Fuses not included. **Specify required fuse clips on all switches. (T fuse clips not available for 200/200 twin switches.)**

③ When branches of a twin unit are of different ampere ratings, as a 30–60 twin unit, price and layout as a 60–60 twin unit; when a 60–100 twin unit, price and layout as a 100–100 twin unit.

④ No DC rating on 600, 800 and 1200 A switches.

⑤ Class J fuse provisions are applicable to 600 V units. When required, use price and dimensions of 600 V units for all voltages 600 V and below.

⑥ Twin 200 A switches are not available with Class R fuse clips at 600 V.

⑦ When shunt trip is required, 400–600 A switches used with Class R fuses are rated 100 kAIC.

3

Box Sizing and Selection—PRL4X

Approximate Dimensions in Inches (mm)

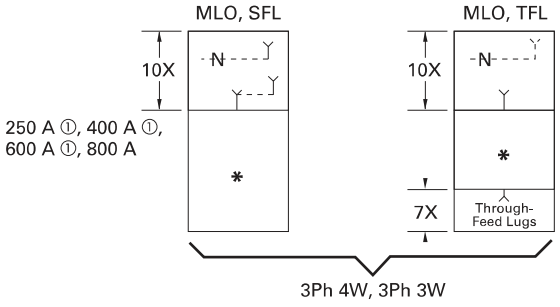
Main Lug Only (MLO), Main Breaker, Neutral, Through-Feed Lug (TFL) and Sub-Feed Lug (SFL) "X" Space Requirements. (For other configurations not shown, refer to Eaton.)

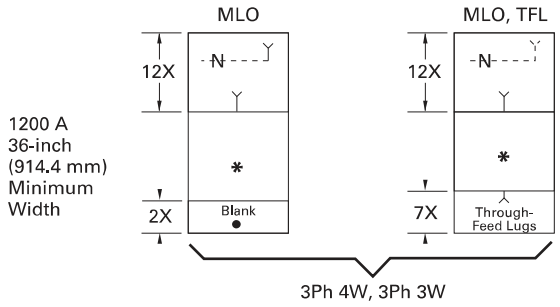
* = Space available for branch devices. For device sizing, see **Page V2-T3-80**.

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

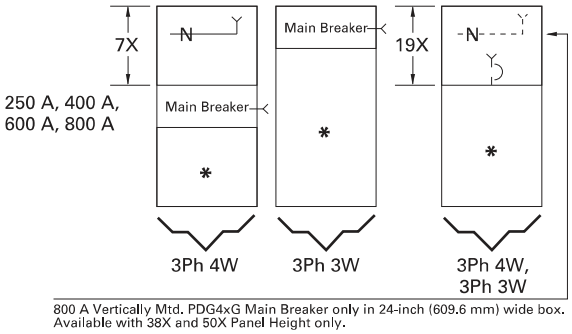
PRL4X Layout

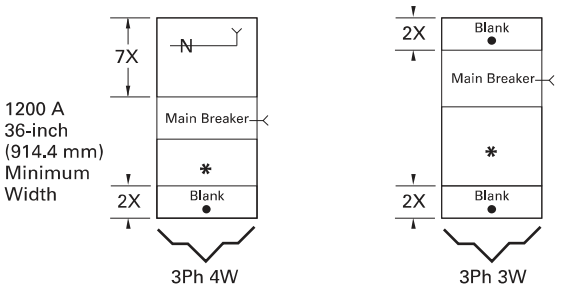
Standard Main Lug, Through-Feed and Sub-Feed Lugs ① (500 kcmil Maximum)



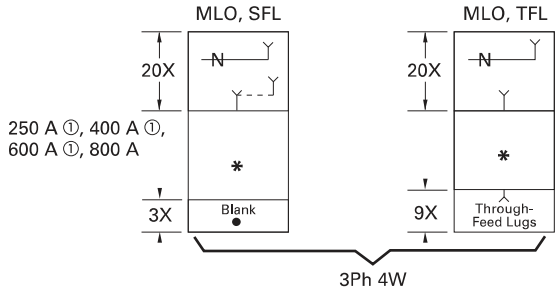


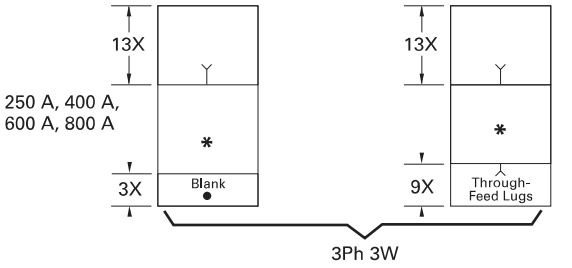
Main Breaker with Neutral (when required) (500 kcmil Maximum)

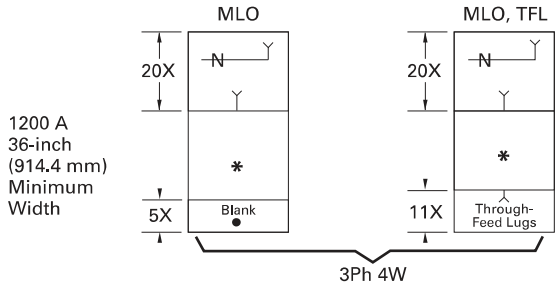


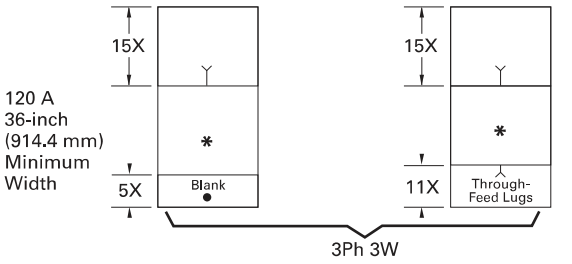


Optional Main Lugs, Through-Feed and Sub-Feed Lugs ① (750 kcmil Maximum)









Note

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

Approximate Dimensions in Inches (mm)

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 table on right. Three standard box heights are available to accommodate any and all layout arrangements. "X" unit totals that do not exactly match those in table on right must be rounded off to the next highest standard (26X, 38X, 50X).

If 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–PRL4X panelboard, 480Y/277 volt, three-phase four-wire 65 kA, 800 A, main lug, consisting of:
  - 12–20 A/single-pole PDG2xM
  - 1–400 A/three-pole PDG3xM*

Reference PRL4X Layout Example

1. From layout guide, total "X" height of panel = 26X, (which is a design standard and no rounding off is necessary).
2. From table on right, enclosure height for 26X panel = 57 inches (1447.8 mm).
3. Width = 24 inches (609.6 mm)—directly from layout guide.
4. Enclosure depth = 11.31 inches (287.0 mm)—standard for all PRL4X panelboards.

PRL4X Layout Example

20 A/1P	20 A/1P	1X
20 A/1P	20 A/1P	1X
20 A/1P	20 A/1P	1X
20 A/1P	20 A/1P	1X
20 A/1P	20 A/1P	1X
20 A/1P	20 A/1P	1X
250 A/3P		3X
250 A/3P		3X
400 A/3P		4X
Main Lugs 800 A Neutral		10X

Total = 26X

Box Dimensions—PRL4X

"X" Units	Catalog Number	Height	Width	Depth ①
26X	**BX2457**	57.00 (1447.8)	24.00 (609.6)	11.31 (287.0)
38X	**BX2473**	73.50 (1866.9)	24.00 (609.6)	11.31 (287.0)
50X	**BX2490**	90.00 (2286.0)	24.00 (609.6)	11.31 (287.0)
38X	**BX3673**	73.50 (1866.9)	36.00 (914.4)	11.31 (287.0)
50X	**BX3690**	90.00 (2286.0)	36.00 (914.4)	11.31 (287.0)
38X	**BX4473**	73.50 (1866.9)	44.00 (1117.6)	11.31 (287.0)
50X	**BX4490**	90.00 (2286.0)	44.00 (1117.6)	11.31 (287.0)

Top and Bottom Gutters

10.63-inch (269.9 mm) minimum.

Side Gutters—Minimum

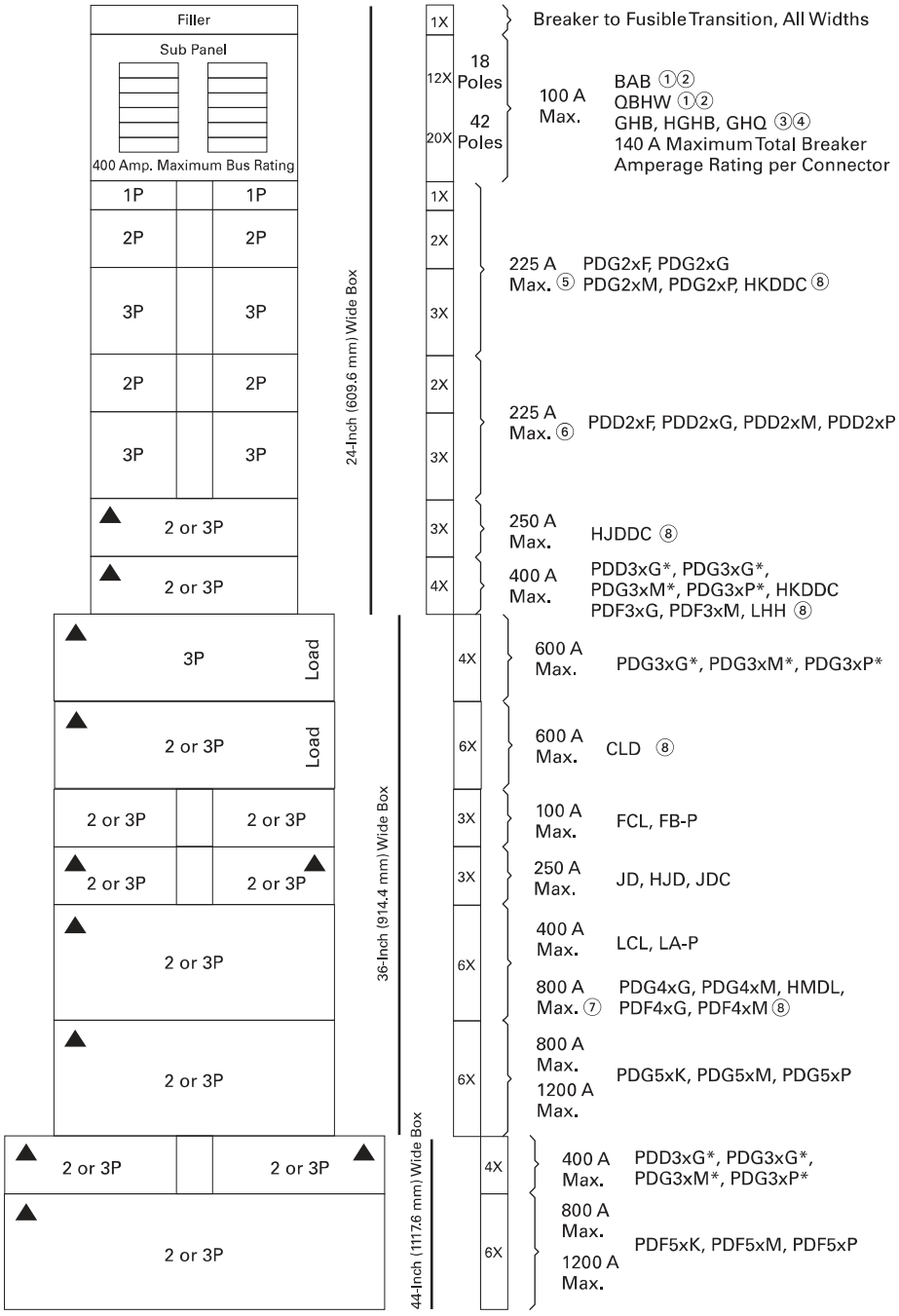
24.00-inch (609.6 mm) wide box—5.00-inch (127.0 mm).
36.00-inch (914.4 mm) wide box—6.00-inch (152.4 mm).
44.00-inch (1117.6 mm) wide box—8.00-inch (203.2 mm).

Notes

① Box depth is 10.40 inches (264.2 mm), cover adds 0.90 inches (22.9 mm) to depth.

800 A maximum bus size in 24.00-inch (609.6 mm) wide box. Flush trims not available on PRL4X panels.

Layout for Branch and Horizontally Mounted Main Devices Layout—PRL4X



Notes

① BAB and QBHW breakers with shunt trips require one additional pole space, i.e., single-pole is two-pole size, two-pole is three-pole size, and three-pole is four-pole size.
② If panel contains only BAB or QBHW branch breakers, use a PRL1X panelboard.
③ GHB, HGHB or GHQ breakers cannot be mixed on same subchassis as BAB, QBHW.
④ If panel contains only GHB, HGHB or GHQ branch breakers, use a PRL2X panelboard.
⑤ When only one single-pole breaker of the group is required on either side of chassis, the single-pole breaker space required changes from 1X to 2X.
⑥ Minimum 36-inch (914.4 mm) wide box is required if optional #6–300 kcmil lug is required.
⑦ PDG4xG main breaker in 24-inch (609.6 mm) wide box, refer to **Page V2-T3-78**.
⑧ For use on DC systems only.

See **Page V2-T3-78** for MLO or Neutral and Vertically Mounted Mains space requirements.

Box Sizing and Selection—PRL4F

Approximate Dimensions in Inches (mm)

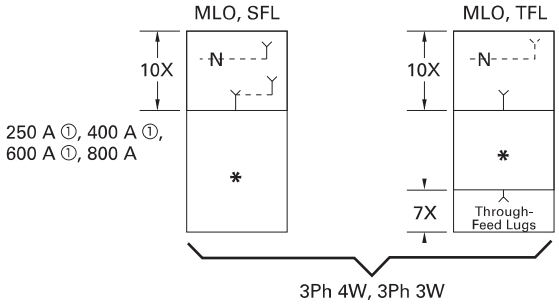
Main Lug (MLO), Main Switch, Neutral, Through-Feed (TFL) and Sub-Feed Lug (SFL) "X" Space Requirements.
(For other configurations not shown, refer to Eaton.)

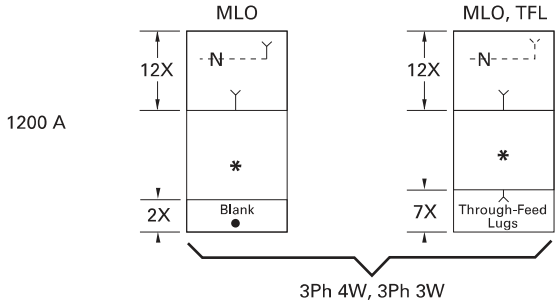
* = Space available for branch devices. For device sizing, see **Page V2-T3-83**.

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

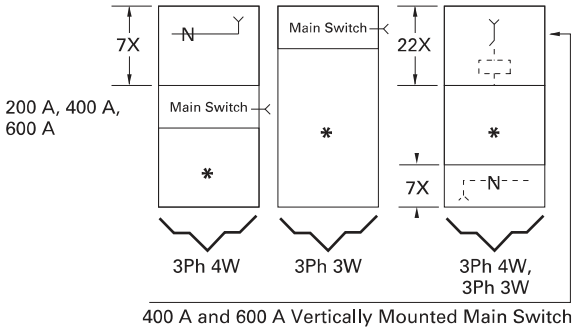
PRL4F Layout

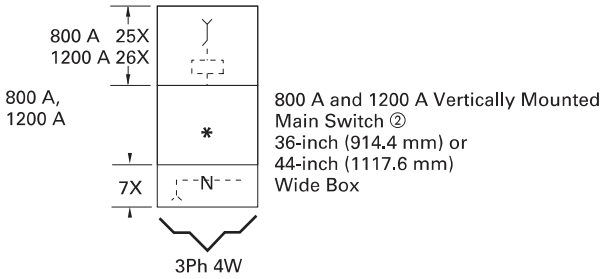
Standard Main Lug, Through-Feed and Sub-Feed Lugs ① (500 kcmil Maximum)



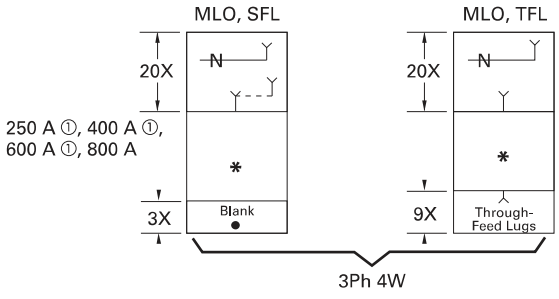


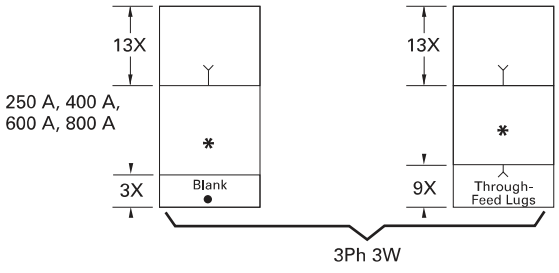
Main Switch with Neutral (when required) (500 kcmil Maximum)

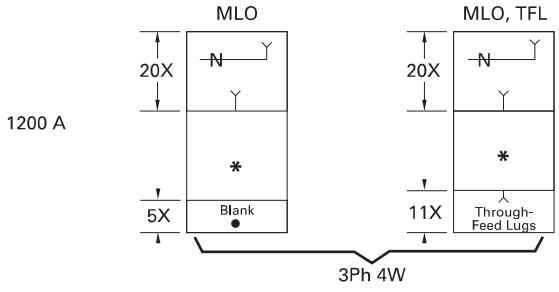


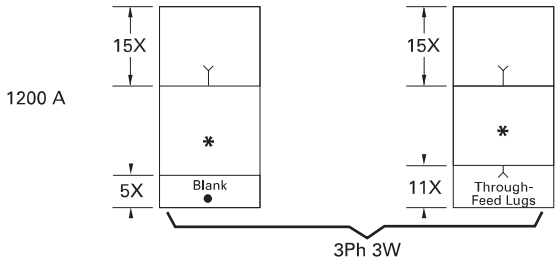


Optional Main Lugs, Through-Feed and Sub-Feed Lugs ① (750 kcmil Maximum)









Notes

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

② 800 A and 1200 A mains available only in vertical mounting.

Approximate Dimensions in Inches (mm)

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 table on right. Three standard box heights are available to accommodate any and all layout arrangements. "X" unit totals that do not exactly match those in table on right must be rounded off to the next higher standard (38X, 50X).

If 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

- PRL4F, three-phase four-wire, 208Y/120 volt complete with 400 A main switch and the following branches:
  - One 200 A/three-pole
  - Two 100 A/three-pole
  - Two 30 A/three-pole

Panel to have short-circuit rating of 100 kA symmetrical.

Reference PRL4F Layout Example

1. From layout guide, total "X" height of panel = 43X.
2. Rounded off to next higher standard = 50X.
3. From table on right, enclosure height for 50X panel = 90 inches (2286.0 mm).
4. Width = 36 inches (914.4 mm).
5. Enclosure depth is standard for all PRL4X panelboards = 11.31 inches (287.0 mm).

Type PRL4F Layout Example

400 A Neutral		7X
30 A/3P	30 A/3P	4X
100 A/3P	100 A/3P	5X
200 A/3P		6X
400 A three-pole Main Switch (Vertical Mounted)		21X
	Total =	43X

Box Dimensions—PRL4F

"X" Units	Catalog Number	Height	Width	Depth ①
38X	**BX3673**	73.50 (1866.9)	36.00 (914.4)	11.31 (287.0)
50X	**BX3690**	90.00 (2286.0)	36.00 (914.4)	11.31 (287.0)
38X	**BX4473**	73.50 (1866.9)	44.00 (1117.6)	11.31 (287.0)
50X	**BX4490**	90.00 (2286.0)	44.00 (1117.6)	11.31 (287.0)

Top and Bottom Gutters

10.63 inches (269.9 mm) minimum.

Side Gutters—Minimum

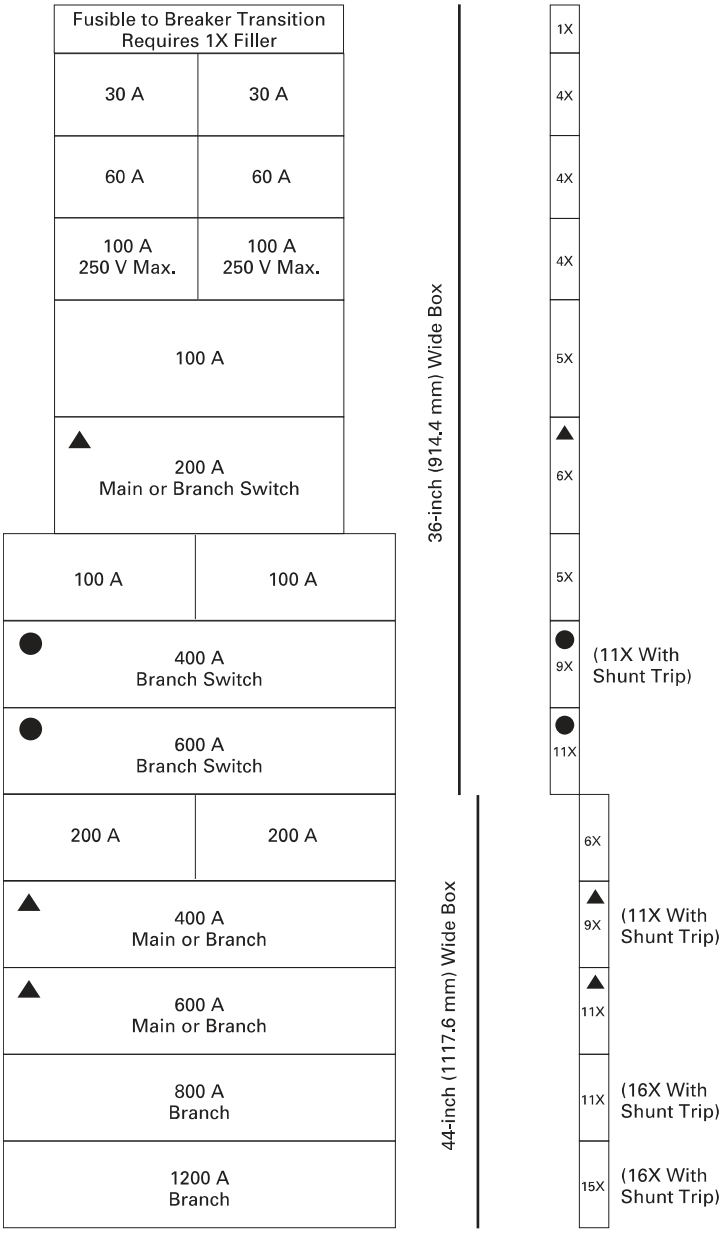
- 36-inch (914.4 mm) wide box:
  - 8-inch (203.2 mm)—200 A maximum
  - 6-inch (152.4 mm)—400–1200 A maximum
- 44-inch (1117.6 mm) wide box:
  - 10-inch (254.0 mm)—200 A maximum
  - 8-inch (203.2 mm)—400–1200 A

Notes

① Box depth is 10.40-inch (264.2 mm), cover adds 0.90-inch (22.8 mm) to depth.

Flush trims not available on PRL4F panels.

Layout for Branch and Horizontally Mounted Main Device—PRL4F



▲ Fusible switch may be used as horizontally main.

● 400 and 600 A horizontally mounted feeder switches in 36-inch (914.4 mm) or 44-inch (1117.6 mm) wide box. 400 and 600 A horizontally mounted main switches only in 44-inch (1117.6 mm) wide box. For vertically mounted main, see **Page V2-T3-81** for sizing.

Note: See **Page V2-T3-81** forMLO or Neutral and Vertically Mounted Main space requirements.

Type PRL4DX

Type PRL4DX Drawout Molded Case Circuit Breaker Power Panelboard

Contents

Type PRL4DX

Product Description

- Drawout molded case circuit breaker power panelboard
- Front accessible
- Front connected
- Through-the-door design drawout mechanism
- Visual indication of breaker status and position
- Large grab handles for easy removal
- 600 Vac maximum
- 1200 A maximum mains
- 600 A maximum drawout molded case feeder breakers

Application Description

- Interrupting ratings up to 200 kAIC symmetrical
- Feeder power panelboard
- Rated as Service Entrance Equipment when appropriately equipped
- Ideal for:
  - Data centers
  - Industrial facilities
  - Process equipment manufacturing
  - Anywhere that requires quick change of feeder devices is needed

Benefits

- Ease of maintenance
- Faster to remove and install
- Less downtime

Standards and Certifications

- UL 67 Listed chassis
- UL 50 Listed box and trim

UL Listed

Product Selection

Type PRL4DX

PRL4DX Main Lugs and Main Breakers

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480 Vac	600 Vac	Breaker Type	"X" Space
Main Lugs Only (Fixed-Mounted Only)					
400	—	—	—	—	10X
600	—	—	—	—	10X
800	—	—	—	—	10X
1200	—	—	—	—	12X
Main Circuit Breaker (Drawout Only) ①					
600	65	35	18	PDG3xG* ③	9X
600	100	65	35	PDG3xM* ③	9X
600	200	100	50	PDG3xP* ③	9X
Main Circuit Breaker (Fixed-Mounted Only) ①					
600	65	35	18	PDG3xG* ③	4X
600	100	65	35	PDG3xM* ③	4X
600	200	100	50	PDG3xP* ③	4X
600	65	35	25	CLD ②	6X
800	65	35	18	PDG4xG	6X
800	100	65	35	PDG4xM	6X
800	65	35	18	PDF4xG ②	6X
800	100	65	35	PDF4xM ②	6X
1200	85	50	25	NGS	6X
1200	100	65	35	PDG5xM	6X
1200	200	100	65	PDG5xP	6X
1200	65	50	25	CND ②	6X

Notes

① For ground fault protection on main devices, see Modification 10—applies to 310 and 310+ trip units only.

② 100% rated circuit breaker.

③ The 400 A frame must use trip units of ratings 0100–0400, while the 600 A frame must use trip units of ratings 0500, 0600 or designated by H, such as H250. The H as the leading character of the ampacity indicates a high instantaneous version of the breaker for coordination purposes. H ratings must use 600 A frame.

PRL4DX Drawout Branch/Feeder Breakers

Type PRL4DX

Single Mount Two-Pole and Three-Pole

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480 Vac	600 Vac	Breaker Type	"X" Space
Single-Mount Breakers with Thermal-Magnetic Trip Units					
70–250	85	35	18	JGS	7X
70–250	100	65	25	JGH	7X
70–250	200	100	35	JGC	7X
250–600	85	35	18	LGS	9X
250–600	100	65	35	PDG3xM* ①	9X
250–600	200	100	65	PDG3xP* ①	9X
Single-Mount Breakers with Electronic 310+ Trip Units (Three-Pole Only)					
20–50	85	35	18	JGS	7X
20–50	100	65	25	JGH	7X
20–50	200	100	35	JGC	7X
40–100	85	35	18	JGS	7X
40–100	100	65	25	JGH	7X
40–100	200	100	35	JGC	7X
80–150	85	35	18	JGS	7X
80–150	100	65	25	JGH	7X
80–150	200	100	35	JGC	7X
100–250	85	35	18	JGS	7X
100–250	100	65	25	JGH	7X
100–250	200	100	35	JGC	7X
100–250	85	35	18	LGS	9X
100–250	100	65	35	PDG3xM* ①	9X
100–250	200	100	65	PDG3xP* ①	9X
200–400	85	35	18	LGS	9X
200–400	100	65	35	PDG3xM* ①	9X
200–400	200	100	65	PDG3xP* ①	9X
250–600	85	35	18	LGS	9X
250–600	100	65	35	PDG3xM* ①	9X
250–600	200	100	65	PDG3xP* ①	9X
Provision for Future (Includes Factory-Installed Base Cassette)					
20–250	Any JG family branch/feeder breaker				7X
100–600	Any LG family branch/feeder breaker				9X

Note

① The 400 A frame must use trip units of ratings 0100–0400, while the 600 A frame must use trip units of ratings 0500, 0600 or designated by H, such as H250. The H as the leading character of the ampacity indicates a high instantaneous version of the breaker for coordination purposes. H ratings must use 600 A frame.

For Dual/Twin feeder breakers, select any two breakers within the same "Breaker Type."

Type PRL4DX

Dual/Twin Mount Two-Pole and Three-Pole

Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480 Vac	600 Vac	Breaker Type	"X" Space
Dual-/Twin-Mount Breakers with Thermal-Magnetic Trip Units					
70–250	85	35	18	JGS	7X
70–250	100	65	25	JGH	7X
70–250	200	100	35	JGC	7X
Dual-/Twin-Mount Breakers with Electronic 310+ Trip Units (Three-Pole Only)					
20–50	85	35	18	JGS	7X
20–50	100	65	25	JGH	7X
20–50	200	100	35	JGC	7X
40–100	85	35	18	JGS	7X
40–100	100	65	25	JGH	7X
40–100	200	100	35	JGC	7X
80–150	85	35	18	JGS	7X
80–150	100	65	25	JGH	7X
80–150	200	100	35	JGC	7X
100–250	85	35	18	JGS	7X
100–250	100	65	25	JGH	7X
100–250	200	100	35	JGC	7X
Provision for Future (Includes Factory-Installed Base Cassette)					
20–250	Any JG Family Branch/Feeder Breaker				7X
100–600	Any LG Family Branch/Feeder Breaker				9X

3

Box Sizing and Selection—PRL4DX

Approximate Dimensions in Inches (mm)

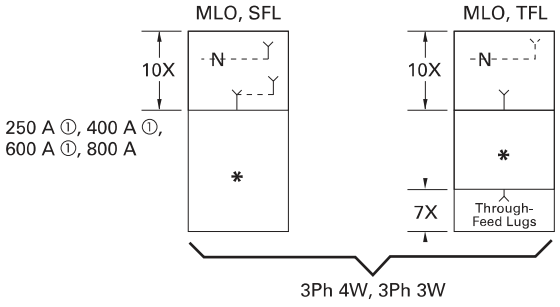
Main Lug Only (MLO), Main Breaker, Neutral, Through-Feed Lug (TFL) and Sub-Feed Lug (SFL) "X" Space Requirements. (For other configurations not shown, refer to Eaton.)

* = Space available for branch devices. For device sizing, see **Page V2-T3-90**.

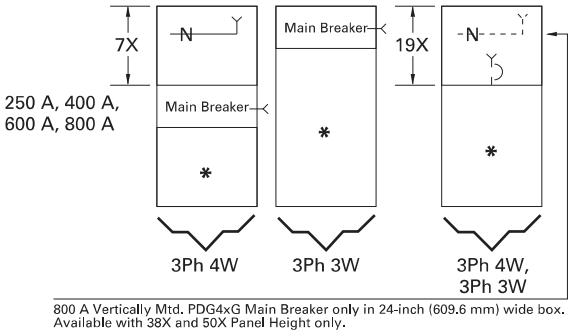
● = Blank means no bus under cover, to meet NEC cable bending space.

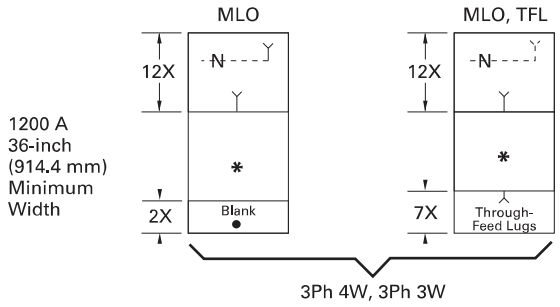
PRL4DX Layout

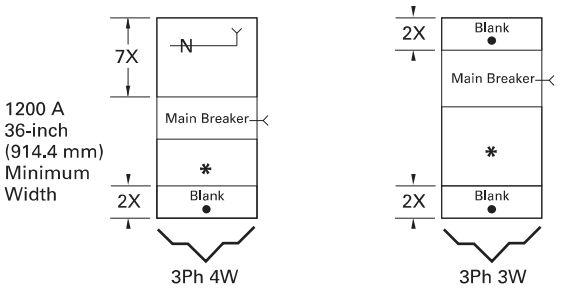
Standard Main Lug, Through-Feed and Sub-Feed Lugs ① (500 kcmil Maximum)



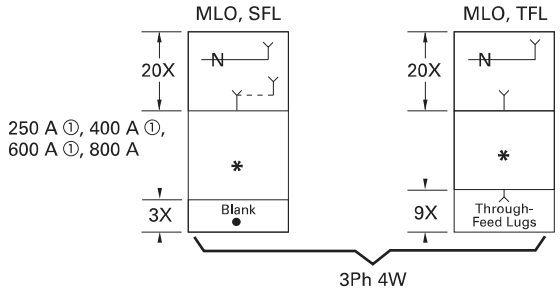
Main Breaker with Neutral (when required) (500 kcmil Maximum)

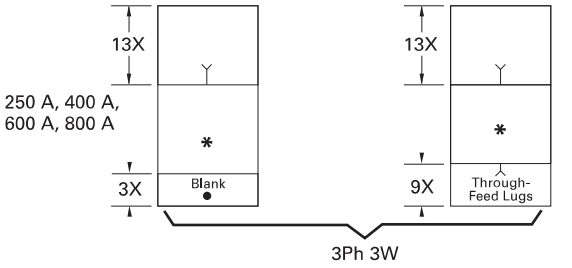


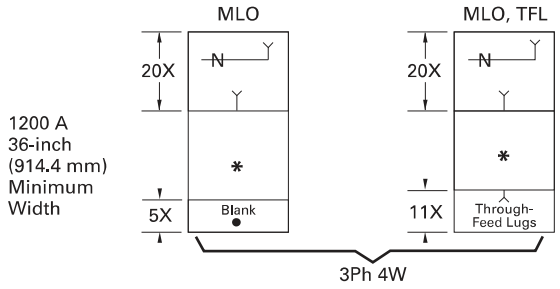


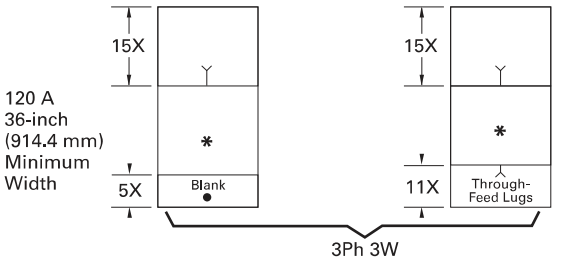


Optional Main Lugs, Through-Feed and Sub-Feed Lugs ① (750 kcmil Maximum)









Note

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

Approximate Dimensions in Inches (mm)

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 table on right. Three standard box heights are available to accommodate any and all layout arrangements. "X" unit totals that do not exactly match those in table on right must be rounded off to the next higher standard (38X, 50X).

If 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

- One PRL4DX panelboard, 480Y/277 Vac, three-phase, four-wire, 65 kA, 800 A main lugs only with:
  - One JGS 200 A/ three-pole
  - One LGS 400 A/ three-pole
  - One JGS 150 A/ three-pole dual mount
  - One JGS 100 A/ three-pole dual mount

Reference PRL4DX Layout Example

1. From layout guide, total "X" height of panel = 33X.
2. From table on right, 33X must use minimum 38X dimensions. Minimum box height is 73.50 inches (1866.9 mm).
3. From the layout for branch and main devices, find minimum box width requirements for mains and branch/feeder devices.

- JGS single minimum width: 36 inches
- LGS single minimum width: 36 inches
- JGS dual minimum width: 44 inches

As the JGS duals require a minimum of a 44-inch-wide box, the minimum box width is 44 inches.

4. From PRL4DX Layout Example, the correct minimum box selection is BX4473, which is 73.50 inches H x 44.00 inches W x 11.31 inches D (1866.9 mm H x1117.6 mm W x 287.0 mm D).

Box Dimensions—PRL4DX

"X" Units	Catalog Number	Height	Width	Depth ①
38X	**BX3673**	73.50 (1866.9)	36.00 (914.4)	11.31 (287.0)
50X	**BX3690**	90.00 (2286.0)	36.00 (914.4)	11.31 (287.0)
38X	**BX4473**	73.50 (1866.9)	44.00 (1117.6)	11.31 (287.0)
50X	**BX4490**	90.00 (2286.0)	44.00 (1117.6)	11.31 (287.0)

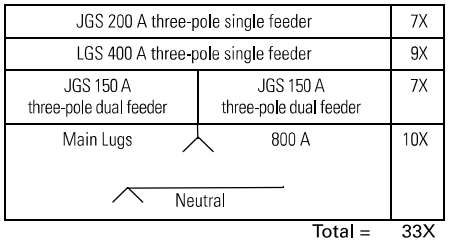
Top and Bottom Gutters

10.63 inches (269.9 mm) minimum.

Side Gutters—Minimum

- 36-inch (914.4 mm) wide box: 6-inch (152.4 mm)
- 44-inch (1117.6 mm) wide box: 8-inch (203.2 mm)

Type PRL4DX Layout Example



Notes

① Box depth is 10.40-inch (264.2 mm), cover adds 0.90-inch (22.8 mm) to depth.

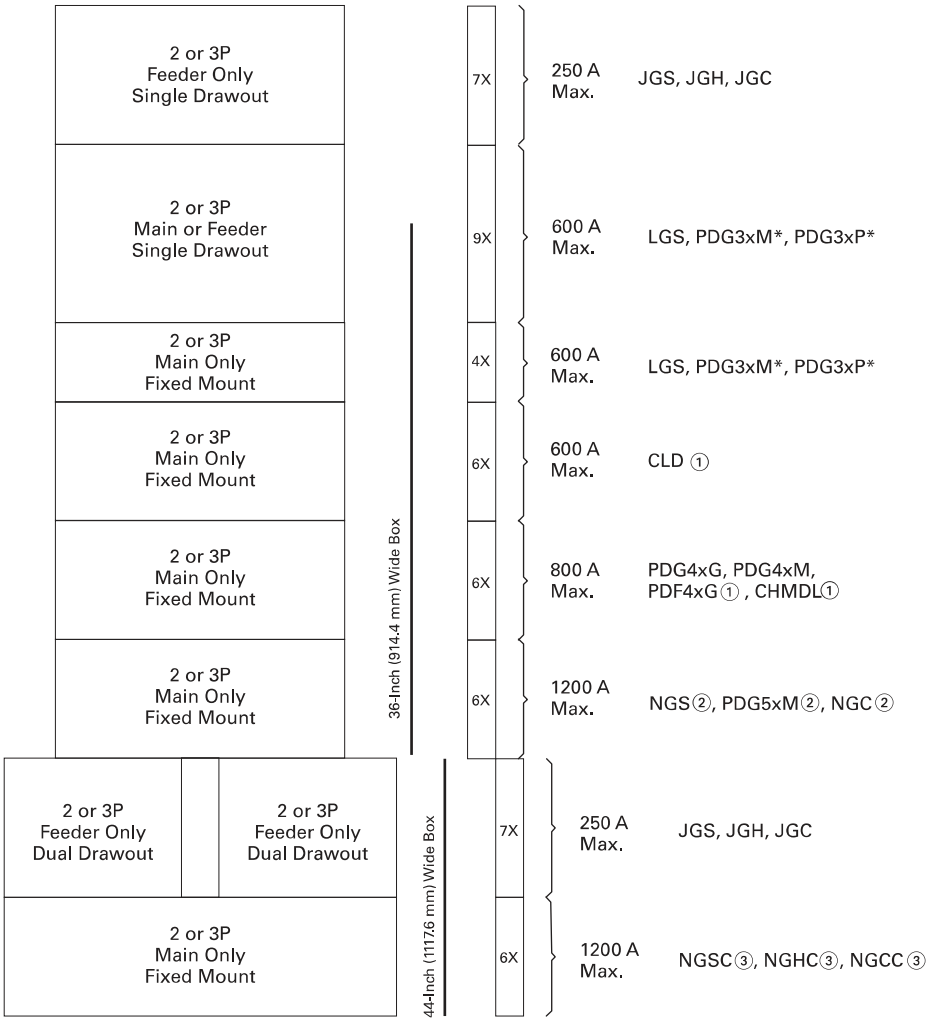
Flush trims not available on PRL4DX panels.

Door-to-door option not available on PRL4DX panels.

Layout for Branch and Horizontally Mounted Main Devices—PRL4DX

Instructions

Determine box size by locating all main and feeder devices in your panel. The width of box is determined by the maximum box size shown for each device. For main lugs, through-feed lugs and sub-feed lugs, refer to **Page V2-T3-88**.



Notes

① 100% rated breaker.
② Optional 750 kcmil terminal requires 44-inch (1117.6 mm) wide box.
③ Contact Eaton for availability.

Accessories and Modifications

PRL4DX Modifications

Modification	Item Number
Ambient compensating breakers	1
Breaker accessories—internal	2
Complete assembly	3
Compression type lugs	4
Conduit covers	5
Copper lugs/terminals	6
Copper main bus	7
Density rated bus	8
Directory frame—metal	9
Electronic trip units	10
Ground bars	11
Ground fault protection	12
Infrared (IR) viewing windows	13
Handle lock-off device	14
Nameplates	15
Permanent circuit numbers	16
Seismically qualified	17
Service entrance equipment rated	18
Shunt trips	19
Sub-feed lugs	20
Surge protective devices	21
Through-feed lugs	22
Touchup paint	23

1. Ambient Compensating Breakers

For ambient compensating breakers (where available) in lieu of standard breakers, add 10% to panelboard branch breaker and to main breaker list prices, if required. (Not UL Listed.)

2. Breaker Accessories—Internal (Only One Accessory Per Position)

Accessories

Breaker Type	Device Mounting	Internal Breaker Accessory
JG family	Drawout ①	Auxiliary switch 1A-1B
JG family	Drawout ①	Auxiliary switch 2A-2B
JG family	Drawout ①	Bell alarm
JG family	Drawout ①	High load alarm w/trip
JG family	Drawout ①	Ground fault alarm w/trip
JG family	Drawout ②	Undervoltage release
JG family	Drawout ②	Zone selective interlock
LG family	Drawout ①	Auxiliary switch 1A-1B
LG family	Drawout ①	Auxiliary switch 2A-2B
LG family	Drawout ①	Bell alarm
LG family	Drawout ①	High load alarm w/trip
LG family	Drawout ①	Ground fault alarm w/trip
LG family	Drawout ②	Undervoltage release ③
LG family	Drawout ②	Zone selective interlock
LG family	Fixed	Auxiliary switch 1A-1B
LG family	Fixed	Auxiliary switch 2A-2B
LG family	Fixed	Bell alarm
LG family	Fixed	High load alarm w/trip
LG family	Fixed	Ground fault alarm w/trip
LG family	Fixed	Undervoltage release ③
LG family	Fixed	Zone selective interlock
PDG4xG family	Fixed	Auxiliary switch 1A-1B
PDG4xG family	Fixed	Auxiliary switch 2A-2B
PDG4xG family	Fixed	Auxiliary switch 1A-1B w/alarm
PDG4xG family	Fixed	Auxiliary switch 2A-2B w/alarm
NG family	Fixed	Auxiliary switch 1A-1B
NG family	Fixed	Auxiliary switch 2A-2B
NG family	Fixed	Bell alarm
NG family	Fixed	High load alarm w/trip
NG family	Fixed	Ground fault alarm w/trip
NG family	Fixed	Undervoltage release ③
NG family	Fixed	Zone selective interlock

Notes

① Accessories wired to a pull-apart terminal block. Right position only.
② Accessories wired to a pull-apart terminal block. Left position only.
③ Not available when breaker is equipped with ARMS trip unit.

3

3. Complete Assembly

Complete assembly of panelboard box, interior and trim prior to shipment, when requested on order.

4. Compression Main Lugs

Al/Cu Burndy Range Taking Type.

Modification 4

Main Lug Amperes	PRL4DX Lug Wire Range
800	(3) 500–750 kcmil
1200	(4) #2–600 kcmil (4) 500–750 kcmil

5. Conduit Covers

Fabricated sheet metal to cover open conduits above and/or below standard Type 1 box.

Modification 5

Description
Conduit enclosing shield—open back
Conduit enclosing shield—solid back

6. Copper Lugs/Terminals

Optional copper mechanical main lugs only and includes main incoming neutral lug.

Modification 6

Main Lug Amperes	PRL4DX Lug Wire Range
600	(2) 1/0–600 kcmil
800	(2) 1/0–600 kcmil
1200	(3) 1/0–600 kcmil

7. Copper Main Busbars

Optional copper busbars are available in all ampere ratings.

Modification 7

Ampere Range	Bare Copper Chassis Bus	Silver-Plated Copper Bus
600		
800		
1000		
1200		

8. Density Rated Bus

Standard main bus ampere rating is determined by UL listed temperature rise testing. Density rated bus is defined at 750 A per square inch for aluminum bus and 1000 A per square inch for copper bus. Adder for aluminum density rated bus is in addition to the base price. Adder for copper density rated bus is in addition to the base price plus the appropriate adder for copper bus. See Modification 7.

Modification 8

Ampere Rating
Aluminum—750 A per Square Inch
600
800
1000
1200
Copper—1000 A per Square Inch
600
800
1000
1200

9. Directory Frame—Metal

Metal directory frame in lieu of standard non-metallic pocket directory holder.

Modification 9

Directory Frame Type
Metal frame, plastic cover

10. Electronic Trip Units

Thermal-magnetic trip units are standard. For electronic trip units, select appropriate breaker from the electronic trip section of **Pages V2-T3-86 and V2-T3-87**. See selection below for electronic trip units.

Modification 10

Breaker Frame Family	Trip Unit Type
Drawout Feeder JGS, JGH, JGC	Digitrip 310+ LS Digitrip 310+ LSI Digitrip 310+ LSG Digitrip 310+ LSIG
Drawout Feeder or Main LGS, PDG3xM*, PDG3xP*	Digitrip 310+ LS Digitrip 310+ LSI Digitrip 310+ LSG Digitrip 310+ LSIG

The following electronic trip units integrate Eaton's Arcflash Reduction Maintenance System within the trip unit.

Breaker Frame Family	Trip Unit Type
Drawout Feeder or Main LGS, PDG3xM*, PDG3xP*	Digitrip 310+ ALSI Digitrip 310+ ALSIG

Electronic Trip Units for Fixed-Mounted Mains Only.

Breaker Frame Family	Trip Unit Type	Trip Unit Functionality ①
LGS, PDG3xM*, PDG3xP*	Digitrip 310+	LS
	Digitrip 310+	LSI
	Digitrip 310+	LSG
	Digitrip 310+	LSIG
	Digitrip 310+	ALSI ②
	Digitrip 310+	ALSIG ②
CLD	Digitrip 310	LS
	Digitrip 310	LSI
	Digitrip 310	LSG
	Digitrip 310	LSIG
PDG4xG, PDG4xM, PDF4xG, PDF4xM	Digitrip 310	LS
	Digitrip 310	LSI
	Digitrip 310	LSG
	Digitrip 310	LSIG
NGS, PDG5xM, PDG5xP	Digitrip 310+ ③	LS
	Digitrip 310+ ③	LSI
	Digitrip 310+ ③	LSG
	Digitrip 310+ ③	LSIG
	Digitrip 310+ ③	ALSI ②
	Digitrip 310+ ③	ALSIG ②
CND	Digitrip 310 ④	LS
	Digitrip 310 ④	LSI
	Digitrip 310 ④	LSG
	Digitrip 310 ④	LSIG

11. Ground Bars

Modification 11

Description	Bar Type
Aluminum bar for aluminum and copper conductors	Standard, attached to box Insulated/isolated ground bar
Copper bar for use with copper only conductors	Standard, attached to box Insulated/isolated bar

Notes

① L = Adjustable long delay pickup
S = Adjustable short delay pickup w/fixed short delay
I = Adjustable instantaneous pickup
G = Adjustable ground fault pickup
A = Arcflash Reduction Maintenance System

② Trip unit includes Arcflash Reduction Maintenance System.

③ Digitrip 310+ is standard for the NGS, PDG5xM and PDG5xP.

④ Digitrip 310 is standard for CND.

12. Ground Fault Protection

Refer to Modification 10 for ground fault trip units.

13. Infrared (IR) Viewing Windows

Infrared viewing windows for main devices and drawout single-mounted feeder devices.

Modification 13

Overcurrent Device	IR Window Manufacturer
All fixed mount mains	Iriss Hawk (Fluke)
Single drawout feeder breakers ①	Iriss Hawk (Fluke)

14. Handle Lock-Off Devices for Breakers

Contact Eaton for a list of padlockable and non-padlockable circuit breaker handle lock-offs.

15. Nameplates, Engraved

Field-attached nameplates.

Modification 15

Description
Mastic back, engraved, black with white lettering
Mastic back, engraved, colors other than black
Nameplates, screw attached

16. Permanent Circuit Numbers

Permanently attached micarta circuit numbering.

17. Seismically Qualified

For seismically qualified PRL4DX panelboards, request seismic labeling on order.

18. Service Entrance Equipment

Service Entrance labeling as detailed under the "Service Entrance Equipment" per UL and NEC. Only panelboards meeting these requirements may be labeled as such. The requirement or service entrance labeling must be noted on the order. Includes neutral disconnect link and labeling "Suitable For Use as Service Equipment" (SUSE). Ground bar must be ordered separately. See Modification 11.

19. Shunt Trip for Main or Feeder Breakers

For tripping breaker from remote point. Voltage and frequency must be specified when ordering shunt trips. Wiring to terminal block is included with the drawout molded case product as standard. For all others wired to terminal block, contact Eaton.

20. Sub-Feed Lugs

Available only on main lug only panelboards.

Not available on service entrance panelboards with main lugs using the six disconnect rule.

Mechanical Al/Cu lugs. Compression or copper body lugs require additional price adder from Modification 4 or Modification 6, as appropriate.

Modification 20

Panel Ampere Rating	Box Height Addition
600	4X
800	6X

21. Surge Protective Devices (SPD)

Package includes SPD unit and integral circuit breaker disconnect (30 A) connected to the chassis bus.

Modification 21

Surge Current Rating	50	80	100	120	160	200	250	300	400
SPD Package Options—Basic Package									
LED monitor, L-N, L-G, L-L and N-G	■	■	■	■	■	■	■	■	■
Standard Package									
LED monitor, L-N, L-G, L-L and N-G. EMI/RFI filtering. Audible alarm with disable switch. Form C relay contact.	■	■	■	■	■	■	■	■	■
Premium Package									
LED monitor, L-N, L-G, L-L and N-G. EMI/RFI filtering. Audible alarm with disable switch. Form C relay contact. Six-digit LCD display. Counts surges in all modes. Nonvolatile memory (no battery backup). Reset button designed to prevent accidental resets.	■	■	■	■	■	■	■	■	■

22. Through-Feed Lugs

Mechanical Al/Cu lugs. Compression or copper lugs require additional price adder from Modification 4 Compression Lug or Modification 6 Copper Lugs/Terminals.

Modification 22

Refer to PRL4DX Layout.

Panel Main Ampere Rating	Box Height Addition
600	7X
800	7X
1200	9X

23. Touchup Paint

Modification 23

Description
12 oz spray can. ANSI-61 light gray indoor
Case lot of 12—12 oz spray can. ANSI-61 light gray indoor

Note

① Available on only single-mounted drawout. Not available on dual-mounted feeder devices.

Power Xpert Multipoint Meter

Contents

Overview

Allocation of energy consumption in a residential or commercial application is a tremendous task for a property owner, management firm or electrical energy manager. Eaton's Power Xpert Multipoint Meter low-cost solution can assist in allocation or direct billing of consumed energy. The Power Xpert Multipoint Meter provides a cost-effective energy tabulation system for residential or commercial metering installations, including:

- High-rise buildings
- Universities and campuses
- Office buildings
- Apartment and condominium complexes
- Shopping malls
- Airports

Eaton's Power Xpert Multipoint Meter can provide accurate information of consumed energy for monthly involving statements. Using the Power Xpert Multipoint Meter for utility allocation maximizes revenue by effectively measuring, allocating and recovering utility expenditures. The Power Xpert Multipoint Meter solution can interface with a third-party utility allocation service and offers the following advantages:

- Purchase energy at bulk rates while charging consumer rates
- Capitalize on naturally variable tenant loads by purchasing energy at a lower coinciding load
- Capture and allocate common area maintenance cost
- Promote tenant retention with accurate and defensible billing
- Eliminate subsidization of other tenants

Product Description

Eaton's Power Xpert Multipoint Metering Panelboard design simplifies the task of multiple tenant sub-metering. The Power Xpert Multipoint Metering Panelboard combines the Power Xpert Multipoint Meter and Eaton's PRL4X, PRLC or Integrated Facility System™ (IFS™) to provide a space-saving, cost-effective energy tabulation system for residential or commercial metering installations.

Application Description

With energy cost on the rise, it is vital to proactively monitor and conserve electrical energy. Documentations of electrical energy usage can promote energy conservation for tenants or business departments.

When the need for accurate energy consumption information for monthly tenant invoicing arises, Eaton's Power Xpert Multipoint Metering Panelboard is the solution. The Power Xpert Multipoint Meter allocates the utility's energy consumption, maximizing revenue by effectively measuring, allocating and recovering utility expenditures.

The Power Xpert Multipoint Meter, using Eaton's cost-allocation software or a third-party billing software, can generate single-rate or multi-rate billing.

Features, Benefits and Functions

The Power Xpert Multipoint Metering Panelboard offers the property owner or the property management firm the following benefits:

- Capture and allocate common area maintenance cost
- Promote tenant retention with accurate billing
- Eliminate subsidization of other tenants
- Factory-wired system
- Save floor space
- Lower installed cost
- Network compatible
- Tenant sub-billing

The Power Xpert Multipoint Metering Panelboard space-saving design reduces the need for multi-metering equipment for each tenant. Additionally, the Power Xpert Multipoint Meter can monitor loads up to 5000 A for energy billing or cost allocation. The meter is rated per ANSI C12.20 for revenue metering grade accuracy. With built-in communications capabilities, the Power Xpert Multipoint Meter can be connected to a local PC or network.

The Power Xpert Multipoint Meter can connect to a third-party billing service to provide monthly energy consumption charges used by tenants. Additionally, unit status and communication activity are provided by a display on the meter compartment front panel.

The Power Xpert Multipoint Meter device can measure up to 60 total poles in any combination of single-, two- or three-pole breakers. The meters and current sensors are factory mounted with the current sensors factory wired to the meter inside the host structure. The meter monitors power and energy including instantaneous (kW), demand and cumulative (kWh) measurements for each load. The meter provides the following:

- Interval energy data logging
- Time-of-use energy registers
- Coincident peak demand storage
- Schedule remote meter reading data in non-volatile memory
- Measure bus voltage

Standards and Certifications

- UL Listed
- UL 67 Listed chassis
- UL 50 Listed box and trim

Listed

Product Selection

For more information, refer to Eaton's *Consulting Application Guide*. For complete application and pricing information, contact your local Eaton sales office.

Options

- Energy Portal Module or Ethernet-based communications plus Modbus TCP and BACnet/IP
- Pulse input module for WAGES input
- Digital Output module for programmable alarm functions

PRL1X PXBCM Panelboard

Contents

Product Description

Eaton's Pow-R-Line Xpert Branch Circuit Monitoring (PXBCM) panelboard is an integrated, affordable metering device that combines exceptional performance and easy installation to deliver a cost-effective solution for branch circuit level energy and power monitoring. The Pow-R-Line PXBCM can monitor up to 84 branch circuits and 16 main and auxiliary panel connections.

The Pow-R-Line PXBCM panelboard provides a means to monitor main power coming into the panelboard and up to four additional three-phase meters. The Pow-R-Line PXBCM panelboard can be used in lighting appliance, small power distribution panelboards, and Pow-R-Command™ lighting control panelboards with a maximum 400 A main breaker and 125 A branch breakers.

The Pow-R-Line PXBCM panelboard is available in PRL1X, PRL2X and PRL3E panelboard classifications.

Application Description

The Pow-R-Line PXBCM panelboard can be used in various industries and LEED certified buildings. There is a rapidly changing emphasis on LEED designs and the Pow-R-Line PXBCM panelboard helps you meet the measurement and verification points required by LEED and the U.S. Green Building Council. Typical applications include:

- Energy management
- Industrial monitoring
- Cost allocation
- Data center management
- Light commercial
- Industrial
- Institutions

Features and Benefits

The Pow-R-Line PXBCM panelboard offers Modbus RS-485 and TCP output standard while allowing flexibility for onboard configuration. Also, communication and data-analysis can be communicated through an integrated Web server or a number of building automation sources, including Eaton's Power Xpert and Foreseer® products.

The Pow-R-Line PXBCM panelboard allows you to:

- Make informed load shifting and load shedding decisions
- Fairly and accurately allocate energy costs to users
- Identify wasteful practices
- Decrease unnecessary energy usage
- Produce an energy profile

Key features include:

- Power and energy readings at the branch circuit level
- Integrated Web server for remote monitoring and configuration
- Optional remote color touchscreen display for local readings
- Compatibility with the Power Xpert Gateway for remote monitoring

Standards and Certifications

- UL 67 Listed chassis
- UL 50 Listed box and trim

UL Listed

Product Selection

For more information, refer to Eaton's *Consulting Application Guide*. For complete application and pricing information, contact your local Eaton sales office.

Modifications and Accessories

Because each Pow-R-Line 1X, 2X and 3E panelboard is assembled by an experienced technician, Eaton can easily and efficiently incorporate any combination of modifications and accessories, including:

- Breaker lock-off devices
- Compression type lugs (main lugs only)
- Arc fault breakers
- Increased dimensions
- Trim to fix existing boxes
- Main breakers with solid-state trip units
- Permanent circuit numbering
- Service entrance
- Special doors and locks
- Surge protection devices
- Pow-R-Command™ lighting control

Note: Contact your local Eaton distributor or sales engineer for additional information on these and other modifications and accessories.

Dimensions

Approximate Dimensions in Inches (mm)

NEMA Enclosure Options

A variety of NEMA enclosures are available as options: NEMA Type 1, 2, 3R, 4, 4X and 12. Pow-R-Line 1X, 2X, with 400 A main bus, all PRL3E and Pow-R-Command panel applications require a 28-inch wide box to provide additional gutter space for cable bending.

Pow-R-Line PXBCM Panelboard

Heights

36 (914.4)

42 (1066.8)

48 (1219.2)

60 (1524.0)

72 (1828.8)

90 (2286.0)

Widths ①

20 (508.0)

28 (711.2)

Depth ①

5.75 (146.1)

Note

① Dimensions for NEMA Type 1 enclosure. For dimensions of optional NEMA enclosure, contact your Eaton distributor or sales engineer.

Technical Data and Specifications

Pow-R-Line 1X, 2X and 3E Specifications

Description	Rating
Pow-R-Line 1X Ratings	
Voltage	240 Vac maximum
Main breaker	100–600 A
Main lug	100–600 A
Maximum kAIC	10–22 kA fully rated
	22–200 kA series rated
Branch circuit breaker	15–100 A
Branch breaker connector	140 A
Branch circuit breaker types	BA (BAB, BAB-H), QBH (QBHW, QBHW-H), QBGFT, QBGFEP, QBHGFT, QBHGFEP, HQP, QPHW, QHPX, QPGF, QPHGF QPGEP, QPHGFEP BABR, QBAF, QBAG, QBHAF, QBCAF and QBHCAF
Pow-R-Line 2X Ratings	
Voltage	240 Vac, 480Y/277 Vac and 125/250 Vdc maximum
Main breaker	100–600 A
Main lug	100–600 A
Maximum kAIC	240 Vac: 65 kA fully rated 65–200 kA series rated
	480Y/277 Vac: 14 kA fully rated 22–150 kA series rated
	125/250 Vdc: 10–14 kA fully rated
Branch circuit breaker	15–100 A
Branch breaker connector	140 A
Branch circuit breaker types	GB, GHB, GHBGFEP, HGHB, GQ, GHQ, GHQRD ① and GHQRSP ①
Pow-R-Line 3E Ratings	
Voltage	240 Vac, 480Y/277 Vac or 480 Vac and 250 Vdc maximum
Main breaker	125–400 A ②
Main lug	100–400 A ②
Maximum kAIC	240 Vac: 20–100 kA fully rated 100–200 kA series rated
	480Y/277 Vac or 480 Vac: 18–65 kA fully rated 65–100 kA series rated
	250 Vdc: 10–42 kA fully rated
Branch circuit breaker	15–125 A
Branch breaker connector	140 A
Branch circuit breaker types	EGB, EGS and EGH

Parameters

Pow-R-Line Xpert PXBCM Panelboard

Measured Parameter	Main	Branch	Virtual ③
Current per phase	■	—	—
Maximum and minimum current per phase	■	—	—
Current demand per phase	■	—	—
Peak current demand per phase	■	—	—
Forward and reverse energy (kWh) per phase	■	—	—
Maximum and minimum real power (W) per phase	■	—	—
Apparent power (VA)	■	—	■
Power factor total ④	■	—	—
Power factor per phase	■	—	—
Maximum and minimum voltage (line-to-line)	■	—	—
Maximum and minimum voltage (line-to-neutral)	■	—	—
Maximum and minimum voltage (phase A)	■	—	—
Current	—	■	—
Maximum current	—	■	■
Current demand	—	■	—
Real power (W)	—	■	—
Forward and reverse real power (W) demand	—	■	■
Forward and reverse energy (kWh) per circuit	—	■	—
Maximum apparent power (kVA)	—	■	—
Power factor	—	■	■
Virtual meters	—	—	■
Average current	—	—	■
Forward and reverse energy (kWh)	—	—	■
Forward and reverse power (W) demand	—	—	■
Forward and reverse power (W) peak demand	—	—	■
Maximum real power (W)	—	—	■
Maximum apparent power (VA)	—	—	■

Notes

① Remote operated circuit breaker.
② 600 A is available without main metering.
③ Virtual means Web server.
④ Based on a three-phase breaker rotation.

Elevator Control Panelboard

Contents

Elevator Control Panelboard

Product Description

- 600 Vac maximum
- Three-phase four-wire
- 800 A maximum mains
- 30–200 A branch devices
- Short-circuit current rating up to 200 kA rms symmetrical
- Elevator controls including shunt trip, CPT, indicating lights and keyed selector switch

Application Description

- Instrument protection
- Fully rated
- Interrupting ratings up to 200 kA symmetrical when protected by fuse
- Provides selective coordination to 0.01 seconds with the appropriate upstream overcurrent protective device
- Eaton's Elevator Control Panelboard provides significant space savings in the elevator control room when compared to traditional installations
- Factory assembled

Standards and Certifications

- UL 67 panelboards
- UL 50 enclosures
- UL 98 fusible switches

Elevator Control Panelboard is intended to meet the:

- NFPA 70 (National Electrical Code)
- NFPA 72 (National Fire Alarm Code)
- ANSI/ASME A17.1 (Safety Code for Elevators and Escalators)
- NFPA 13 (Installation of Sprinkler Systems)

UL Listed

Product Selection

Elevator Control Panelboard

Elevator Control Panelboard

Ampere Rating	Interrupting Rating (kA Symmetrical) 600 Vac	Main Type	Fuse Clip ①
Main Lug Only			
400	200	—	—
600	200	—	—
800	200	—	—
Main Fusible Switch 600 Vac			
400	200	FDPW	Class J
600	200	FDPW	Class J
800	200	FDPB	Class J

Branch Elevator Control Modules ②

Ampere	Interrupting Rating (kA Symmetrical)	Breaker Type	Fuse Clip ①
30	200	FDPB	Class J
60	200	FDPB	Class J
100	200	FDPB	Class J
200	200	FDPB	Class J

Options

Elevator Control Options

Description	
Fused control power transformer	
Fire safety interface relay	
ON pilot light	
Isolated neutral termination	
200% isolated neutral termination	
Fire alarm voltage monitoring relay (monitors shunt trip voltage)	
NEMA Type 3R enclosure	
Surge Protective Devices	
120 kA	Basic
	Standard
	Standard with surge counter
160 kA	Basic
	Standard
	Standard with surge counter
200 kA	Basic
	Standard
	Standard with surge counter
250 kA	Basic
	Standard
	Standard with surge counter

Notes

① Fuses provided by others.

② Standard features include, fused switch with 120 Vac shunt trip, control power terminals ground termination, 120 Vac key test switch, 1NO and 1NC 120 Vac class mechanically interlocked auxiliary contact for hydraulic elevators with automatic recall.

Box Sizing and Selection

- Refer to Bid Manager™ drawings for your specific configuration

Pow-R-Line Panelboards

Contents

Types PRL1X, 2X, 3X, 3E, 4X, Column

Modifications Selection Guide

Modifications—Alphabetical Index

		Available on Panelboard Types							
Modification	**Item**	**PRL1X**	**PRL2X**	**PRL3X**	**PRL3E**	**PRL4X**	**PRL4F**	**Column Type**	**Pow-R-Command**
Ambient compensating breakers	1	No	No	Yes	No	Yes	—	No	—
Bus density	2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—
Cabinets—special: Types 2, 3R, 4, 4X, 12	3	Yes	Yes	Yes	Yes	Yes	Yes	No	—
Complete assembly	4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—
Compression type lugs, mains only	5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—
Concealed trim clamps (LT trim)	6	Yes	Yes	Yes	Yes	No	No	No	—
Conduit covers	7	Yes	Yes	Yes	Yes	Yes	Yes	No	—
Copper lugs	8	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—
Copper main bus	9, 9a, 9b	Yes	Yes	Yes	Yes	Yes	Yes	Standard	—
Directory frame—metal	10	Yes	Yes	Yes	Yes	Yes	Yes	No	—
Doors, special	11	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—
Fungus-proof	12	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—
Ground bar	13	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—
Electronic trip units	14	No	No	No	Yes	Yes	—	No	—
Ground fault protection (zero sequence)	15	No	No	No	No	Yes	Yes	No	—
Handle lockoff device	16	Yes	Yes	Yes	Yes	Yes	Std.	Yes	—
Hinges, special (LT trim)	17	Yes	Yes	Yes	Yes	Yes	Yes	No	—
Increased dimensions	18	Yes	Yes	Yes	Yes	No	No	No	—
Increased panel bus rating	19	Yes	Yes	Yes	Yes	No	No	No	—
Interiors to fit existing boxes	20	Yes	Yes	Yes	Yes	Yes	Yes	No	—
Locks, special (LT trim)	21	Yes	Yes	Yes	Yes	Yes	Yes	No	—
Molded case switches	22	Yes	Yes	Yes	Yes	Yes	No	Yes	—
Nameplates engraved	23	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—

Modifications—Alphabetical Index, continued

Modification	Item	Available on Panelboard Types							
		PRL1X	PRL2X	PRL3X	PRL3E	PRL4X	PRL4F	Column Type	Pow-R-Command
Neutral rated 200%	24	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Painting and special coating	25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Permanent circuit numbers	26	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Remote control switches (ASCO 920)	27	No	No	Yes	Yes	No	No	No	No
Service entrance	28	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Shunt trips	29	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Split bus or meter loop	30	No	No	Yes	No	No	No	No	No
Metering devices	31	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Sub-metering, IQ Energy Sentinel	32	No	No	No	No	Yes	No	No	No
Sub-feed breakers	33	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Sub-feed lugs	34	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Tamperproof screws (LT trim)	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Through-feed lugs	36	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time clock space only	37	Yes	Yes	Yes	Yes	—	—	No	Yes
Touchup paint	38	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Surge protective device (SPD)	39	Yes	Yes	Yes	Yes	Ye	Yes	No	Yes
Terminals, copper only for breakers	40	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes

1. Ambient Compensating Breakers

For ambient compensating breakers (where available) in lieu of standard breakers, add 10 percent to panelboard branch breaker and to main breaker list prices, if required. (Not UL listed.)

2. Bus Density

Main bus ampere rating is determined by UL listed temperature test. For 750 A per square inch aluminum or 1000 A per square inch copper, make price addition as follows:

Modification 2

Panel Type	Maximum Amperes
Aluminum—750 A per Square Inch	
PRL1X, 2X	100
	225
	400
PRL3X	250
	400
PRL4X	400
	800
Copper—1000 A per Square Inch	
PRL1X, 2X	100
	225
	400, 600
PRL3X	250
	600
PRL4X	400
	1200

3. Special Cabinet (Box) Construction

Modification 3

Modification
Type 1 Enclosure
28-inch (711.2 mm) wide in place of standard 20-inch (508.0 mm) wide PRL1X, PRL2X, PRL3X, PRL3E
Type 2 Enclosure
(Drip-proof with gasketed trim) PRL1X, PRL2X, PRL3X, PRL3E 20-inch (508.0 mm) wide
Type 3R Enclosure
PRL1X, PRL2X 20-inch (508.0 mm) wide
PRL1X, PRL2X 28-inch (711.2 mm) wide
PRL3X ①, PRL3E 20-inch (508 mm) wide (600 A maximum)
PRL3X ①, PRL3E 28-inch (711.2 mm) wide (600 A maximum)
PRL4X 24-inch (609.6 mm) or 36-inch (914.4) wide only
Type 12 Enclosure
PRL1X, PRL2X 20-inch (508.0 mm) wide
PRL1X, PRL2X 28-inch (711.2 mm) wide
PRL3X ①, PRL3E 20-inch (508 mm) wide (600 A maximum)
PRL3X ①, PRL3E 28-inch (711.2 mm) wide (600 A maximum)
PRL4X 24-inch (609.6 mm) or 36-inch (914.4) wide only Must also add bus density price from Modification 2 for PRL4X
Type 4 Enclosure or Type 4X Stainless Steel Enclosure
Refer to Eaton

4. Complete Assembly

Complete assembly of panelboard box, interior and trim prior to shipment when required.

5. Compression Main Lugs—Al/Cu Burndy Range Taking

For other terminal types and box sizes, refer to Eaton.

Modification 5—Compression Lug Data

Main Amperes	Wire Range by Panel Type PRL1X and PRL2X	PRL3E	PRL3X	PRL4X
100	(1) #1–1/0 or (1) 2/0–300 kcmil	—	—	—
125	—	(1) #4–2/0 or (1) 2/0–300 kcmil	(1) #4–2/0 or (1) 2/0–300 kcmil	—
225	(1) 2/0–300 kcmil or (1) 4/0–500 kcmil	—	—	—
250	—	(1) 2/0–350 kcmil or (1) 4/0–500 kcmil	(1) 2/0–350 kcmil or (1) 4/0–500 kcmil	(2) 500–750 kcmil
400	(2) 4/0–300 kcmil or (2) 500–750 kcmil	(2) 4/0–300 kcmil or (2) 500–750 kcmil	(2) 4/0–300 kcmil or (2) 500–750 kcmil	(2) 500–750 kcmil
600	—	(2) 2/0–500 kcmil or (2) 500–750 kcmil	(2) 2/0–500 kcmil or (2) 500–750 kcmil	(2) 500–750 kcmil
800	—	—	—	(3) 500–750 kcmil
1200	—	—	—	(4) #2–600 kcmil or (4) 500–750 kcmil

Modification 5—Box Height Additions

Main Amperes	PRL1X, PRL2X	PRL3E, PRL3X without Neutral	PRL3E, PRL3X with Neutral
100	0	0X	0X
225	0	—	—
250	—	2X	5X
400	0	0X	0X
600	0	0X	0X

Maximum size for PRL1X and PRL2X panels:
1–750 kcmil per phase, or 2–500 kcmil per phase.
For PRL4X panels, see layout pages.

6. Concealed Trim Clamps—LT Trim

Modification 6

Description
Add per panel PRL1X, PRL2X, PRL3X, PRL3E

7. Conduit Covers

Fabricated sheet metal to cover open conduits above and/or below standard Type 1 box.

Modification 7

Cover Type
Conduit Enclosing Shield (open back) PRL1X, PRL2X, PRL3X, PRL3E, PRL4X—Refer to Eaton
Conduit Enclosure (solid back) PRL1X, PRL2X, PRL3X, PRL3E, PRL4X—Refer to Eaton

Note

① At 600 A, PRL3X requires the addition of density rated copper bus for Type 3R or 12 enclosure.

8. Copper Lugs

Optional copper mechanical main lugs only. (Includes main incoming neutral lug.)

Modification 8

Main Amperes	Wire Range and Number of Lugs Per Phase
100	(1) #14–1/0
225	(1) #6–250 kcmil
250	(1) #6–250 kcmil
400	(2) #1/0–600 kcmil
600	(2) #1/0–600 kcmil
800	(2) #1/0–600 kcmil
1200	(3) #1/0–600 kcmil

Modification 8—Box Height Additions

Main Amperes	PRL1X, PRL2X	PRL3E, PRL3X without Neutral	PRL3E, PRL3X with Neutral	PRL4X
100	0	0X	0X	—
225	0	—	—	—
250	—	0X	0X	0X
400	0	0X	0X	0X
600	—	1X	1X	0X
800	—	—	—	0X
1200	—	—	—	0X

9. Copper Main Bus

Modification 9

Available in PRL1X, PRL2X, PRL3X, PRL3E, PRL4X, PRL1XF, PRL2XF, PRL1RX, PRL2RX, PRL1X-LX and PRL2X-LX

9a. Silver-Plated Copper Main Bus

Modification 9a

Available in PRL1X, PRL2X, PRL3X, PRL3E, PRL4X, PRL1XF, PRL2XF, PRL1RX, PRL2RX, PRL1X-LX and PRL2X-LX

9b. Tin-Plated Copper Main Bus (PRL1X, 2X, 3X, Only)

Modification 9b

Panel Type
PRL1X, PRL2X, PRL3X, PRL3E

10. Directory Frame—Metal

Modification 10

Frame Type
Metal frame, plastic cover

11. Trim and Door Modifications—Special Fronts and Doors

Modification 11

Description
Door-in-door, one door over interior and one which exposes gutter. (LT Trim) (PRL1X, PRL2X, PRL3X, PRL3E only)
Common trim for two section panels with boxes bolted together. (LT Trim) (PRL1X, PRL2X, PRL3X, PRL3E only)
Standard flush lock with quarter turn fasteners at top and bottom of trim door (LT Trim) (standard on doors 48-inch (1219.2 mm) high and over). (PRL1X, PRL2X, PRL3X, PRL3E only)
To provide a trim with a lockable door for PRL4X panels (door-in-door is standard with this adder). Includes National lock with standard keying. ① **Add per panel**

12. Fungus Proofing

For fungus proofing external portions of circuit breakers and all non-metallic parts, add 10 percent of total panelboard list price. For fungus proofing fusible switches and all non-metallic parts, add 20 percent of total panelboard list price.

13. Ground Bar

Modification 13

	Description	Bar Type
Panel Type		
PRL1X PRL2X PRL3X PRL3E PRL4X	Aluminum terminal bar for aluminum or copper cable	Standard, insulated/isolated ②
	Copper terminal bar for copper cable only	Standard, insulated/isolated ②
Column Type		
In Pull Box In Gutter	Aluminum terminal bar for aluminum or copper cable	Standard, insulated/isolated ②
	Copper terminal bar for copper cable only	Standard, insulated/isolated ②

Notes

① Extra depth box is required. Box will be 12.82-inch (325.6 mm) deep.

② For PRL1X, 2X, 3X and Column Type panelboards. The insulated/isolated ground bar includes a standard ground bar.

14. Electronic Trip Units

Modification 14—Applies to Digitrip 310 and 310+ Trip Units

Description
K-, L- and M-Frame Circuit Breaker (three-pole only)
Digitrip RMS310 LS
Digitrip RMS310 LSI
Digitrip RMS310 LSG ①
Digitrip RMS310 LSIG ①
N-Frame circuit breaker
Digitrip RMS310 LS
Digitrip RMS310 LSI
Digitrip RMS310 LSG ①
Digitrip RMS310 LSIG ①
Digiview Ammeter for 310+ Trip Unit

15. Zero Sequence Ground Fault Protection

For main devices only (circuit breakers or FDPW switch) in PRL4X assembled panels. Available in 250–1200 A panels.

Price includes current monitors, ground bar, static sensor, shunt trip, necessary space, mounting and connecting in panelboards. Price does not include circuit breaker or FDPW switch.

Zero sequence ground fault is available with the following family of main devices:

Modification 15

Main Device
JD, KD, LD, MDL, ND, LCL, LA-P, NB-P FDPW switches (400–1200 A)

16. Circuit Breaker Handle Lockoff Devices

Modification 16

Breaker Types
Non-Padlockable
BAB, QBHW, GHB, PDG2xF, PDG2xG, PDD2xG, PDD2xM, PDD2xP, HQP, QPHW
PDG3xG*, PDG4xG
Padlockable
PDG2xF, PDG2xG, PDG2xM, PDG2xP, PDD2xG, PDD2xM, PDD2xP, GHB, BAB, QBHW, HQP, QPHW, EGB, EGS, EGH
PDG3xG*, PDG4xG

17. Special Hinges—LT Trim

Piano hinges in lieu of standard hinges.

18. Increased Dimensions (PRL1X, PRL2X, PRL3X and PRL3E Only) Type 1 Enclosure Only

Modification 18

Description
Increased End Gutters
4 inch (101.6 mm) Top or Bottom
7 inch (177.8 mm) Top or Bottom
12 inch (304.8 mm) Top or Bottom
Increased Side Gutters
4 inch (101.6 mm) Left or Right
7 inch (177.8 mm) Left or Right
12 inch (304.8 mm) Left or Right

19. Increased Panel Main Bus Rating (Three-Phase Four-Wire, Single-Phase Three-Wire)

Modification 19

Main Bus Ampere Rating	Panel Type
100–225/250	PRL1X, PRL2X, PRL3X, PRL3E
225–400	
600 (PRL3X)	
250–400	PRL4X
400–600	
600–800	
800–1200	

20. Interior and Fronts to Fit Existing Boxes

Refer to Eaton.

21. Special Locks

Modification 21

Description
LT Type Trim
Yale 511S with rosette
Yale 4651S (LL803 Key)
Master keying—above locks or standard lock—per panelboard
Corbin 15767 (Cat. #60 Key) PRL1X, PRL2X, PRL3X, PRL3E
Tee handle and 3-point catch PRL1X, PRL2X, PRL3X, PRL3E
COMPX metal lock with standard keying PRL1X, PRL2X, PRL3X, PRL3E
COMPX metal lock with GE75 keyway PRL1X, PRL2X, PRL3X, PRL3E, PRL4X
EZ Type Trim
Standard Lock, Keyed GE75
Standard Lock, Keyed to Corbin TEU-1
Standard Lock, Keyed to Corbin Cat 60
Standard Lock, Keyed to Corbin WEM1

Notes

① Main breaker only.

PRL4X with door includes National lock with standard keying. See **Modification 11**.

22. Molded Case Switches (Three-Pole, Two-Pole)

Modification 22

Not UL Listed Breaker Frame	Maximum Volts	Maximum Amperes
PDG2xF	480	100
PDG2xG	600	225
PDD3xG*	240	400
PDG3xG*	600	400
PDG4xG	600	800

23. Nameplates, Engraved

Modification 23

Type
Mastic back and installed by purchaser, per nameplate
Fixed to panel trim with two screws or rivets, per nameplate PRL1X, PRL2X, PRL3X, PRL3E only

24. Neutral Rated 200%

Modification 24

Main Bus Rating	Neutral Rating
100	225
225	450
250	500
400	800
600	1200

Modification 24—Box Height Additions

Main Bus Rating	Neutral Rating	PRL1X, PRL2X	PRL3X, PRL3E	PRL4X
100	225	0	0X	—
225	450	0	—	—
250	500	—	3X	0X
400	800	0	3X	0X
600	1200	—	3X	0X

Note: Dimensions based on mechanical lugs. For compression or copper lugs, refer to Eaton.

For 800 and 1200 A PRL4X with 200% neutral, refer to Eaton.

25. Painting and Special Coatings

Standard boxes are code-gauge galvanized sheet steel. Standard trims are code-gauge sheet steel with a rust inhibiting phosphatized coating and finished with ANSI-61.

Modification 25

Description
Painted boxes (ANSI-61)
Painted trims or boxes (other than ANSI-61)

26. Permanent Circuit Numbers

Modification 26

Description
To provide permanently attached Micarta ×circuit numbers.

27. Remote Control Switches—ASCO 920 (Three-Pole, Two-Pole)

Electrically operated, mechanically held remote control switch directly mounted to panelboard bus for total or split bus switching applications.

(For split bus applications, make price addition from **Modification 30**.)

480 Vac maximum short-circuit rating of panelboard is 22 kAIC maximum.

Includes complete installation in the panelboard with a screw cover over the switch compartment.

Pushbuttons or other control devices are not included. For control circuit modifications, refer to Eaton.

Modification 27—Remote Control Switches (PRL3X and PRL3E Only)

Switch Rating Amperes
30, 60, 75, 100, 150, 200, 225

Modification 27—Remote Control Switch Modifications

Description
Two-wire control relay
Three-wire control relay
Control power transformer
To provide hinged cover in place of standard screw cover

28. Service Entrance

To provide a Service Entrance Label as detailed under the "Service Entrance Equipment" in application considerations. Only panelboards meeting these requirements can be labeled as such. The requirement for a Service Entrance Label must be noted on order entry. Includes neutral disconnect link and Service Entrance Equipment Label. (Ground bar not included—see **Modification 13**.)

Modification 28

Panel Type
PRL1X, PRL2X, PRL3X, PRL3E, PRL4X

29. Shunt Trip for Main or Branch Circuit Breaker and FDPW Switches

For tripping device from a remote point. Voltage and frequency must be specified. Wiring to terminal blocks is not included. Standard leads extend 18-inches (457.2 mm) out of device.

Factory-installed 120, 240 or 480 Vac shunt trips are available with UL listing as shown in table below. Underwriters Laboratories listing is not available for shunt trip mounted on molded case switches.

Modification 29

Device
BAB, QBHW—Requires one additional pole space, i.e., single-pole is two-pole size, two-pole is three-pole size and three-pole is four-pole size.
GHB (three-pole only)
All other circuit breakers
FDPW switch (400–1200 A)

30. Split Bus or Meter Loop (250 A Max., 3Ph 4W, 3Ph 3W, 1Ph 3W, 1Ph 2W)

Panel type PRL3X only. For enclosure size, refer to Eaton.

Modification 30

Main Bus Amperes
100–250

31. Metering Devices

IQ digital metering for incoming service. Devices are installed in chassis mounted compartment with hinged door. Standard CTs (1200 A maximum) are included with devices. Requires copper bus at 1200 A.

Modification 31

Device	Box Height Addition
IQ 35 with CTs and display	13X
IQ 35 with CTs, no display	13X
IQ 130 with CTs and display	13X ①
IQ 130 with CTs, no display	13X ①
IQ 140 with CTs and display	13X ①
IQ 140 with CTs, no display	13X ①
IQ 150 with CTs and display	13X ①
IQ 150 with CTs, no display	13X ①
IQ 210 with CTs	13X ①
IQ 220 with CTs	13X ①
IQ 230 with CTs	13X ①
IQ 230M with CTs	13X ①
IQ 250 with CTs and display	13X ①
IQ 250 with CTs, no display	13X ①
IQ 260 with CTs and display	13X ①
IQ 260 with CTs, no display	13X ①
PXM 2250 with CTs and display	13X ①
PXM 2250 with CTs, no display	13X ①
PXM 2260 with CTs and display	13X ①
PXM 2260 with CTs, no display	13X ①
PXM 2270 with CTs and display	13X ①
PXM 2270 with CTs, no display	13X ①

Note

① PRL4X only.

32. Sub-Metering IQ Multi-Point Submeter II (PRL4X Only)

Microprocessor-based breaker-mounted device to monitor power and energy (kW, kWH, kW demand). Device mounts on the load side of three-pole F-, J- and K-Frame feeder breakers. Units are shipped with the interior for field installation. Minimum box width of 36 inches (914.4 mm) is required.

Modification 32

IQ Energy Sentinel
F-Frame three-pole (150 A maximum)
J-Frame three-pole
K-Frame three-pole

33. Sub-Feed Breakers

Modification 33—Panel Types PRL1X, PRL2X, PRL3X, PRL3E. One Breaker Per Panel

Maximum Amperes	Number of Poles	Breaker Type	Interrupting Rating (kA Symmetrical) 240 V	480 V	Box Height Addition PRL3X
100	2	PDG2xF	35	25	NA
225	2	PDG2xG	65	35	NA
225	2	PDG2xM	100	65	NA
225	2	PDG2xP	200	100	NA
225	2	PDD2xF	35	—	NA
225	2	PDD2xG	65	—	NA
225	2	PDD2xM	100	—	NA
400	2	PDD3xG*	65	—	15X
400	2	PDG3xG*	65	35	15X
400	2	PDG3xM*	100	65	15X
400	2	PDG3xP*	200	100	15X
100	3	PDG2xF	35	25	NA
225	3	PDG2xG	65	35	NA
225	3	PDG2xM	100	65	NA
225	3	PDG2xP	200	100	NA
225	3	PDD2xF	35	—	NA
225	3	PDD2xG	65	—	14X
225	3	PDD2xM	100	—	14X
400	3	PDD3xG*	65	—	15X
400	3	PDG3xG*	65	35	15X
400	3	HKD	100	65	15X
400	3	PDG3xP*	200	100	15X

Note: 225 A maximum on Column Type panels. Sub-feed breaker not available on PRL3X panel with subchassis.

Modification 33—Panel Type PRL3X Only. Two Breakers Per Panel—Twin Mounted

Maximum Amperes	Number of Poles	Breaker Type	Interrupting Rating (kA Symmetrical) 240 Volts	480 Volts	Box Height Addition PRL3X
225	2	JD	65	35	20X
225	2	HJD	100	65	20X
225	2	JDC	200	100	20X
250	2	JD	65	35	20X
250	2	HJD	100	65	20X
250	2	JDC	200	100	20X
225	3	JD	65	35	20X
225	3	HJD	100	65	20X
225	3	JDC	200	100	20X
250	3	JD	65	35	20X
250	3	HJD	100	65	20X
250	3	JDC	200	100	20X

34. Sub-Feed Lugs (3Ph 4W, 3Ph 3W, 1Ph 3W, 1Ph 2W)

Note: Not available on service entrance panels with main lugs only (six disconnect rule).

Mechanical Al/Cu lugs. Compression or copper lugs requires additional price adder from **Modification 5—Compression Lug Data** or **Modification 8** as appropriate.

Available on main lug panels only.

Modification 34

Main Amperes	Box Height Addition
Panel Types PRL1X, PRL2X	
100–225	0X
Panel Type PRL3X, PRL3E	
100–250	1X
Panel Type PRL4X ①	
250–400	0X
600	4X

35. Tamperproof Screws—LT Trim

Modification 35

Description
Tamperproof screws for trims, in lieu of standard screws.

36. Through-Feed Lugs (3Ph 4W, 3Ph 3W, 1Ph 3W, 1Ph 2W)

Note: 225 A maximum on Column Type panels. Not available on service entrance panels with main lugs only (six disconnect rule).

Mechanical Al/Cu lugs. Compression or copper lugs requires additional price adder from **Modification 5—Compression Lug Data** or **Modification 8** as appropriate.

Not available on panels with sub-feed breaker.

Modification 36

Main Amperes	Box Height Addition
Panel Types PRL1X, PRL2X	
100	②
225	②
400	②
600	②
Panel Type PRL3X, PRL3E	
100	2X
250	5X
400	8X
600	8X
800	14X
Panel Type PRL4X ②	
250	7X
400	7X
600	7X
800	7X
1200	5X

37. Time Clock Space Only

Includes box, trim, door and mounting pan.

Modification 37

Enclosure Type
Type 1
PRL1X, PRL2X, PRL3X, PRL3E (24-inch (609.6 mm) space)
PRL1X, PRL2X, PRL3X, PRL3E (36-inch (914.4mm) space)
Type 3R
PRL1X, PRL2X, PRL3X, PRL3E (24-inch (609.6 mm) space)

38. Touchup Paint

Modification 38

Description
12 oz. spray can. ANSI-61 light gray indoor
Case Lot of 12—12 oz. spray cans. ANSI-61 light gray indoor single style

Notes

① Refer to PRL4X layout.
② Refer to panelboard sizing charts.

39. Surge Protective Device (SPD)

Type PRL1X, PRL2X, PRL 3X and PRL3E Panelboards

Package includes SPD unit connected to the panelboard bus.

Available for all enclosure types.

Sizing:
PRL1X, PRL2X, PRL3E: Add 7 inches (177.8 mm) to the standard box height.

PRL3X: Add 4X for 100–200 kA SPD units.

PRL3E: AdVisor/SuperVisor display (200 kA maximum) add 8 inches. SML TVSS add 7 inches.

Type PRL4X and Elevator Control Panelboards

Package includes SPD unit and integral circuit breaker disconnect (30 A) connected to the panel bus.

Available for all enclosure types.

The SPD unit and integral circuit breaker disconnect will require 7X of chassis space. (Only available in 36-inches (914.4 mm) or 44-inches (1117.6 mm) wide enclosure.)

Modification 39

Description	kA/Phase								
Surge Current Rating	**50**	**80**	**100**	**120**	**160**	**200**	**250**	**300**	**400**
SPD Package Options									
Basic LEDs monitor L-N, L-G, L-L and N-G									
PRL1X, PRL2X, PRL3X, PRL3E	■	■	■	■	■	■	—	—	—
PRL4X, Elevator Control Panelboard	■	■	■	■	■	■	■	■	■
Standard Feature Package LEDs monitor L-N, L-G, L-L and N-G EMI/RFI filtering Audible alarm with disable switch Form C relay contact									
PRL1X, PRL2X, PRL3X, PRL3E	■	■	■	■	■	■	—	—	—
PRL4X, Elevator Control Panelboard	■	■	■	■	■	■	■	■	■
Standard Package LEDs monitor L-N, L-G, L-L and N-G EMI/RFI filtering Audible alarm with disable switch Form C relay contact Six digit LCD display Counts surges in all modes Non-volatile memory (no battery backup) Reset button designed to prevent accidental resets									
PRL1X, PRL2X, PRL3X, PRL3E	■	■	■	■	■	■	—	—	—
PRL4X, Elevator Control Panelboard	■	■	■	■	■	■	■	■	■

40. Copper Wire Only Terminals for Molded Case Circuit Breakers

(To replace standard Al/Cu terminals.)

Modification 40

Breaker Frame	Maximum Breaker Ampere Rating	Terminal Material	Wire Range
F	225	Copper	#4–4/0
J	250	Stainless Steel	#4–350
K	225	Copper	(1) #3–350
	350	Copper	(1) 250–500
	400	Copper	(2) 3/0–250
L	600	Copper	(2) 250–500
M	600	Copper	(2) #2/0–500
	800	Copper	(3) #3/0–300
N	700	Copper	(2) #2/0–500
	1000	Copper	(3) #3/0–500
	1200	Copper	(4) #3/0–400

Note

① Requires 15 A branch breaker for cable connection—three-pole (three-phase) or two-pole (single-phase). (Add breaker separately, not included in price.)

Pow-R-Command Panelboards

Contents

An Eaton Green Solution

Product Overview

Pow-R-Command™ is a lighting control and energy management system that integrates branch circuit protection, control (switching and dimming) and metering into a single panelboard enclosure. The integrated design simplifies electrical distribution and control systems design, and eliminates separate equipment enclosures and associated wiring. Other benefits include reducing equipment wall space, installation labor and total installed cost. Pow-R-Command systems are designed to meet or exceed ASHRAE, IECC and LEED® requirements.

Pow-R-Command Intelligent Panelboards use Eaton Pow-R-Line® 1X and 2X lighting panelboard platforms to mount Pow-R-Command electronics and solenoid-operated controllable circuit breakers. Panelboard mains include 100 A to 400 A main lug and main circuit breaker configurations. Available voltages include 120/240, 208Y/120 and 480Y/277, single-phase and three-phase.

Panelboard options include installation of controllable and non-controllable circuit breakers, 200% rated neutral, metering and surge protection devices (SPDs).

Pow-R-Command intelligent lighting control panelboards are assembled in two basic configurations, Pow-R-Command Master and Expansion Panelboard. Pow-R-Command Master Panelboards are designed for standalone and networked systems. Master Panelboard components include controller with low-voltage power supply, Breaker Control Bus (BCB) and solenoid-operated controllable circuit breakers. Expansion Panelboards (PRCEP) are designed to directly connect to Master Panelboard via controller SLAN communications. Expansion Panelboard includes BCB and solenoid-operated controllable circuit breakers. Pow-R-Command systems are scalable using both Master and Expansion Panelboards to provide the right amount of control with reduced installed cost.

System Electronics

The 5th generation PRC "E" Series controller family includes PRC2000E, PRC1000E and PRC750E models. Specifiers and users select the controller to meet specific control and communication requirements. PRC-E controllers offer a broad range of schedule and occupant-based control. Network options include RS-485 and Ethernet. PRC-E controllers communicate with each other using powerful Pow-R-Command peer-to-peer protocol. All PRC-E controllers can be programmed, monitored and overridden using the onboard web pages through the controller maintenance Ethernet port using an industry standard patch cable. The PRC2000E model includes access to onboard web pages through the Ethernet network connector. PRC2000E model includes BACnet/IP and Modbus TCP/RTU for simple and straightforward integration with building management systems. All Pow-R-Command controllers can control up to 168 solenoid-operated controllable circuit breakers by connecting PRCEP panelboards using the controller SLAN sub-network communications port.

Breaker Control Bus electronics come in 9-, 15- and 21-circuit lengths depending on the size of the panelboard and are directly mounted to panelboard interior rails. BCBs are connected to the controller SLAN via 4-conductor cable and act as the interface between controller and controllable circuit breaker for providing status and control. Onboard power switching circuitry signals the controllable circuit breaker solenoid to switch the controllable circuit breaker ON and OFF. Each BCB is addressable between 1 and 8, allowing the controller to monitor and control up to 168 controllable circuit breakers. Pow-R-Command panelboards are assembled with one or two BCBs to offer the right amount of control.

Controllable Circuit Breakers

Controllable circuit breakers include standard circuit protection and control. Solenoid mechanism provides control, mechanical and electronic status and override lever. Controllable circuit breakers are available in 15–30 A, single-pole and two-pole configurations and are suitable for electrical distribution systems up to 480Y/277 Vac. Emergency lighting controllable circuit breakers are two-pole devices used for controlling dual purpose emergency lighting fixtures, Device includes non-switched pole to maintain power on the battery power sensing circuit and the second pole is controllable to switch the load ON and OFF.

Accessories

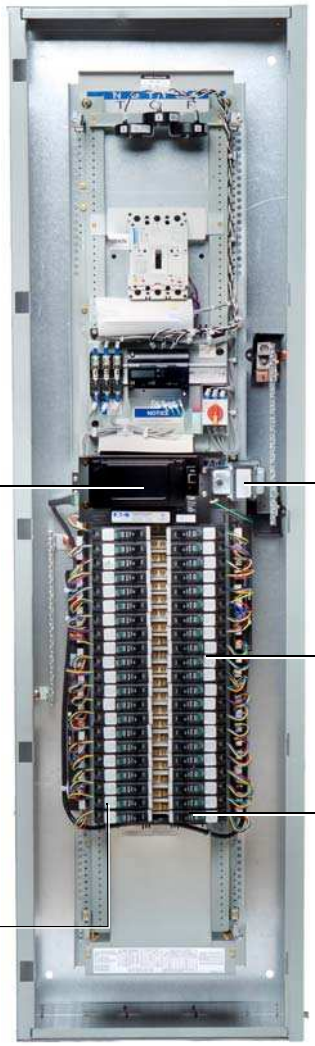
Pow-R-Command system accessories include override switches, analog I/O expansion module, switch override controller, master building lighting controller and communications devices.

Software

PRCE series controllers include an embedded web server. PRC systems are configured, programmed and monitored via a commonly used web browser and mobile devices. PRC Lighting Optimization Software (PRCLOS) is only recommended for remote connection to PRC1000E controller or existing legacy PRC100 and PRC1000 systems. Consult factory for more information.

Features

Pow-R-Command Master Panelboard Mounted Components



PRC-E panelboard system is controlled and monitored by microprocessor-based controller. Onboard time clock provides schedule-based control. Digital inputs are used for connecting low-voltage wallstations and occupancy sensors for override control. Analog I/O used for dimming and daylight harvesting control. Light level sensors are connected to analog inputs. Both fluorescent and LED lighting fixtures equipped with 0–10 Vdc dimming circuitry are connected to controller analog outputs. PRC-E controllers include backlit color LCD touchscreen and Maintenance Port for local programming, system monitoring and override control. User can locally access controller by connecting PC to controller front panel Maintenance Port using industry standard patch cable. Ethernet and RS-485 network connections located in controller low-voltage compartment provide remote access options.

Standard circuit breakers can be mounted to feed non-controlled loads.

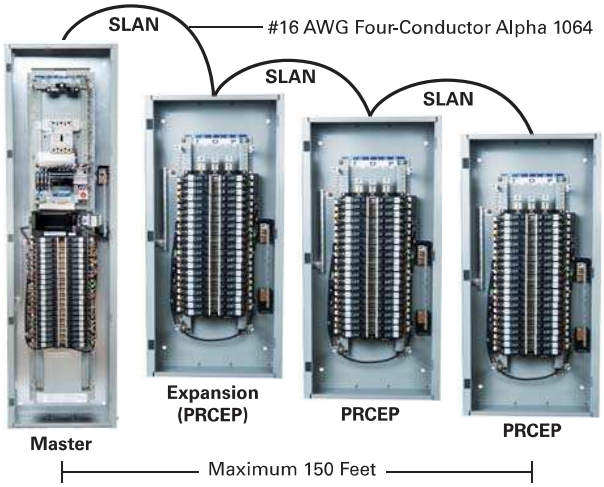
Low-voltage regulated power supply provides stable power for system electronics and reliable switching of solenoid-operated controllable circuit breakers.

Breaker Control Bus (BCB) electronics provide the control and monitoring interface between Pow-R-Command controllers and solenoid-operated controllable circuit breakers.

Single- and multi-pole solenoid-operated controllable circuit breakers provide branch circuit protection and control of connected loads.

Pow-R-Command Expansion Panelboard

Expansion Panelboard (PRCEP) includes Breaker Control Bus electronics and solenoid-operated controllable circuit breakers. Master and Expansion Panelboards are connected via SLAN communications sub-network to provide a scalable system architecture for cost-effective control solutions.



Consult factory for applications requiring longer distances.

Pow-R-Command Controllers

Pow-R-Command intelligent lighting control panelboards integrate branch circuit protection and control into a single panelboard enclosure to eliminate the need for mounting external time clocks with contactors or relay panels. Three 5th generation PRC-E series controller models are available to allow users and specifiers to select the controller that best fits the application.

PRC750E

- Microprocessor-based programmable lighting control system intended for standalone applications
- Designed with the electrical contractor in mind, it offers integral back-lit color LCD touchscreen display for simple, straightforward commissioning and startup
- Front panelboard programming can also be achieved by connecting the controller Maintenance Port to a laptop using an industry standard Ethernet patch cable
- Preconfigured web pages can be used to program, monitor and override the system
- Control options include schedule-based, occupant override and photocell control
- Sixteen two-wire low-voltage inputs are available for connecting wall stations, occupancy sensors and photocells
- Each controller can be connected to three Expansion Panelboards via SLAN communications to control and monitor up to 168 solenoid-operated circuit breakers

PRC1000E

PRC1000E is intended for use on existing PRC1000E, PRC1000 and PRC100 systems. Device includes all the features of the PRC750E controller with the addition of:

- Up to 120 controllers can be connected to the same Pow-R-Command RS-485 peer-to-peer network
- Powerful peer-to-peer protocol and network architecture allows schedules and external wiring device signals to be broadcast over the network to control any or all of the solenoid-operated controllable circuit breakers connected to the system. This system capability eliminates the need for changing the same schedule in multiple panelboards and requiring additional wiring devices to be directly connected to specific controllers
- Eight universal inputs can be programmed to accept either digital or analog external wiring devices. Compatible with low-voltage digital wiring devices like wall stations, occupancy sensors and photocells when programmed as digital inputs. When programmed as 0–10 Vdc analog inputs, indoor and outdoor photosensors can be connected for dimming and daylight harvesting applications
- Eight analog 0–10 Vdc outputs for connecting to fluorescent and LED lighting fixtures equipped with 0–10 Vdc dimming circuitry to meet dimming and daylight harvesting application requirements
- Compatible with existing PRC1000 and PRC100 systems

PRC2000E

Includes all the features of the PRC1000E controller with the addition of:

- Ethernet communications
- BACnet/IP and Modbus TCP/RTU communications protocol for integrating into building management systems
- Remote access to preconfigured web pages for programming, system monitoring and override control via Ethernet network connection
- Compatible with existing PRC2000 systems

Product Selection

PRC-E Controller

Pow-R-Command "E" Series controllers are available in three models and offer a range of features to meet a broad range of applications and meet energy codes.

Each PRC-E controller includes a backlit color LCD touchscreen, SLAN expansion network, schedule-based controls and two-wire low-voltage inputs for connecting occupancy sensors, wallstations and other building control signals.

The PRC-E Controller Selection Guide may be used to quickly identify the controller that best fits the application.

PRC-E Controller Selection Guide



Controller	PRCEP	PRC750E	PRC1000E	PRC2000E
Inputs				
Dry-contact inputs	—	16	8	8
Universal inputs, configurable dry-contact or analog 0–10 Vdc	—	—	8	8
Outputs				
Maximum number of controllable circuit breakers	—	168	168	168
Analog outputs, 0–10 Vdc, 80 mA sink or 40 mA source current ①	—	—	8	8
Power supply to power external devices, 100 mA at 12 Vdc/30 Vac	—	■	■	■
Power supply to power integrated Breaker Control Bus and SLAN V+ and V–	PRCEPP	■	■	■
Inputs and Outputs Accessory Modules				
Analog Expansion Module (PRCEAEM) w/ 8 universal inputs configurable as maintained dry-contact or analog 0–10 Vdc, 8 analog outputs 0–10 Vdc at 80 mA sink or source current ①②④	—	—	8 UI/8 AO ③	8 UI/8 AO
Switch Override Controller (PRCSOC) w/ 60 maintained dry-contact inputs, optional card includes 32 two-wire 24 Vdc outputs for status LEDs ③⑤	—	—	60 I/ 32 O	60 I/ 32 O
Control Logic				
Panelboard configurations include 18, 30, 42, 60, 72 and 84 circuits	—	■	■	■
Maximum number of control groups, 17–250 groups require PRCLOS software configuration	—	16	250	250
365-day time clock	—	■	■	■
Astronomical time clock with sunrise and sunset offsets	—	■	■	■
Schedules	—	250	250	250
Holidays	—	32	32	32
Automatic daylight savings time	—	■	■	■
Circuit breaker blink notice	—	■	■	■
Override time switches	—	■	■	■
Manual dimming and automatic daylight harvesting	—	—	■	■
Configurable source logic (OR, AND, XOR, XNOR, NAND and LAST EVENT)	—	—	■ ③	■

Notes

① Refer to driver/ballast manufacturer specs to calculate maximum connected load.
② Connects to controller MLAN network.
③ PRC1000E requires PRCLOS configuration software.
④ Maximum of seven PRCEAEM (PRC1000E maximum one PRCEAEM) connected to MLAN network.
⑤ Connects to controller RS-485 CNET network.

PRC-E Controller Selection Guide, continued



Controller	PRCEP	PRC750E	PRC1000E	PRC2000E
Communications				
Expansion panelboard SLAN	■	■	■	■
Maximum Breaker Control Bus (BCB) per SLAN		8	8	8
Ethernet network	—	—	—	■
BACnet/IP protocol	—	—	—	■
Modbus TCP/RTU	—	—	—	■
Email notification, user configurable alarms	—	—	—	■
Pow-R-Command RS-485 (CNET)	—	—	■	■
Digital Switch Network (DSN)	—	—	■	■
MLAN communications to Analog Expansion Module (PRCEAEM) ①	—	—	■	■
MLAN communications to metering devices with Modbus RTU communications ②	—	—	—	■
Modbus TCP pass-through metering mode	—	—	—	■
Modbus RTU, Breaker Control Bus addresses 1–16	■	—	—	—
Local Programming				
4.3-inch backlit color LCD touchscreen	—	■	■	■
Front Maintenance Port (Ethernet) access to web server ③	—	■	■	■
PRC Lighting Optimization Software (PRCLOS), Maintenance Port (Ethernet) access ③	—	■	■	■
Password protection	—	■	■	■
Remote Programming				
Remote access to controller web server via Ethernet connection	—	—	—	■
PRC Lighting Optimization Software (PRCLOS)	—	—	■	—
Password protection	—	■	■	—
Memory				
SD card for logs and programming database (GB)	—	4	4	4
Onboard capacitor to power clock chip during power outage (days)	—	10	10	10

Notes

① Maximum of seven PRCEAEM (PRC1000E maximum one PRCEAEM) connected to MLAN network.
② Maximum of eight meters with Modbus RTU communications.
③ Requires industry standard Ethernet patch cable.

Externally Mounted Controllers

Externally mounted controllers (PRCEEC) are available for retrofit and renovation projects when existing panelboards do not have required controller mounting space. Externally mounted controllers include controller and control power transformer mounted in a NEMA 1 enclosure.

Eaton Pow-R-Line 1X and 2X lighting panelboards can be converted to Pow-R-Command Expansion Panelboards (PRCEP) in the field by mounting Breaker Control Bus (BCB) and controllable circuit breakers directly to the interior.

Externally mounted controllers are connected to the retrofitted PRCEP panelboard using the SLAN communications network.

PRCE Externally Mounted Controller

PRCE Externally Mounted Controllers

Controller Type	Connected System Voltage	Catalog Number
PRC750E with display	120 Vac	**PRC750EECD-120**
PRC750E with display	277 Vac	**PRC750EECD-277**
PRC1000E with display	120 Vac	**PRC1000EECD-120**
PRC1000E with display	277 Vac	**PRC1000EECD-277**
PRC2000E with display	120 Vac	**PRC2000EECD-120**
PRC2000E with display	277 Vac	**PRC2000EECD-277**

Breaker Control Bus

Breaker Control Bus (BCB) provides the electronic interface and power switching signal between the controller and solenoid-operated controllable circuit breaker.

BCB comes in three lengths to fit standard lighting panelboards and is mounted to the panelboard interior rails.Each BCB has a set of DIP switches to configure the device SLAN address between 1 and 8. BCBs are connected to the PRC-E controller using PRC-to-BCB and BCB-to-BCB SLAN cables in a daisy-chain network architecture. RUN, SLAN and PWR LEDs indicate BCB operating status.

Breaker Control Bus (BCB)

Breaker Control Bus (BCB)

Description	Controlled Circuits	Part Number	Catalog Number ①
9-circuit Breaker Control Bus	9	1A32374G13	**PRCBCB9R**
18-circuit Breaker Control Bus	18	1A32374G12	**PRCBCB15R**
21-circuit Breaker Control Bus	21	1A32374G11	**PRCBCB21R**

Note

① Includes mounting screws and remote-operated circuit breaker pigtail connector protective caps.

Controller and Breaker Control Bus SLAN Cables

Controller and BCB SLAN cables are used for connecting controllers to associated BCBs.

Each cable type is made in three lengths using Alpha 1064 4-conductor #16 AWG wire.

One pair of wires used for 30 Vac power with the second pair used to transmit and receive communications from connected controller.

Controller and Breaker Control Bus SLAN Cables

Controller and Breaker Control Bus SLAN Cables

Description	Catalog Number
Controller-to-BCB / 42-circuit	**PRCSLAN42**
Controller-to-BCB / 30-circuit	**PRCSLAN30**
Controller-to-BCB / 18-circuit	**PRCSLAN18**
Controller-to-BCB / 42-circuit with right BCB only	**PRCSLAN42R**
Controller-to-BCB / 30-circuit with right BCB only	**PRCSLAN30R**
Controller-to-BCB / 18-circuit with right BCB only	**PRCSLAN18R**
BCB-to-BCB / 42-circuit	**PRCSLAN42B**
BCB-to-BCB / 30-circuit	**PRCSLAN30B**
BCB-to-BCB / 18-circuit	**PRCSLAN18B**

Auxiliary Power Supply

Auxiliary Power Supply (PRCPS) is used to boost power on the SLAN. Master and Expansion Panelboards communicate over the SLAN via Alpha 1064 4-conductor #16 AWG cable. Recommended maximum SLAN length is 150 ft. One pair of wires provides power to BCB for switching controllable circuit breakers with the second pair used for controller to BCB RS-485 communications. The PRCPS can be used to power a single Expansion Panelboard or extend the SLAN an additional 150 ft. The SLAN can be extended up to 4000 ft by using a PRCPS in each PRCEP.

Auxiliary Power Supply

Auxiliary Power Supply

Description	Catalog Number
PRC power supply 96 VA with 120/277 Vac input and 30 Vac output voltage	**PRCPS**

Controllable Circuit Breakers

GHQRD ①

	Number of Poles	Ampere Rating	Interrupting Capacity (Symmetrical Amperes) Vac (50/60 Hz) 120	120/240	277	277/480	Catalog Number
Single-Pole	1	15	65,000	65,000	14,000	—	**GHQRD1015**
		20	65,000	65,000	14,000	—	**GHQRD1020**
		30	65,000	65,000	14,000	—	**GHQRD1030**
Two-Pole	2	15	65,000	65,000	----	14,000	**GHQRD2015**
		20	65,000	65,000	----	14,000	**GHQRD2020**
		30	65,000	65,000	----	14,000	**GHQRD2030**

GHQRSP ②

	Number of Poles	Ampere Rating	Interrupting Capacity (Symmetrical Amperes) Vac (50/60 Hz) 120	120/240	277	277/480	Catalog Number
Single-Pole	1	15	65,000	65,000	14,000	—	**GHQRSP1015**
		20	65,000	65,000	14,000	—	**GHQRSP1020**
		30	65,000	65,000	14,000	—	**GHQRSP1030**
Two-Pole	2	15	65,000	65,000	—	14,000	**GHQRSP2015**
		20	65,000	65,000	—	14,000	**GHQRSP2020**
		30	65,000	65,000	—	14,000	**GHQRSP2030**

Notes

① Not recommended for existing PRC25, PRC100, PRC750, PRC1000 and PRC2000 systems. GHQRSP controllable circuit breakers are compatible with these systems.

② Compatible with existing PRC25, PRC100, PRC750(E), PRC1000(E), PRC1500(E) and PRC2000(E) systems. Recommend using GHQRD controllable circuit breakers for PRC-E systems.

BABRSP ①

	Number of Poles	Ampere Rating	Interrupting Capacity (Symmetrical Amperes) Vac (50/60 Hz) 120	120/240	Catalog Number
Single-Pole	1	15	10,000	—	**BABRSP1015**
		20	10,000	—	**BABRSP1020**
		30	10,000	—	**BABRSP1030**
Two-Pole	2	15	—	10,000	**BABRSP2015**
		20	—	10,000	**BABRSP2020**
		30	—	10,000	**BABRSP2030**
		40	—	10,000	**BABRSP2040**
		50	—	10,000	**BABRSP2050**

BABRP ②

	Number of Poles	Ampere Rating	Interrupting Capacity (Symmetrical Amperes) Vac (50/60 Hz) 120	120/240	Catalog Number
Single-Pole	1	15	10,000	----	**BABRP1015**
		20	10,000	----	**BABRP1020**
		30	10,000	----	**BABRP1030**
Two-Pole	2	15	----	10,000	**BABRP2015**
		20	----	10,000	**BABRP2020**
		30	----	10,000	**BABRP2030**
		40	----	10,000	**BABRP2040**

Notes

① Compatible with PRC25, PRC100, PRC750(E), PRC1000(E), PRC1500(E) and PRC2000(E) systems. Recommend using BABRP controllable circuit breakers for PRC25 systems.

② Compatible with PRC25, MTM6 and MTM4 controllers only. Not compatible with PRC750(E), PRC1000(E), PRC1500(E) and PRC2000(E) systems.

Emergency Circuit Breaker

The GHQRDEL and GHQRSPEL controllable circuit breakers are designed to meet NEC 700.12(F) for sources of power in unit equipment used for emergency lighting applications. The controllable circuit breaker includes both switched circuit for controlling lighting and standard non-switched circuit to provide power to the unit emergency charging and detection circuitry. Controllable circuit breaker includes a common handle tie and a common trip mechanism.

Emergency Circuit Breaker

GHQRD Emergency Circuit Breaker ①

Number of Poles	Ampere Rating	Interrupting Capacity (Symmetrical Amperes) Vac (50/60 Hz) 277	277/480	Catalog Number
2	15	14,000	—	**GHQRDEL2015**
	20	14,000	—	**GHQRDEL2020**

Emergency Circuit Breaker

GHQRSP Emergency Circuit Breaker ②

Number of Poles	Ampere Rating	Interrupting Capacity (Symmetrical Amperes) Vac (50/60 Hz) 277	277/480	Catalog Number
2	15	14,000	—	**GHQRSPEL2015**
	20	14,000	—	**GHQRSPEL2020**

Notes

① Compatible with PRC750E, PRC1000E, PRC1500E and PRC2000E systems. Not recommended for existing PRC100, PRC750, PRC1000 and PRC2000 systems. GHQRSPEL controllable circuit breakers are compatible with these systems.

② Compatible with PRC750(E), PRC1000(E), PRC1500(E) and PRC2000(E) systems. Not recommended for existing PRC100, PRC750, PRC1000 and PRC2000 systems. GHQRSP controllable circuit breakers are compatible with these systems.

Pow-R-Command Switches

Digital Switches

Pow-R-Command Digital Switches (PRCDS) are used for occupant override and light level control. PRCDS include digital and analog I/O and 12 Vdc external power source for connecting field wiring devices. The 12 Vdc external power source is used to power an occupancy sensor and digital input for monitoring occupancy status. Analog input is used to connect a light level sensor analog output for controlling lighting equipped with 0–10 Vdc dimming circuitry. Consult factory for maximum number lighting fixtures. Digital switches are connected to controllers' Digital Switch Network (DSN) via CAT6 cable with 23 AWG wire using standard RJ45 connectors. Each controller DSN supports connecting up to 99 digital switches. Onboard rotary switches allow addresses to be set in the field. LED backlit buttons provide real-time breakers and/or groups status. Each digital switch can have a title description using up to 16 characters. Pushbutton labels can have up to four characters. Standard font type is Helvetica regular bold.

Front View

Back View

Six-Button

Six-Button Engraved

Digital Switches ①②

Color	Number of Buttons	Catalog Number
Black	2	**PRCDS2B**
	4	**PRCDS4B**
	6	**PRCDS6B**
White	2	**PRCDS2W**
	4	**PRCDS4W**
	6	**PRCDS6W**
Almond	2	**PRCDS2A**
	4	**PRCDS4A**
	6	**PRCDS6A**
Ivory	2	**PRCDS2V**
	4	**PRCDS4V**
	6	**PRCDS6V**

Notes

① Not compatible with PRC750(E) controllers. Recommended for PRC1000(E), PRC1500(E) and PRC2000(E) controllers.
② Contact factory for custom labeling.

Digital Switch I/O Configuration

Pushbutton Configuration	Analog Input 0–10 Vdc	Digital Input 0–10 Vdc	Analog Output 0–10 Vdc	12 Vdc Output 20 mA Maximum
Two-button	■	■	■	■
Four-button	■	■	■	■
Six-button	■	—	■	■

Digital Switch Network Splitter

Digital Switch Network Splitter (PRCDSNS) is used as a convenient way to split the DSN into 2 legs to span in two directions.

If there are more than 50 Digital Switches connected to a controller, a splitter is recommended.

Consult factory for applications that may require this device.

Digital Switch Network Splitter

Digital Switch Network Splitter

Description	Catalog Number
Digital Switch Network Splitter	**PRCDSNS**

Digital Switch Network Power Injector

Digital Switch Network Power Injector (PRCDSNPI) is used to provide 24 Vac power on the DSN. A PRCDSNPI should be installed on the DSN before every 16th PRCDS or before the total length of DSN reaches 500 ft (whichever comes first).

Digital Switch Network Power Injector

Digital Switch Network Power Injector

Description	Catalog Number
Digital Switch Network Power Injector	**PRCDSNPI**

Low-Voltage Switch

Pow-R-Command Low-voltage Switch (PRCLS) includes momentary dry-contact pushbuttons used for inputs into the controller. PRCLS directly connect to controller digital and universal inputs.

Each PRCLS can have a title description using up to 16 characters. Pushbutton labels can have up to four characters. Standard font type is Helvetica regular bold.

Low-Voltage Switch

Termination Board

Low-Voltage Switch ①

Color	Number of Buttons	Catalog Number
Black	2	**PRCLS2B**
	4	**PRCLS4B**
	6	**PRCLS6B**
White	2	**PRCLS2W**
	4	**PRCLS4W**
	6	**PRCLS6W**
Almond	2	**PRCLS2A**
	4	**PRCLS4A**
	6	**PRCLS6A**
Ivory	2	**PRCLS2V**
	4	**PRCLS4V**
	6	**PRCLS6V**

Switch Wallplates

Fits rocker-style Decorator, Decora style switches. Screwless design is available in black, white, almond and ivory for 1-, 2- and 3-switch designs.

Switch Wallplates

Switch Wallplates

Color	Number of Switches	Catalog Number
Black	1	**PRCSWP1B**
	2	**PRCSWP2B**
	3	**PRCSWP3B**
White	1	**PRCSWP1W**
	2	**PRCSWP2W**
	3	**PRCSWP3W**
Almond	1	**PRCSWP1A**
	2	**PRCSWP2A**
	3	**PRCSWP3A**
Ivory	1	**PRCSWP1V**
	2	**PRCSWP2V**
	3	**PRCSWP3V**

Note

① Consult factory for custom labeling.

Analog Expansion Module

PRCE Analog Expansion Module (PRCEAEM) is used when the required number of analog inputs or analog outputs exceeds the PRCE master controller's maximum number of eight. Each PRCEAEM includes eight universal inputs and eight 0–10 Vdc analog outputs. Universal inputs are used to connect 0–10 Vdc analog devices, such as photosensors. Universal inputs can also accept 2-wire maintained dry-contact devices.

Analog outputs are used to connect LED and fluorescent lighting equipped with 0–10 Vdc dimming control circuitry. There is a maximum of 80 mA sink or source current per analog output channel. The PRCEAEM is shipped in a factory assembled NEMA 1 enclosure with 120 Vac voltage power supply.

PRCEAEM is connected to the PRCE controller MLAN network in a daisy-chain network architecture using Belden 3105A shielded twisted pair cable.

It can be mounted near the controller or remotely to reduce field wiring. Up to a maximum of seven PRCEAEMs can be connected to PRC2000E controllers. PRC1000E controller can accept a single PRCEAEM. Maximum overall network length of 4000 ft. PRCEAEM is configured using the PRC2000E controller web server interface. Pow-R-Command Lighting Optimization Software (PRCLOS) is required when connected to PRC1000E controller.

PRCEAEM Specification

- Eight universal inputs
  - Used to connect 0–10 Vdc analog photosensors or 2-wire maintained dry-contact devices
  - 18 AWG 500 ft maximum distance
- Eight analog outputs
  - Used to connect lighting fixtures equipped with 0–10 Vdc dimming circuitry
  - Maximum 80 mA sink or source current
  - 18 AWG 1000 ft maximum distance
- MLAN RS-485 network
  - Belden 3105A shielded twisted pair in a daisy-chain network architecture
  - 4000 ft maximum overall network length from PRCE controller
- Compatible with PRC2000E (maximum of seven devices) and PRC1000E (maximum of one) controllers
- Configured by using PRC2000E embedded web server or PRC1000E using PRC Lighting Optimization Software (PRCLOS)
- I/O status and control
  - PRC2000E controller web pages
  - PRC1000E controller using PRC Lighting Optimization Software
- Available in NEMA 1 enclosure with 120 Vac power supply (see table below)

PRCEAEM_E

PRCE Analog Expansion Module (PRCEAEM)

Description	Catalog Number
One analog expansion module, NEMA 1 enclosure with 120 Vac power supply	**PRCEAEM1E**
Two analog expansion modules, NEMA 1 enclosure with 120 Vac power supply	**PRCEAEM2E**
Three analog expansion modules, NEMA 1 enclosure with 120 Vac power supply	**PRCEAEM3E**
Four analog expansion modules, NEMA 1 enclosure with 120 Vac power supply	**PRCEAEM4E**

Note: Consult factory for non-standard configurations and enclosures.

Pow-R-Command Switch Override Controller

The Pow-R-Command Switch Override Controller (PRCSOC) can be used to connect digital and analog I/O to Pow-R-Command systems. This device is recommended when controller onboard digital and analog I/O has been exceeded or when there is an advantage to connecting remote I/O via a network connection. The PRCSOC is supplied with the controller, termination board, dual voltage 120/277 Vac power supply in a NEMA 1 enclosure. Optional 32-status LED output card is available.

The PRCSOC is connected to the Pow-R-Command system via the RS-485 network. Status and command signals are sent to the system using Pow-R-Command peer-to-peer protocol. The PRCSOC is configured using Pow-R-Command Lighting Optimization Software (PRCLOS).

All digital and analog I/O is connected using #18 AWG with maximum of 500 ft length. The PRCSOC features include:

- Sixty low-voltage two-wire maintained switch inputs for connecting wall stations, occupancy sensors and control relay outputs from building management systems
- Eight low-voltage two-wire universal (digital or analog) inputs. Analog field devices like light level sensors with 0–5 Vdc outputs can be connected for dimming and daylight harvesting applications
- Three low-voltage 0–10 Vdc analog outputs for controlling fluorescent and LED light fixtures equipped dimming circuitry; maximum of 40 each per output with optional dimmer cables
- Sixteen low-voltage two-wire 24 Vdc outputs to power status LEDs; optional to add 32 low-voltage two-wire 24 Vdc outputs to power status LEDs
- External 15 Vdc power source for powering occupancy and light level sensors and PRC auxiliary devices
- Connects to Pow-R-Command RS-485 network
- Communicates to the system using Pow-R-Command peer-to-peer protocol
- Configured by using Pow-R-Command Lighting Optimization Software
- Provided in a NEMA 1 enclosure
- Not compatible with PRC750(E) controllers

Pow-R-Command Switch Override Controller

Pow-R-Command Switch Override Controller

Description	Catalog Number
PRC Switch Override Controller without power supply mounted in NEMA 1 enclosure	**PRCSOCC**
PRC Switch Override Controller w/ 120/277 Vac power supply mounted in a NEMA 1 enclosure	**PRCSOCEC**
PRC Switch Override Controller w/ 120/277 Vac power supply, pilot output card mounted in a NEMA 1 enclosure	**PRCSOCECO**

Accessories

Ethernet Interface Module

Pow-R-Command Ethernet Interface Module (PRCEIM) allows access to the PRC controller RS-485 network when using a PC connected directly to the EIM Ethernet port or connected on a facility's Ethernet network.

PRCEIM can be used as the master scheduler and includes 250 unique schedules. The PRCEIM can be programmed to sync controller time clocks. This device is connected to the Ethernet network using standard CAT5 cable. The three-pin connector is used to directly connect to the Pow-R-Command RS-485 controller network.

The PRCEIM comes in a table top enclosure and should be physically located near an Ethernet hub or repeater, but the PC can be located anywhere on the Ethernet network. The PRCEIM will communicate at 10BASE-T and must have a fixed IP address assignment on the Ethernet network.

Ethernet Interface Module

Ethernet Interface Module ①

Description	Catalog Number
PRC Ethernet Interface Module mounted in table top enclosure	**PRCEIM**

Note

① Not compatible with PRC750(E) controllers. Recommended for PRC100 and PRC1000(E) controllers.

BACnet Interface Module

Pow-R-Command BACnet Interface Module (PRCBIM-1) is designed for simple BACnet integration without the need for extensive BACnet knowledge. The device maps Pow-R-Command controller points to BACnet/IP points of any RS-485 network connected Pow-R-Command controller. The PRCBIM-1 can map up to 50 points.

These points include status and control of individual controllable circuit breakers and groups of controllable circuit breakers. Input status is also included in the points map. Programming the device is accomplished by using Pow-R-Command Lighting Optimization Software (PRCLOS). The PRCBIM-1 includes two network connections.

The RS-485 connection is used for connecting the Pow-R-Command RS-485 network while the Ethernet 10BASE-T connection is used for connecting to the facility Ethernet network. The device requires a fixed IP address to be configured before connecting to the network.

BACnet Interface Module

BACnet Interface Module ①

Description	Catalog Number
PRC BACnet Interface Module	**PRCBIM-1**

BACnet Shadow Server

Pow-R-Command BACnet Shadow Server (PRCSS) is designed for simple BACnet integration without the need for extensive BACnet knowledge. The PRCSS maps Pow-R-Command controller points to BACnet/IP points. Up to 120 devices can be connected to a system. Each PRCSS has full access to all 150 points of the directly connected Pow-R-Command controller. These points include status and control of individual controllable circuit breakers and groups of controllable circuit breakers.

Input status is also included in the points map. Programming the device is accomplished by using Pow-R-Command Lighting Optimization Software (PRCLOS). The PRCSS includes two network connections. The RS-485 connection is used for connecting the Pow-R-Command RS-485 network while the Ethernet 10BASE-T connection is used for connecting to the facility Ethernet network.

The PRCBIM-1 includes two network connections. The RS-485 connection is used for connecting the Pow-R-Command controller while the Ethernet 10BASE-T connection is used for connecting to the facility Ethernet network. The device requires a fixed IP address to be configured before connecting to the network. Device power is supplied by controller 12 Vdc external power source.

BACnet Shadow Server

BACnet Shadow Server ①

Description	Catalog Number
PRC BACnet Shadow Server	**PRCSS**

Note

① Not compatible with PRC750(E) controllers. Recommended for PRC100 controllers. Consult factory for PRC1000(E) controllers.

Universal Ethernet Interface

The Pow-R-Command Universal Ethernet Interface (PRCUEI) is used in conjunction with the PRC5000(E) Advanced Lighting Controller to connect multiple RS-485 networks using the facility's Ethernet network via TCP protocol.

The PRC5000(E) can connect up to 16 Pow-R-Command RS-485 networks using a PRCUEI to connect each network. The PRCUEI supports up to 120 Pow-R-Command devices on each RS-485 network.

The device power is supplied by the controller 12 Vdc external power connection.

PC Central Software (PRCPCC01) is required for configuration and programming.

Universal Ethernet Interface

Universal Ethernet Interface ①

Description	Catalog Number
PRC Universal Ethernet Interface	**PRCUEI**

Universal Ethernet Router

Universal Ethernet Router PRCUER is intended for facilities where an Ethernet network is already installed.

The PRCUER extends the Pow-R-Command controller network by tunneling Pow-R-Command controller LAN control packets over existing Ethernet network using UDP Ethernet protocol. PRCUER devices extend the controller LAN transparently across Ethernet segments within the same subnet, allowing segments of the controller network to be physically separated from each other within a facility. Programming the device is accomplished by using Pow-R-Command Lighting Optimization Software (PRCLOS). The PRCUER includes two network connections.

The RS-485 connection is used for connecting the Pow-R-Command RS-485 network while the Ethernet 10BASE-T connection is used for connecting to the facility Ethernet network. The device can be configured for DHCP or be assigned a static IP address. Device power is supplied by controller 12 Vdc external power source.

Universal Ethernet Router

Universal Ethernet Router ①

Description	Catalog Number
PRC Universal Ethernet Router	**PRCUER**

Note

① Not compatible with PRC750(E) controllers. Recommended for PRC100 and PRC1000(E) controllers RS-485 networks.

PRC5000E Master Controller

Pow-R-Command 5000E Master Controller (PRC5000E) is capable of providing master scheduling control, load shedding and demand response, reporting, trend logging and implementing other control strategies.

PRC5000E Master Controller is commonly used to serve facility custom graphics via web pages. Authorized users can log into the device using a standard web browser for viewing custom graphics. System schedule changes and override controls can be made at the click of a button.

PRC5000E

PRC5000E Master Controller

Description	Catalog Number
Small Building Controller (web graphics) up to 20 CNET devices in enclosure	**PRC5000ESE**
Small Building Controller (web graphics) up to 20 CNET devices with I/O (7DO, 4AO, 4DI, 8UI) in enclosure	**PRC5000ESIE**
Small Building Controller (web graphics) up to 20 CNET devices with BACnet/IP in enclosure	**PRC5000ESBE**
Small Building Controller (web graphics) up to 20 CNET devices with I/O (7DO, 4AO, 4DI, 8UI) with BACnet/IP in enclosure	**PRC5000ESIBE**
Building Controller (web graphics) more than 20 CNET devices in enclosure	**PRC5000EE**
Building Controller (web graphics) more than 20 CNET devices with I/O (7DO, 4AO, 4DI, 8UI) in enclosure	**PRC5000EIE**
Building Controller (web graphics) more than 20 CNET devices with BACnet/IP in enclosure	**PRC5000EBE**
Building Controller (web graphics) more than 20 CNET devices with I/O (7DO, 4AO, 4DI, 8UI) with BACnet/IP in enclosure	**PRC5000EIBE**

Suffix	Feature
S	Small Building less than 20 devices
B	BACnet/IP
I	I/O (7DO, 4AO, 4DI, 8UI)
E	Enclosure

PRC25 Controller

PRC25 controller and associated system components are available for repair and replacement.

Direct replacement for existing MTM-4 and MTM-6 controllers. Consult factory for more information.

PRC25

PRC25 Controller

Description	Catalog Number
PRC25 6-channel controller	**PRC25**

Lighting Optimization Software

Lighting Optimization Software (PRCLOS) is recommended for Pow-R-Command system users. Refer to Software Compatibility Chart.

PRCLOS allows users to set up, program and monitor their system. This basic software package is capable of recognizing and saving databases for a single site.

Software Compatibility Chart ①

Controller Model	Compatibility
PRC100	Yes
PRCSOC (Switch Override Controller)	Yes
PRCNIB (Network Interface Box)	Yes
PRCEIM (Ethernet Interface Module)	Yes
PRC750 ②	Yes
PRC1000 ③	Yes
PRC2000 ③	Yes
PRC750E ④⑤	Up to and including firmware version 5.2.0
PRC1000E ⑥	Yes
PRC2000E ⑤⑥	Up to and including firmware version 5.2.0

Lighting Optimization Software

Description	Catalog Number
PRC Lighting Optimization Software	**PRCLOS**

PC Central Software

PC Central Software (PRCPCC) is recommended for field technicians responsible for maintaining Pow-R-Command systems. Refer to Software Compatibility Chart.

PRCPCC allows users to set up, program and monitor their system with the added features of advanced diagnostics and programming capabilities. This advanced software package is capable of recognizing and saving databases for single or multiple sites.

PC Central Software

Description	Catalog Number
PC Central Software (single site)	**PRCPCC01**
PC Central Software (10 sites)	**PRCPCC10**

Desktop Computer

Recommended Minimum Computer Specifications

Although it is difficult to guarantee compatibility with all PC-compatible equipment, the basic installation is generally compatible with the following minimum specifications:

- Microsoft® Windows® operating system
- Intel i3 processor or equivalent
- 4 GB RAM
- 1024x768 or better display
- Ethernet network adapter
- USB port if connecting to legacy products

Lighting Optimization Software and PC Central Software is compatible with the following Microsoft operating systems:

- Windows Server 2008 R2, all 32- and 64-bit versions
- Windows 7, all 32- and 64-bit versions
- Windows 8.1, all 32- and 64-bit versions
- Windows Server 2012, 64-bit
- Windows 10, 64-bit

Smart Cable Programming Tool

Pow-R-Command Smart Cable (PRCSmartCable) is used for front panelboard programming PRC100, PRC750, PRC1000 and PRC2000 controllers.

The PRCSmartCable connects the local laptop USB port to controller Maintenance Port.

Smart Cable Programming Tool

Description	Catalog Number
PRC smart cable	**PRCSmartCable**

Notes

① Contact Pow-R-Command Tech Support for more information. 833-POW-R-CMD.
② Local access only through Maintenance Port. PC connection requires PRCSmartCable.
③ Optional local access through Maintenance Port. PC connection requires PRCSmartCable.
④ Local access only through Maintenance Port. PC connection requires industry standard patch cable.
⑤ Firmware version 7.1.0 and above not compatible with software. Controller configuration, programming, monitoring and override performed using commonly standard web browsers.
⑥ Optional local access through Maintenance Port. PC connection requires industry standard patch cable.

Metering Service Section

Contents

Product Description

- 600 Vac maximum
- Three-phase four-wire, three-phase three-wire, single-phase three-wire.
- Service entrance panel combining a main disconnect with a power company metering compartment
- Circuit breaker or fusible switch disconnect
- 400–1200 A ratings
- Provision for power company metering:
  - Hinged sealable door over CT section
  - Arranged for bar-type, 200–1200 A utility-furnished CTs
  - Barriered CT compartment
- Factory assembled
- Wallmounted enclosure

Application Description

- For use in areas where the disconnect and current transformer combination is required by utilities
- Suitable for use as Service Entrance Equipment
- Top or bottom entrance
- Hot or cold sequence metering
- The current transformer compartment will accommodate the following 12-inch (304.8 mm) bar-type CTs:

Bar-Type CTs

ABB	General Electric	Sangamo	Astra
CTB	JCT-10	R6B	TAB, TA
CSF	JCM-0	R6BA	TCB, AA
CMF	JCW-0	R6M	AB
CBH	JAK-0		

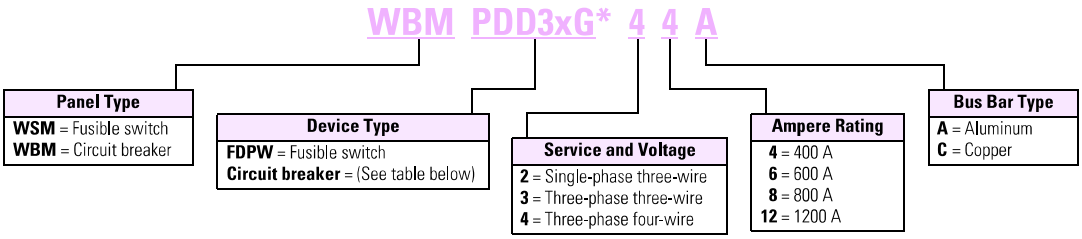
Standards and Certifications

- UL 67, UL 50
- NEC

UL Listed

Catalog Number Selection

Panelboard Catalog Number Selection Guide ①



Example: WBMPDD3xG*44A

WBM = Circuit breaker type, **PDD3xG*** = Circuit breaker type from table below, **4** = Three-phase four-wire, **4** = 400 A, **A** = Aluminum bus bar.

Product Selection

Metering Service Section

Type WBM Circuit Breaker Sections

Max. Ampere Rating	Interrupting Rating (kA Symmetrical) 240 Vac	480 Vac	600 Vac	Breaker Type ②③	Base Catalog Number ④
400	65	—	—	PDD3xG*	**WBMDK**
400	65	35	25	PDG3xG*	**WBMKD**
400	100	65	35	PDG3xM*	**WBMHKD**
400	200	100	65	PDG3xP*	**WBMKDC**
400	200	200	—	LCL	**WBMLCL**
800	65	35	25	PDG4xG	**WBMMDL**
800	100	65	35	PDG4xM	**WBMHMDL**
800	100	65	35	PDG5xM	**WBMHND800**
1200	65	50	25	NDG ⑤	**WBMNDG1200**
1200	100	65	35	PDG5xM	**WBMHND1200**
1200	100	65	35	HNDG ⑤	**WBMHNDG1200**

Notes

① Refer to Hartford Satellite Plant.
② For other breaker types, refer to Hartford Satellite Plant.
③ In cold sequence metering only, a 10X or 18X feeder breaker section can be supplied downstream from the CT compartment. Refer to Hartford Satellite Plant.
④ Complete catalog number according to Catalog the Number Selection Guide—table above.
⑤ Integral ground fault.

WSM Fusible Switch Sections

Ampere Rating	Interrupting Rating (kA Symmetrical)	Fusible Switch ①	Base Catalog Number ②
240 Vac Fusible Devices ③			
400	Refer to table on right (FDPW Switch Ratings, 250 or 600 Vac)	FDPW	**WSMFDPW**
600		FDPW	**WSMFDPW**
800		FDPW	**WSMFDPW**
1200		FDPW	**WSMFDPW**
600 Vac Fusible Devices ③			
400	Refer to table on right (FDPW Switch Ratings, 250 or 600 Vac)	FDPW	**WSMFDPW**
600		FDPW	**WSMFDPW**
800		FDPW	**WSMFDPW**
1200		FDPW	**WSMFDPW**

Modifications

Modifications for WBM Metering Service Sections

Description
Copper bus
Circuit breaker shunt trip installed
Circuit breaker undervoltage release installed
Type 3R outdoor enclosure
Provisions for PTs

Modifications for WSM Metering Service Sections

Description
Copper bus
Shunt trip installed
Type 3R outdoor enclosure
Provisions for PTs
FDPW fusible switch ground fault system Includes zero sequence current monitor, static sensor, shunt trip and fused control power transformer

Technical Data and Specifications

FDPW Switch Ratings, 250 or 600 Vac

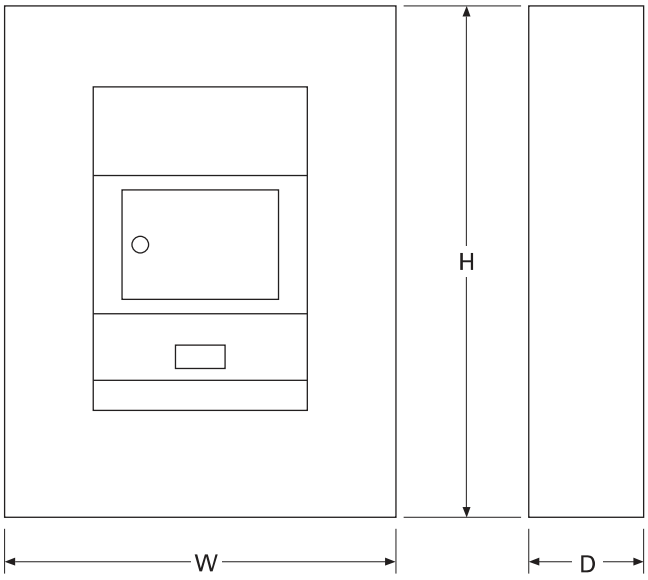
Ampere Rating	Fuse Class Used ①	Short-Circuit Ratings (kA Sym.)
400, 600	R	200
400, 600	J ③	200
800, 1200	L	200

Dimensions

Approximate Dimensions in Inches (mm)

Note: Not to be used for construction purposes unless approved.

Type 1 Enclosure—Metering Service Section



Type 1 Enclosure

Panelboard Type	Ampere Rating	Enclosure Dimensions Height	Width	Depth	Box Catalog Number
WBM, Circuit breaker	400–1200	73.50 (1866.9)	36.00 (914.4)	11.31 (287.0)	**BX3673**
WSM, Fusible	400–1200	90.50 (2286.0)	36.00 (914.4)	11.31 (287.0)	**BX3690**

Notes

① Fuses are not included.

② Complete catalog number according to Catalog Number Selection Guide—**Page V2-T3-131**.

③ Class J Fuse provisions are applicable only to 600 V units. When required, use price and dimensions of 600 V units for all voltages 600 and below.

Pow-R-Stock Plus

Product Description

Offering two options to meet the demanding schedule requirements of today's customers.

Type PRL1X Panelboard

- Factory-assembled panelboards available from your local satellite plant in 24 to 72 hours
- Unassembled panelboards in stock at authorized Pow-R-Stock Plus distributors

The Product Offering

Pow-R-Stock Plus panels, available either as factory-assembled or as unassembled from distributor stock, are based on the most frequently ordered panelboards, including:

- 120/240 V, 208Y/120 V and 480Y/277 V ratings
- 100–600 A mains
- Single- and three-phase
- Surface and flush mounted
- Aluminum or copper bus
- Type 1 or Type 3R enclosures
- Service entrance available
- Options for 200% neutrals and isolated ground bars
- Full menu of branch breakers available

Factory-Assembled Panelboard Option

The Pow-R-Stock Plus factory-assembled panelboard option offers key advantages over programs that offer only unassembled panelboards.

Reduced Installation Time

Unassembled panelboards must be assembled at the job site before the true installation process can begin, adding time and labor cost to the process. Pow-R-Stock Plus assembled panelboards are ready to install the moment they arrive at the job site.

Reduced On-Site Material Handling

A typical 42-circuit unassembled panelboard has a minimum of 46 parts to receive and handle, taking up valuable time at the job site. A Pow-R-Stock Plus assembled panelboard is just one item to receive and handle (two if the box is shipped ahead).

Factory Warranty

Field assembly of unassembled panelboards adds to contractor warranty responsibility. Pow-R-Stock Plus assembled panelboards carry a full factory warranty.

Simplicity

Order your Pow-R-Stock Plus Panelboard by description and it will arrive at the job site complete. No need to worry about matching catalog number kits at the job site or chasing after miscellaneous parts and pieces.

Contact your local satellite plant (see next page for a listing) for more information on the Pow-R-Stock Plus factory-assembled panelboard option.

Pow-R-Stock Plus Program Includes the EZ Trim and EZ Box

Unassembled Panelboard Option

Pow-R-Line 1X and 2X Panelboards are Designed to Provide Application Flexibility with Off-the-Shelf Service

The Pow-R-Stock Plus unassembled panelboard interior is designed specifically for distributor stock and field assembly. Its modular design allows for easy configuration in the field.

Top or bottom incoming, main lugs or main breaker...all with the same Pow-R-Stock Plus unassembled interior. Lug and breaker kits provide greater flexibility with fewer boxes, interiors and trims to stock.

Color-Coded Package Labels

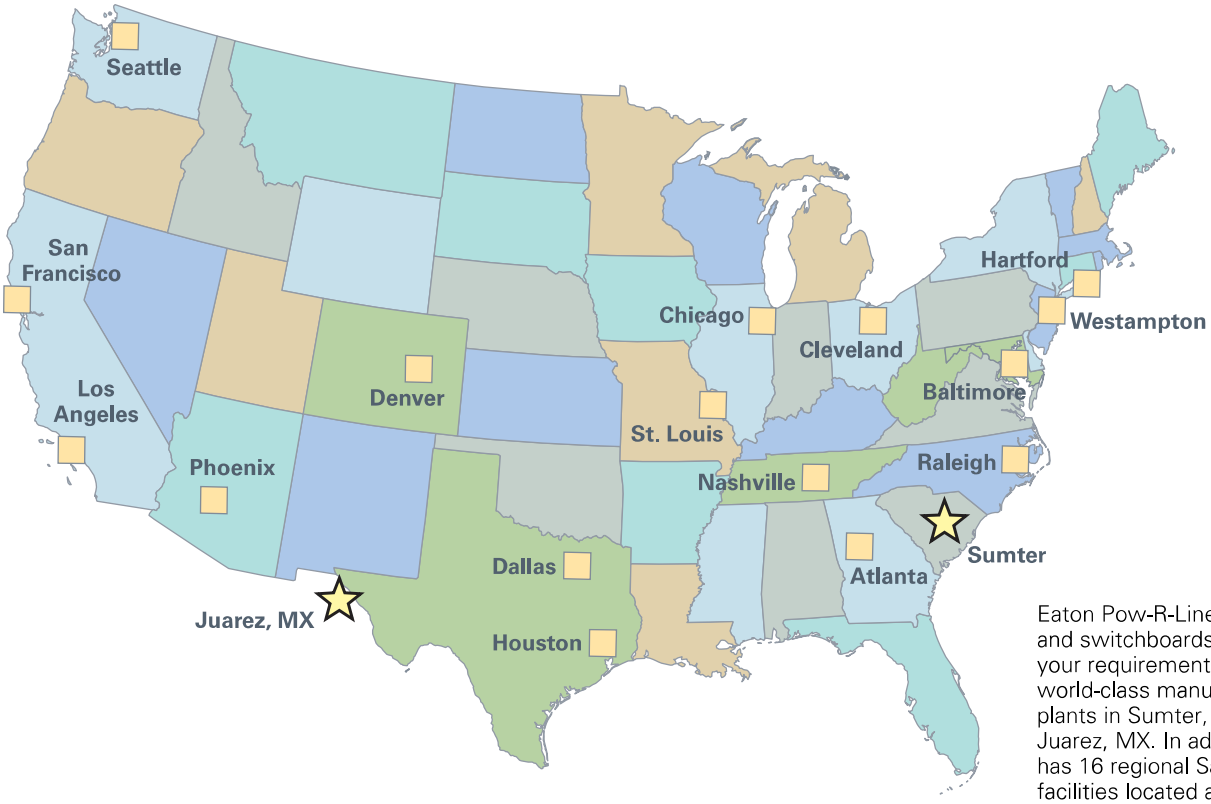
The box, interior and trim packaging are clearly identified with brightly colored labels (a different color for each box size). This facilitates stocking, filling orders, and matching components in the field.

Contact your local Eaton distributor for more details on the Pow-R-Stock Plus unassembled panelboard option.

Eaton Distributors

Contact your Eaton sales office or local satellite manager and arrange to review the program details and criteria for qualification as a Pow-R-Stock Plus distributor.

Satellite Operations



Eaton Pow-R-Line panelboards and switchboards are built to your requirements at our world-class manufacturing plants in Sumter, SC and Juarez, MX. In addition, Eaton has 16 regional Satellite facilities located across the country to meet your panelboard and switchboard service needs.

For an unparalleled commitment to your specific needs, please visit your local Satellite facility.

Atlanta
7000 Highlands Parkway SE
Suite 102
Smryna, GA 30082
678.309.4260

Baltimore
7451 Coca Cola Drive
Suite C
Hanover, MD 21076
410.796.7777

Chicago
230 Windy Point Drive
Glendale Heights, IL 60139
630.260.6303

Cleveland
12875 Corporate Drive
Unit E
Parma, OH 44130
216.265.3284

Dallas
631 Westport Parkway
Suite 100
Grapevine, TX 76051
817.251.6733

Denver
2450 Airport Road
Suite C
Aurora, CO 80011
303.366.2080

Hartford
40A International Drive
Windsor, CT 06095
860.298.1305

Houston
14825 Northwest Freeway
Suite 100
Houston, TX 77040
713.744.7530

Juarez
Prolongacion Hermanos
Escobar #7014,
Parque Industrial Omega
Adicion Oriental Cd.
Juarez, Chihuahua
Mexico 32648

Los Angeles
13201 Dahlia Street
Suite 300
Fontana, CA 92337
919.428.8903

Nashville
1421 Gould Boulevard
Suite C
La Vergne, TN 37086
615.287.3200

Phoenix
560 N 54th Street
Suite 1
Chandler, AZ 85226
480.449.4222

Raleigh
9400 Globe Center Drive
Suite 121
Morrisville, NC 27560
919.544.7074

St. Louis
56 Soccer Park Road
Fenton, MO 63026
636.717.3500

Sumter
Main Manufacturing Plant
845 Corporate Circle
Sumter, SC 29154
803.481.3131

San Francisco
20923 Cabot Boulevard
Hayward, CA 94545
510.784.8981

Seattle
1604 15th Street SW
Suite 114
Auburn, WA 98001
253.833.5021

Westampton
96 Stemmers Lane
Westampton, NJ 08060
609.835.4230

Satellites

A unique concept of facilities close to customer locations, assuring fast delivery of standard- and custom-assembled equipment *when it's needed*.

Located at strategic locations throughout the United States, these facilities manufacture and deliver standard or custom-assembled panelboards, switchboards and enclosed circuit breakers … when and where you need them. And, when you have an emergency, they can have your equipment ready in hours.

Highly trained and experienced personnel will manage your order and ensure that you receive on-time delivery of high quality equipment that meets your specifications.

Special Configurations

The unique capabilities of these plants and people can provide solutions for special products to meet special needs.

Typical examples include special dimensions, retrofit equipment and panelboard interiors to fit existing boxes.

Speedy Delivery

- Panelboards: from one to five days.
- Switchboards: between five and 10 days.
- Assembled Enclosed Circuit Breakers: from one to 10 days.

Save Time and Money

No matter your location, you will save time and money when ordering from a satellite location. For more information, contact your Eaton representative or authorized distributor.


Powering Business Worldwide

Power Defense molded case circuit breakers

Frame size 2 (15–225 A)

Frame size 2 configurator

Shown: PD2 3-pole with PXR 25 trip unit

Dimensions and weights

Approximate dimensions in inches (mm)

Number of poles	Width	Height	Depth
1	1.38 (35.1)	6.00 (152.4)	3.50 (88.9)
2	2.75 (69.9)	6.00 (152.4)	3.50 (88.9)
3	4.12 (104.6)	6.00 (152.4)	3.50 (88.9)
4	5.49 (139.5)	6.00 (152.4)	3.50 (88.9)

Approximate shipping weight in lb (kg)

Breaker type	1-Pole	2-Pole	3-Pole	4-Pole
PDG2 225 A	2.00 (0.91)	3.00 (1.36)	4.21 (1.82)	5.69 (2.46)

Trip unit ratings

Poles	Continuous current rating	Trip units
1-pole Thermal-magnetic	15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 110, 125, 150	TFF, VFF
2-, 3-, 4-pole Thermal-magnetic	15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	TFF, VFF
3-, 4-pole Electronic	60, 100, 150, 225, adjustable range (15–225)	B2N, E##, D##, P## ❶

❶ All #s refer to protection and options. Refer to the MCCB catalog or Power Defense poster for more information. Direct links are below.

Additional information

MCCB catalog

Time current curve

Power Defense poster

Catalog number/product selection

Interrupting ratings (2-, 3- and 4-pole)

Catalog designator	F	G	K ❶	M ❶	N ❶	P ❶
UL/CSA	kA rms	kA rms	kA rms	kA rms	kA rms	kA rms
240 Vac	35	65	85	100	150	200
480 Vac	25	35	50	65	85	100
600 Vac	14	18	22	25	30/25 ❸	35/25 ❸
250 Vdc ❷	2	10	10	10	22	22 22

❶ UL current limiting for 3- and 4-pole breakers.

❷ DC ratings available in thermal-magnetic breakers only. 250 Vdc is achieved using two poles in series.

❸ First rating listed is for thermal-magnetic breakers, second rating is for breakers with PXR electronic trip units.

Terminals

Maximum breaker amperes	Breaker frame ❶	Terminal body type	Wire type	Wire class	Number of conductors per phase	AWG/kcmil range per conductor	Metric (mm²) range per conductor	3-pole catalog number
Standard terminals								
100	15–100	Steel	Cu/Al	B, C	1	14–1/0	2.08–53.5	**PDG2X3T100** ❷❸
225	60–225	Aluminum	Cu/Al	B, C	1	4–4/0	21.2–107	**PDG2X3TA225** ❹❸
Alternate terminals								
50	15–50	Aluminum	Cu/Al	B, C	1	14–4	2.08–21.2	**PDG2X3TA50** ❸
100	60–100	Aluminum	Cu/Al	B, C	1	14–1/0	2.08–53.5	**PDG2X3TA100** ❸
150	60–150	Aluminum	Cu/Al	B, C	1	14–4/0	2.08–107	**PDG2X3TA150** ❸
225	175–225	Aluminum	Cu/Al	B, C	1	6–300	13.3–152	**PDG2X3TA225K** ❹❺

❶ The "Breaker frame" column provides information on the ampere ratings for which the terminal may be used (field installation); in some cases the range is limited by proper fit of the terminal onto the breaker conductor. The column "Standard on Amperes" provides information on what terminal is used during factory configuration per Digit 14 of the breaker catalog number. The two may not match.

❷ Factory standard terminals and non-aluminum terminals for 100 A and below are the same terminals.

❸ No accessories included.

❹ PDF2 225 A breakers with Digit 14 designation of "J" are equipped with PDG2X3TA225K terminals. PDF2 150 A breakers with Digit 14 designation of "J" are equipped with PDG2X3TA225 terminals.

❺ Terminal shield included.

Trip units

Description	Specification
Trip unit	
Thermal-magnetic (**T**)	Fixed thermal-fixed magnetic
Molded case switch (**K**)	Fixed magnetic
Motor circuit protector (**M**)	Adjustable magnetic only (3-pole)
Electronic	
PXR 10 **(B)** adjustable LSI	LSI, MLSI
PXR 20 **(E)** current metering / comm opt.	LSI, LSIG
PXR 20D **(D)** current metering / comm std.	LSI, LSIG
PXR 25 **(P)** power metering / comm std.	LSI, LSIG, MLSI, MLSIG

PXR electronic trip units

Powering Business Worldwide

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

Printed in USA
Publication No. MZ012018EN / Z24189
June 2020

Follow us on social media to get the latest product and support information.


Powering Business Worldwide

Power Defense molded case circuit breakers

Frame size 3 (45–600 A)

Frame size 3 configurator

Shown: PD3 3-pole with PXR 25 trip unit

Dimensions and weights

Approximate dimensions in inches (mm)

Number of poles	Width	Height	Depth
2	5.47 (138.9)	10.13 (257.1)	4.30 (109.1)
3	5.47 (138.9)	10.13 (257.1)	4.30 (109.1)
4	7.22 (182.9)	10.13 (257.1)	4.30 (109.1)

Approximate shipping weight in lb (kg)

Breaker type	2-Pole	3-Pole	4-Pole
PDG3 400 A	8.05 (3.65)	11.02 (5.0)	13.77 (6.25)
PDG3 600 A	10.43 (4.73)	12.36 (5.61)	16.27 (7.39)

Trip unit ratings

Poles	Continuous current rating	Trip units
2-, 3-, 4-pole Thermal-magnetic	100, 125, 150, 175, 200, 225, 250, 300, 350, 400, 500, 600	TFA, VFA
3-, 4-pole Electronic	125, 250, H250, 400, H400, 600, adjustable range (45–600) ❶	B2N, E##, D##, P## ❷

❶ H as the leading character of the ampacity indicates a high instantaneous version of the breaker for coordination purposes. H ratings must use 600 A frame.

❷ All #s refer to protection and options. Refer to the MCCB catalog or Power Defense poster for more information. Direct links are below.

Additional information

MCCB catalog

Time current curve

Power Defense poster

Catalog number/product selection

Interrupting ratings

Catalog designator	F		G		K		M ❶		N ❶		P ❶	
UL/CSA	**kA rms**		**kA rms**		**kA rms**		**kA rms**		**kA rms**		**kA rms**	
240 Vac	35		65		85		100		150		200	
480 Vac	25		35		50		65		85		100	
600 Vac	14		18		25		35		50		65	
250 Vdc ❷❸	10/22		10/22		10/22		22/42		22/42		22/42	
IEC	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
240 Vac	35	35	55	55	85	85	100	100	150	100	200	150
380–415 Vac	25	25	36	36	50	50	70	53	70	70	100	70
440 Vac	25	20	30	22.5	35	35	50	40	70	50	100	50
480 Vac	20	20	25	20	35	22.5	50	30	65	40	85	40
525 Vac	18	5	20	7.5	25	10	30	15	35	25	40	25
660–690 Vac	—	—	8	4	10	5	15	7.5	20	10	20	10
250 Vdc ❷❸	10/22	10/22	10/22	10/22	10/22	10/22	22/42	22/42	22/42	22/42	22/42	22/42

❶ UL current limiting. M interrupting rating only current limiting for the 400 A construction breakers.

❷ DC ratings available in thermal-magnetic breakers only. 250 Vdc is achieved using two poles in series.

❸ First rating listed is for 400 A frame, second rating is for 600 A frame.

Terminals

Maximum breaker amperes	Breaker frame	Terminal body type	Wire type	Wire class	Number of conductors per phase	AWG/ kcmil range per conductor	Metric (mm^2) range per conductor	3-Pole catalog number
Standard terminals								
300	400	Aluminum	Cu/Al	B, C	1	3–350	26.7–177	**PDG3X3TA300** ❶
350	400	Aluminum	Cu/Al	B, C	1	250–500	127–253	**PDG3X3TA350** ❶
400	400	Aluminum	Cu/Al	B, C	2	3/0–250	85–127	**PDG3X3TA400** ❷
400	600	Aluminum	Cu/Al	B, C	1	500–750	253–380	**PDG3X3TA401H** ❷
630	600	Aluminum	Cu/Al	B, C	2	2–500	33.6–253	**PDG3X3TA630** ❷

❶ No accessories included.

❷ Terminal shield included.

Trip units

Description	Specification
Trip unit	
Interchangeable trip units	Yes
Thermal-magnetic **(T)**	Fixed thermal-adjustable magnetic
Molded case switch **(K)**	Fixed magnetic
Motor circuit protector **(M)**	Adjustable magnetic only (3-pole)
Electronic	
PXR 10 **(B)** adjustable LSI	LSI, MLSI
PXR 20 **(E)** current metering / comm opt.	LSI, LSIG, ALSI, ALSIG
PXR 20D **(D)** current metering / comm std.	LSI, LSIG, ALSI, ALSIG
PXR 25 **(P)** power metering / comm std.	LSI, LSIG, ALSI, ALSIG, MLSI, MLSIG

PXR electronic trip units

Powering Business Worldwide

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

Printed in USA
Publication No. MZ012019EN / Z24189
June 2020

Follow us on social media to get the latest product and support information.


Powering Business Worldwide

Power Defense molded case circuit breakers

Frame size 4 (300–800 A)

Frame size 4 configurator

Shown: PD4 3-pole with PXR 25 trip unit

Dimensions and weights

Approximate dimensions in inches (mm)

Number of poles	Width	Height	Depth
2	8.25 (209.6)	16 (406.4)	4.38 (111.2)
3	8.25 (209.6)	16 (406.4)	4.38 (111.2)
4	11.0 (279.4)	16 (406.4)	4.38 (111.2)

Approximate shipping weight in lb (kg)

Breaker type	2-Pole	3-Pole	4-Pole
PDG4 800 A	30 (13.6)	30 (13.6)	39.9 (18.08)

Trip unit ratings

Poles	Continuous current rating	Trip units
2-, 3-, 4-pole Thermal-magnetic	300, 350, 400, 450, 500, 600, 700, 800	TFA, VFA
3-, 4-pole Electronic	800, adjustable range (320–800)	B2N, E##, D##, P## ❶

❶ All #s refer to protection and options. Refer to the MCCB catalog or Power Defense poster for more information. Direct links are below.

Additional information

MCCB catalog

Time current curve

Power Defense poster

Catalog number/product selection

Interrupting ratings

Catalog designator	G		K		M	
UL/CSA	**kA rms**		**kA rms**		**kA rms**	
240 Vac	65		85		100	
480 Vac	35		50		65	
600 Vac	18		25		35	
250 Vdc ❶	22		22		25	
IEC	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
240 Vac	55	55	85	85	100	100
380–415 Vac	36	36	50	50	70	53
440 Vac	30	22.5	35	35	50	40
480 Vac	25	20	35	22.5	50	30
525 Vac	20	16.5	25	20	30	25
660–690 Vac	8	4	10	5	15	7.5
250 Vdc ❶	22	22	22	22	25	25

❶ DC ratings available in thermal-magnetic breakers only. 250 Vdc is achieved using two poles in series.

Terminals

Maximum breaker amperes	Terminal body type	Wire type	Wire class	Number of conductors per phase	AWG/kcmil range per conductor	Metric (mm²) range per conductor	3-Pole catalog number
Standard terminals							
700	Aluminum	Cu/Al	B, C	2	1–500	42.4–253	**PDG4X3TA700** ❶
800	Aluminum	Cu/Al	B, C	3	3/0–400	85–203	**PDG4X3TA800** ❶
Alternate terminals							
800	Aluminum	Cu/Al	B, C	2	500–750	253–380	**PDG4X3TA801** ❶

❶ No accessories included.

Trip units

Description	Specification
Trip unit	
Interchangeable trip units	Yes
Thermal-magnetic **(T)**	Fixed thermal-adjustable magnetic
Molded case switch **(K)**	Fixed magnetic
Electronic	
PXR 10 **(B)** adjustable LSI	LSI
PXR 20 **(E)** current metering / comm opt.	LSI, LSIG, ALSI, ALSIG
PXR 20D **(D)** current metering / comm std.	LSI, LSIG, ALSI, ALSIG
PXR 25 **(P)** power metering / comm std.	LSI, LSIG, ALSI, ALSIG

PXR electronic trip units

Powering Business Worldwide

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

Printed in USA
Publication No. MZ012020EN / Z24189
June 2020

Follow us on social media to get the latest product and support information.


Powering Business Worldwide

Low-voltage power distribution and control systems > Panelboards >

Pow-R-Line 1X, 2X and 3X panelboards

Contents

Powering Business Worldwide

More about this product
Eaton.com/panelboards

Complete library of design guides
Eaton.com/designguides

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 mid-range panelboards.

EZTrim 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 1X, 2X and 3X

- Robust design using Eaton circuit breakers
- Increased ratings (with Series Rated main circuit breakers) provide higher short-circuit ratings
- Pow-R-Line 3X can accommodate branch breakers dual-mounted through 150 A and single-mounted through 225 A
- Lock and Door opening mechanism includes a positive slide catch and right- or left-hand installation
- Surface or flush trims
- UL tested and listed. 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. Available main and branch breaker combinations are tabulated on **Page 22.1-32** through **Page 22.1-42**. All combinations shown are UL tested and listed.

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 22.1-1)

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.

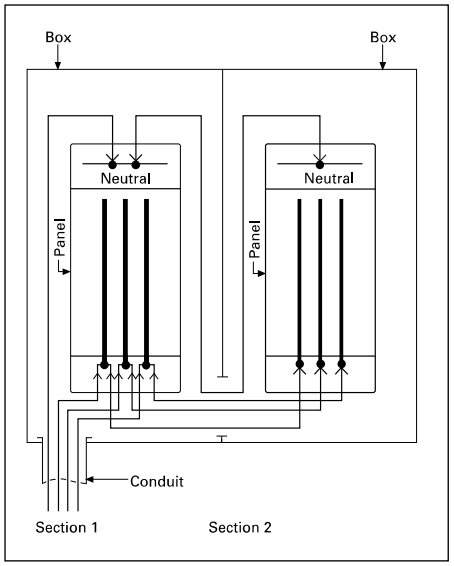


Figure 22.1-1. Sub-Feed Lugs

Through-Feed Lugs (Figure 22.1-2)

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.

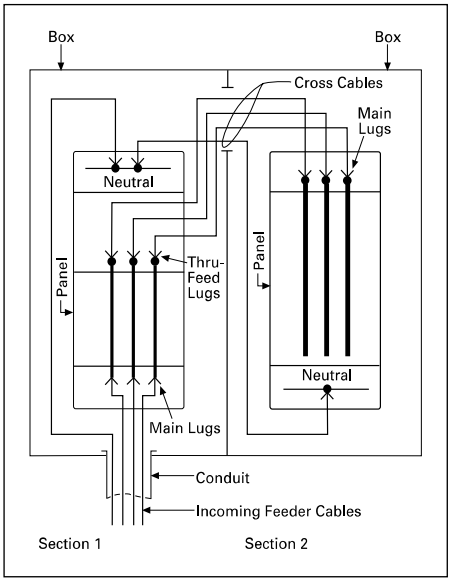


Figure 22.1-2. Through-Feed Lugs

Multiple Section Panelboard—Flush Mounted

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

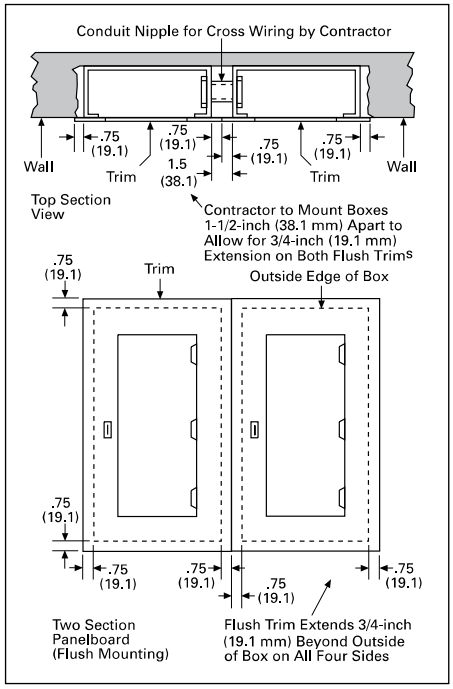


Figure 22.1-3. Multiple Section Panelboard—Flush Mounted—Dimensions in Inches (mm)

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.

Pow-R-Line 1X

Pow-R-Line 1X

General Description

Panelboard Ratings

Voltage

- 240 Vac maximum

Main Lugs

- 100–600 A

Main Breakers

- 100–600 A

Branch Breakers

- 15–100 A
  (Bolt-on or plug-on chassis)

Short-Circuit Current Ratings (Symmetrical)

- 240 Vac: 10 kA and 22 kA fully rated
- 240 Vac: 22–200 kA series rated

Service

- Three-phase, four-wire 208Y/120 V and 240/120 V delta
- Single-phase, three-wire 120/240 V
- Single-phase, two-wire 120 V
- Three-phase, three-wire 208 V and 240 V

Suitable for service entrance applications when specified.

Mains

For available mains, refer to **Table 22.1-1**.

Main breakers, 100 A, Types BAB and QBH are horizontally mounted, same as branch breakers. All other main breakers are vertically mounted.

Branch Circuits

For available branch devices, refer to **Table 22.1-2**.

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: 100, 225, 400 and 600.

Main Circuit Breakers

The short-circuit rating shown is that of the main breaker only. The short-circuit rating of the assembled panelboard is the rating of the lowest fully rated main or branch device or the rating of an approved series rated combination.

Series Rated Combinations

Refer to series rating tables beginning on **Page 22.1-34** for the approved series rated combinations available for the branch circuit breakers listed in **Table 22.1-2**.

Table 22.1-1. Main Circuit Breakers

Breaker Frame Amperes	Breaker Type	Interrupting Rating (kA Symmetrical) at 240 Vac
100	BAB	10
100	QBHW	22
100	PDG2xF	18
225	PDG2xG, PDG3xG5*	65
225	PDG2xM	100
225	PDG2xP	200
225	PDD2xF	22
225	PDD2xG	65
225	PDD2xM	100
225	PDD2xM	200
400	PDD3xGy	65
400	PDG3xG*	65
400	PDG3xM*	100
400	PDG3xP*	200
400	LHH	100
600	PDG3xG*	65
600	LGS	85
600	PDG3xM*	100
600	PDG3xM*	200

Table 22.1-2. Branch Circuit Breakers

Breaker Type	Ampere Rating	Number of Poles	Interrupting Rating (kA Symmetrical)		
			120 Vac	120/240 Vac	240 Vac
BAB, HQP	15–70	1	10	—	—
BAB, HQP	15–100	2	—	10	—
BAB, HQP	15–100	2, 3	—	—	10
BAB-D ①, HQP-D ①	15–60	1, 2	10	10	—
BAB-C ②, HQP-B ②	15–30	1, 2	10	10	—
BABRP ③	15–30	1, 2	10	10	—
BABRSP ③	15–30	1, 2	10	10	—
QBGF, QBGFEP,	15–50 ④	1, 2	10	10	—
QPGF, QPGFEP	15–50 ④	1, 2	10	10	—
QBCAF ⑤	15–20	1	10	10	—
QBHW	15–70	1	22	—	—
QBHW	15–100	2	—	22	—
QBHW	15–100	2, 3	—	—	22
QBHGF, QBGFEP	15–30	1, 2	22	22	—
QPHGF, QPHGFEP	15–30	1, 2	22	22	—
QBHCAF ⑤	15–20	1	22	22	—

① HID (High Intensity Discharge) rated breaker.
② Switching neutral breaker. Single-pole device requires two-pole space, two-pole device requires three-pole space.
③ Solenoid operated breaker.
④ 50 A is two-pole only.
⑤ Arc fault breaker.

Pow-R-Line 2X

Pow-R-Line 2X

General Description

Panelboard Ratings

Voltage

- 240 Vac maximum
- 480Y/277 Vac maximum

Note: PRL2X panelboards are suitable for use on three-phase, three-wire applications when derived from a three-phase, four-wire 480Y/277 Vac service where the neutral is not brought to the panelboard. For three-phase, three-wire 480 Vac delta services, use a PRL3X panelboard.

- 250 Vdc maximum

Main Lugs

- 100–600 A

Main Breakers

- 100–600 A

Branch Breakers

- 15–100 A (bolt-on)

Short-Circuit Current Ratings (Symmetrical)

- 240 Vac: 65 kA fully rated
- 240 Vac: 100–200 kA series rated
- 480Y/277 Vac: 14 kA fully rated
- 480Y/277 Vac: 22–150 kA series rated
- 250 Vdc: 10 kA and 14 kA fully rated

Service

- Three-phase, four-wire 208Y/120 V and 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 208 and 240 V
- Two-wire 125 Vdc
- Two-wire 250 Vdc

Suitable for service entrance applications when specified.

Mains

For available mains, refer to **Table 22.1-3.**

The GHB main breaker is horizontally mounted, same as branch breakers. All other main breakers are vertically mounted.

Branch Circuits

For available branch devices, refer to **Table 22.1-4.**

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: 100, 225 and 400.

Main Circuit Breakers

The short-circuit rating shown is that of the main breaker only. The short-circuit rating of the assembled panelboard is the rating of the lowest fully rated main or branch device or the rating of an approved series rated combination.

Series Rated Combinations

Refer to series rating tables beginning on **Page 22.1-34** for the approved series rated combinations available for the branch circuit breakers listed in **Table 22.1-4.**

Table 22.1-3. Main Circuit Breakers

Breaker Frame (Amperes)	Breaker Type	Interrupting Rating (kA Symmetrical)		
		240 Vac	480Y/277 Vac	125/250 Vdc
100	GHB ①	65	14	14
100	PDG2xF	18	14	10
225	PDG2xG, PDG3xG	65	35	10
225	PDG2xM	100	65	22
225	PDG2xP	200	100	22
225	PDD2xG	65	—	—
250	PDD2xM	100	—	—
250	PDD2xM	200	—	—
400	PDD3xGy	65	—	10
400	PDG3xG	65	35	10
400	PDG3xM*	100	65	22
400	LHH	100	65	—
400	PDG3xP*	200	100	22
600	PDG3xG*	65	35	22
600	LGS	65	50	22
600	PDG3xM*	100	65	42
600	PDG3xM*	200	100	42

① For use on 480Y/277 Vac systems only.

Table 22.1-4. Branch Circuit Breakers

Breaker Type	Ampere Rating	Number of Poles	Interrupting Rating (kA Symmetrical)				
			120 Vac	240 Vac	277 Vac	480Y/277 Vac	125/250 Vdc
GHB ②	15–100	1	65	—	14	—	14
GHB ②	15–100	2, 3	—	65	—	14	14
GHQ	15–30	1, 2	65	—	14	—	—
HGHB	15–30	1	65	—	25	—	—
GHQRSP ②③	15–20	1, 2	65	65	14	14	—
GHBGFEP	15–60	1	—	—	14	—	—

② For use on 480Y/277 Vac systems only.
③ Solenoid operated breaker.

Pow-R-Line 3X

Pow-R-Line 3X

General Description

Panelboard Ratings

Voltage

- 240 Vac maximum
- 480 Vac maximum
- 600 Vac maximum
- 250 Vdc maximum

Main Lugs

- 100–800 A

Main Breakers

- 100–600 A

Branches

- 240 Vac 15–225 A
- 480 Vac 15–225 A
- 600 Vac 15–225 A (bolt-on)

Interrupting Capacity (Symmetrical)

- 240 Vac: 10–200 kA fully rated
- 240 Vac: 22–200 kA series rated
- 480 Vac: 14–100 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 240, 480 and 600 V
- Two-wire 125 Vdc
- Two-wire 250 Vdc

Suitable for service entrance applications when specified.

Mains

For available mains, refer to **Table 22.1-5.**

Main breakers, 100, 150 and 225 A, Types PDG2xF, PDG2xG, PDG3xG, PDG2xM, HFDE and PDG2xP may be horizontally mounted, same as branch breakers. All other main breakers are vertically mounted.

Branch Circuits

For available branch devices, refer to **Table 22.1-6.**

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: 100, 250, 400, 600 and 800.

Main Circuit Breakers

The short-circuit rating shown is that of the main breaker only. The short-circuit rating of the assembled panelboard is the rating of the lowest fully rated main or branch device, or the rating of an approved series rated combination.

Table 22.1-5. Main Circuit Breakers

Breaker Frame (Amperes)	Breaker Type	Interrupting Rating (kA Symmetrical)			
		240 Vac	480 Vac	600 Vac	250 Vdc
100	PDG2xF	18	14	—	10
100	FCL	200	150	—	—
100	FB-P	200	200	200	①
225	PDG2xG, PDG3xG	65	35	18	10
225	PDG2xM	100	65	25	22
225	PDG2xP	200	100	35	22
225	PDD2xF	22	—	—	—
225	PDD2xG	65	—	—	—
225	PDD2xM	100	—	—	—
225	PDD2xM	200	—	—	—
400	PDD3xGy	65	—	—	10
400	PDG3xG	65	35	25	10
400	PDG3xM*	100	65	35	22
400	LHH	100	65	—	—
400	PDG3xP*	200	100	65	22
400	LCL	200	200	—	—
400	LA-P	200	200	200	①
600	PDG3xG*	65	35	18	22
600	PDG3xM*	100	65	35	22
400	PDG3xM*	200	100	50	42
600	CLD ②	65	35	25	22

① 100,000 AIC based on NEMA test procedure.
② 100% rated breaker. Requires copper bus. Not available in Type 12, 4 or 4X enclosure.

Series Rated Combinations

Refer to series rating tables beginning on **Page 22.1-34** for the approved series rated combinations available for the branch circuit breakers listed in **Table 22.1-6.**

Table 22.1-6. Branch Circuit Breakers

Breaker Type	Ampere Rating	Number of Poles	Interrupting Rating (kA Symmetrical) Volts						
			120 Vac	120/240 Vac	240 Vac	480 Vac	600 Vac	125 Vdc	250 Vdc
BAB	15–70	1	10	—	—	—	—	—	—
BAB	15–100	2	—	10	—	—	—	—	—
BAB	15–100	2, 3	—	—	10	—	—	—	—
BAB-D ①	15–60	1, 2	10	10	—	—	—	—	—
BAB-C ②	15–30	1, 2	10	10	—	—	—	—	—
BABRP ③	15–30	1, 2	10	10	—	—	—	—	—
BABRSP ③	15–30	1, 2	10	10	—	—	—	—	—
QBGF, QBGFEP	15–50 ④	1, 2	10	10	—	—	—	—	—
QBCAF ⑤	15–20	1	10	10	—	—	—	—	—
QBHW	15–70	1	22	—	—	—	—	—	—
QBHW	15–100	2	—	22	—	—	—	—	—
QBHW	15–100	2, 3	—	—	22	—	—	—	—
QBHGF, QBHGFEP	15–50 ④	1, 2	22	22	—	—	—	—	—
QBHCAF ⑤	15–20	1	22	22	—	—	—	—	—
GHB ⑥⑦	15–100	1	—	—	65	14	—	14	—
GHB ⑥	15–100	2, 3	—	—	65	14	—	—	14
GHQ ⑥⑦	15–30	1, 2	—	—	65	14	—	—	—
HGHB ⑥⑦	15–30	1	—	—	65	25	—	—	—
GHBGFEP	15–60	1	—	—	65	14	—	14	—
GHQRSP ③⑥⑦	15–20	1, 2	65	65	65	14	—	—	—
PDG2xF ⑦	15–100	1	—	—	14	14	—	10	—
PDG2xF	15–100	2, 3	—	—	18	14	—	—	10
PDG2xG ⑦	15–100	1	—	—	65	35	—	10	—
PDG2xG, PDG3xG	15–225	2, 3	—	—	65	35	18	—	10
PDG2xM ⑦	15–100	1	—	—	65	65	—	10	—
PDG2xM	15–225	2, 3	—	—	100	65	25	—	22
PDG2xP	15–225	2, 3	—	—	200	100	35	—	22
PDD2xF	100–225	2, 3	—	—	22	—	—	10	—
PDD2xG	100–225	2, 3	—	—	65	—	—	10	—
PDD2xM	100–225	2, 3	—	—	100	—	—	10	—
PDD2xM	100–225	2, 3	—	—	200	—	—	10	—

① HID (High Intensity Discharge) rated breaker.
② Switching neutral breaker. Single-pole device requires two-pole space, two-pole device requires three-pole space.
③ Solenoid operated breaker.
④ 50 A is two-pole only.
⑤ Arc fault breaker.
⑥ For use on 480Y/277 Vac systems only.
⑦ Single-pole breaker rated 277 Vac.

Circuit Breaker Technical Data

Table 22.1-7. Electrical Characteristics of Circuit Breakers

Circuit Breaker Ratings				UL Listed Interrupting Ratings (kA rms Symmetrical)						
Type	Ampere Rating	Number of Poles	Volts AC	AC Rating, Volts					DC Rating, Volts ①	
				120/240	240	277	480	600	125	250
BAB, HQP	15–70 15–100	1 2	120 120/240	10 10	— —	— —	— —	— —	— —	— —
BAB-H, HQP-H	15–100	2, 3	240	—	10	—	—	—	—	—
BABRP, BABRSP	15–30 15–30	1 2	120 120/240	10 10	— —	— —	— —	— —	— —	— —
QBGF, QPGF, QPGFEP QBGFEP	15–50 15–50	1 2	120 120/240	10 10	— —	— —	— —	— —	— —	— —
QBAF, QBAG	15–20 15–20	1 2	120 120/240	10 10	— —	— —	— —	— —	— —	— —
QBHW, QPHW	15–70 15–100	1 2	120 120/240	22 22	— —	— —	— —	— —	— —	— —
QBHW-H, QPHW-H	15–100	2, 3	240	—	22	—	—	—	—	—
QBHGF, QPHGF, QPHGFEP QBHGFEP	15–30 15–30	1 2	120 120/240	22 22	— —	— —	— —	— —	— —	— —
QBHAF, QBHAG	15–20 15–20	1 2	120 120/240	22 22	— —	— —	— —	— —	— —	— —
GHB	15–100 ② 15–100	1 2, 3	277 480Y/277	65 —	— 65	14 —	— 14 ③	— —	14 —	— 14
GHQ	15–30	1, 2	277	65	—	14	—	—	—	—
HGHB	15–30	1	277	65	—	25	—	—	—	—
GHBGFEP	15–60	1	277	—	—	14	—	—	—	—
GHQRSP	15–100 15–100	1 2	277 480Y/277	65 —	— 65	14 14	— 14 ③	— —	— —	— —
GHBS	15–30 15–30	1 2	277 480Y/277	65 —	— 65	14 14	— 14 ③	— —	— —	— —
EGB	15–125 15–125	1 2, 3	277 480	35 —	35 35	18 —	— 18	— —	10 —	— 10
EGS	15–125 15–125	1 2, 3	277 480	100 —	— 100	35 —	— 35	— —	35 —	— 35
EGH	15–125 15–125	1 2, 3	277 480	200 —	— 200	65 —	— 65	— —	42 —	— 42
PDG2xF	15–100 15–100	1 2, 3	277 480	— —	— 18	14 —	— 14	— —	10 —	— 10
PDG2xG, PDG3xG*	15–150 15–225	1 2, 3	277 600	— —	— 65	35 —	— 35	— 18	10 —	— 10
PDD2xF PDD2xG PDD3xGY	100–225 100–225 250–400	2, 3 2, 3 2, 3	240 240 240	— — —	22 65 65	— — —	— — —	— — —	10 10 —	— — 10
PDG3xG* ④, PDF3xG ⑤ LHH ⑥ PDG3xG* CLD ④⑤	100–400 150–400 250–600 300–600	2, 3 2, 3 3 2, 3	600 480 600 600	— — — —	65 100 65 65	— — — —	35 65 35 35	25 35 18 25	— — — —	10 42 22 22 ⑥

① DC ratings apply to substantially non-inductive circuits.
② DC rated single-pole, 15–70 A only.
③ Rating 480Y/277 Vac maximum.
④ Available with integral ground fault protection.
⑤ 100% rated breaker.
⑥ DC rating not available with PXR trip units.

Table 22.1-7. Electrical Characteristics of Circuit Breakers (Continued)

Circuit Breaker Ratings					UL Listed Interrupting Ratings (kA rms Symmetrical)							
Type	Ampere Rating	Number of Poles	Voltage		AC Rating, Volts					DC Rating, Volts ①		
			AC	DC	120/240	240	277	480	600	125	250	600
High Interrupting Capacity Circuit Breakers												
PDG2xM	15–150 15–225	1 2, 3	277 600	— —	— —	— 100	65 —	— 65	— 25	10 —	— 22	— —
PDD2xM PDG3xM* ②, PDF3xM ③	100–225 100–400	2, 3 2, 3	240 600	— —	— —	100 100	— —	— 65	— 35	10 —	— 22	— —
Current Limiting Circuit Breakers												
PDG2xP PDD2xM	15–225 100–225	2, 3 2, 3	600 240	— —	— —	200 200	— —	100 —	35 —	— 10	22 —	— —
PDG3xP* ② PDG3xM* ④	100–400 250–600	2, 3 2, 3	600 600	— —	— —	200 200	— —	100 100	65 50	— —	22 42	— —
Current Limit-R® Circuit Breakers												
FCL LCL ②	15–100 125–400	2, 3 2, 3	480 480	— —	— —	200 200	— —	150 200	— —	— —	— —	— —
TRI-PAC® Current Limiting Circuit Breakers												
FB-P LA-P	15–100 70–400	2, 3 2, 3	600 600	— —	— —	200 200	— —	200 200	200 200	— —	⑤ ⑤	— —

① DC ratings apply to substantially non-inductive circuits.
② Available with integral ground fault protection.
③ 100k based on NEMA test procedure.
④ DC rating not available with PXR trip units.
⑤ Non-interrupting trip type.

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 22.1-8. 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 1X, 1XF, 1RX Pow-R-Line 2X, 2XF, 2RX Pow-R-Line 3X	#12–1/0 #12–1/0 #12–1/0	#6–300 kcmil #6–300 kcmil —	— — #6–350 kcmil	(2) #4–500 kcmil (2) #4–500 kcmil (2) #4–500 kcmil	(2) #4–500 kcmil ① (2) #4–500 kcmil ① (2) #4–500 kcmil	— — (3) #4–500 kcmil	— — —
Pow-R-Command	#12–1/0	#6–300 kcmil	—	#4–500 kcmil	—	—	—
PRCE PRC100 PRC25	#12–1/0 #12–1/0 #12–1/0	#6–300 kcmil — #6–300 kcmil	— #6–350 kcmil —	(2) #4–500 kcmil (2) #4–500 kcmil (2) #4–500 kcmil	— — —	— — —	— — —

① Not applicable PRL 1XF, 1RX, PRL 2XF, 2RX.

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

Table 22.1-9. Standard Main Breaker and Branch Breaker Terminals

Breaker Type	Ampere Rating	Wire Size Ranges
BAB, QBHW, BABRSP HQP, QPHW	15–70 90–100	#14–#4 #8–1/0
PDD2xF, PDD2xG PDD2xM, PDD2xM ②	100–225	#4–4/0 or #6–300 kcmil
EGB, EGE, EGS, EGH	15–50 60–125	#14–3/0 Al/Cu #6–3/0 Al/Cu
PDG2xF, PDG2xG PDG2xM, PDG2xP ②, HFDDC ③	15–100 125–225	#14–1/0 #4–4/0
FCL	15–100	#14–1/0
GHB, HGHB, GHQ, GHQRSP	15–50 25–100	#14–1/0 #10–1/0
HJDDC ③	70–250	#4–350 kcmil
PDD3xGy	250–350 400	250–500 kcmil (2) 3/0–250 kcmil or (1) 3/0–500 kcmil
PDG3xG* PDG3xM*, PDG3xP* HKDDC ③, PDF3xG ② PDF3xM ②	225 350 400	(1) #3–350 kcmil (2) 3/0–250 kcmil or (2) 3/0–250 kcmil or (1) 3/0–500 kcmil
LHH	150–400	#2–500 kcmil (2) #2–500 kcmil or (1) 500–750 kcmil
PDG3xG*, PDG3xM*, PDG3xM*	250–400 500–600	(1) #2–500 kcmil (2) #2–500 kcmil
CLD ②	300–500	(2) 250–350 kcmil

② Suitable for DC applications only.

③ LHH is 400 A maximum.

Table 22.1-10. 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

Power Xpert Release Trip Unit for Molded Case Circuit Breakers

Description

Eaton's Power Xpert Release (PXR) trip units are programmable communicating microprocessor-based low-voltage electronic trip unit systems for Eaton molded case circuit breakers. PXR trip units are available in four models: PXR 10, PXR 20, PXR 20D and PXR 25.

Standards and Certifications

The PXR trip units are listed by Underwriters Laboratories (UL) and Canadian Standards Association (CSA) for use in Frame PD-2, PD-3, PD-4, PD-5 and PD-6 molded case circuit breakers. All PXR units have also passed the IEC 60947-2 test program that includes EMC testing. All trip units meet the low-voltage and EMC directives and carry the CE mark.

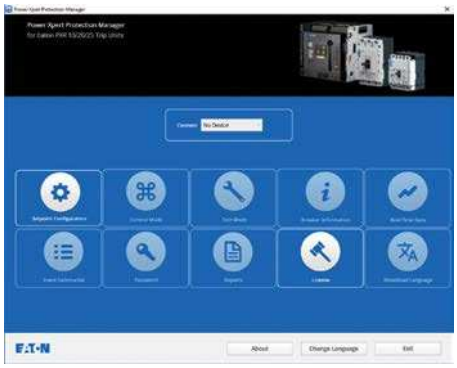
Features

The PXR electronic trip units provide an enhanced and easy-to-use interface that enables end users and maintenance engineers to more easily change set points, test and configure circuit breakers, and review energy and power information. Also, the Power Xpert Protection Manager software provides the capability of secondary injection tests and reports on-demand without the need of expensive test kits.

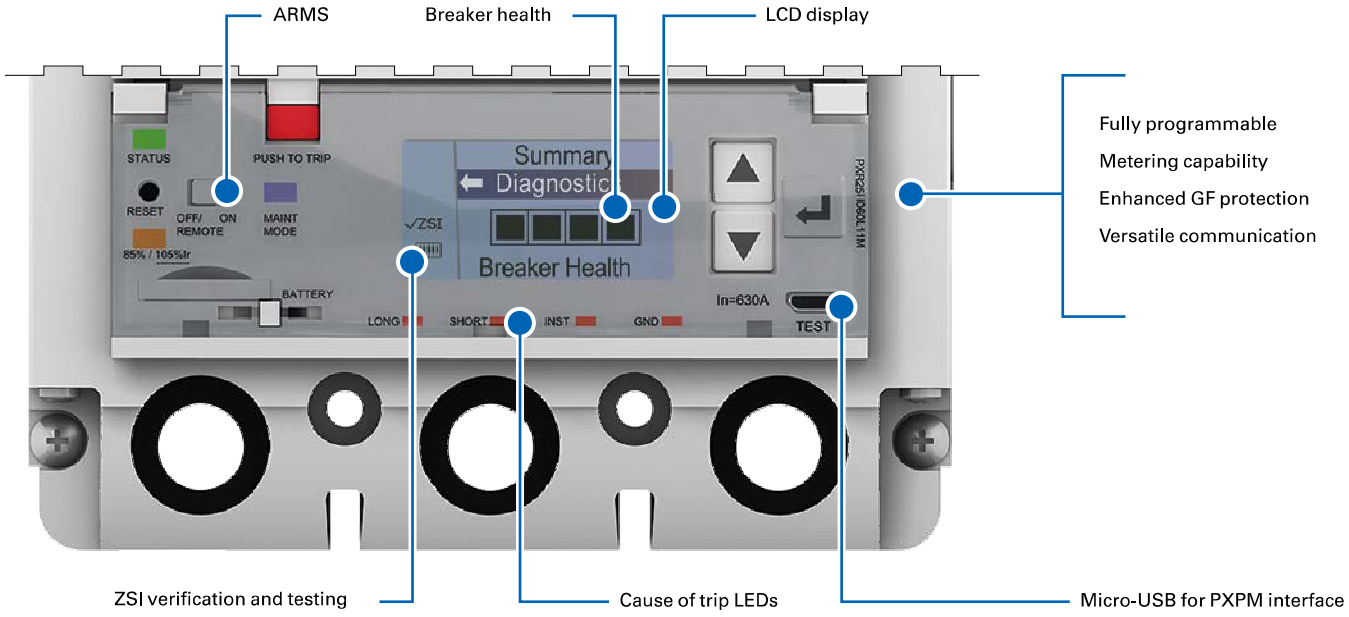
Advanced features include:

- Industry-first breaker health algorithms provide real-time monitoring and communication of breaker condition
- Cause of trip LED indication and trip event data storage
- Zone selective interlocking (ZSI) verification and testing indication
- Adjustable Arcflash Reduction Maintenance System™ (ARMS) settings
- LCD display with programmable settings

Arcflash Reduction Maintenance System (ARMS)



Power Xpert Protection Manager (PXPM) Software



PXR 25 Trip Unit Features

Table 22.1-11. Power Xpert Release (PXR) Features

Features	PXR 10	PXR 20	PXR 20D	PXR 25
Protection types	LSI	LSI/LSIG	LSI/LSIG	LSI/LSIG
Status indication	Standard	Standard	Standard	Standard
USB secondary injection testing	Standard	Standard	Standard	Standard
Programmable by USB port (PXPM)	Standard	Standard	Standard	Standard
Independent instantaneous adjustment	Standard	Standard	Standard	Standard
Adjustable L, S, I, G pickup and time		Standard	Standard	Standard
Cause of trip indication	Available through USB port (PXPM)	Standard	Standard	Standard
Load alarm indication with 2 levels		Standard	Standard	Standard
Programmable load alarm levels			Standard	Standard
Ground fault protection and alarm		Optional	Optional	Optional
Arcflash Reduction Maintenance System (ARMS) Available PD3, PD4, PD5, PD6		Optional	Optional	Optional
Zone selective interlocking (ZSI) with indication		Optional	Optional	Optional
Programmable relays		Optional	Standard	Standard
Modbus RTU communication		Optional	Standard	Standard
CAM module communication		Optional	Optional	Optional
Rotatable LCD display			Standard	Standard
Breaker health and diagnostic monitoring		Available through USB port (PXPM)	Standard	Standard
Voltage metering accurate to 0.5%				Standard
Power and energy metering accurate to 1%				Standard

Metering Devices

Power Xpert Meter 350

Power Xpert Meters 2000

IQ 100/200

Power Xpert Meter 350

The Power Xpert Meter 350 (PXM350) is a revenue grade energy meter that delivers a cost-effective solution for energy and submetering applications. This DIN rail mounted, three-phase energy meter provides high accuracy in a small form factor. The user-friendly LCD display is ideal for building energy management, energy monitoring and metering systems.

Meter features include:

- Data collection and management for energy and multi-parameters measurement
- Demand measurement and forecasting of current, active power, reactive power and apparent power
- System event logging with configurable parameter alarms
- LCD display with backlight support
- Electronic and physical sealing to prevent tampering

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 Branch Circuit Monitor

Power Xpert Branch Circuit Monitor

Eaton's Power Xpert Branch Circuit Monitor (PXBCM) provides remote access to live energy readings and facilitates data integration for data center intensive industries, facilities working to optimize server capacity and companies with a critical need to maintain uptime. By combining monitoring capabilities down to the plug level with overload alerts, which indicate when circuits are close to exceeding thresholds, the PXBCM helps minimize or prevent downtime.

For more information, visit www.eaton.com/meters.

Power Xpert Gateway

Power Xpert Gateway

Eaton's Power Xpert Gateway (PXG) bridges the IT and facilities management worlds by bringing disparate panel-boards, 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

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					■


Powering Business Worldwide

Low-voltage power distribution and control systems > Panelboards >

Pow-R-Line 4X panelboards

Contents

Powering Business Worldwide

More about this product
Eaton.com/panelboards

Complete library of design guides
Eaton.com/designguides

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.

EZTrim 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 4X Power Panels

- Pow-R-Line 4X panelboard uses circuit breakers
- 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
- Will accommodate circuit breakers to provide higher ratings in a standard chassis and increased series ratings
- UL tested and approved. Meets NEC and NEMA standards

Pow-R-Line 4DX Drawout Panelboard

- Quick changeout or addition of breakers without changing hardware
- Front connected, front accessible
- Drawout circuit breakers 20–600 A ratings
- Fixed-mounted molded case circuit breakers 15–1200 A
- Mains 400–1200 A
  - ❑ Main lugs only
  - ❑ Main molded case circuit breaker
- Single chassis supports both drawout and fixed-mounted breakers
- Mains and neutrals mounted on same end of chassis/box

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. Available main and branch breaker combinations are tabulated on **Page 22.3-24** through **Page 22.3-34**. All combinations shown are UL tested and listed.

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 22.3-1)

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.

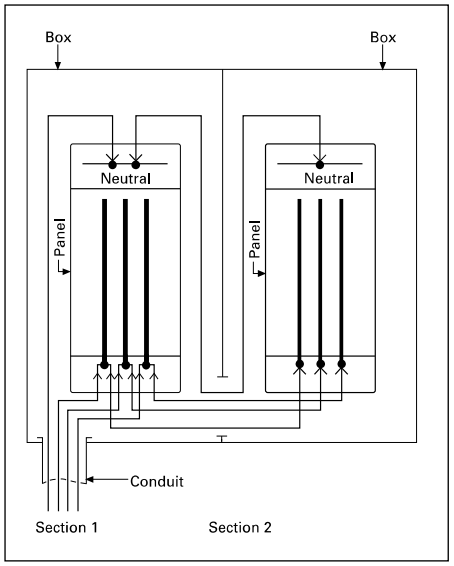


Figure 22.3-1. Sub-Feed Lugs

Through-Feed Lugs (Figure 22.3-2)

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.

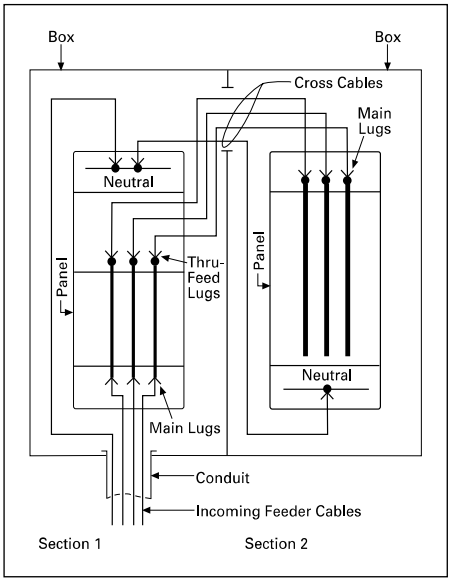


Figure 22.3-2. Through-Feed Lugs

Multiple Section Panelboard—Flush Mounted

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

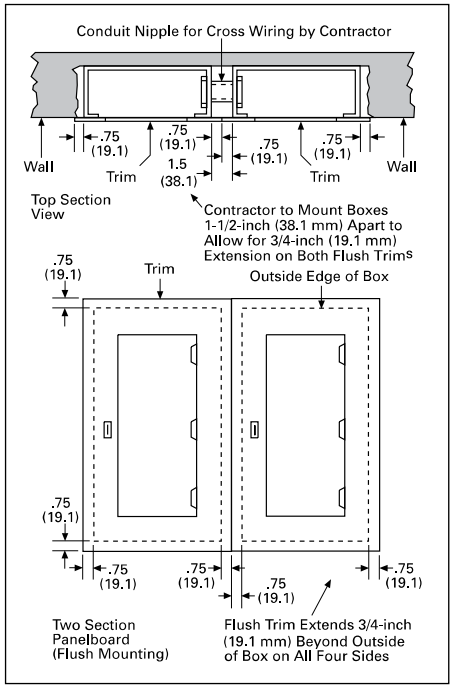


Figure 22.3-3. Multiple Section Panelboard—Flush Mounted—Dimensions in Inches (mm)

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.

Pow-R-Line 4X

PRL4X Circuit Breaker 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

Branches

- Breakers 15–1200 A, bolt-on
- Breakers 20–600 A drawout
- 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.

Main Circuit Breakers

The short-circuit rating shown is that of the main breaker only. The short-circuit rating of the assembled panelboard is the rating of the lowest fully rated main or branch device, or the rating of an approved series rated combination.

Pow-R-Line 4DX Drawout Panelboard

Type PRL4DX Drawout Molded Case Circuit Breaker Power Panelboard

General Description

- Drawout molded case circuit breaker power panelboard
- Front accessible
- Front connected
- Through-the-door design drawout mechanism
- Visual indication of breaker status and position
- Large grab handles for easy removal
- 600 Vac maximum
- 1200 A maximum mains
- 600 A maximum drawout molded case feeder breakers

Application Description

- Interrupting ratings up to 200 kAIC symmetrical
- Feeder power panelboard
- Rated as Service Entrance Equipment when appropriately equipped
- Ideal for:
  - Data centers
  - Industrial facilities
  - Process equipment manufacturing
  - Anywhere that requires quick change of feeder devices is needed

Benefits

- Ease of maintenance
- Faster to remove and install
- Less downtime

Standards and Certifications

- UL 67 Listed chassis
- UL 50 Listed box and trim

Circuit Breaker Technical Data

Table 22.3-1. Electrical Characteristics of Circuit Breakers

Circuit Breaker Ratings				UL Listed Interrupting Ratings (kA rms Symmetrical)						
Type	Ampere Rating	Number of Poles	Volts AC	AC Rating, Volts					DC Rating, Volts ①	
				120/240	240	277	480	600	125	250
BAB, HQP	15–70 15–100	1 2	120 120/240	10 10	— —	— —	— —	— —	— —	— —
BAB-H, HQP-H	15–100	2, 3	240	—	10	—	—	—	—	—
BABRP, BABRSP	15–30 15–30	1 2	120 120/240	10 10	— —	— —	— —	— —	— —	— —
QBGF, QPGF, QPGFEP QBGFEP	15–50 15–50	1 2	120 120/240	10 10	— —	— —	— —	— —	— —	— —
QBAF, QBAG	15–20 15–20	1 2	120 120/240	10 10	— —	— —	— —	— —	— —	— —
QBHW, QPHW	15–70 15–100	1 2	120 120/240	22 22	— —	— —	— —	— —	— —	— —
QBHW-H, QPHW-H	15–100	2, 3	240	—	22	—	—	—	—	—
QBHGF, QPHGF, QPHGFEP QBHGFEP	15–30 15–30	1 2	120 120/240	22 22	— —	— —	— —	— —	— —	— —
QBHAF, QBHAG	15–20 15–20	1 2	120 120/240	22 22	— —	— —	— —	— —	— —	— —
GHB	15–100 ② 15–100	1 2, 3	277 480Y/277	65 —	— 65	14 —	— 14 ③	— —	14 —	— 14
GHQ	15–30	1, 2	277	65	—	14	—	—	—	—
HGHB	15–30	1	277	65	—	25	—	—	—	—
GHBGFEP	15–60	1	277	—	—	14	—	—	—	—
GHQRSP	15–100 15–100	1 2	277 480Y/277	65 —	— 65	14 14	— 14 ③	— —	— —	— —
GHBS	15–30 15–30	1 2	277 480Y/277	65 —	— 65	14 14	— 14 ③	— —	— —	— —
EGB	15–125 15–125	1 2, 3	277 480	35 —	35 35	18 —	— 18	— —	10 —	— 10
EGS	15–125 15–125	1 2, 3	277 480	100 —	— 100	35 —	— 35	— —	35 —	— 35
EGH	15–125 15–125	1 2, 3	277 480	200 —	— 200	65 —	— 65	— —	42 —	— 42
PDG2xF	15–100 15–100	1 2, 3	277 480	— —	— 18	14 —	— 14	— —	10 —	— 10
PDG2xG, PDG3xG*	15–150 15–225	1 2, 3	277 600	— —	— 65	35 —	— 35	— 18	10 —	— 10
PDD2xF PDD2xG PDD3xGY	100–225 100–225 250–400	2, 3 2, 3 2, 3	240 240 240	— — —	22 65 65	— — —	— — —	— — —	10 10 —	— — 10
PDG3xG* ④, PDF3xG ⑤ LHH ⑥ NHH PDG3xG* CLD ④⑤ PDG4xG ④, PDF4xG ④⑤ CND ④⑤	100–400 150–400 150–350 250–600 300–600 300–800 400–1200	2, 3 2, 3 3 3 2, 3 2, 3 2, 3	600 480 600 600 600 600 600	— — — — — — —	65 100 100 65 65 65 65	— — — — — — —	35 65 65 35 35 50 50	25 35 35 18 25 25 25	— — — — — — —	10 42 — 22 22 ⑥ 22 —
CNGC CNGH CNGS PDG5xP PDG5xM NGS	800, 1200 800, 1200 800, 1200 800, 1200 800, 1200 800, 1200	— — — — — —	— — — — — —	— — — — — —	200 100 85 200 100 85	— — — — — —	100 65 50 100 65 50	65 35 25 65 35 25	— — — — — —	— — — — — —

① DC ratings apply to substantially non-inductive circuits.
② DC rated single-pole, 15–70 A only.
③ Rating 480Y/277 Vac maximum.
④ Available with integral ground fault protection.
⑤ 100% rated breaker.
⑥ DC rating not available with PXR trip units.

Table 22.3-1. Electrical Characteristics of Circuit Breakers (Continued)

Circuit Breaker Ratings					UL Listed Interrupting Ratings (kA rms Symmetrical)							
Type	Ampere Rating	Number of Poles	Voltage		AC Rating, Volts					DC Rating, Volts ①		
			AC	DC	120/240	240	277	480	600	125	250	600
High Interrupting Capacity Circuit Breakers												
PDG2xM	15–150 15–225	1 2, 3	277 600	— —	— —	— 100	65 —	— 65	— 25	10 —	— 22	— —
PDD2xM PDG3xM* ②, PDF3xM ③	100–225 100–400	2, 3 2, 3	240 600	— —	— —	100 100	— —	— 65	— 35	10 —	— 22	— —
PDG4xM ②, PDF4xM ②③, PDG5xM ②	300–800 400–1200	2, 3 2, 3	600 600	— —	— —	100 100	— —	65 65	35 35	— —	25 —	— —
Current Limiting Circuit Breakers												
PDG2xP PDD2xM	15–225 100–225	2, 3 2, 3	600 240	— —	— —	200 200	— —	100 —	35 —	— 10	22 —	— —
PDG3xP* ② PDG3xM* ④ PDG5xP ②	100–400 250–600 400–1200	2, 3 2, 3 2, 3	600 600 600	— — —	— — —	200 200 200	— — —	100 100 100	65 50 65	— — —	22 42 —	— — —
Current Limit-R® Circuit Breakers												
FCL LCL ②	15–100 125–400	2, 3 2, 3	480 480	— —	— —	200 200	— —	150 200	— —	— —	— —	— —
TRI-PAC® Current Limiting Circuit Breakers												
FB-P LA-P NB-P	15–100 70–400 300–800	2, 3 2, 3 2, 3	600 600 600	— — —	— — —	200 200 200	— — —	200 200 200	200 200 200	— — —	⑥ ⑥ ⑥	— — —
Direct Current (DC) Rated Breakers												
HFDDC ⑤⑥ HJDDC ⑤⑦ HKDDC ⑤⑦	15–150 70–250 100–400	2, 3 2, 3 2, 3	— — —	600 600 600	— — —	— — —	— — —	— — —	— — —	42 42 42	42 42 42	35 35 35
HLDDC ⑤⑦ HMDLDC ⑤⑦ NBDC ⑤⑦	300–600 300–800 700–1200	2, 3 2, 3 2, 3	— — —	600 600 600	— — —	— — —	— — —	— — —	— — —	42 42 42	42 42 42	35 35 35

① DC ratings apply to substantially non-inductive circuits.
② Available with integral ground fault protection.
③ 100k based on NEMA test procedure.
④ DC rating not available with PXR trip units.
⑤ For use on DC systems only.
⑥ Non-interrupting trip type.
⑦ Interrupting trip type.

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 22.3-2. 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 4X	—	—	#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 22.3-3. Standard Main Breaker and Branch Breaker Terminals

Breaker Type	Ampere Rating	Wire Size Ranges
BAB, QBHW, BABRSP HQP, QPHW	15–70 90–100	#14–#4 #8–1/0
PDD2xF, PDD2xG PDD2xM, PDD2xM ①	100–225	#4–4/0 or #6–300 kcmil
EGB, EGE, EGS, EGH	15–50 60–125	#14–3/0 Al/Cu #6–3/0 Al/Cu
PDG2xF, PDG2xG PDG2xM, PDG2xP ①, HFDDC ②	15–100 125–225	#14–1/0 #4–4/0
FCL	15–100	#14–1/0
GHB, HGHB, GHQ, GHQRSP	15–50 25–100	#14–1/0 #10–1/0
HJDDC ②	70–250	#4–350 kcmil
PDD3xGy	250–350 400	250–500 kcmil (2) 3/0–250 kcmil or (1) 3/0–500 kcmil
PDG3xG* PDG3xM*, PDG3xP* HKDDC ②, PDF3xG ① PDF3xM ①	225 350 400	(1) #3–350 kcmil (2) 3/0–250 kcmil or (2) 3/0–250 kcmil or (1) 3/0–500 kcmil
LHH	150–400	#2–500 kcmil (2) #2–500 kcmil or (1) 500–750 kcmil
PDG3xG*, PDG3xM*, PDG3xM*	250–400 500–600	(1) #2–500 kcmil (2) #2–500 kcmil
CLD ①	300–500	(2) 250–350 kcmil
PDG4xG, PDG4xM, HMDLDC ① PDF4xG, PDF4xM	400–600 700–800	(2) #1–500 kcmil (3) 3/0–400 kcmil
PDG5xM, CND PDG5xP, CLD ①	800–1000 1200	(3) 3/0–400 kcmil (4) 4/0–500 kcmil
NGS, PDG5xM, PDG5xP CNGS, CNGH, CNGC	400–1200	(4) 4/0–500 kcmil or (3) 500–750 kcmil

① Suitable for DC applications only.
② LHH is 400 A maximum.

Table 22.3-4. 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

Power Xpert Release Trip Unit for Molded Case Circuit Breakers

Description

Eaton's Power Xpert Release (PXR) trip units are programmable communicating microprocessor-based low-voltage electronic trip unit systems for Eaton molded case circuit breakers. PXR trip units are available in four models: PXR 10, PXR 20, PXR 20D and PXR 25.

Standards and Certifications

The PXR trip units are listed by Underwriters Laboratories (UL) and Canadian Standards Association (CSA) for use in Frame PD-2, PD-3, PD-4, PD-5 and PD-6 molded case circuit breakers. All PXR units have also passed the IEC 60947-2 test program that includes EMC testing. All trip units meet the low-voltage and EMC directives and carry the CE mark.

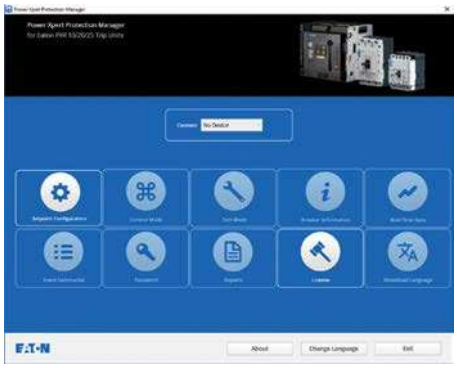
Features

The PXR electronic trip units provide an enhanced and easy-to-use interface that enables end users and maintenance engineers to more easily change set points, test and configure circuit breakers, and review energy and power information. Also, the Power Xpert Protection Manager software provides the capability of secondary injection tests and reports on-demand without the need of expensive test kits.

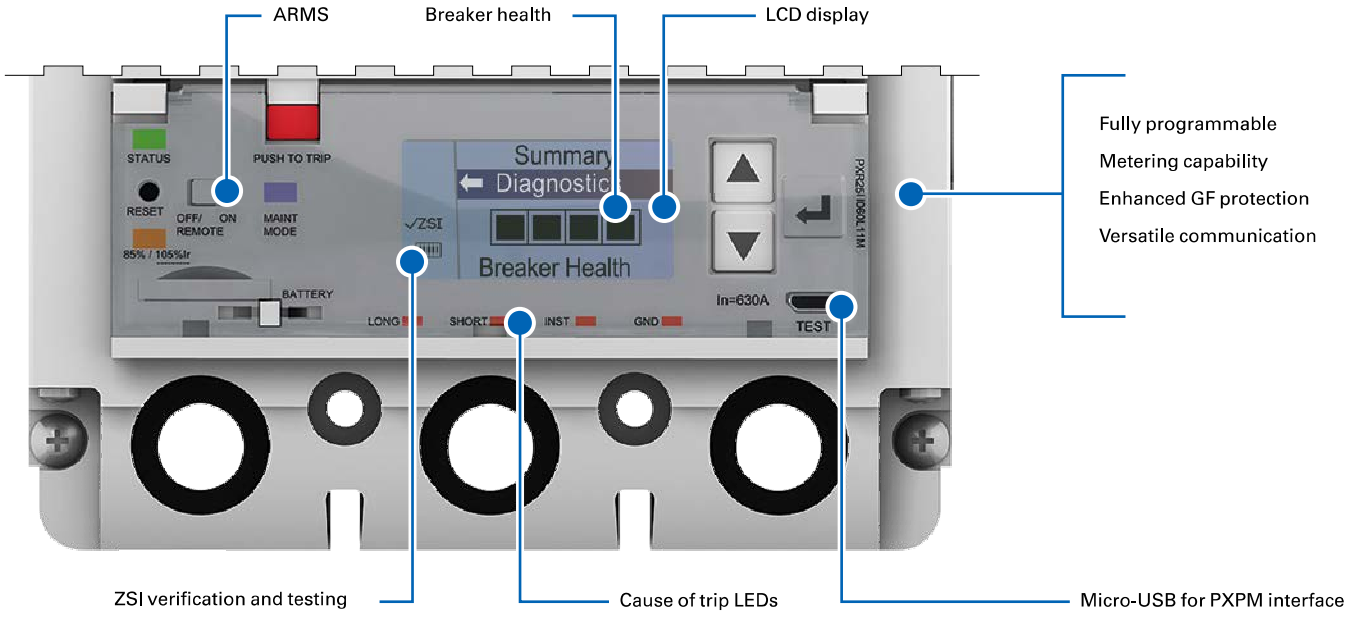
Advanced features include:

- Industry-first breaker health algorithms provide real-time monitoring and communication of breaker condition
- Cause of trip LED indication and trip event data storage
- Zone selective interlocking (ZSI) verification and testing indication
- Adjustable Arcflash Reduction Maintenance System™ (ARMS) settings
- LCD display with programmable settings

Arcflash Reduction Maintenance System (ARMS)



Power Xpert Protection Manager (PXPM) Software



PXR 25 Trip Unit Features

Table 22.3-5. Power Xpert Release (PXR) Features

Features	PXR 10	PXR 20	PXR 20D	PXR 25
Protection types	LSI	LSI/LSIG	LSI/LSIG	LSI/LSIG
Status indication	Standard	Standard	Standard	Standard
USB secondary injection testing	Standard	Standard	Standard	Standard
Programmable by USB port (PXPM)	Standard	Standard	Standard	Standard
Independent instantaneous adjustment	Standard	Standard	Standard	Standard
Adjustable L, S, I, G pickup and time		Standard	Standard	Standard
Cause of trip indication	Available through USB port (PXPM)	Standard	Standard	Standard
Load alarm indication with 2 levels		Standard	Standard	Standard
Programmable load alarm levels			Standard	Standard
Ground fault protection and alarm		Optional	Optional	Optional
Arcflash Reduction Maintenance System (ARMS) Available PD3, PD4, PD5, PD6		Optional	Optional	Optional
Zone selective interlocking (ZSI) with indication		Optional	Optional	Optional
Programmable relays		Optional	Standard	Standard
Modbus RTU communication		Optional	Standard	Standard
CAM module communication		Optional	Optional	Optional
Rotatable LCD display			Standard	Standard
Breaker health and diagnostic monitoring		Available through USB port (PXPM)	Standard	Standard
Voltage metering accurate to 0.5%				Standard
Power and energy metering accurate to 1%				Standard

Metering Devices

Power Xpert Meter 1000

Power Xpert Meters 2000

IQ 100/200

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 Multi-Point Meter

Power Xpert Gateway

Integrated Surge Protective Devices

Power Xpert Multi-Point Meter

Eaton Power Xpert Multi-Point meter (PXMP) helps facility managers track and accurately allocate energy usage among tenants or departments in office buildings, shopping malls, industrial sites, universities and campuses, and apartment and condominium complexes. Power Xpert Multi-Point Meters monitor, quantify and help benchmark energy usage.

Key features include:

- Meets rigid ANSI C12.20 and IEC 62053-22 accuracy specifications for revenue meters
- Quick connect terminals for current sensors, Modbus communication and bus voltages
- Monitors power and energy for up to 60 current sensors; scalable from 6 to 60 circuits
- 256 MB of standard memory for up to two years of 15-minute interval data
- Extensive LEDs for verification of sensor connections, communication status and equipment status
- Automatically detects rating of each current sensor; current sensors are self-protecting in the event of an open circuit condition under load for added safety and reliability

For more information, visit www.eaton.com/meters.

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					■


Powering Business Worldwide

Technical Data **TD01005006E** Effective August 2009

Eaton's SPD Series for integration into electrical distribution equipment

Contents

Powering Business Worldwide

Introduction

Eaton's SPD Series surge protective devices

Eaton's SPD Series surge protective devices are the latest and most advanced UL® 1449 3rd Edition certified surge protectors. Units are available integrated within Eaton electrical assemblies, including panelboards, switchboards, motor control centers, switchgear, and bus plugs. Side-mount versions of the SPD Series are also available for installation external to an electrical assembly. Application of SPD Series units throughout a facility will ensure that equipment is protected with the safest and most reliable surge protective devices available.

SPD Series units are available in all common voltages and configurations and also in a variety of surge current capacity ratings from 50 through 400 kA. Three feature package options are also available to choose from. The breadth of the SPD Series' features, options, and configurations ensures that the correct unit is available for all electrical applications, including service entrances, distribution switchboards, panelboards, and point-of-use applications.

Applications

The SPD Series is available as an integrated device within the following Eaton electrical assemblies:

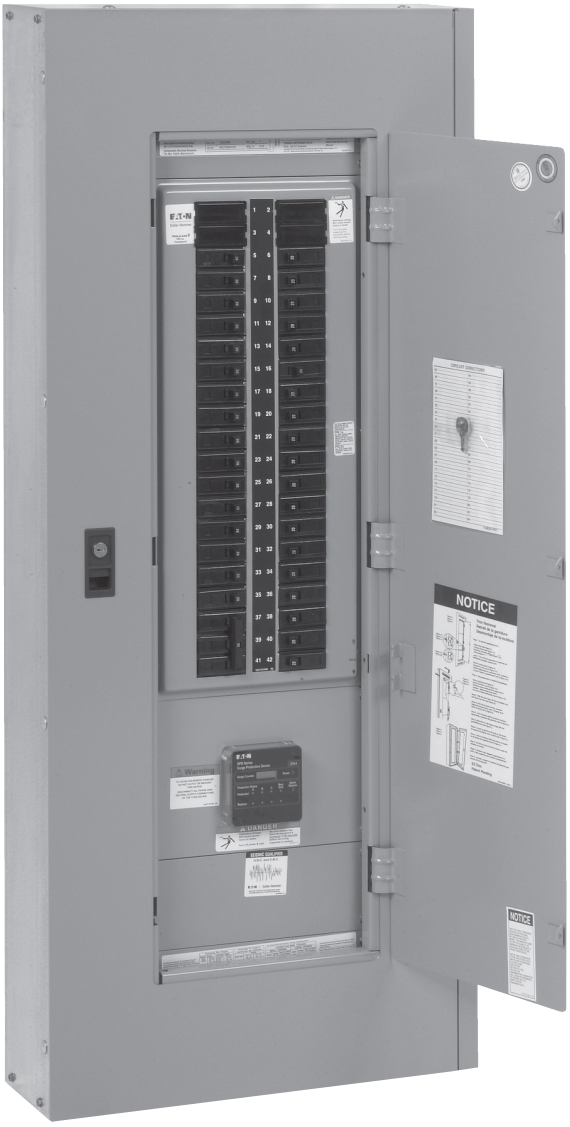
- Panelboards
- Switchboards
- Motor control centers
- Switchgear
- Automatic transfer switches
- Bus plugs

Features

- Uses thermally protected metal oxide varistor (MOV) technology
- 20 kA nominal discharge current (I_n) rating (maximum rating assigned by UL)
- 50 through 400 kA surge current capacity ratings
- Three feature package options
- 200 kA short circuit current rating (SCCR)
- 10-year warranty

Standards and certifications

- UL 1449 3rd Edition recognized component for the United States and Canada, covered by Underwriters Laboratories certification and follow-up service



SPD Series Unit Integrated Within an Eaton Panelboard

Feature package options

The SPD Series provides users with the option of selecting between three feature packages. These feature packages are the basic, standard, and standard with surge counter. The proper feature package can be selected based on the requirements of the application or specification.

Table 1. Feature Package Comparison

Feature	Basic	Standard	Standard with Surge Counter
Surge protection using thermally protected MOV technology	✔	✔	✔
Dual-colored protection status indicators for each phase	✔	✔	✔
Dual-colored protection status indicators for the neutral-ground protection mode	✔	✔	✔
Audible alarm with silence button		✔	✔
Form C relay contact		✔	✔
EMI/RFI filtering, providing up to 50 dB of noise attenuation from 10 kHz to 100 MHz		✔	✔
Surge counter with reset button			✔

Remote display mounting option

The SPD Series offers the option of mounting its display remotely from the device. This is useful for applications where OEMs or other integrators would like to embed the unit within a piece of equipment and still be able to view its display.

SPD Series unit catalog numbers ending with 'B' (refer to catalog number configuration on **Page 7**) should be ordered for applications where the display is to be mounted remotely. These units include the SPD Series unit and the remote display panel.

In addition to the unit itself, a remote display cable will have to be purchased. Remote display cables are available in 4, 8, and 12 foot lengths.

Table 2. Remote Display Cables

Description	Catalog Number
4 ft remote display cable	**SPDRDCAB04**
8 ft remote display cable	**SPDRDCAB08**
12 ft remote display cable	**SPDRDCAB12**

Note: Integrated units factory-installed with Eaton switchgear assemblies do not require the purchase of a remote display cable. The cable is provided and all required mounting is performed at the factory.

Existing SPD Series units previously installed without a remote display also have the capability of mounting their displays remotely from the device. Complete remote display kits are available that contain all items required to mount the display remotely, including the remote display cable. Remote display kits are available in 4, 8, and 12 foot cable length options.

Table 3. Remote Display Kits

Description	Catalog Number
Remote display kit with 4 ft remote display cable	**SPDRDKIT04**
Remote display kit with 8 ft remote display cable	**SPDRDKIT08**
Remote display kit with 12 ft remote display cable	**SPDRDKIT12**

For the dimensions of the cutout required to accommodate the remote display panel, see **Figure 1** below.

Dimensions

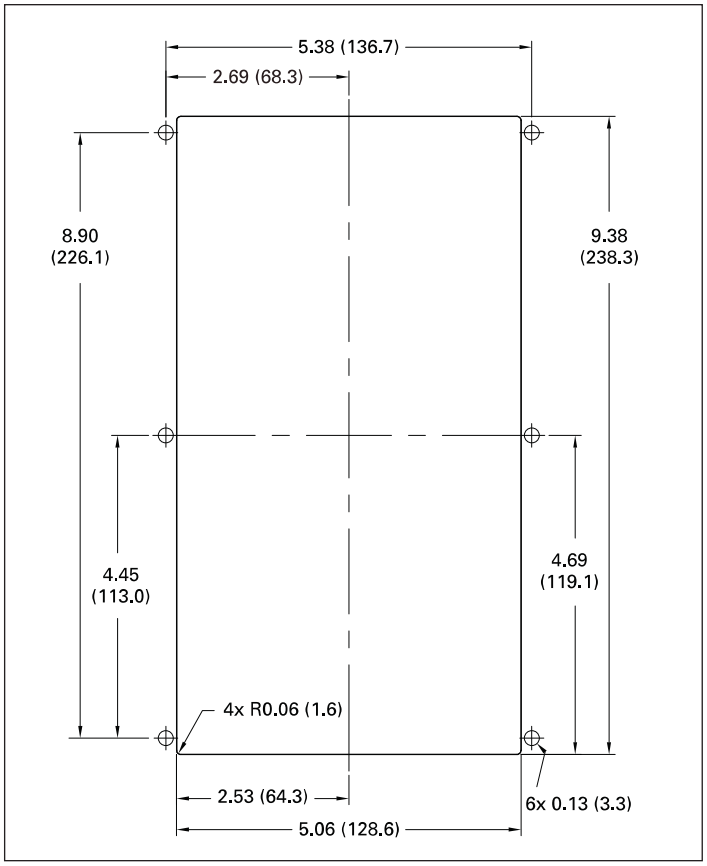


Figure 1. Dimensions of the Cutout Required to Accommodate the Optional Remote Display Panel

Dimensions (continued)

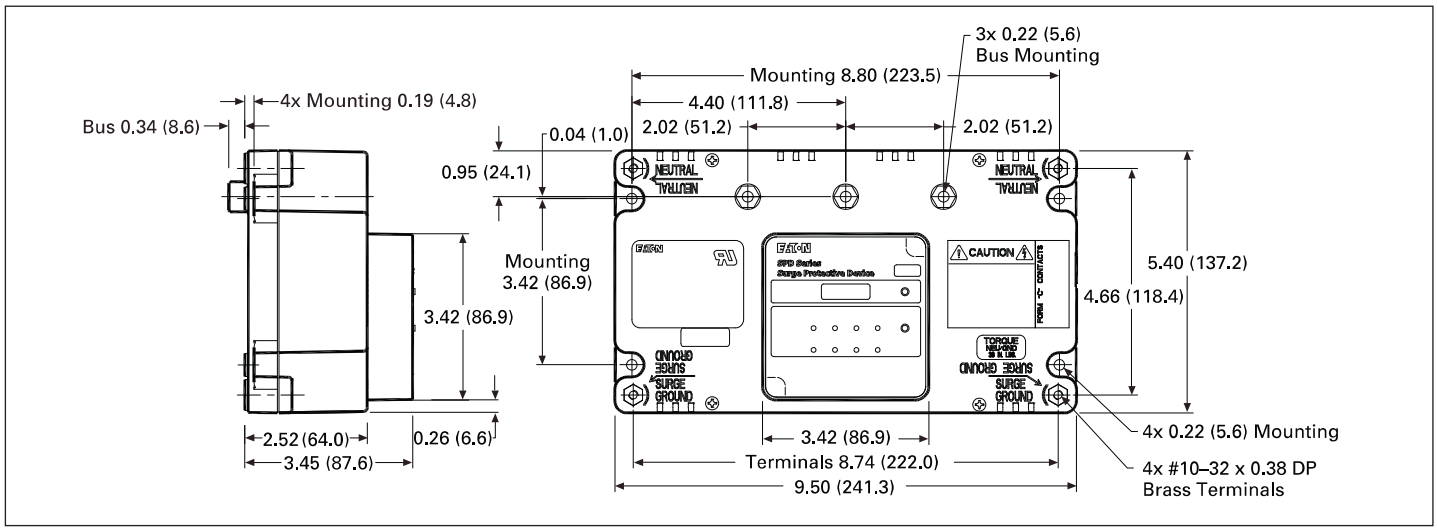


Figure 2. Dimensions of 50 through 200 kA Integrated Units

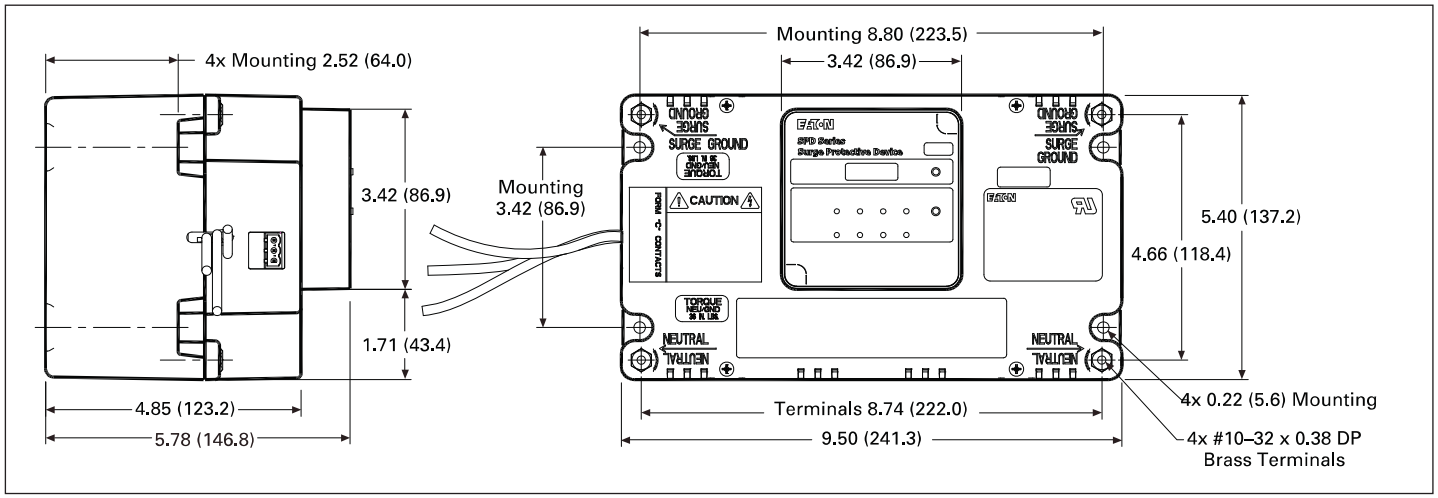


Figure 3. Dimensions of 250 through 400 kA Integrated Units

Performance data

ANSI/UL 1449 3rd Edition voltage protection ratings

Voltage protection rating (VPR) data is included for both direct bus mounted units (catalog number ending with 'A') and units interfaced to the electrical assembly via a circuit breaker (catalog number ending with 'B,' 'C,' or 'J'). Direct bus mounted units are available for installation within Eaton PRL1a, 2a, 3a, and 3E panelboards only.

Table 4. 50 kA Direct Bus Mounted Integrated Unit VPR

	Protection Mode			
Voltage Code	**L-N**	**L-G**	**N-G**	**L-L**
240S	500	1000	500	1000
208Y and 220Y	500	1000	500	1000
400Y and 480Y	1000	2000	1000	2000
600Y	1200	2500	1200	2500
240D	N/A	1000	N/A	900
480D	N/A	2000	N/A	2000
600D	N/A	2500	N/A	2500
240H	500	1000	500	1000

Table 5. 80–100 kA Direct Bus Mounted Integrated Unit VPR

	Protection Mode			
Voltage Code	**L-N**	**L-G**	**N-G**	**L-L**
240S	500	600	500	900
208Y and 220Y	500	600	500	900
400Y and 480Y	1000	1200	1000	1800
600Y	1200	1500	1200	2500
240D	N/A	1000	N/A	900
480D	N/A	1800	N/A	1800
600D	N/A	2500	N/A	2500
240H	500	600	500	900

Table 6. 120–200 kA Direct Bus Mounted Integrated Unit VPR

	Protection Mode			
Voltage Code	**L-N**	**L-G**	**N-G**	**L-L**
240S	500	600	500	800
208Y and 220Y	500	600	500	800
400Y and 480Y	900	1000	900	1800
600Y	1200	1200	1200	2500
240D	N/A	900	N/A	900
480D	N/A	1800	N/A	1800
600D	N/A	2500	N/A	2500
240H	500	600	500	800

Table 7. 250–300 kA Circuit Breaker Interfaced Integrated Unit VPR

	Protection Mode			
Voltage Code	**L-N**	**L-G**	**N-G**	**L-L**
240S	600①	700	600	1000
208Y and 220Y	600①	700	600	1000
400Y and 480Y	1000	1200	900	1800
600Y	1500	1500	1200	2500
240D	N/A	1000	N/A	1000
480D	N/A	1800	N/A	1800
600D	N/A	2500	N/A	2500
240H	600①	700	600	1000

① L-N VPR for 250–300 kA units containing the standard and standard with surge counter feature packages is 600V. L-N VPR for units containing the basic feature package is 700V. All other VPR numbers reported in all tables represent the VPR for all feature packages.

Table 8. 50 kA Circuit Breaker Interfaced Integrated Unit VPR

	Protection Mode			
Voltage Code	**L-N**	**L-G**	**N-G**	**L-L**
240S	700	1200	700	1200
208Y and 220Y	700	1200	700	1200
400Y and 480Y	1200	2000	1200	2000
600Y	1500	2500	1500	2500
240D	N/A	1200	N/A	1200
480D	N/A	2000	N/A	2000
600D	N/A	2500	N/A	2500
240H	700	1200	700	1200

Table 9. 80–100 kA Circuit Breaker Interfaced Integrated Unit VPR

	Protection Mode			
Voltage Code	**L-N**	**L-G**	**N-G**	**L-L**
240S	700	700	700	1000
208Y and 220Y	700	700	700	1000
400Y and 480Y	1200	1200	1200	1800
600Y	1500	1500	1500	2500
240D	N/A	1200	N/A	1200
480D	N/A	2000	N/A	2000
600D	N/A	2500	N/A	2500
240H	700	700	700	1000

Table 10. 120–200 kA Circuit Breaker Interfaced Integrated Unit VPR

	Protection Mode			
Voltage Code	**L-N**	**L-G**	**N-G**	**L-L**
240S	700	700	600	1000
208Y and 220Y	700	700	600	1000
400Y and 480Y	1000	1200	1000	1800
600Y	1500	1500	1200	2500
240D	N/A	1000	N/A	1000
480D	N/A	2000	N/A	1800
600D	N/A	2500	N/A	2500
240H	700	700	600	1000

Table 11. 400 kA Circuit Breaker Interfaced Integrated Unit VPR

	Protection Mode			
Voltage Code	**L-N**	**L-G**	**N-G**	**L-L**
240S	700	700	600	1000
208Y and 220Y	700	700	600	1000
400Y and 480Y	1000	1200	900	1800
600Y	1500	1500	1200	2500
240D	N/A	1000	N/A	1000
480D	N/A	1800	N/A	1800
600D	N/A	2500	N/A	2500
240H	700	700	600	1000

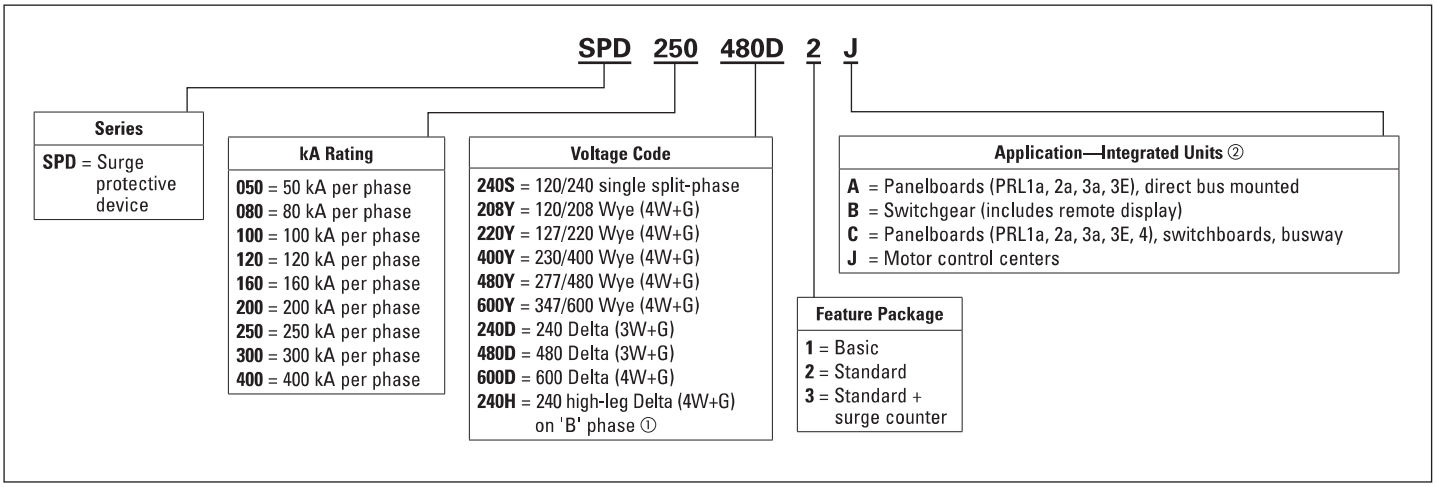
Specifications

Table 12. SPD Series Specifications

Description	Specification
Surge capacity ratings available	50, 80, 100, 120, 160, 200, 250, 300, 400 kA per phase
Nominal discharge current (I_n)	20 kA
Short circuit current rating (SCCR)	200 kA
SPD type	Basic feature package = Type 1 (can also be used in Type 2 applications) Standard and Standard with Surge Counter feature packages = Type 2
Single split phase voltages available	120/240
Three-phase Wye system voltages available	120/208, 127/220, 230/400, 277/480, 347/600
Three-phase Delta system voltages available	240, 480, 600
Input power frequency	50/60 Hz
Power consumption (basic units): 208Y, 220Y, 240S, 240D, and 240H voltage codes 400Y, 480Y, and 480D voltage codes 600Y and 600D voltage codes	 0.5W 1.1W 1.3W
Power consumption (standard and standard with surge counter units): 208Y, 220Y, 240S, 240D, and 240H voltage codes 400Y, 480Y, and 480D basic voltage codes 600Y and 600D voltage codes	 0.6W 1.7W 2.1W
Protection modes	Single split phase . . . . . L-N, L-G, N-G, L-L Three-phase Wye . . . . . L-N, L-G, N-G, L-L Three-phase Delta . . . . . L-G, L-L Three-phase high-leg Delta . . . L-N, L-G, N-G, L-L
Maximum continuous operating voltage (MCOV): 240S, 208Y, 220Y, and 240H MCOV 400Y and 480Y MCOV 600Y MCOV 240D MCOV 480D MCOV 600D MCOV	 150 L-N, 150 L-G, 150 N-G, 300 L-L 320 L-N, 320 L-G, 320 N-G, 640 L-L 420 L-N, 420 L-G, 420 N-G, 840 L-L 320 L-G, 320 L-L 640 L-G, 640 L-L 840 L-G, 840 L-L
Ports	1
Operating temperature	–4°F through 122°F (–20°C through 50°C)
Operating humidity	5% through 95%, noncondensing
Operating altitude	Up to 16,000 ft (5000m)
Seismic withstand capability	Meets or exceeds the requirements specified in IBC® 2006, CBC 2007, and UBC® Zone 4
Weight	50–200 kA units approximately 3.5 lbs (1.6 kg) 250–400 kA units approximately 7.0 lbs (3.2 kg)
Form C relay contact ratings	150 Vdc or 125 Vac, 1A maximum
Form C relay contact logic	Power ON, normal state—NO contact = open, NC contact = closed Power OFF or fault state—NO contact = closed, NC contact = open
EMI/RFI filtering attenuation	Up to 50 dB from 10 kHz to 100 MHz
Agency certifications and approvals	UL 1449 3rd Edition recognized component for the U.S. and Canada UL 1283 (Type 2 SPDs only)
Warranty	10 years

Catalog number selection

Table 13. SPD Series Catalog Number Configuration for Units Integrated into Electrical Distribution Equipment



Example: SPD250480D2J = SPD Series, 250 kA per phase, 480D voltage, standard feature package, motor control center application

① Please consult the factory for 240 high-leg Delta (4W+G) applications with high leg on 'C' phase.

② Units used in PRL1a, 2a, 3a, and 3E panelboard applications are available in 50–200 kA ratings only. Use the 'C' option for PRL1a, 2a, 3a, and 3E panelboard applications when unit is connected through a circuit breaker.

Technical support information

If you have any questions or need additional information, please contact the Eaton Technical Resource Center at 800-809-2772, option 4, option 2. You may also submit inquiries via e-mail: surgeprotection@eaton.com.

Eaton's SPD Series for integration into electrical distribution equipment

Eaton Corporation
Electrical Sector
1111 Superior Ave.
Cleveland, OH 44114
United States
877-ETN-CARE (877-386-2273)
Eaton.com

Printed in USA
Publication No. TD01005006E / Z8902
August 2009

Powering Business Worldwide

PowerChain Management®

Powering Business Worldwide

Dry Type Transformers

Drawings

Dry-Type Transformers General Information

- Standard Transformer Catalog Number: V48M28T4916CU
- Transformer Type: General Purpose Vented
- Phase: 3
- kVA: 150
- Primary Volts: 480
- Secondary Volts: 208Y/120
- Temperature Rise: 150C with 220C Insulation System
- Winding Material: Copper
- Enclosure Type: NEMA 2 (for N3R, select Weather Shield in Mods tab)
- Frequency (Hz): 60
- Frame: 943
- Wiring Diagram: 280B
- Weight (lbs.): 1372
- Impedance (%): 3.39
- UL Listed: Y
- Max Practical Inrush (Amps): 597
- X/R: 1.77
- No Load Losses (Watts): 360
- Total Losses (Watts): 2809

Standard Values

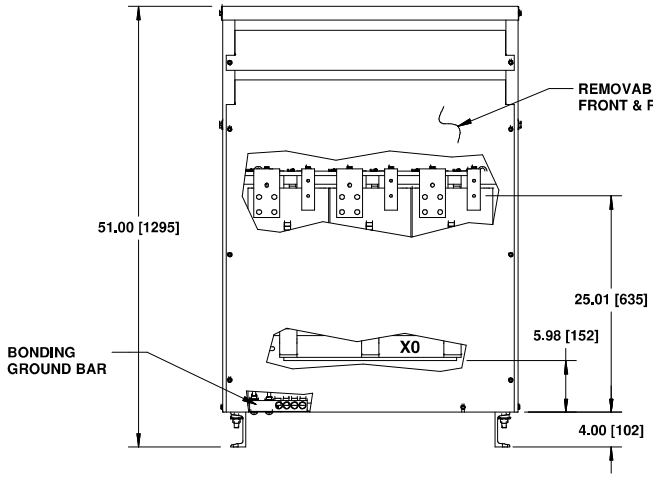
- K-Factor: 1
- TAPS: 2@+2.5%, 4@-2.5%
- Sound Reduction (dB): 0
- NEMA ST20 Sound Level (dB): 50
- DOE 10 CFR Part 431 (2016) Efficient: Y
- Infrared Viewing Window: None

Field-Installed Accessories Included

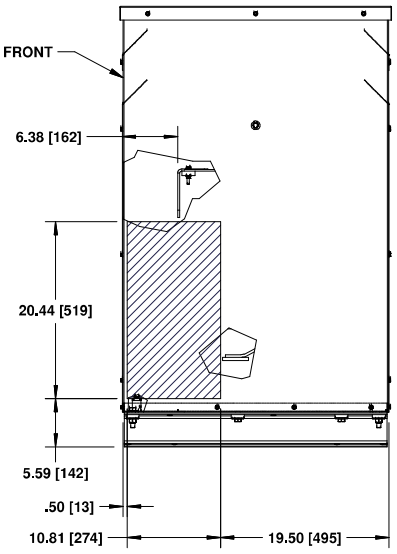
- Lug Kit: Not Included

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	Eaton			
APPROVED BY	DATE	JOB NAME: Dutchess Stadium			
		DESIGNATION: T1A			
VERSION: 1.0.0.4		TYPE: Dry-Type Transformer		DRAWING TYPE: Customer Appr.	
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0	DWG SIZE: A	G.O.	ITEM	SHEET: 1 of 1

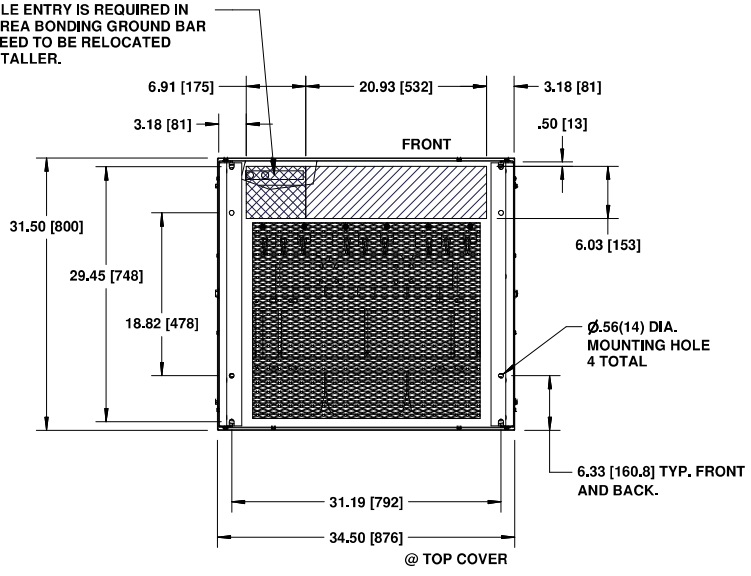
NOTE:
1. ALL UNITS ARE DESIGNED IN ACCORDANCE WITH APPLICABLE NEMA, UL, ANSI, AND IEEE STANDARDS.
2. DRY-TYPE VENTILATED, CLASS AA, NEMA TYPE 2 ENCLOSURE.
3. FOR NEMA 3R OUTDOOR APPLICATION, USE WEATHERSHIELD # WS60.
4. TRANSFORMERS ARE FLOOR-MOUNTED. USE WALL-MOUNT BRACKET WMB04 FOR WALL-MOUNTING.
5. 220°C CLASS INSULATION SYSTEM.
6. PAINT COLOR IS ANSI #61.
7. ALUMINUM UNITS HAVE ALUMINUM WINDINGS AND TERMINATIONS. COPPER UNITS HAVE COPPER WINDINGS AND TERMINATIONS.
8. TRANSFORMER CAN BE INSTALLED AT A MIN. DISTANCE TO BACK AND SIDE WALLS OF 2 INCHES AND TO A 6 INCHES MIN. DISTANCE TO BACK WALLS WHEN WEATHERSHIELDS ARE NEEDED. WALLMOUNT BRACKETS CANNOT BE USED IN COMBINATION WITH WEATHERSHIELDS.
9. DIMENSIONS IN INCHES(mm).



FRONT VIEW



SIDE VIEW



BOTTOM VIEW

USE 20.44[519] x 10.81[275] BOTH SIDES, AND (20.93[532]+6.91[176]) x 6.03[153] ON BOTTOM AS RECOMMENDED CABLE ENTRY LOCATIONS.

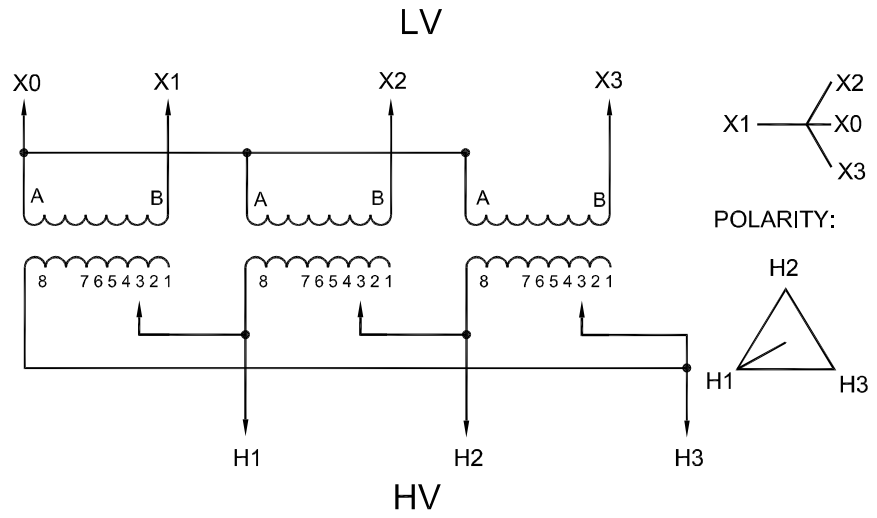
PRODUCT CODE: ·		FEDERAL ID NO.·		
6	CO-0204443 ·	J.C.S.	J.C.S.	31/03/2021
5	ECO-164756 ·	J.C.S.	C.B.	08/05/2019
4	ECO-133517 ·	J.G.	C.B.	14/01/2018
REV	DESCRIPTION	DFTR	APPD	DATE

REVISIONS

DFTR S.B.	DATE 29/10/2015	THE INFORMATION ON THIS DOCUMENT WAS CREATED BY EATON CORPORATION. IT WAS DISCLOSED IN CONFIDENCE AND IS ONLY TO BE USED FOR THE PURPOSE IN WHICH IT WAS SUPPLIED.	EATON
APPD D.G.	DATE 29/10/2015	TITLE DRY TYPE TRANSFORMER OUTLINE	
S.O. ·		TYPE DRY TYPE TRANSFORMER	OUTLINE
REVISION 6		G.O. ·	DWG FR943
			SHEET 1 OF 1

GO/NEG-Alt-Date:	Job Name:	
V0J30111X2K2-0000-4/18/2023	Dutchess Stadium	
Item Number:	Catalog Number: V48M28T4916CU	Designation: T1A

VOLTS	TAP
504	1
492	2
480	3
468	4
456	5
444	6
432	7



PRODUCT CODE: TRANSFORMERS	FEDERAL ID NO.			
4	UPDATE FORMAT EATON & CHANGE DESC. TO HV/LV	J.C.S.	C.B.	10/JUN/14
REV	DESCRIPTION	DFTR	APPD	DATE
REVISIONS				

DFTR HEG	DATE 12/01/01	THE INFORMATION ON THIS DOCUMENT WAS CREATED BY EATON CORPORATION. IT WAS DISCLOSED IN CONFIDENCE AND IS ONLY TO BE USED FOR THE PURPOSE IN WHICH IT WAS SUPPLIED.
APPD EER	DATE 12/01/01	TITLE DRY TYPE TRANSFORMER WIRING SCHEMATIC
S.O.		TYPE DRY TYPE TRANSFORMER — WIRING
REVISION 04		G.O. — DWG 280B — SHEET 1 OF 01

GO/NEG-Alt-Date:		Job Name:
V0J30111X2K2-0000-4/18/2023		Dutchess Stadium
Item Number:	**Catalog Number:** V48M28T4916CU	**Designation:** T1A

Dry-Type Transformers General Information

- Standard Transformer Catalog Number: V48M28T7516CU
- Transformer Type: General Purpose Vented
- Phase: 3
- kVA: 75
- Primary Volts: 480
- Secondary Volts: 208Y/120
- Temperature Rise: 150C with 220C Insulation System
- Winding Material: Copper
- Enclosure Type: NEMA 2 (for N3R, select Weather Shield in Mods tab)
- Frequency (Hz): 60
- Frame: 942
- Wiring Diagram: 280B
- Weight (lbs.): 676
- Impedance (%): 3.21
- UL Listed: Y
- Max Practical Inrush (Amps): 399
- X/R: 0.96
- No Load Losses (Watts): 210
- Total Losses (Watts): 1979

Standard Values

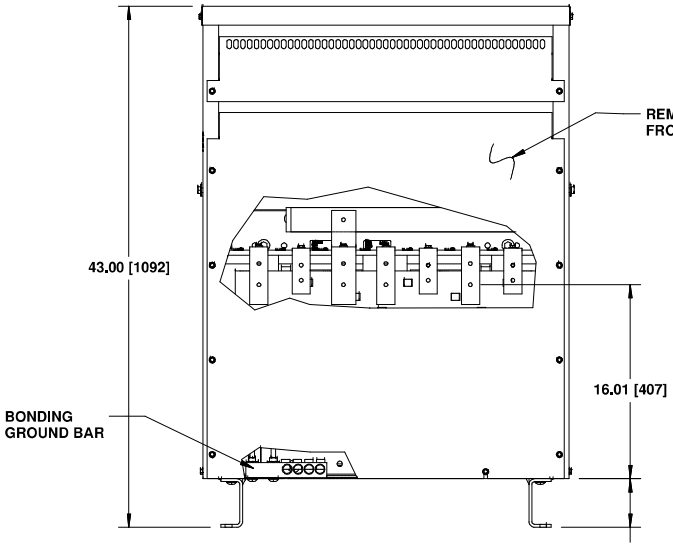
- K-Factor: 1
- TAPS: 2@+2.5%, 4@-2.5%
- Sound Reduction (dB): 0
- NEMA ST20 Sound Level (dB): 50
- DOE 10 CFR Part 431 (2016) Efficient: Y
- Infrared Viewing Window: None

Field-Installed Accessories Included

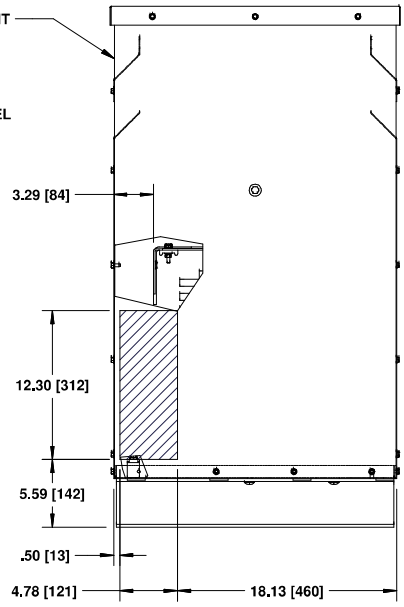
- Lug Kit: Not Included

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	**Eaton**			
APPROVED BY	DATE	JOB NAME: Dutchess Stadium			
		DESIGNATION: T2A			
VERSION: 1.0.0.4		TYPE: Dry-Type Transformer		DRAWING TYPE: Customer Appr.	
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0	DWG SIZE: A	G.O.	ITEM	SHEET: 1 of 1

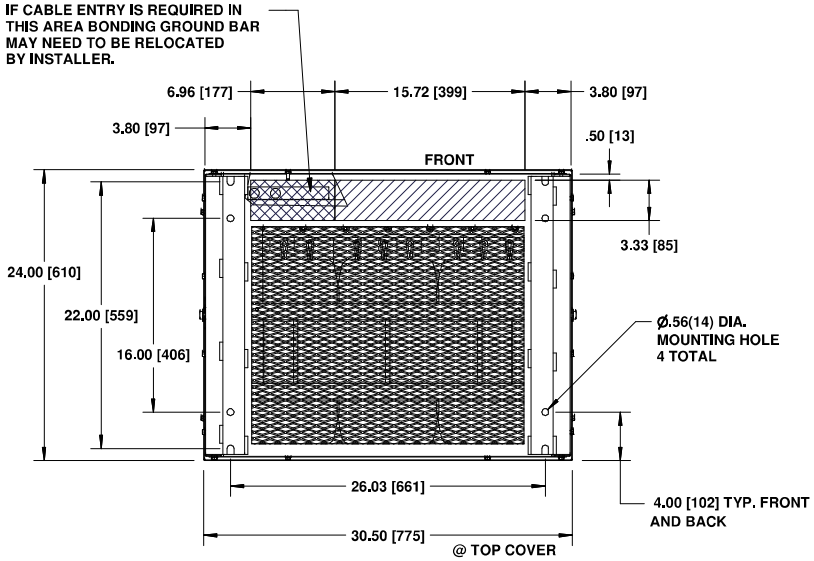
NOTE:
1. ALL UNITS ARE DESIGNED IN ACCORDANCE WITH APPLICABLE NEMA, UL, ANSI, AND IEEE STANDARDS.
2. DRY-TYPE VENTILATED, CLASS AA, NEMA TYPE 2 ENCLOSURE.
3. FOR NEMA 3R OUTDOOR APPLICATION, USE WEATHERSHIELD # WS59.
4. TRANSFORMERS ARE FLOOR-MOUNTED. USE WALL-MOUNT BRACKET WMB04 FOR WALL-MOUNTING.
5. 220°C CLASS INSULATION SYSTEM.
6. PAINT COLOR IS ANSI #61.
7. ALUMINUM UNITS HAVE ALUMINUM WINDINGS AND TERMINATIONS. COPPER UNITS HAVE COPPER WINDINGS AND TERMINATIONS.
8. TRANSFORMER CAN BE INSTALLED AT A MIN. DISTANCE TO BACK AND SIDE WALLS OF 2 INCHES AND TO A 6 INCHES MIN. DISTANCE TO BACK WALLS WHEN WEATHERSHIELDS ARE NEEDED. WALLMOUNT BRACKETS CANNOT BE USED IN COMBINATION WITH WEATHERSHIELDS.
9. DIMENSIONS IN INCHES(mm).



FRONT VIEW



SIDE VIEW



BOTTOM VIEW

USE 12.30[312] x 4.78[121] BOTH SIDES, AND (15.72[399]+6.96[177]) x 3.33[85] ON BOTTOM AS RECOMMENDED CABLE ENTRY LOCATIONS.

REV	DESCRIPTION	DFTR	APPD	DATE
6	CO-0204443 .	J.C.S.	D.G.	31/03/2021
5	ECO-164756 .	J.C.S.	C.B.	07/05/2019
4	ECO-133517 .	J.G.	C.B.	15/01/2018

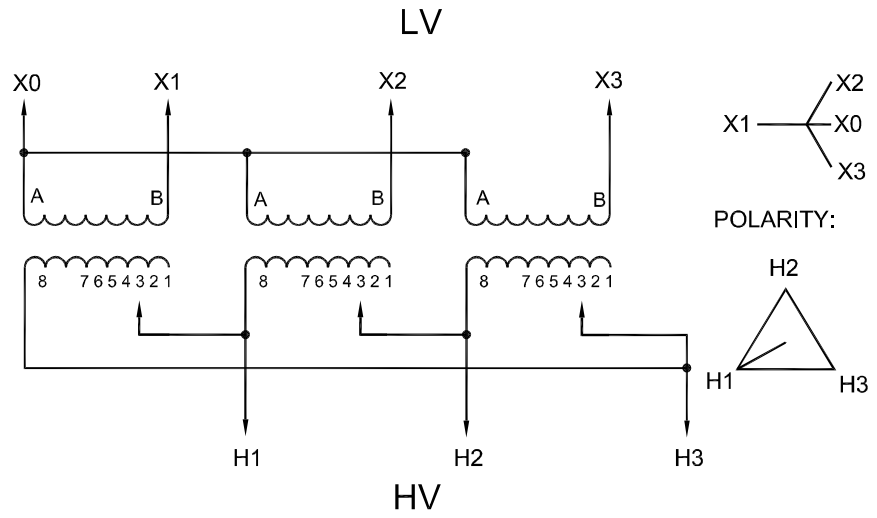
REVISIONS

PRODUCT CODE: · FEDERAL ID NO.: ·

DFTR J.C.S.	DATE 29/10/2015	THE INFORMATION ON THIS DOCUMENT WAS CREATED BY EATON CORPORATION. IT WAS DISCLOSED IN CONFIDENCE AND IS ONLY TO BE USED FOR THE PURPOSE IN WHICH IT WAS SUPPLIED.
APPD D.G.	DATE 29/10/2015	TITLE DRY TYPE TRANSFORMER OUTLINE
S.O. .		TYPE DRY TYPE TRANSFORMERS — OUTLINE
REVISION 6		G.O. . — DWG **FR942** — SHEET 1 OF 1

GO/NEG-Alt-Date: V0J30111X2K2-0000-4/18/2023	**Job Name:** Dutchess Stadium
Item Number:	**Catalog Number:** V48M28T7516CU — **Designation:** T2A

VOLTS	TAP
504	1
492	2
480	3
468	4
456	5
444	6
432	7



PRODUCT CODE: TRANSFORMERS	FEDERAL ID NO.			
4	UPDATE FORMAT EATON & CHANGE DESC. TO HV/LV	J.C.S.	C.B.	10/JUN/14
REV	DESCRIPTION	DFTR	APPD	DATE
REVISIONS				

DFTR HEG	DATE 12/01/01	THE INFORMATION ON THIS DOCUMENT WAS CREATED BY EATON CORPORATION. IT WAS DISCLOSED IN CONFIDENCE AND IS ONLY TO BE USED FOR THE PURPOSE IN WHICH IT WAS SUPPLIED.	EATON
APPD EER	DATE 12/01/01	TITLE DRY TYPE TRANSFORMER WIRING SCHEMATIC	
S.O. .		TYPE DRY TYPE TRANSFORMER	WIRING
REVISION 04		G.O. .	DWG 280B / SHEET 1 OF 01

GO/NEG-Alt-Date:		Job Name:
V0J30111X2K2-0000-4/18/2023		Dutchess Stadium
Item Number:	**Catalog Number:** V48M28T7516CU	**Designation:** T2A

Technical Documents

Eaton DOE 2016 efficient distribution transformers

DOE 2016 efficiency guidelines

The U.S. Department of Energy (DOE) is tasked with periodically reviewing energy efficiency requirements of many appliances, including distribution transformers. The latest DOE ruling, originally published on April 18, 2013, mandates new, higher, energy efficiency levels for liquid-filled and dry-type distribution transformers. This new ruling, 10 CFR Part 431, commonly referred to as DOE 2016, requires that distribution transformers manufactured starting on January 1, 2016 that are intended for sale or installation in the U.S. and U.S. Territories meet the new minimum efficiency levels.

Eaton is proud to support this new legislation that will have long-lasting positive environmental benefits lasting for decades into the future.

For low-voltage dry-type distribution transformers, the new minimum energy efficiency levels, required effective January 1, 2016 are:

Table 1. DOE 2016 minimum efficiency levels for low-voltage dry-type distribution transformers

Single-phase		Three-phase	
kVA	**Efficiency %**	**kVA**	**Efficiency %**
15	97.70	15	97.89
25	98.00	30	98.23
37.5	98.20	45	98.40
50	98.30	75	98.60
75	98.50	112.5	98.74
100	98.60	150	98.83
167	98.70	225	98.94
250	98.80	300	99.02
333	98.90	500	99.14
		750	99.23
		1,000	99.28

Powering Business Worldwide

There are several types of transformers specifically excluded from the scope of low-voltage dry-type distribution transformer efficiency requirements. The most common transformers excluded from the low-voltage standard are motor drive isolation transformers, control transformers, encapsulated transformers (including mini-power centers), and totally enclosed non-ventilated (TENV) transformers.

Eaton has completely redesigned their ventilated transformer product offering to meet the new DOE 2016 requirements. As part of this redesign, several enhancements were made to the product.

- Bonding ground bar added to the bottom panel as standard for compliance with NEC® 450.10 (A)
- Lower center of gravity to help minimize freight damage
- Minimum of 4 inches clearance between bottom panel and the floor to facilitate ease of moving the transformer with a variety of equipment
- Minimum clearance between front and back panels of just 2 inches when installed indoors without weathershields
- Larger wire bending space for ease of connection
- Larger recommended conduit entry locations in the enclosure
- OSHPD approved designs. 150 kVA and smaller are OSHPD approved for wall-mounting applications
- Third-party efficiency verification so customers can be sure their Eaton transformer meets the new DOE 2016 minimum efficiency requirements

Product scope

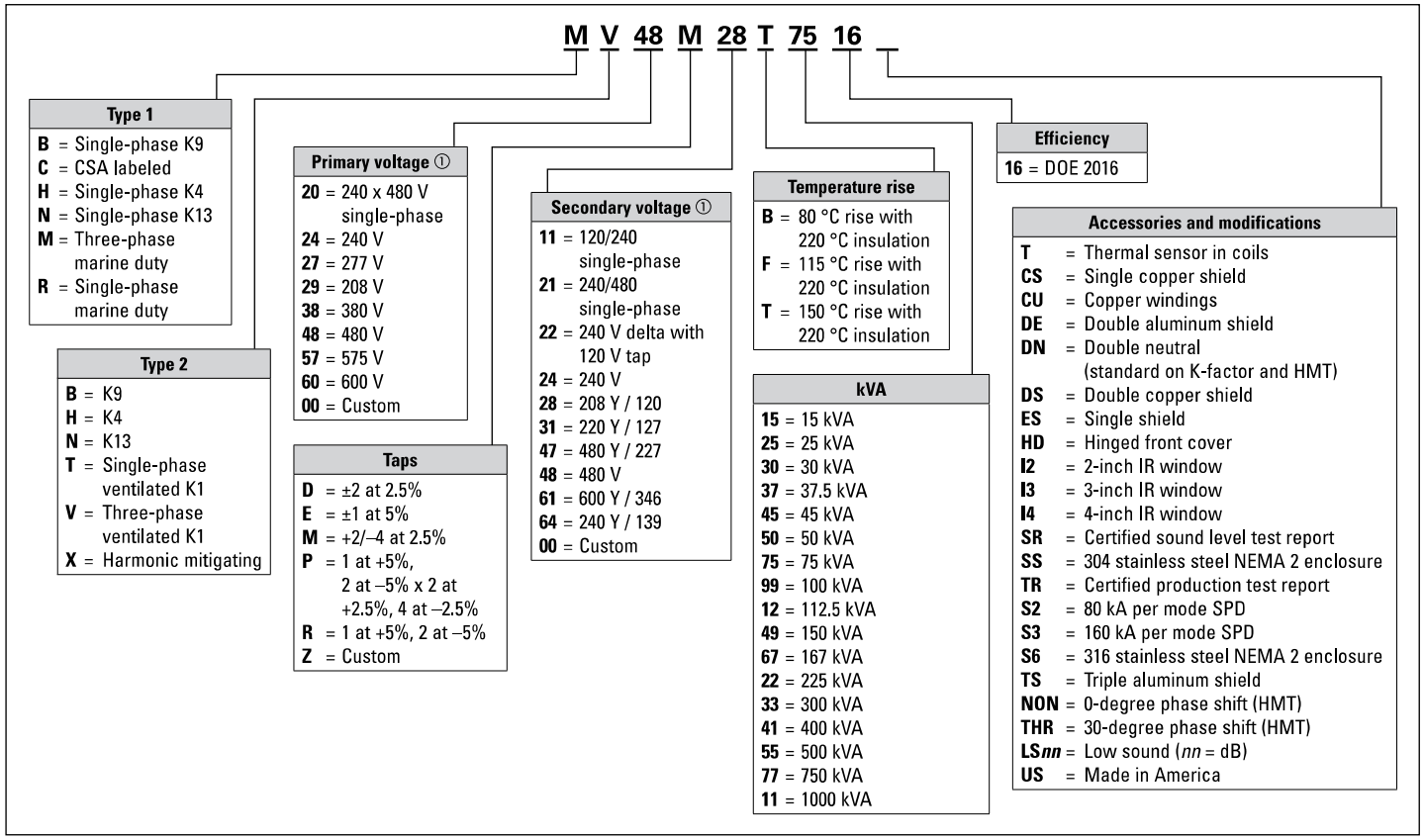
Eaton manufactures a diverse family of DOE 2016 compliant transformers, including:

- 150 °C temperature rise standard, 115 °C and 80 °C rise optional
- General purpose, K-factor, harmonic mitigating, and marine-duty transformers
- K-factor rating of K4, K9, K13, K20, K30
- Aluminum windings standard, copper windings optional
- Wide variety of accessories and custom options
  - Custom voltage combinations
  - Hinged front covers
  - Surge protective devices
  - Custom paint colors
  - IR viewing windows
  - Primary or secondary circuit protective devices
  - Custom electrostatic shielding options
  - And more

Technical specifications

- 15–167 kVA single-phase
- 15–500 kVA three-phase
- 150 °C temperature rise standard, 115 °C or 80 °C optional
- UL® Listed 220 °C insulation system
- 10 kV BIL on three-phase units
- NEMA® Type 2 enclosures; NEMA 3R when proper weathershield is installed
- Enclosure finish: ANSI 61 grey
- Upright mounting only
- Frequency: 60 Hz
- Short-term overload capability as required by ANSI
- Meet NEMA ST-20 audible sound levels
- UL 1561 Listed, UL File E78389
- cUL® energy efficiency verified EV33871
- Designed, manufactured, and tested per applicable portions of standards:
  - NFPA® (NEC)
  - UL 1561
  - NEMA ST-20
  - NEMA 250
  - 10 CFR Part 431
  - ANSI C57.12.70
  - ANSI C57.12.91
  - OSHPD California
  - Uniform Building Code
  - International Building Code
  - American Bureau of Shipping (marine-duty transformers)

Table 2. DOE 2016 catalog numbering system



① The most common voltages are listed. Contact Eaton for additional voltage combinations.

General construction features of DOE 2016 efficient transformers rated 600 V and below

General description

Eaton's single-phase and three-phase general purpose dry-type ventilated transformers are of the two-winding type, self-cooled, and are available in a variety of primary and secondary voltage combinations.

Eaton's transformers are designed, manufactured, and tested in accordance with all of the latest applicable ANSI, NEMA, and IEEE® standards. All 600 V class ventilated transformers with ratings through 1500 kVA are UL listed and bear the UL label. Open core and coil assemblies are UL recognized (UR) labeled products.

These transformers are designed for continuous operation at rated kVA for 24 hours a day, 365 days a year, with a normal life expectancy as defined in ANSI C57.96.

Efficiency validation

Eaton-manufactured transformers in compliance with 10 CFR Part 431 (2016), "DOE 2016 efficient" bear the UL Energy Efficiency Verification Mark to confirm that the transformer meets the minimum energy efficiency requirements set forth in federal law 10 CFR Part 431.

Insulation system

The design life of transformers having different insulation systems is the same; the lower temperature systems are designed to have the same life as the higher rated temperature systems.

Most Eaton ventilated transformers, regardless of their temperature rise, are manufactured using a 220 °C insulation system. Required performance is obtained without exceeding the insulation system rating at rated temperature rise in a 40 °C maximum ambient, with an average of 30 °C over a 24-hour period. Transformers manufactured with 220 °C insulation system meet the requirements of NEC 450.21(b) Exception No. 2. It is not necessary to install them in a special, fire-resistant room.

All insulation materials used are flame-retardant and do not support combustion, as defined in ASTM Standard Test Method D635.

Core and coil assemblies

The transformer core is constructed using high-grade, non-aging, silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Maximum magnetic flux densities are substantially below the saturation point. The transformer core volume allows for efficient transformer operation at 10% above the nominal tap voltage. The core laminations are tightly clamped and compressed. The BIL (basic impulse level) for all 600 V-class windings is 10 kV. The core and coil assembly is installed on neoprene vibration-absorbing pads. Coils are treated with a varnish that does not support the growth of fungus.

Ventilated transformers with wye-connected secondaries have the neutral brought out to a separate terminal or busbar.

The core and coil assembly is grounded to the transformer enclosure by means of a flexible copper ground strap. The copper ground strap is sized per the NEC to be a grounding conductor.

Eaton three-phase DOE 2016 efficient transformers are provided with a bonding ground bar attached to the bottom panel for compliance with NEC 450.10(A).

Electrostatic shielding

There are no industry standards for electrostatic shield performance. Eaton-manufactured transformers have been tested by an independent laboratory to meet the following attenuation levels:

When tested per MIL-Std-220A, Method Of Insertion Loss Measurement, with matched impedance no load technique:

- Common mode noise attenuation:
  Minus 80 dBA minimum at 0.1 kHz to 1.5 kHz;
  minus 55 dBA minimum at 1.51 kHz to 100 kHz
- Normal mode (transverse mode) noise attenuation:
  Minus 30 dBA minimum at 1.5 kHz to 10 kHz.

Primary to secondary capacitance of 24.74 to 18.06 picofarads over the range 100 to 20 kHz.

Taps

Primary taps are available on most Eaton ventilated transformers to allow compensation for source voltage variations.

Winding terminations

Primary and secondary windings are terminated in the wiring compartment. Ventilated transformers have leads brought out to aluminum or copper pads that are pre-drilled to accept Al/Cu lugs. Aluminum-wound transformers have aluminum pads; copper-wound transformers have copper pads. Lugs are not supplied with Eaton transformers; however, lug kits are available as a field-installed accessory. Eaton recommends external cables be rated 75 °C for ventilated designs.

Enclosures

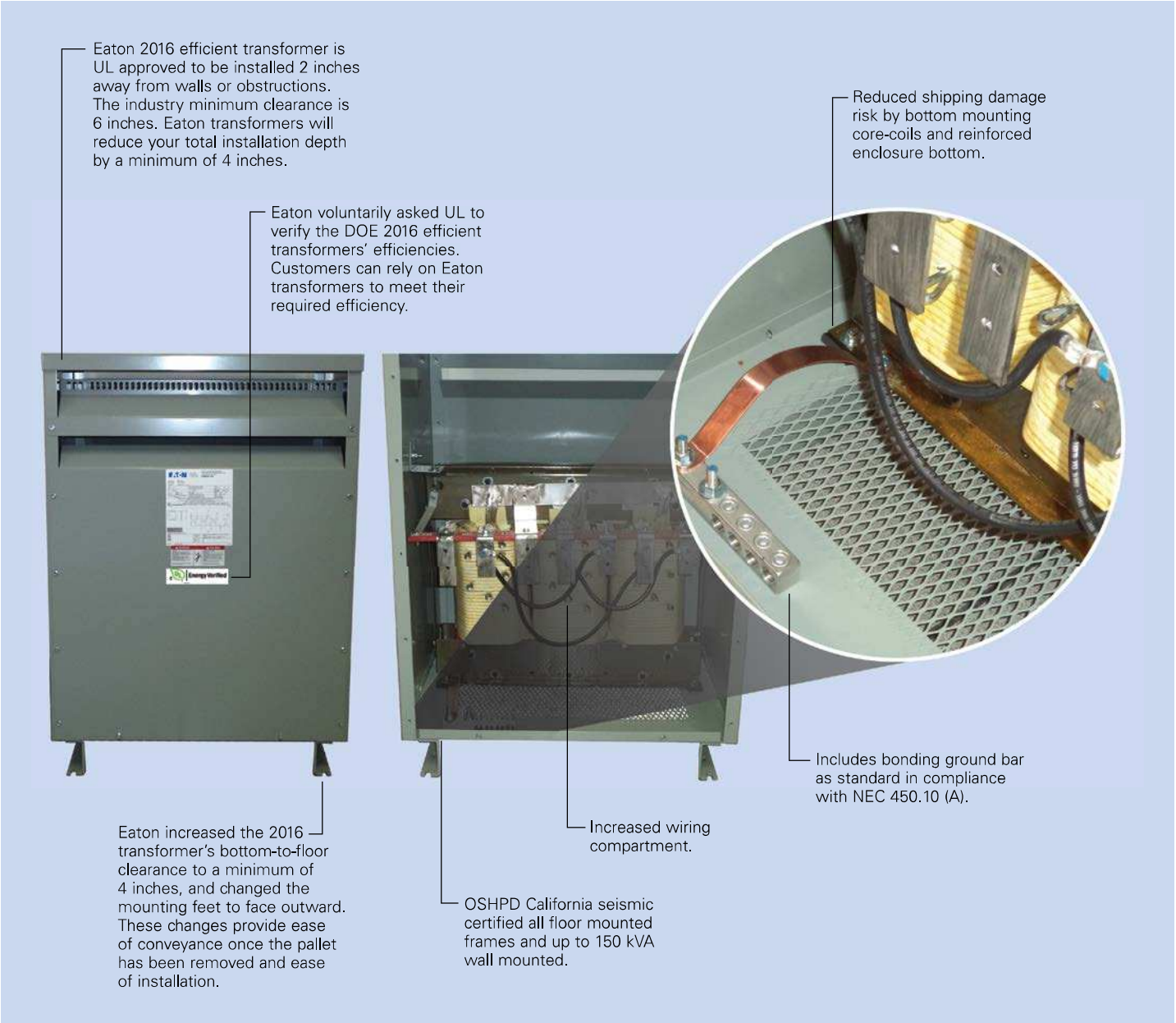
The transformer enclosure is made of heavy-gauge steel and is finished using a continuous process of degreasing, cleaning, and phosphatizing, followed by electrostatic deposition of a thermosetting polyester powder coating and subsequent baking. The coating color is ANSI 61 grey and is UL-recognized for indoor or outdoor use. In compliance with NEMA ST-20, Eaton's ventilated transformers are designed such that the maximum temperature on the top of the enclosure does not exceed 50 °C rise above the ambient temperature.

For ventilated transformers, the enclosure standard construction is drip-proof, NEMA 2, with lifting provisions on the top of the core. All ventilation openings are protected against falling dirt. Proper installation of weathershields makes the enclosure NEMA 3R rated and suitable for outdoor use.

To ensure proper ventilation and cooling of the transformer, follow manufacturer's recommended clearance around ventilation openings.

Installation clearances

Eaton's transformers should be installed with a minimum clearance around the transformer enclosure to prevent accidental contact with flammable or combustible materials.



Eaton 2016 efficient transformer

Selection tables

Aluminum wound, single-phase,

Table 3. 240 x 480 primary volts, 120/240 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**T20P11S1516**	842	196	3XA	WS45	WMB01
25	**T20P11S2516**	842	261	3XA	WS45	WMB01
37.5	**T20P11S3716**	843	304	3XA	WS43	—
50	**T20P11S5016**	843	410	3XA	WS43	—
75	**T20P11S7516**	844	688	3XA	WS44	—
100	**T20P11S9916**	844	699	3XA	WS44	—
167	**T48M11S6716** ③	814	1294	288A	WS13	—

① Frame drawings on **page 14** and **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ 480 V primary only.

Copper wound, single-phase

Table 4. 240 x 480 primary volts, 120/240 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**T20P11S1516CU**	816	270	3XA	WS11	WMB01
25	**T20P11S2516CU**	818	406	3XA	WS11	WMB01
37.5	**T20P11S3716CU**	818	453	3XA	WS11	WMB01
50	**T20P11S5016CU**	819	657	3XA	WS16	WMB01
75	**T20P11S7516CU**	820	803	3XA	WS16	—
100	**T20P11S9916CU**	821	960	3XA	WS13	—
167	**T48M11S6716CU** ③	814E	1665	288A	WS13	—

① Frame drawings on **page 14** and **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ 480 V primary only.

Aluminum wound, three-phase

Table 5. 208 delta primary volts, 208Y/120 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**V29M28T1516**	939	225	280E	WS57	WMB05
30	**V29M28T3016**	940	409	280E	WS58	WMB05
45	**V29M28T4516**	940	416	280E	WS58	WMB05
75	**V29M28T7516**	942	602	280E	WS59	WMB04
112.5	**V29R28T1216**	943	976	324A	WS60	WMB04
150	**V29R28T4916**	943	1239	324A	WS60	WMB04
225	**V29R28T2216**	944	1624	289D	WS61	—
300	**V29R28T3316**	945	2283	289D	WS62	—
500	**V29E28T5516**	③	③	③	—	—
750	**V29N28T7716**	③	③	③	—	—
1000	**V29N28T1116**	③	③	③	—	—

① Frame drawings on **page 14** and **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Aluminum wound, three-phase

Table 6. 208 delta primary volts, 480Y/277 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**V29M47T1516**	939	229	E0342B	WS57	WMB05
30	**V29M47T3016**	940	407	E0342B	WS58	WMB05
45	**V29M47T4516**	940	438	E0342B	WS58	WMB05
75	**V29M47T7516**	942	505	E0342B	WS59	WMB04
112.5	**V29R47T1216**	943	973	E0351A	WS60	WMB04
150	**V29R47T4916**	943	1233	E0351A	WS60	WMB04
225	**V29R47T2216**	944	1624	E0351A	WS61	—
300	**V29R47T3316**	945	2083	E0351A	WS62	—
500	**V29E47T5516**	③	③	③	—	—
750	**V29E47T7716**	③	③	③	—	—
1000	**V29E47T1116**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Table 7. 480 delta primary volts, 208Y/120 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**V48M28T1516**	FR939	236	280B	WS57	WMB05
30	**V48M28T3016**	FR940	418	280B	WS58	WMB05
45	**V48M28T4516**	FR940	450	280B	WS58	WMB05
75	**V48M28T7516**	FR942	626	280B	WS59	WMB04
112.5	**V48M28T1216**	FR943	999	280B	WS60	WMB04
150	**V48M28T4916**	FR943	1257	280B	WS60	WMB04
225	**V48M28T2216**	FR944	1655	280B	WS61	—
300	**V48M28T3316**	FR945	2222	280B	WS62	—
500	**V48M28T5516**	③	③	③	—	—
750	**V48M28T7716**	③	③	③	—	—
1000	**V48D28T1116**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Table 8. 480 delta primary volts, 240 delta with 120 V center tap secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**V48M22T1516**	FR939	230	282B	WS57	WMB05
30	**V48M22T3016**	FR940	399	282B	WS58	WMB05
45	**V48M22T4516**	FR940	437	282B	WS58	WMB05
75	**V48M22T7516**	FR942	593	282B	WS59	WMB04
112.5	**V48M22T1216**	FR943	972	282B	WS60	WMB04
150	**V48M22T4916**	FR943	1232	282B	WS60	WMB04
225	**V48M22T2216**	FR944	1679	282B	WS61	—
300	**V48M22T3316**	FR945	2200	282B	WS62	—
500	**V48M22T5516**	③	③	③	—	—
750	**V48M22T7716**	③	③	③	—	—
1000	**V48D22T1116**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Aluminum wound, three-phase

Table 9. 480 delta primary volts, 480Y/277 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**V48M47T1516**	FR939	208	280B	WS57	WMB05
30	**V48M47T3016**	FR940	395	280B	WS58	WMB05
45	**V48M47T4516**	FR940	436	280B	WS58	WMB05
75	**V48M47T7516**	FR942	576	280B	WS59	WMB04
112.5	**V48M47T1216**	FR943	976	280B	WS60	WMB04
150	**V48M47T4916**	FR943	1241	280B	WS60	WMB04
225	**V48M47T2216**	FR944	1630	280B	WS61	—
300	**V48M47T3316**	FR945	2294	280B	WS62	—
500	**V48M47T5516**	③	③	③	—	—
750	**V48M47T7716**	③	③	③	—	—
1000	**V48D47T1116**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Copper wound, three-phase

Table 10. 208 delta primary volts, 208Y/120 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**V29M28T1516CU**	939	250	280E	WS57	WMB05
30	**V29M28T3016CU**	940	415	280E	WS58	WMB05
45	**V29M28T4516CU**	940	478	280E	WS58	WMB05
75	**V29M28T7516CU**	942	678	280E	WS59	WMB04
112.5	**V29R28T1216CU**	943	1263	324A	WS60	WMB04
150	**V29R28T4916CU**	943	1410	324A	WS60	WMB04
225	**V29R28T2216CU**	944	1760	289D	WS61	—
300	**V29R28T3316CU**	945	2361	289D	WS62	—
500	**V29E28T5516CU**	③	③	③	—	—
750	**V29N28T7716CU**	③	③	③	—	—
1000	**V29N28T1116CU**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Table 11. 208 delta primary volts, 480Y/277 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**V29M47T1516CU**	939	254	E0342B	WS57	WMB05
30	**V29M47T3016CU**	940	427	E0342B	WS58	WMB05
45	**V29M47T4516CU**	940	503	E0342B	WS58	WMB05
75	**V29M47T7516CU**	942	570	E0342B	WS59	WMB04
112.5	**V29R47T1216CU**	943	1255	E0351A	WS60	WMB04
150	**V29R47T4916CU**	943	1406	E0351A	WS60	WMB04
225	**V29E47T2216CU**	③	③	③	—	—
300	**V29E47T3316CU**	③	③	③	—	—
500	**V29E47T5516CU**	③	③	③	—	—
750	**V29E47T7716CU**	③	③	③	—	—
1000	**V29E47T1116CU**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Copper wound, three-phase

Table 12. 480 delta primary volts, 208Y/120 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**V48M28T1516CU**	FR939	262	280B	WS57	WMB05
30	**V48M28T3016CU**	FR940	415	280B	WS58	WMB05
45	**V48M28T4516CU**	FR940	478	280B	WS58	WMB05
75	**V48M28T7516CU**	FR942	676	280B	WS59	WMB04
112.5	**V48M28T1216CU**	FR943	1289	280B	WS60	WMB04
150	**V48M28T4916CU**	FR943	1432	280B	WS60	WMB04
225	**V48M28T2216CU**	FR944	1787	280B	WS61	—
300	**V48M28T3316CU**	FR945	2289	280B	WS62	—
500	**V48M28T5516CU**	③	③	③	—	—
750	**V48M28T7716CU**	③	③	③	—	—
1000	**V48D28T1116CU**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Table 13. 480 delta primary volts, 240 delta with 120 V center tap secondary volts, 150 °C temperature rise, 60 H

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**V48M22T1516CU**	FR939	255	282B	WS57	WMB05
30	**V48M22T3016CU**	FR940	419	282B	WS58	WMB05
45	**V48M22T4516CU**	FR940	463	282B	WS58	WMB05
75	**V48M22T7516CU**	FR942	640	282B	WS59	WMB04
112.5	**V48M22T1216CU**	FR943	1254	282B	WS60	WMB04
150	**V48M22T4916CU**	FR943	1404	282B	WS60	WMB04
225	**V48M22T2216CU**	FR944	1813	282B	WS61	—
300	**V48M22T3316CU**	FR945	2266	282B	WS62	—
500	**V48M22T5516CU**	③	③	③	—	—
750	**V48M22T7716CU**	③	③	③	—	—
1000	**V48D22T1116CU**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Table 14. 480 delta primary volts, 480Y/277 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**V48M47T1516CU**	FR939	231	280B	WS57	WMB05
30	**V48M47T3016CU**	FR940	415	280B	WS58	WMB05
45	**V48M47T4516CU**	FR940	457	280B	WS58	WMB05
75	**V48M47T7516CU**	FR942	673	280B	WS59	WMB04
112.5	**V48M47T1216CU**	FR943	1260	280B	WS60	WMB04
150	**V48M47T4916CU**	FR943	1415	280B	WS60	WMB04
225	**V48M47T2216CU**	FR944	1760	280B	WS61	—
300	**V48M47T3316CU**	FR945	2363	280B	WS62	—
500	**V48M47T5516CU**	③	③	③	—	—
750	**V48M47T7716CU**	③	③	③	—	—
1000	**V48D47T1116CU**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

K-factor 4, aluminum wound, three-phase

Table 15. 480 delta primary volts, 208Y/120 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**H48M28T1516**	FR940	407	283B	WS58	WMB05
30	**H48M28T3016**	FR940	437	283B	WS58	WMB05
45	**H48M28T4516**	FR940	439	283B	WS58	WMB05
75	**H48M28T7516**	FR942	599	283B	WS59	WMB04
112.5	**H48M28T1216**	FR943	987	283B	WS60	WMB04
150	**H48M28T4916**	FR944	1637	283B	—	—
225	**H48M28T2216**	FR944	1642	283B	—	—
300	**H48M28T3316**	FR945	2394	283B	—	—
500	**H48M28T5516**	③	③	③	—	—
750	**H48M28T7716**	③	③	③	—	—
1000	**H48D28T1116**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Table 16. 480 delta primary volts, 240 delta with 120 V center tap secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**H48M22T1516**	FR940	407	284B	WS58	WMB05
30	**H48M22T3016**	FR940	437	284B	WS58	WMB05
45	**H48M22T4516**	FR940	439	284B	WS58	WMB05
75	**H48M22T7516**	FR942	599	284B	WS59	WMB04
112.5	**H48M22T1216**	FR943	987	284B	WS60	WMB04
150	**H48M22T4916**	FR944	1637	284B	—	—
225	**H48M22T2216**	FR944	1642	284B	—	—
300	**H48M22T3316**	FR945	2394	284B	—	—
500	**H48M22T5516**	③	③	③	—	—
750	**H48M22T7716**	③	③	③	—	—
1000	**H48D22T1116**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Table 17. 480 delta primary volts, 480Y/277 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**H48M47T1516**	FR940	407	283B	WS58	WMB05
30	**H48M47T3016**	FR940	437	283B	WS58	WMB05
45	**H48M47T4516**	FR940	439	283B	WS58	WMB05
75	**H48M47T7516**	FR942	599	283B	WS59	WMB04
112.5	**H48M47T1216**	FR943	987	283B	WS60	WMB04
150	**H48M47T4916**	FR944	1637	283B	—	—
225	**H48M47T2216**	FR944	1642	283B	—	—
300	**H48M47T3316**	FR945	2394	283B	—	—
500	**H48M47T5516**	③	③	③	—	—
750	**H48M47T7716**	③	③	③	—	—
1000	**H48D47T1116**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

K-factor 4, copper wound, three-phase

Table 18. 480 delta primary volts, 208Y/120 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**H48M28T1516CU**	FR940	418	283B	WS58	WMB05
30	**H48M28T3016CU**	FR940	458	283B	WS58	WMB05
45	**H48M28T4516CU**	FR942	677	283B	WS59	WMB04
75	**H48M28T7516CU**	FR943	1274	283B	WS60	WMB04
112.5	**H48M28T1216CU**	FR943	1818	283B	WS60	WMB04
150	**H48M28T4916CU**	FR944	1883	283B	—	—
225	**H48M28T2216CU**	FR945	2674	283B	—	—
300	**H48M28T3316CU**	FR945	2845	283B	—	—
500	**H48M28T5516CU**	③	③	③	—	—
750	**H48M28T7716CU**	③	③	③	—	—
1000	**H48D28T1116CU**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Table 19. 480 delta primary volts, 240 delta with 120 V center tap secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**H48M22T1516CU**	FR940	418	284B	WS58	WMB05
30	**H48M22T3016CU**	FR940	458	284B	WS58	WMB05
45	**H48M22T4516CU**	FR942	677	284B	WS59	WMB04
75	**H48M22T7516CU**	FR943	1274	284B	WS60	WMB04
112.5	**H48M22T1216CU**	FR943	1818	284B	WS60	WMB04
150	**H48M22T4916CU**	FR944	1883	284B	—	—
225	**H48M22T2216CU**	FR945	2674	284B	—	—
300	**H48M22T3316CU**	FR945	2845	284B	—	—
500	**H48M22T5516CU**	③	③	③	—	—
750	**H48M22T7716CU**	③	③	③	—	—
1000	**H48D22T1116CU**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Table 20. 480 delta primary volts, 480Y/277 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**H48M47T1516CU**	FR940	418	283B	WS58	WMB05
30	**H48M47T3016CU**	FR940	458	283B	WS58	WMB05
45	**H48M47T4516CU**	FR940	485	283B	WS58	WMB05
75	**H48M47T7516CU**	FR942	1274	283B	WS59	WMB04
112.5	**H48M47T1216CU**	FR943	1448	283B	WS60	WMB04
150	**H48M47T4916CU**	FR944	1883	283B	—	—
225	**H48M47T2216CU**	FR945	2641	283B	—	—
300	**H48M47T3316CU**	FR945	2845	283B	—	—
500	**H48M47T5516CU**	③	③	③	—	—
750	**H48M47T7716CU**	③	③	③	—	—
1000	**H48D47T1116CU**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

K-factor 13, aluminum wound, three-phase

Table 21. 480 delta primary volts, 208Y/120 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**N48M28T1516**	FR940	412	283B	WS58	WMB05
30	**N48M28T3016**	FR940	416	283B	WS58	WMB05
45	**N48M28T4516**	FR942	594	283B	WS59	WMB04
75	**N48M28T7516**	FR943	1012	283B	WS60	WMB04
112.5	**N48M28T1216**	FR943	1297	283B	WS60	WMB04
150	**N48M28T4916**	FR944	1425	283B	—	—
225	**N48M28T2216**	FR945	2341	283B	—	—
300	**N48M28T3316**	③	③	③	—	—
500	**N48M28T5516**	③	③	③	—	—
750	**N48M28T7716**	③	③	③	—	—
1000	**N48D28T1116**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Table 22. 480 delta primary volts, 240 delta with 120 V center tap secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**N48M22T1516**	FR940	412	284B	WS58	WMB05
30	**N48M22T3016**	FR940	416	284B	WS58	WMB05
45	**N48M22T4516**	FR942	594	284B	WS59	WMB04
75	**N48M22T7516**	FR943	1012	284B	WS60	WMB04
112.5	**N48M22T1216**	FR943	1297	284B	WS60	WMB04
150	**N48M22T4916**	FR944	1425	284B	—	—
225	**N48M22T2216**	FR945	2341	284B	—	—
300	**N48M22T3316**	③	③	③	—	—
500	**N48M22T5516**	③	③	③	—	—
750	**N48M22T7716**	③	③	③	—	—
1000	**N48D22T1116**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Table 23. 480 delta primary volts, 480Y/277 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**N48M47T1516**	FR940	412	283B	WS58	WMB05
30	**N48M47T3016**	FR940	416	283B	WS58	WMB05
45	**N48M47T4516**	FR940	594	283B	WS58	WMB05
75	**N48M47T7516**	FR942	1012	283B	WS59	WMB04
112.5	**N48M47T1216**	FR943	1297	283B	WS60	WMB04
150	**N48M47T4916**	FR944	1425	283B	—	—
225	**N48M47T2216**	FR944	2341	283B	—	—
300	**N48M47T3316**	③	③	③	—	—
500	**N48M47T5516**	③	③	③	—	—
750	**N48M47T7716**	③	③	③	—	—
1000	**N48D47T1116**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

K-factor 13, copper wound, three-phase

Table 24. 480 delta primary volts, 208Y/120 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**N48M28T1516CU**	FR940	420	283B	WS58	WMB05
30	**N48M28T3016CU**	FR940	480	283B	WS58	WMB05
45	**N48M28T4516CU**	FR942	658	283B	WS59	WMB04
75	**N48M28T7516CU**	FR943	1115	283B	WS60	WMB04
112.5	**N48M28T1216CU**	FR943	1500	283B	WS60	WMB04
150	**N48M28T4916CU**	FR944	2132	283B	—	—
225	**N48M28T2216CU**	FR945	2628	283B	—	—
300	**N48M28T3316CU**	③	③	③	—	—
500	**N48M28T5516CU**	③	③	③	—	—
750	**N48M28T7716CU**	③	③	③	—	—
1000	**N48D28T1116CU**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Table 25. 480 delta primary volts, 240 delta with 120 V center tap secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**N48M22T1516CU**	FR940	420	284B	WS58	WMB05
30	**N48M22T3016CU**	FR940	480	284B	WS58	WMB05
45	**N48M22T4516CU**	FR942	658	284B	WS59	WMB04
75	**N48M22T7516CU**	FR943	1115	284B	WS60	WMB04
112.5	**N48M22T1216CU**	FR943	1500	284B	WS60	WMB04
150	**N48M22T4916CU**	FR944	2132	284B	—	—
225	**N48M22T2216CU**	FR945	2628	284B	—	—
300	**N48M22T3316CU**	③	③	③	—	—
500	**N48M22T5516CU**	③	③	③	—	—
750	**N48M22T7716CU**	③	③	③	—	—
1000	**N48D22T1116CU**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Table 26. 480 delta primary volts, 480Y/277 secondary volts, 150 °C temperature rise, 60 Hz

kVA	Catalog number	Frame ①	Weight (lb)	Wiring diagram ②	Type 3R WS	Wallmount bracket
15	**N48M47T1516CU**	FR940	420	283B	WS58	WMB05
30	**N48M47T3016CU**	FR940	480	283B	WS58	WMB05
45	**N48M47T4516CU**	FR942	658	283B	WS59	WMB04
75	**N48M47T7516CU**	FR943	1115	283B	WS60	WMB04
112.5	**N48M47T1216CU**	FR943	1500	283B	WS60	WMB04
150	**N48M47T4916CU**	FR944	2741	283B	—	—
225	**N48M47T2216CU**	FR945	3100	283B	—	—
300	**N48M47T3316CU**	③	③	③	—	—
500	**N48M47T5516CU**	③	③	③	—	—
750	**N48M47T7716CU**	③	③	③	—	—
1000	**N48D47T1116CU**	③	③	③	—	—

① Frame drawings on **page 15**.

② Wiring diagrams on **page 16** through **page 20**.

③ Contact local Eaton representative.

Enclosure drawings

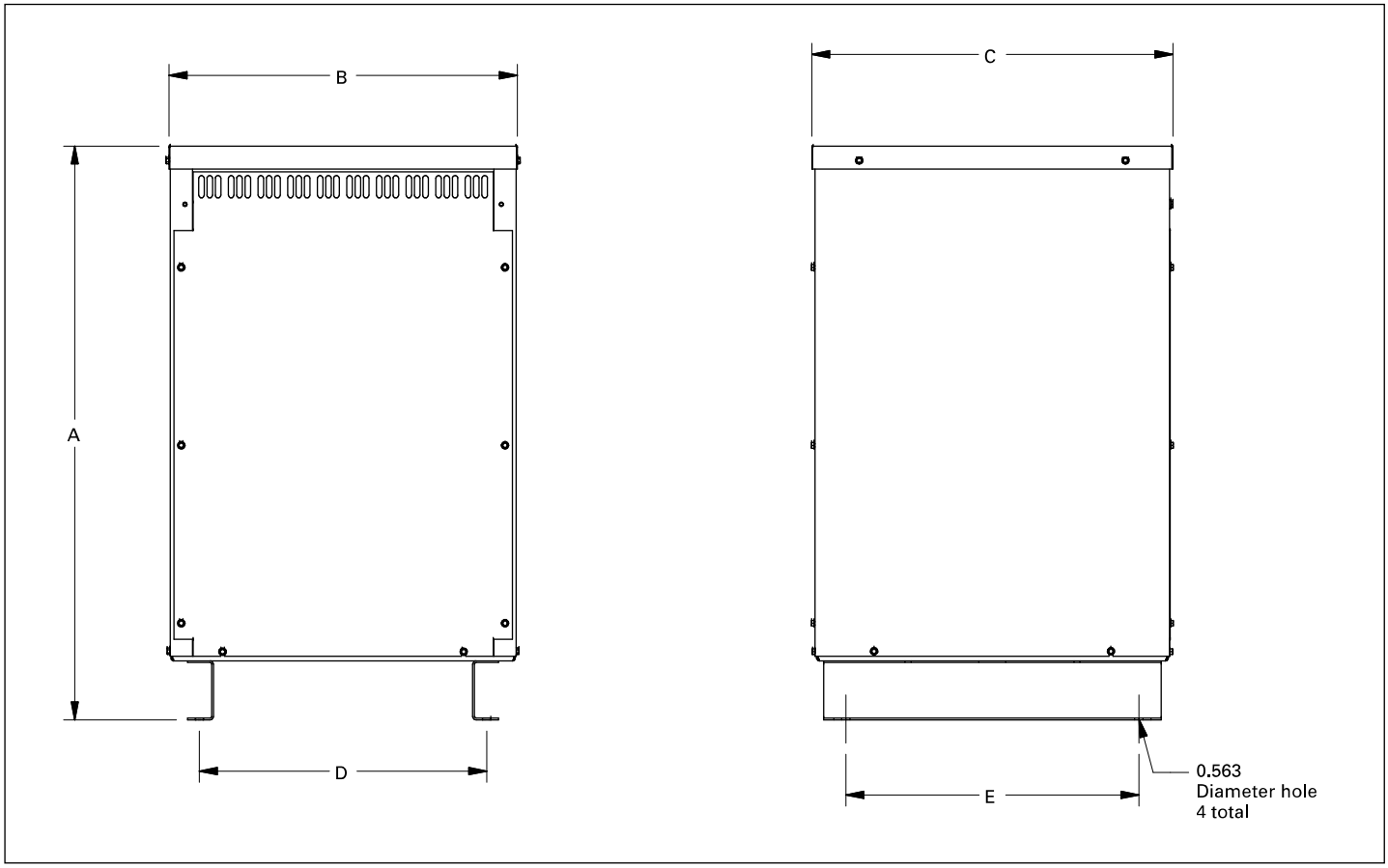


Figure 1. Single-phase enclosures—dimensions in inches (mm)

Frame	A	B	C	D	E
FR842	33.75 (857)	22.45 (570)	17.40 (442)	18.56 (471)	12.76 (324)
FR843	38.70 (983)	23.51 (597)	24.38 (619)	19.39 (493)	19.80 (503)
FR844	44.92 (1141)	26.27 (667)	27.12 (689)	23.21 (590)	22.50 (572)
FR814	62.91 (1598)	29.97 (761)	33.97 (863)	28.00 (711)	26.50 (673)
FR816	31.30 (795)	22.89 (579)	18.39 (467)	20.87 (530)	12.00 (304)

Frame	A	B	C	D	E
FR818	37.59 (955)	22.87 (581)	20.36 (517)	20.91 (531)	14.00 (355)
FR819	42.03 (1068)	24.22 (615)	23.84 (606)	22.35 (567)	19.20 (487)
FR820	42.02 (1067)	24.22 (615)	23.84 (606)	22.25 (565)	18.82 (478)
FR821	62.88 (1597)	29.97 (761)	33.97 (863)	28.00 (711)	26.50 (673)
FR814E	62.91 (1598)	29.97 (761)	33.97 (863)	28.00 (711)	26.50 (673)

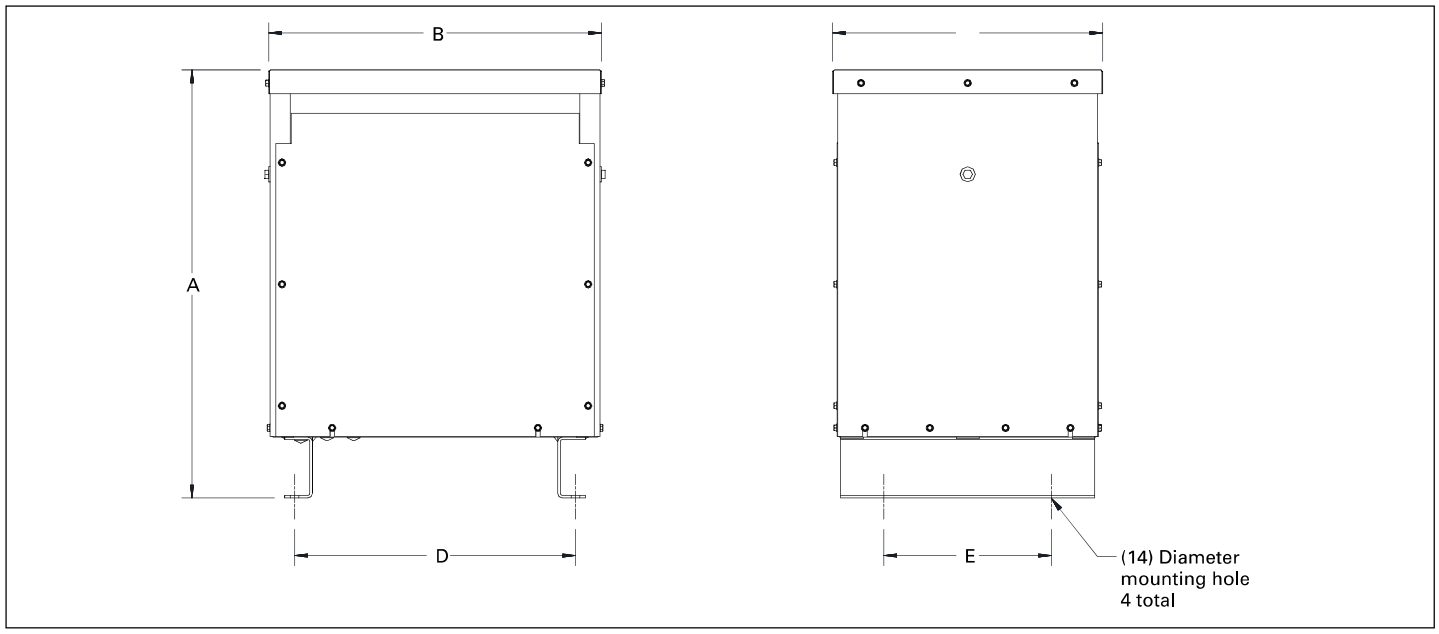


Figure 2. Three-phase enclosure FR939—dimensions in inches (mm)

Frame	A	B	C	D	E
FR939	28.00 (711)	21.88 (556)	17.75 (451)	18.44 (468)	11.00 (279)

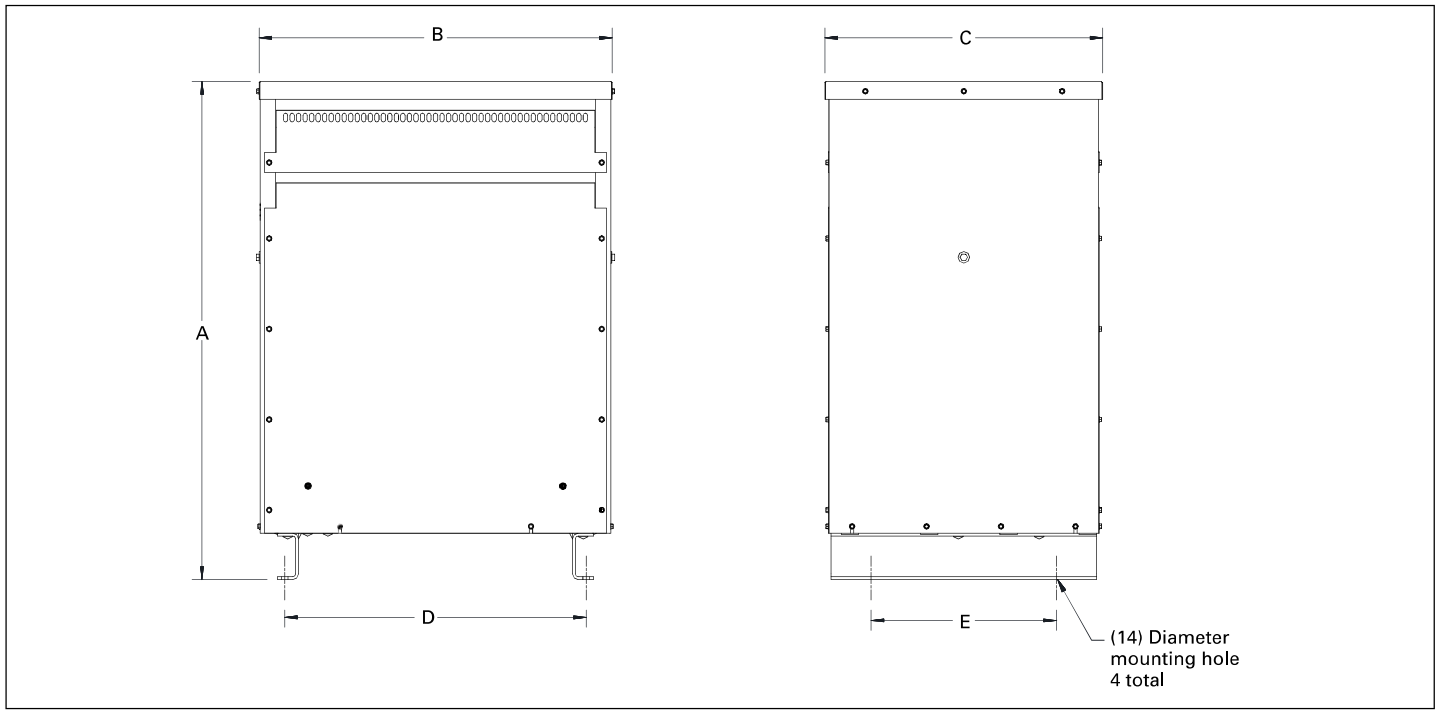


Figure 3. Three-phase enclosures FR940 to FR945—dimensions in inches (mm)

Frame	A	B	C	D	E
FR940	36.88 (937)	24.88 (6320	21.13 (537)	21.44 (545)	11.00 (279)
FR942	43.00 (1092)	30.50 (775)	24.00 (610)	26.03 (661)	16.00 (406)
FR943	51.00 (1295)	34.50 (876)	31.50 (800)	31.19 (792)	18.82 (478)
FR944	60.00 (1524)	38.00 (965)	33.70 (856)	33.83 (859)	24.88 (632)
FR945	66.18 (1681)	42.18 (1071)	33.50 (851)	35.39 (899)	24.88 (632)

Wiring diagrams

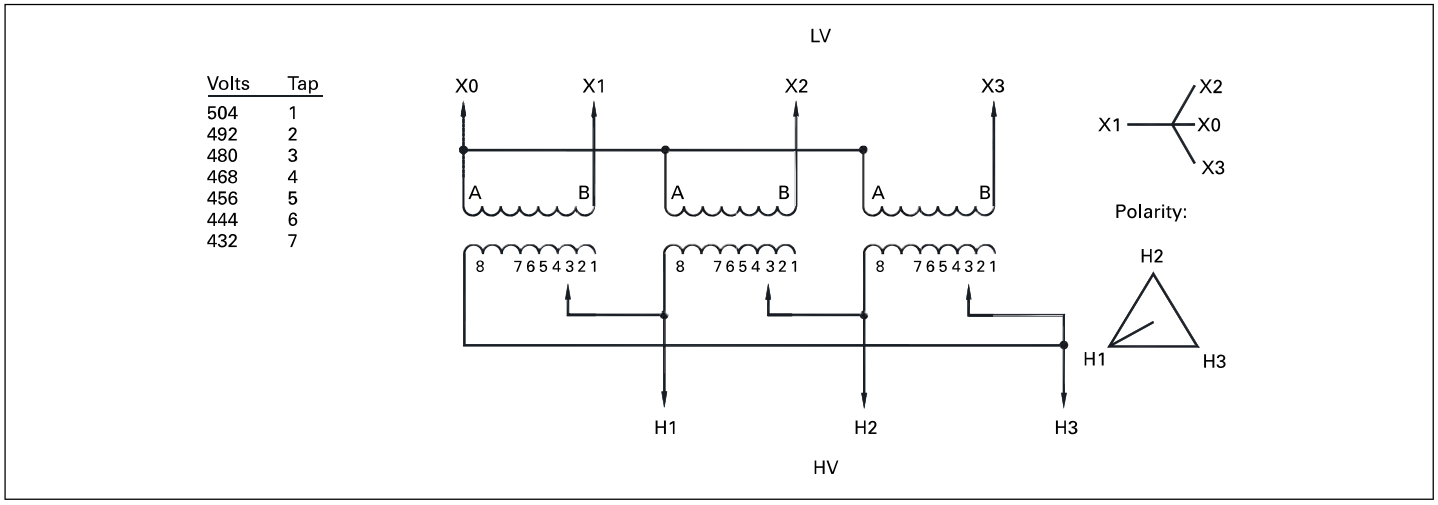


Figure 4. 280B

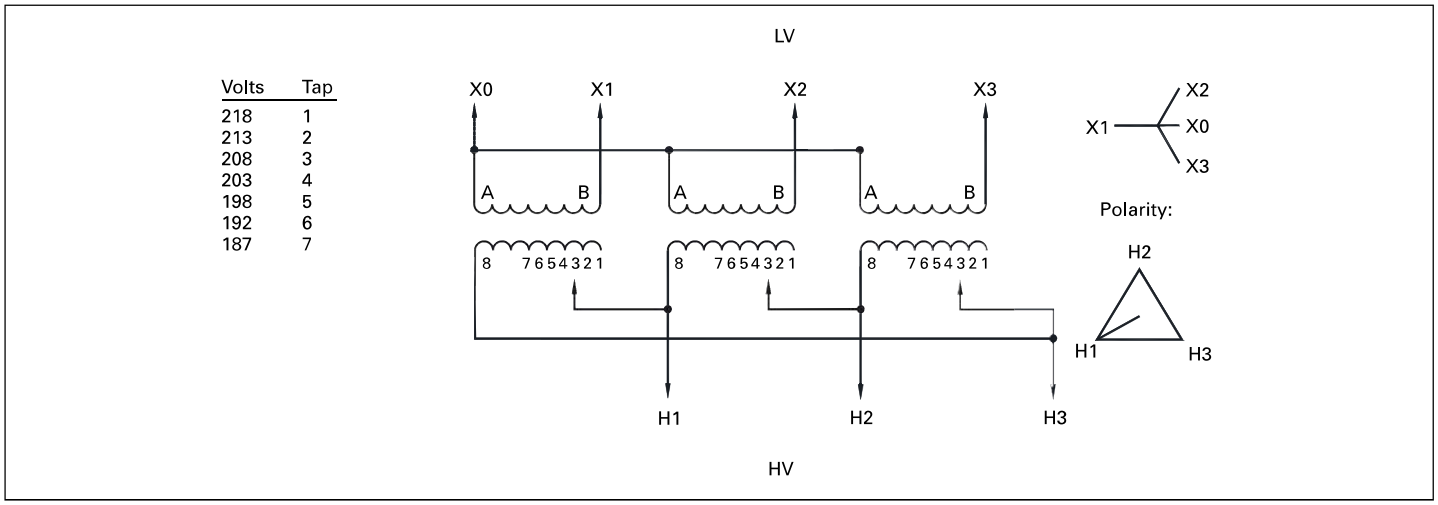


Figure 5. 280E

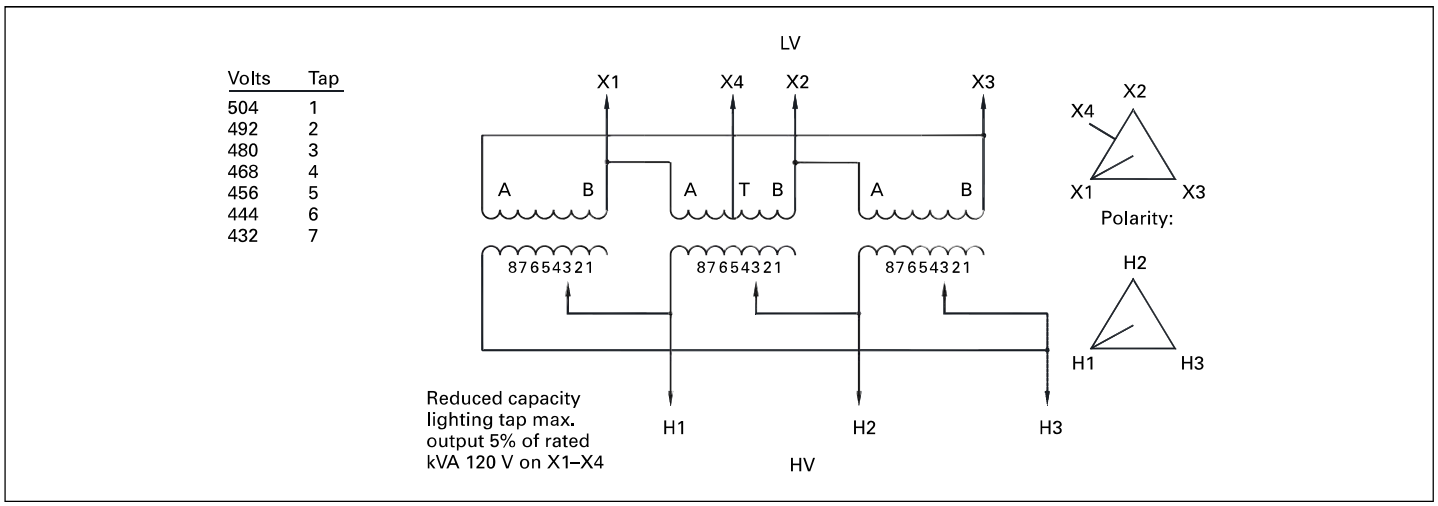


Figure 6. 282B

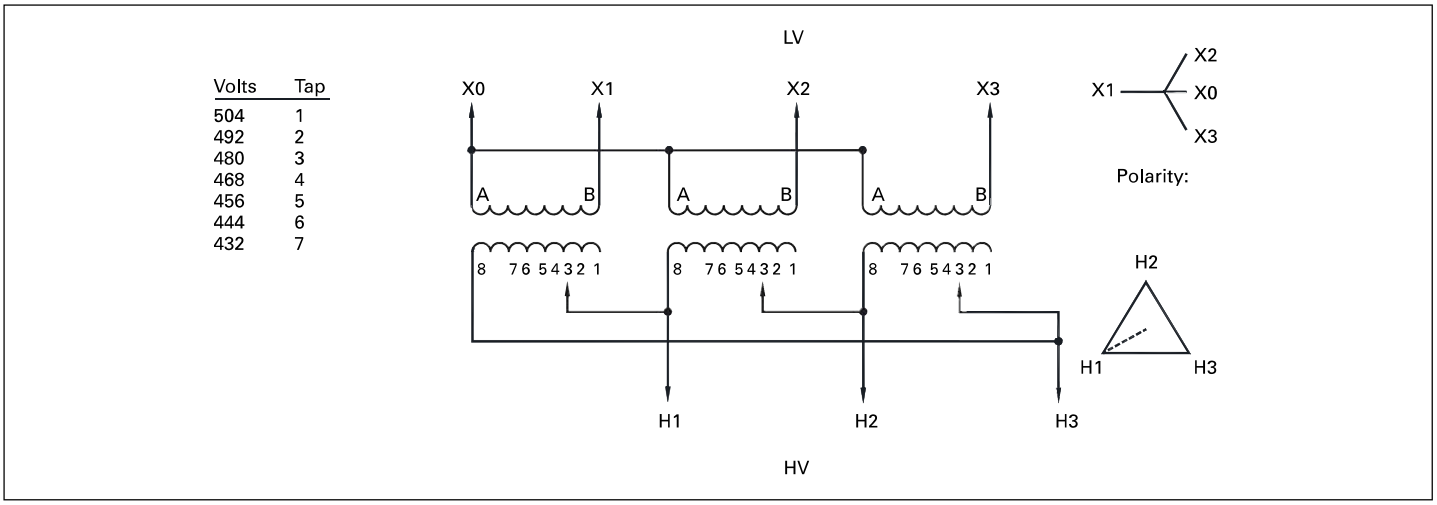


Figure 7. 283B

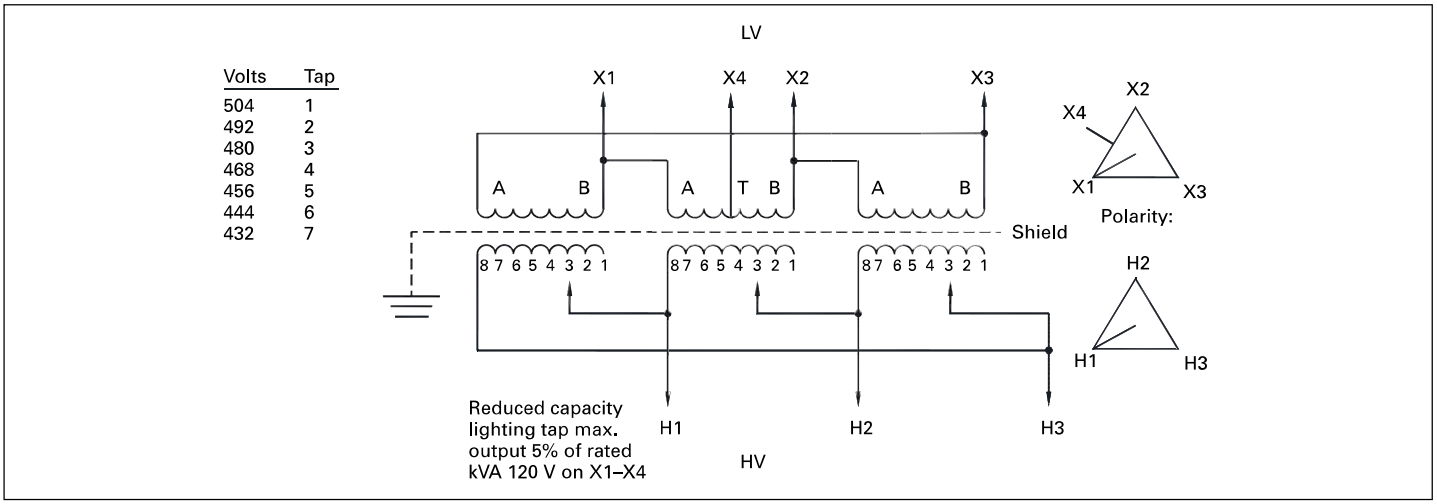


Figure 8. 284B

Volts	Connect
504	4 to 5
492	4 to 6
480	4 to 7
468	3 to 6
456	3 to 7
444	2 to 6
432	2 to 7

Secondary		
Volts	Connect	Line
240	X2 to X3	X1–X4
120	X1 to X3 X2 to X4	X1–X4
120/240 ①	X2 to X3	X1–X2–X4

① Three-wire operation.

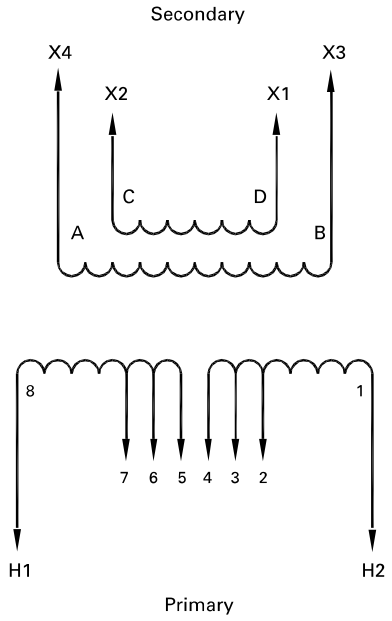


Figure 9. 288A

Volts	Connect
218	3 to 4
208	3 to 5
198	2 to 4
187	2 to 5

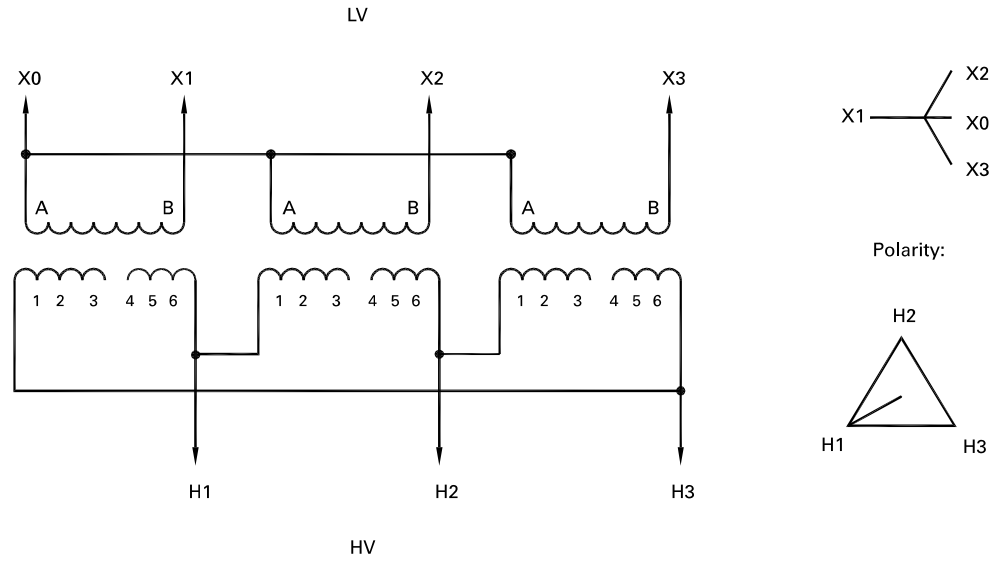


Figure 10. 289D

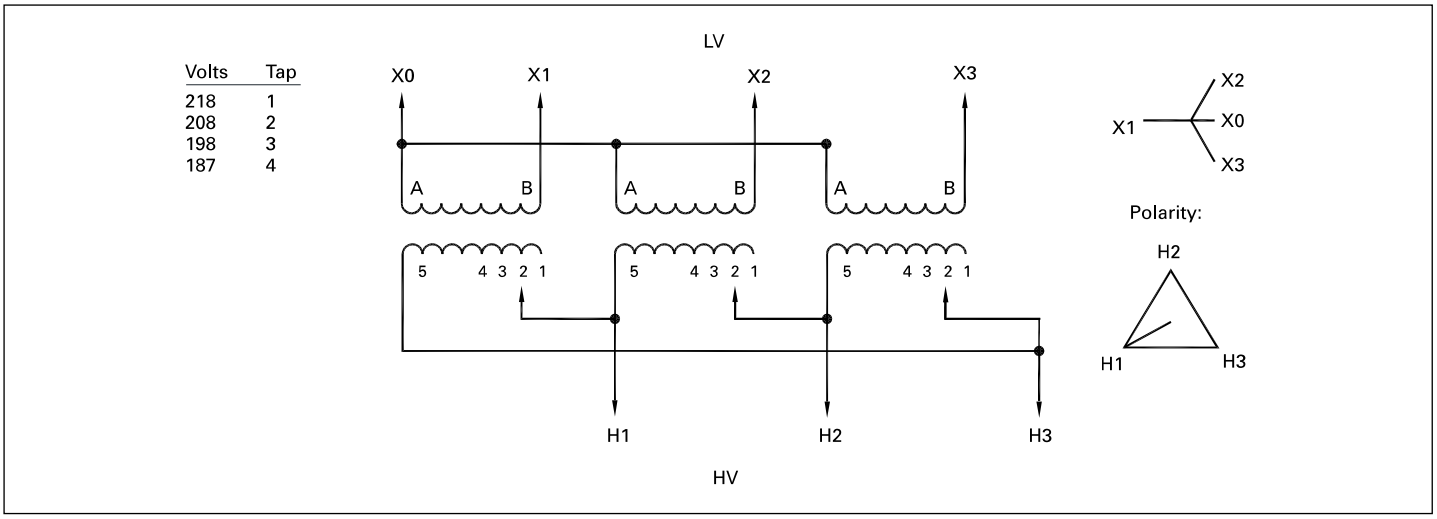


Figure 11. 324A

WDG	Volts	Connect	Line
		Use both cables provided	
Primary	504	5 to 10	H1–H2
	492	5 to 9	H1–H2
	480	4 to 9	H1–H2
	468	4 to 8	H1–H2
	456	3 to 8	H1–H2
	444	3 to 7	H1–H2
	432	2 to 7	H1–H2
		Use 1 cable per connection	
	252	5 to H2 and 10 to H1	H1–H2
	240	4 to H2 and 9 to H1	H1–H2
	228	3 to H2 and 8 to H1	H1–H2
	216	2 to H2 and 7 to H1	H1–H2
Secondary	240	X2 to X3	X1–X4
	120	X1 to X3 and X2 to X4	X1–X4
	120/240 ①	X2 to X3	X1–X3–X4

① Three-wire operation.

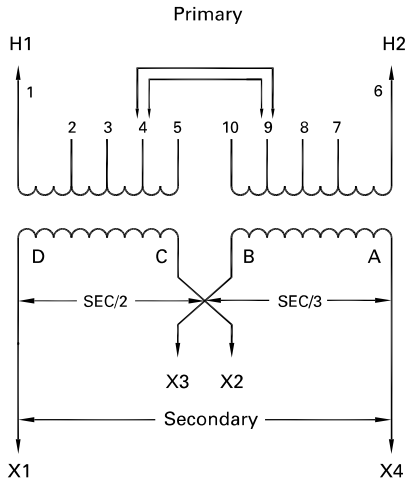


Figure 12. 3XA

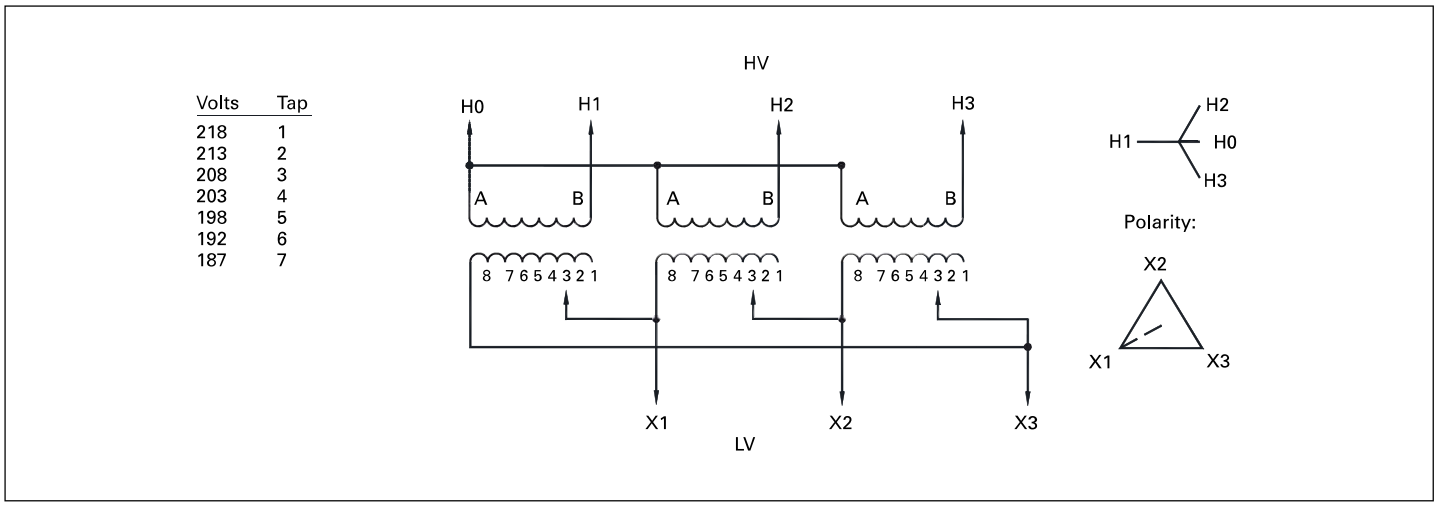


Figure 13. E0342B

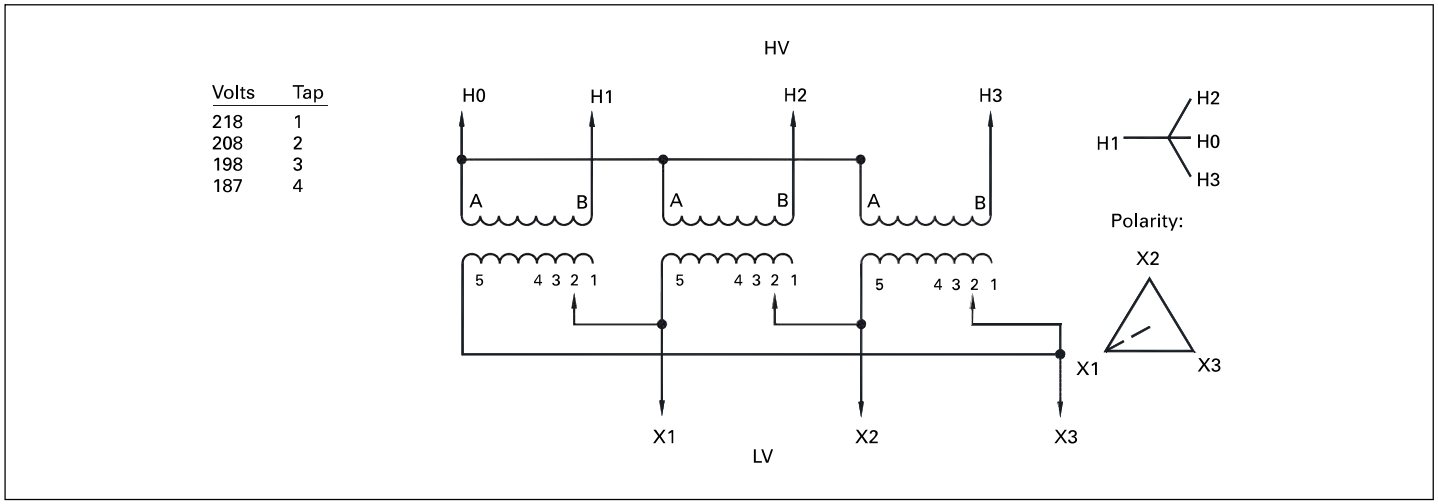


Figure 14. E0351A

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

Printed in USA
Publication No. MZ009002EN / Z18308
July 2016

Powering Business Worldwide

Safety Switches

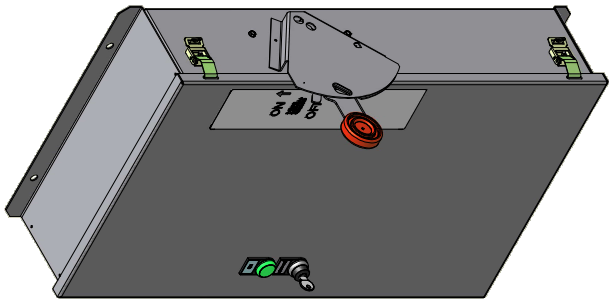
Drawings

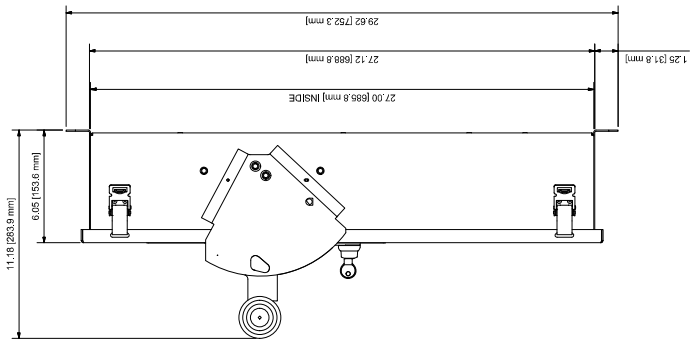
General Information: Elevator Control Switches

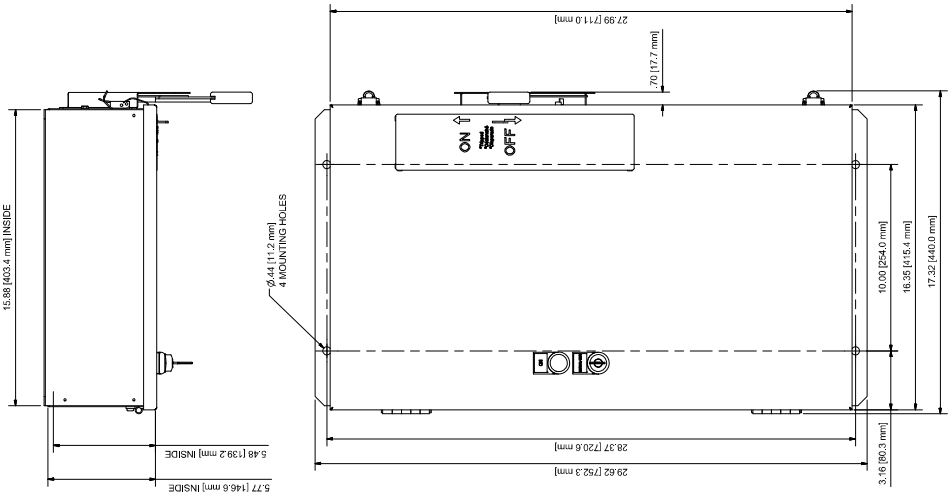
Elevator Control Switch: 60A, 3-Pole, 600VAC (ES2T1R1RF3NB)
Industrial Control Transformer 100VA, 480V:120V
Pilot Light "ON": Red
Three Pole Fire Alarm Voltage Monitoring Relay
NEMA 1 Enclosure
Additional auxiliary contacts - 1 NO / 1 NC (Total: 2 NO / 2 NC)
Isolated Full Capacity Neutral Lug
95-1811 - Technical Data Sheet

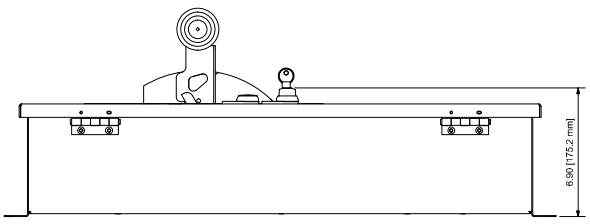
CONFIRM SWITCH AND FUSE SIZE WITH ELEVATOR INSTALLER

PREPARED BY: STEVEN BURNS	DATE: 4/18/2023	Eaton			
APPROVED BY	DATE	JOB NAME: Dutchess Stadium			
		DESIGNATION			
VERSION: 1.0.0.0		TYPE: Elevator Control Switches		DRAWING TYPE: Customer Appr.	
NEG-ALT Number: V0J30111X2K2-0000	REVISION: 0	DWG SIZE: A	G.O.	ITEM	SHEET: 1 of 1









GO/NEG-Alt-Date: V0J30111X2K2-0000-4/18/2023		**Job Name:** Dutchess Stadium
Item Number:	**Catalog Number:** ES2T1R1RF3NB	**Designation:**

Technical Documents

Technical Data **TD00801003E**

Effective November 2011
Supercedes December 2009

Elevator Control ES Switch

Contents

For more information, visit eaton.com

Powering Business Worldwide

Danger and Warnings

⚠DANGER

HAZARDOUS VOLTAGE WILL CAUSE SEVERE INJURY OR DEATH. WORKING ON OR NEAR ENERGIZED CIRCUITS POSES A SERIOUS RISK OF ELECTRICAL SHOCK. DE-ENERGIZE ALL CIRCUITS BEFORE INSTALLING OR SERVICING THIS EQUIPMENT AND FOLLOW ALL PRESCRIBED SAFETY PROCEDURES.

⚠IMPORTANT

THESE PROCEDURES DO NOT CLAIM TO COVER ALL POSSIBLE DETAILS OR VARIATIONS ENCOUNTERED WITH THE ELEVATOR CONTROL SWITCH ELEVATOR DISCONNECT. NOR DO THEY PROVIDE FOR ALL POSSIBLE CONDITIONS THAT MAY BE ENCOUNTERED. IF FURTHER INFORMATION IS DESIRED OR NEEDED TO ADDRESS ANY PARTICULAR ISSUE NOT COVERED IN THIS DOCUMENT, CONTACT YOUR EATON REPRESENTATIVE. THE INFORMATION IN THIS DOCUMENT DOES NOT RELIEVE THE USER FROM EXERCISING GOOD JUDGMENT, NOR FROM USING SOUND SAFETY PRACTICES.

NOTE: BECAUSE EATON HAS A POLICY OF CONTINUOUS PRODUCT IMPROVEMENT, WE RESERVE THE RIGHT TO CHANGE DESIGN SPECIFICATIONS WITHOUT NOTICE. SHOULD A CONFLICT ARISE BETWEEN THE GENERAL INFORMATION IN THIS DOCUMENT AND THE CONTENTS OF DRAWINGS OR SUPPLEMENTARY MATERIAL, OR BOTH, THE LATTER SHALL TAKE PRECEDENCE. FOR THE LATEST VERSION OF THIS INSTRUCTION LEAFLET, DOWNLOAD TD00801003E FROM THE EATON WEB SITE AT: www.eaton.com.

THE CONTENTS OF THIS INSTRUCTION LEAFLET ARE NOT PART OF, NOR DO THEY MODIFY, ANY PRIOR OR EXISTING AGREEMENT, COMMITMENT OR RELATIONSHIP. THE EATON TERMS AND CONDITIONS OF SALE CONSTITUTE THE ENTIRE OBLIGATION OF EATON. THE WARRANTY IN THE TERMS AND CONDITIONS OF SALE IS THE SOLE WARRANTY OF EATON. ANY STATEMENTS IN THIS DOCUMENT DO NOT CREATE NEW WARRANTIES OR MODIFY ANY EXISTING WARRANTY.

⚠IMPORTANT

FOR THE PURPOSE OF THIS INSTRUCTION LEAFLET, A QUALIFIED PERSON:

(A) IS FAMILIAR WITH THE SUBJECT EQUIPMENT AND THE HAZARDS INVOLVED WITH THEIR APPLICATION, USE, ADMINISTRATION, AND MAINTENANCE.

(B) IS TRAINED AND AUTHORIZED TO DE-ENERGIZE, CLEAR, GROUND, AND TAG CIRCUITS AND EQUIPMENT IN ACCORDANCE WITH ESTABLISHED SAFETY PRACTICES.

(C) IS TRAINED IN THE PROPER CARE AND USE OF PERSONAL PROTECTIVE EQUIPMENT SUCH AS RUBBER GLOVES, HARD HAT, SAFETY GLASSES OR FACE SHIELDS, ARC-FLASH CLOTHING, ETC., IN ACCORDANCE WITH ESTABLISHED SAFETY PRACTICES.

(D) IS TRAINED TO RENDER FIRST AID.

(E) HAS RECEIVED SAFETY TRAINING TO RECOGNIZE AND AVOID THE HAZARDS INVOLVED.

(F) AS THE SKILLS AND KNOWLEDGE PERTAINING TO THE CONSTRUCTION AND OPERATION OF THIS EQUIPMENT AND ITS INSTALLATION.

Signal Words

The signal words "DANGER," "WARNING," "CAUTION" and "NOTICE" (along with their assigned symbol) throughout this manual indicate the degree of hazard the user may encounter.

These symbols and words are defined as:

⚠DANGER

DANGER: Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠WARNING

WARNING: Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION

CAUTION: Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE: Indicates a hazardous situation which, if not avoided, could result in property damage.

Safety Concerns

The following are important safety precautions that Elevator Control Switch elevator disconnect users should observe at all times. This summary is not comprehensive. It is assumed the Elevator Control Switch elevator disconnect user will follow standard safety precautions for working in an electrical environment. For more information on safety precautions and procedures, consult the following sources:

Web Sites:

National Fire Protection Association (NFPA): www.nfpa.org.

Underwriters Laboratories (UL): www.ul.com.

National Electrical Manufacturers Association (NEMA): www.nema.org.

International Electrotechnical Commission (IEC): www.iec.ch.

Overview

The Eaton Elevator Control ES disconnect switch is designed for single cable or hydraulic elevator application to interrupt the incoming AC power upon receiving a signal from the Fire Alarm Control Panel (FACP).

The Elevator Control Switch numbering system assures you get all the right components, with the right ratings, and properly assembled. The unit comes completely assembled for quick installation, eliminating the labor and time needed to assemble individual components. It is also easy to meet Code requirements for selective coordination in a fully fused system. The Eaton Elevator Control ES Switch utilizes Class J fuses that easily coordinate with any upstream fuse by simply using a 2:1 lineside-to-loadside fuse ratio.

The Eaton Elevator Control ES Switch meets prevailing ANSI/ASME, NEC® and NFPA 72 requirements in a UL 98 Listed (enclosed switch) and UL 50 Listed (enclosure) unit. It comes in a standard NEMA 1 enclosure or optional NEMA 3R, 4, or 12 enclosures. It is available in 30, 60, 100, 200 or 400 amp configurations, for 208, 240, 480, or 600 Vac, 3 or 4 wire systems with a UL 98 Listed 200kA assembly short-circuit current rating (SCCR).

Standard Features

- 30-400 amp 600 Vac 3-phase fused power switch
- 200 kA RMS assembly short-circuit current rating
- Shunt trip 120 V
- Control power terminal block
- Ground lug per NEC®
- Class J fuse mounting only (Class J fuses not included)
- Key to test switch
- Pilot light – "ON"
- Mechanically interlocked auxiliary contact for hydraulic elevators with battery backup (5 amp 120 Vac rated)

Optional Features

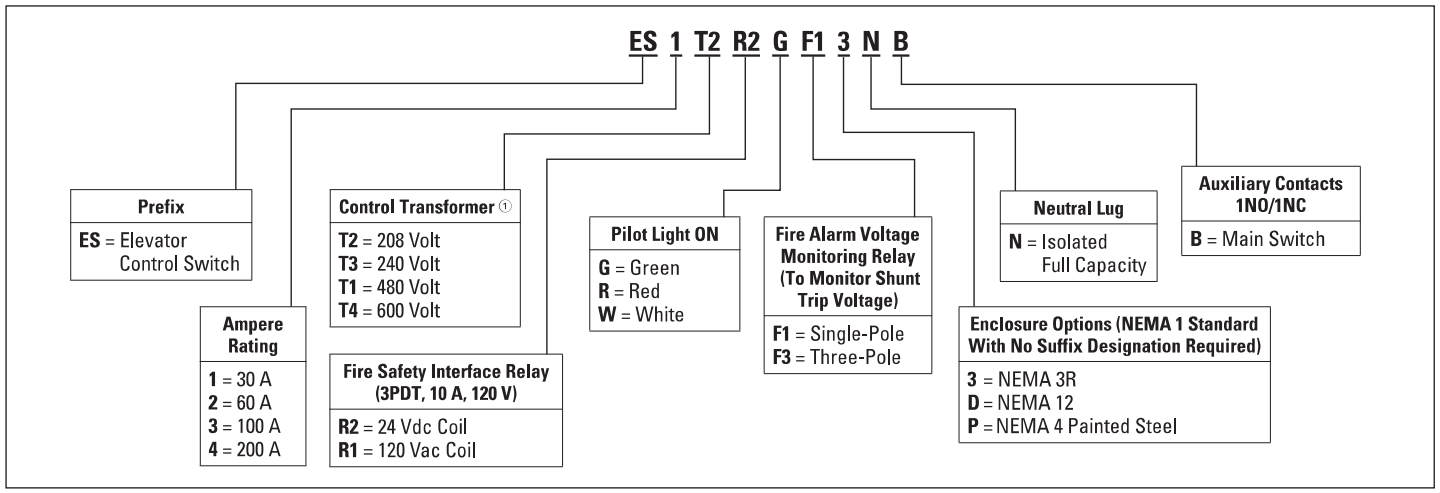
- Control power transformer with fuses and blocks
- Fire safety interface relay
- Isolated neutral lug (oversized 200% rated neutral option available where required by excessive non-linear loads)
- Fire Alarm Voltage Monitoring Relay (to monitor Shunt Trip Voltage)
- NEMA 3R, 4, and 12 enclosures available

Agency Information

- UL 98 Enclosed and Dead Front Switch - Guide 96NK3917, File E182262
- NEMA 1, UL 50, listed enclosure cUL per Canadian Standards C22.1
- CAN/CSA C22.2, No. 4 Enclosed Switch

Catalog Number System

The following catalog numbering system defines an Elevator Control Switch construction.



① 100 VA with Primary and Secondary fusing (120 V Secondary)

Figure 1. Eaton Elevator Control Switch Selector.

Other Options

Optional features include contact closure, i.e. battery lowering/door opening system. The B option offers support for the states of Arizona, Oregon, and Texas requirements to prevent "nuisance" fire alarms by over-riding the "Control Power not Available" signal when the Eaton Elevator Control ES disconnect is manually (intentionally) turned off, and distinctive signaling for ON-OFF-TRIPPED conditions (Option B).

All Eaton Elevator Control elevator disconnect switches are UL-Listed and designed for safe access by qualified personnel. When maintenance or shutdown service is required, no energized parts are exposed inside the enclosure when the disconnect switch is manually turned to the OFF position. For proper maintenance safety precautions, always turn off incoming power to the Eaton Elevator Control ES elevator switch when possible. When servicing any live electrical equipment, always wear appropriate personal protective equipment.

⚠DANGER

ELECTRICAL SHOCK HAZARD. ELECTRICAL EQUIPMENT MAY CONTAIN HAZARDOUS VOLTAGES. THESE CAN CAUSE ELECTRICAL SHOCK, BURN OR DEATH. ONLY QUALIFIED PERSONNEL SHOULD PERFORM PROCEDURES INVOLVING ELECTRICAL EQUIPMENT. ALWAYS PROPERLY GROUND EQUIPMENT AND LOCKOUT ELECTRIC POWER (DE-ENERGIZE) BEFORE ACCESSING ELECTRICAL EQUIPMENT AND ENCLOSURES. ALL DEADFRONTS AND OTHER SHIELDING MUST BE IN PLACE BEFORE ENERGIZING THIS DISCONNECT SWITCH. TAKE NOTE OF AND FOLLOW ALL SAFETY INSTRUCTIONS IN THIS INSTRUCTION LEAFLET.

Shunt-Trip Operation

The disconnecting means is a shunt-trip operated switch. The control power source for the shunt-trip operator is a 120 Vac supply originating in the Eaton Elevator Control ES switch. Current to the shunt-trip device is switched by an isolation relay, which is in turn controlled by the FACP.

The control signal may be either 24 Vdc from the FACP (Option R2) or a "dry" contact closure in the FACP (Option R1). In the case of a "dry" contact closure, the sensing voltage is 120 Vac originating in the Eaton Elevator Control ES switch.

A key test switch (Option K) is included for testing the shunt-trip circuit.

Supervisory Indication

Additionally, an optional separate relay can be specified to monitor the 120 Vac control power source in the Eaton Elevator Control ES switch. This relay (Option F1 or F3) is used to provide supervisory indication of "Control Power Available" as required by NFPA 72 Section 6.15.4.4.

Table 1. Transformer Fuse Table.

ECS Voltage/ Transformer Voltage	Primary Fuse (amps)	Secondary Fuse (amps)
208/120	FNQ-R-2	FNM-1 1/4
240/120	FNQ-R-2	FNM-1 1/4
480/120	FNQ-R-1	FNM-1 1/4
600/120	FNQ-R-1	FNM-1 1/4

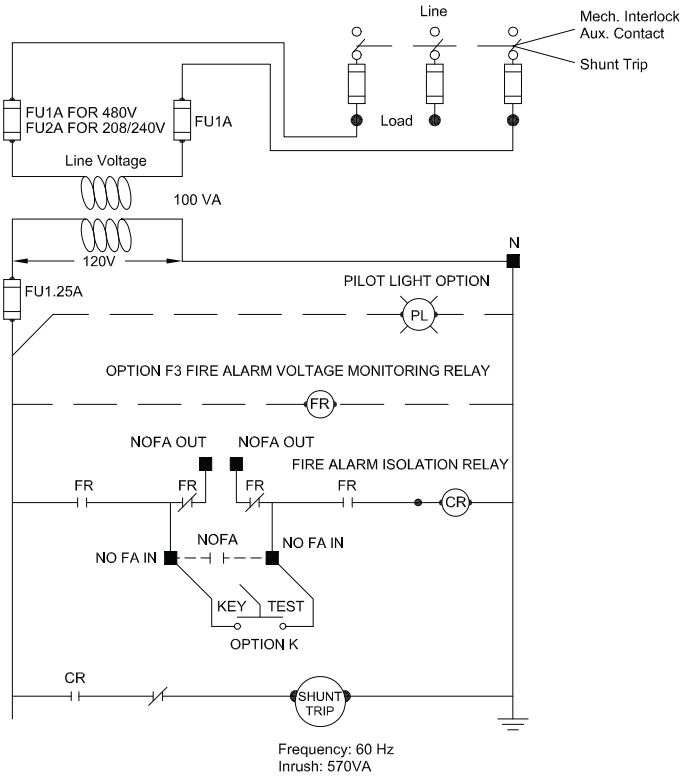
Table 2. Lug Torque Specifications.

Molded Case Switch					Fuse Base			Neutral Mains		
Catalog Number Prefix	Ampacity	Main Lugs (Line) Wire Size Range	Torque Wire Size	in lb	Wire Size Range	Torque Wire Size	in lb	Wire Size Range	Torque Wire Size	in lb
ES1	30 Amp	14 - 1/0	14 - 10 AWG	35	2 - 14 AWG	14 - 10 AWG	35	2 - 14 AWG	14 - 10 AWG	35
			8 AWG	40		8 AWG	40		8 AWG	40
			6 - 4 AWG	45		6 AWG	45		6-2 AWG	45
			3 - 4/0	50						
ES2	60 Amp	14 - 1/0	14 - 10 AWG	35	2 - 14 AWG	14 - 10 AWG	35	2 - 14 AWG	14 - 10 AWG	35
			8 AWG	40		8 AWG	40		8 AWG	40
			6 - 4 AWG	45		6 AWG	45		6 -2 AWG	45
			3 - 4/0	50						
ES3	100 Amp	14 - 1/0	14 - 1/0	50	14 - 1/0	14 - 1/0	50	14 - 1/0	14 - 1/0	50
ES4	200 Amp	4 - 4/0 (3/16 hex recess)	4 - 4/0	120	4 - 300 kcmil (5/16 hex recess)	4 - 300 kcmil	275	6 - 250 kcmil	6 - 250 kcmil	275
ES5	400 Amp	(2) 2 - 500 kcmil	(2) 2 - 500 kcmil	375	(2) 1/0 - 300 kcmil or (1) 750 kcmil	(2) 1/0 - 300 kcmil or (1) 750 kcmil	500	(2) 1/0 - 300 kcmil or (1) 750 kcmil	(2) 1/0 - 300 kcmil or (1) 750 kcmil	500

Typical Control with Wiring Options for Fire Safety Interface

OPTIONS R1 & F3

TYPICAL CONTROL WITH WIRING OPTIONS FOR FIRE SAFETY INTERFACE



Auxiliary Switch Logic						
Main Switch Position	Option A		Option B		Option A *	
	NO	NC	NO	NC	NO	NC
Closed	O	C	O	C	O	C
Tripped	C	C	O	C	C	O
Open	C	O	C	O	C	O

* Auxiliary Switch Logic when blue wire with "+" marker is removed from NC terminal.

Where local authorities having jurisdiction permit, field removal of the blue wire identified by "+" marker will change the option A switch logic. Removal has the effect of disabling the battery lowering device when the switch is in the tripped position. Field installer must ensure this meets all local codes before removal.

LEGEND:

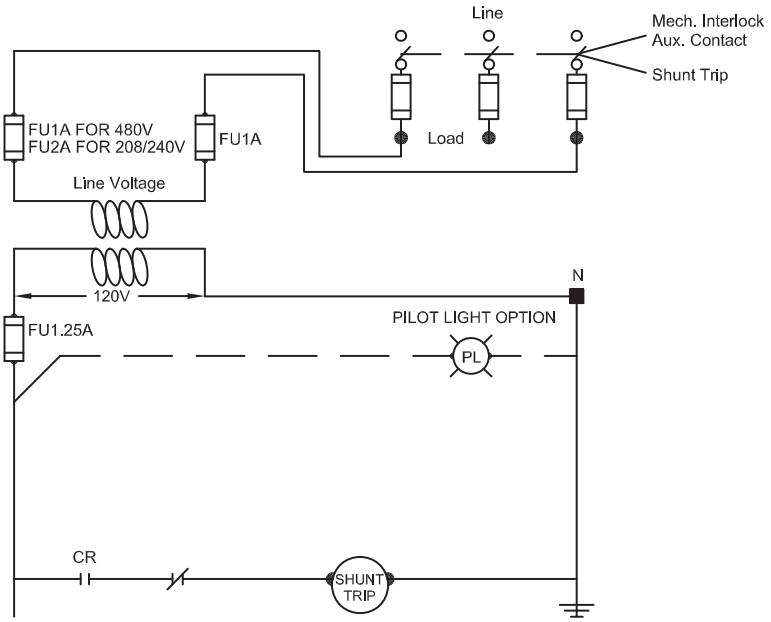
FACP - FIRE ALARM CONTROL PANEL
NOFAIN - NORMALLY OPEN FIRE ALARM CONTROL INPUT.
NOFA - NORMALLY OPEN FIRE ALARM CONTACTS SUPPLIED FROM THE FIRE ALARM SYSTEM TO INITIATE THE SHUNT TRIP.
SHUNT TRIP - SOLENOID FOR REMOTE TRIP OF SWITCH, WHICH IS ACTIVATED BY THE CLOSING OF THE FIRE ALARM CONTACTS OR KEY TEST SWITCH.
OPTION R1 - FIRE ALARM INTERFACE RELAY THAT IS OPERATED AT 120VAC FROM SECONDARY OF TRANSFORMER. NO ADDITIONAL POWER NEEDED.
CR - CONTROL RELAY USED TO ISOLATE THE N.O.F.A. CONTACTS FROM THE DUTY OF THE SHUNT TRIP.
FR - FIRE ALARM VOLTAGE MONITORING RELAY USED TO MONITOR THE STATUS OF CONTROL VOLTAGE FROM A REMOTE LOCATION (i.e. FIRE ALARM CONTROL PANEL).
PL - PILOT LIGHT TO VISUALLY INDICATE PRESENCE OF VOLTAGE ON OUTSIDE OF SWITCH ENCLOSURE.
CPT - CONTROL POWER TRANSFORMER USED TO STEP DOWN LINE VOLTAGE TO 120VAC TO POWER SHUNT TRIP COIL.
SW AUX. - OPTION A OR B, NORMALLY CLOSED CONTACT WHEN SWITCH IS CLOSED. OPENS AS POWER SWITCH OPENS.
KEY TEST - KEY-TO-TEST SWITCH USED TO OPERATE SHUNT TRIP FROM THE OUTSIDE OF SWITCH ENCLOSURE. CAN BE USED FOR TROUBLE-SHOOTING AND INSPECTION.
MECHANICALLY INTERLOCKED AUXILIARY CONTACT - CONTACT USED TO DISABLE BATTERY LOWERING DEVICE.
■ - TERMINAL BLOCK CONNECTION POINT.
● - PRE-WIRED CONNECTION POINTS.

Figure 2. Options R1 and F3.

Typical Control with Wiring Options for Fire Safety Interface (Cont.)

OPTION R2

TYPICAL CONTROL WITH WIRING OPTIONS FOR FIRE SAFTEY INTERFACE



Frequency: 60 Hz
Inrush: 570VA

AUXILIARY SWITCH LOGIC						
MAIN SWITCH	OPTION A		OPTION B		OPTION A *	
POSITION	NO	NC	NO	NC	NO	NC
CLOSED	O	C	O	C	O	C
TRIPPED	C	C	O	C	C	O
OPEN	C	O	C	O	C	O

* AUXILIARY SWITCH LOGIC WHEN BLUE WIRE WITH "+" MARKER IS REMOVED FROM NC TERMINAL

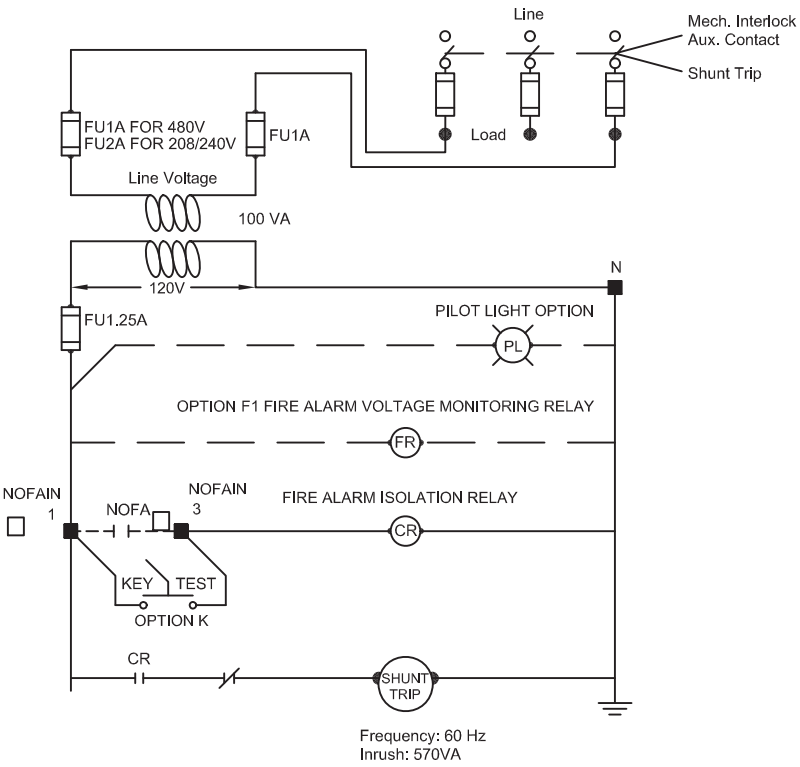
WHERE LOCAL AUTHORITIES HAVING JURISDICTION PERMIT, FIELD REMOVAL OF THE BLUE WIRE IDENTIFIED BY "+" MARKER WILL CHANGE THE OPTION A SWITCH LOGIC, SEE THE AUXILARY SWITCH LOGIC TABLE, REMOVAL HAS THE EFFECT OF DISABLING THE BATTERY LOWERING DEVICE WHEN THE SWITCH IS IN THE TRIPPED POSITION. FIELD INSTALLER MUST ENSURE THIS MEETS ALL LOCAL CODES BEFORE REMOVAL.

LEGEND:
FACP - FIRE ALARM CONTROL PANEL
NOFAIN - NORMALLY OPEN FIRE ALARM CONTROL INPUT.
NOFA - NORMALLY OPEN FIRE ALARM CONTACTS SUPPLIED FROM THE FIRE ALARM SYSTEM TO INITIATE THE SHUNT TRIP.
SHUNT TRIP - SOLENOID FOR REMOTE TRIP OF SWITCH, WHICH IS ACTIVATED BY THE CLOSING OF THE FIRE ALARM CONTACTS OR KEY TEST SWITCH.
OPTION R1 - FIRE ALARM INTERFACE RELAY THAT IS OPERATED AT 120VAC FROM SECONDARY OF TRANSFORMER. NO ADDITIONAL POWER NEEDED.
CR - CONTROL RELAY USED TO ISOLATE THE N.O.F.A. CONTACTS FROM THE DUTY OF THE SHUNT TRIP.
FR - FIRE ALARM VOLTAGE MONITORING RELAY USED TO MONITOR THE STATUS OF CONTROL VOLTAGE FROM A REMOTE LOCATION (i.e. FIRE ALARM CONTROL PANEL).
PL - PILOT LIGHT TO VISUALLY INDICATE PRESENCE OF VOLTAGE ON OUTSIDE OF SWITCH ENCLOSURE.
CPT - CONTROL POWER TRANSFORMER USED TO STEP DOWN LINE VOLTAGE TO 120VAC TO POWER SHUNT TRIP COIL.
SW AUX. - OPTION A OR B, NORMALLY CLOSED CONTACT WHEN SWITCH IS CLOSED. OPENS AS POWER SWITCH OPENS.
KEY TEST - KEY-TO-TEST SWITCH USED TO OPERATE SHUNT TRIP FROM THE OUTSIDE OF SWITCH ENCLOSURE. CAN BE USED FOR TROUBLE-SHOOTING AND INSPECTION.
MECHANICALLY INTERLOCKED AUXILIARY CONTACT - CONTACT USED TO DISABLE BATTERY LOWERING DEVICE.
■ - TERMINAL BLOCK CONNECTION POINT.
● - PRE-WIRED CONNECTION POINTS.

NOTE: TERMINAL 1 IS NOT PRESENT WHEN OPTION K IS ABSENT.

Figure 3. Option R2

Typical Control with Wiring Options for Fire Safety Interface (Cont.)



AUXILIARY SWITCH LOGIC						
MAIN SWITCH POSITION	OPTION A		OPTION B		OPTION A *	
	NO	NC	NO	NC	NO	NC
CLOSED	O	C	O	C	O	C
TRIPPED	C	C	O	C	C	O
OPEN	C	O	C	O	C	O

* AUXILIARY SWITCH LOGIC WHEN BLUE WIRE WITH "+" MARKER IS REMOVED FROM NC TERMINAL

WHERE LOCAL AUTHORITIES HAVING JURISDICTION PERMIT, FIELD REMOVAL OF THE BLUE WIRE IDENTIFIED BY "+" MARKER WILL CHANGE THE OPTION A SWITCH LOGIC, SEE THE AUXILARY SWITCH LOGIC TABLE, REMOVAL HAS THE EFFECT OF DISABLING THE BATTERY LOWERING DEVICE WHEN THE SWITCH IS IN THE TRIPPED POSITION. FIELD INSTALLER MUST ENSURE THIS MEETS ALL LOCAL CODES BEFORE REMOVAL.

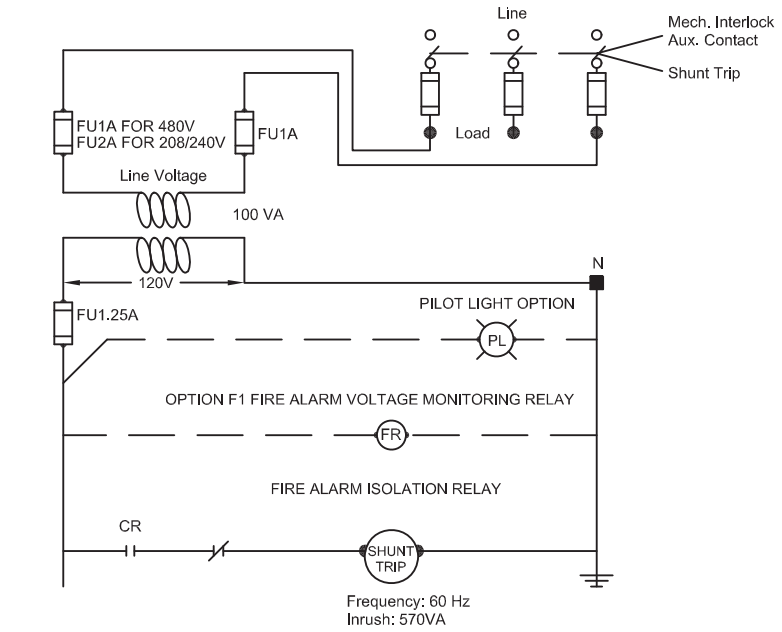
LEGEND:
FACP - FIRE ALARM CONTROL PANEL
NOFAIN - NORMALLY OPEN FIRE ALARM CONTROL INPUT.
NOFA - NORMALLY OPEN FIRE ALARM CONTACTS SUPPLIED FROM THE FIRE ALARM SYSTEM TO INITIATE THE SHUNT TRIP.
SHUNT TRIP - SOLENOID FOR REMOTE TRIP OF SWITCH, WHICH IS ACTIVATED BY THE CLOSING OF THE FIRE ALARM CONTACTS OR KEY TEST SWITCH.
OPTION R1 - FIRE ALARM INTERFACE RELAY THAT IS OPERATED AT 120VAC FROM SECONDARY OF TRANSFORMER. NO ADDITIONAL POWER NEEDED.
CR - CONTROL RELAY USED TO ISOLATE THE N.O.F.A. CONTACTS FROM THE DUTY OF THE SHUNT TRIP.
FR - FIRE ALARM VOLTAGE MONITORING RELAY USED TO MONITOR THE STATUS OF CONTROL VOLTAGE FROM A REMOTE LOCATION (i.e. FIRE ALARM CONTROL PANEL).
PL - PILOT LIGHT TO VISUALLY INDICATE PRESENCE OF VOLTAGE ON OUTSIDE OF SWITCH ENCLOSURE.
CPT - CONTROL POWER TRANSFORMER USED TO STEP DOWN LINE VOLTAGE TO 120VAC TO POWER SHUNT TRIP COIL.
SW AUX. - OPTION A OR B, NORMALLY CLOSED CONTACT WHEN SWITCH IS CLOSED. OPENS AS POWER SWITCH OPENS.
KEY TEST - KEY-TO-TEST SWITCH USED TO OPERATE SHUNT TRIP FROM THE OUTSIDE OF SWITCH ENCLOSURE. CAN BE USED FOR TROUBLE-SHOOTING AND INSPECTION.
MECHANICALLY INTERLOCKED AUXILIARY CONTACT - CONTACT USED TO DISABLE BATTERY LOWERING DEVICE.
■ - TERMINAL BLOCK CONNECTION POINT.
● - PRE-WIRED CONNECTION POINTS.

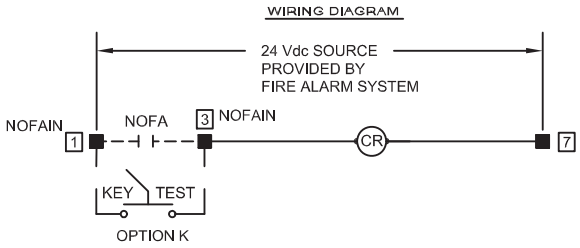
Figure 4. Options R1 and F1

Typical Control with Wiring Options for Fire Safety Interface (Cont.)

OPTION R2 & F1

TYPICAL CONTROL WITH WIRING OPTIONS FOR FIRE SAFTEY INTERFACE





AUXILIARY SWITCH LOGIC						
MAIN SWITCH	OPTION A		OPTION B		OPTION A *	
POSITION	NO	NC	NO	NC	NO	NC
CLOSED	O	C	O	C	O	C
TRIPPED	C	C	O	C	C	O
OPEN	C	O	C	O	C	O

* AUXILIARY SWITCH LOGIC WHEN BLUE WIRE WITH "+" MARKER IS REMOVED FROM NC TERMINAL

WHERE LOCAL ANTHORITIES HAVING JURISDICTION PERMIT, FIELD REMOVAL OF THE BLUE WIRE IDENTIFIED BY "+" MARKER WILL CHANGE THE OPTION A SWITCH LOGIC, SEE THE AUXILARY SWITCH LOGIC TABLE, REMOVAL HAS THE EFFECT OF DISABLING THE BATTERY LOWERING DEVICE WHEN THE SWITCH IS IN THE TRIPPED POSITION. FIELD INSTALLER MUST ENSURE THIS MEETS ALL LOCAL CODES BEFORE REMOVAL.

LEGEND:
FACP - FIRE ALARM CONTROL PANEL
NOFAIN - NORMALLY OPEN FIRE ALARM CONTROL INPUT.
NOFA - NORMALLY OPEN FIRE ALARM CONTACTS SUPPLIED FROM THE FIRE ALARM SYSTEM TO INITIATE THE SHUNT TRIP.
SHUNT TRIP - SOLENOID FOR REMOTE TRIP OF SWITCH, WHICH IS ACTIVATED BY THE CLOSING OF THE FIRE ALARM CONTACTS OR KEY TEST SWITCH.
OPTION R1 - FIRE ALARM INTERFACE RELAY THAT IS OPERATED AT 120VAC FROM SECONDARY OF TRANSFORMER. NO ADDITIONAL POWER NEEDED.
CR - CONTROL RELAY USED TO ISOLATE THE N.O.F.A. CONTACTS FROM THE DUTY OF THE SHUNT TRIP.
FR - FIRE ALARM VOLTAGE MONITORING RELAY USED TO MONITOR THE STATUS OF CONTROL VOLTAGE FROM A REMOTE LOCATION (i.e. FIRE ALARM CONTROL PANEL).
PL - PILOT LIGHT TO VISUALLY INDICATE PRESENCE OF VOLTAGE ON OUTSIDE OF SWITCH ENCLOSURE.
CPT - CONTROL POWER TRANSFORMER USED TO STEP DOWN LINE VOLTAGE TO 120VAC TO POWER SHUNT TRIP COIL.
SW AUX. - OPTION A OR B, NORMALLY CLOSED CONTACT WHEN SWITCH IS CLOSED. OPENS AS POWER SWITCH OPENS.
KEY TEST - KEY-TO-TEST SWITCH USED TO OPERATE SHUNT TRIP FROM THE OUTSIDE OF SWITCH ENCLOSURE. CAN BE USED FOR TROUBLE-SHOOTING AND INSPECTION.
MECHANICALLY INTERLOCKED AUXILIARY CONTACT - CONTACT USED TO DISABLE BATTERY LOWERING DEVICE.
■ - TERMINAL BLOCK CONNECTION POINT.
● - PRE-WIRED CONNECTION POINTS.

NOTE: TERMINAL 1 IS NOT PRESENT WHEN OPTION K IS ABSENT.

Figure 5. Options R2 and F1

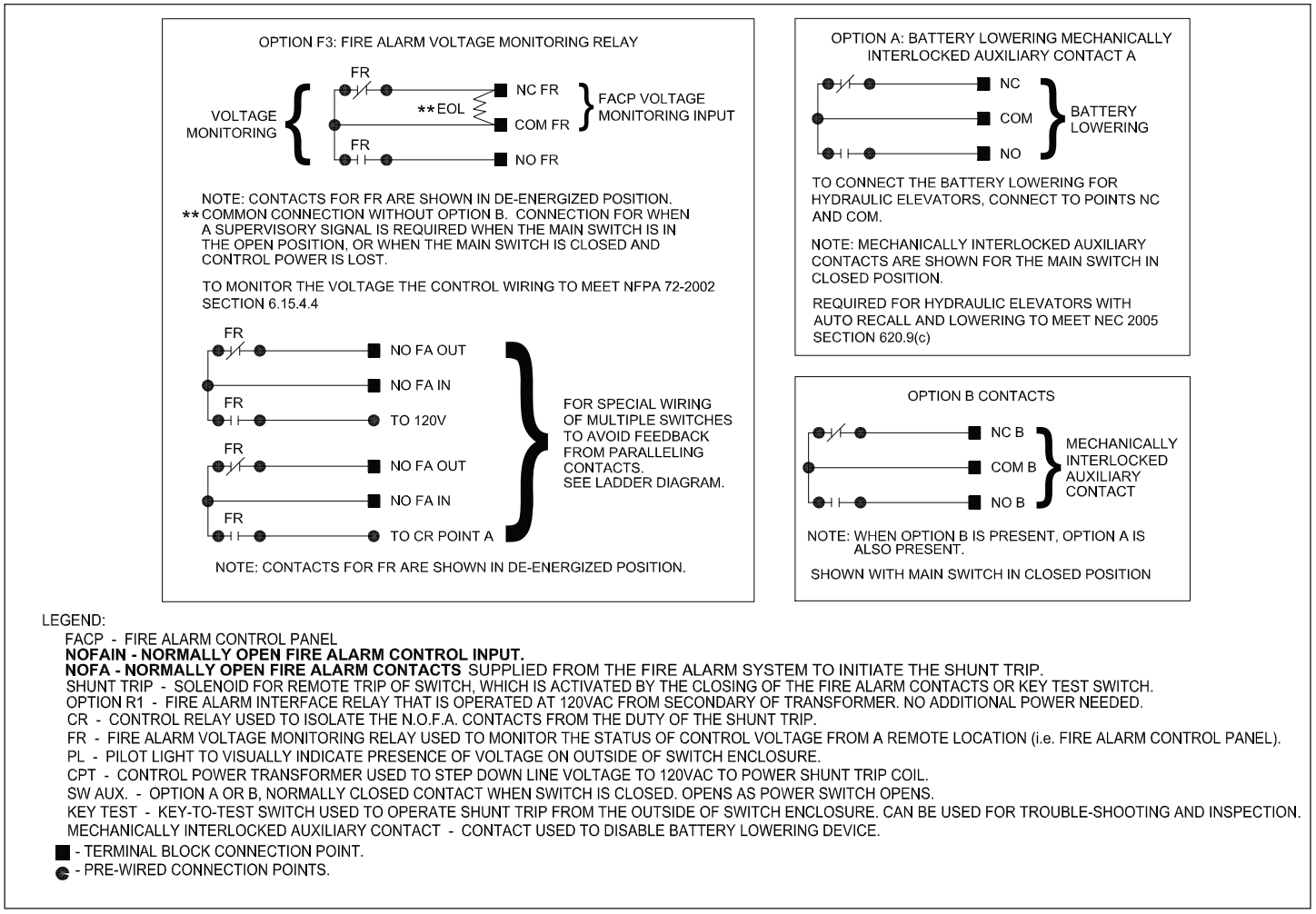


Figure 6. Option F3.

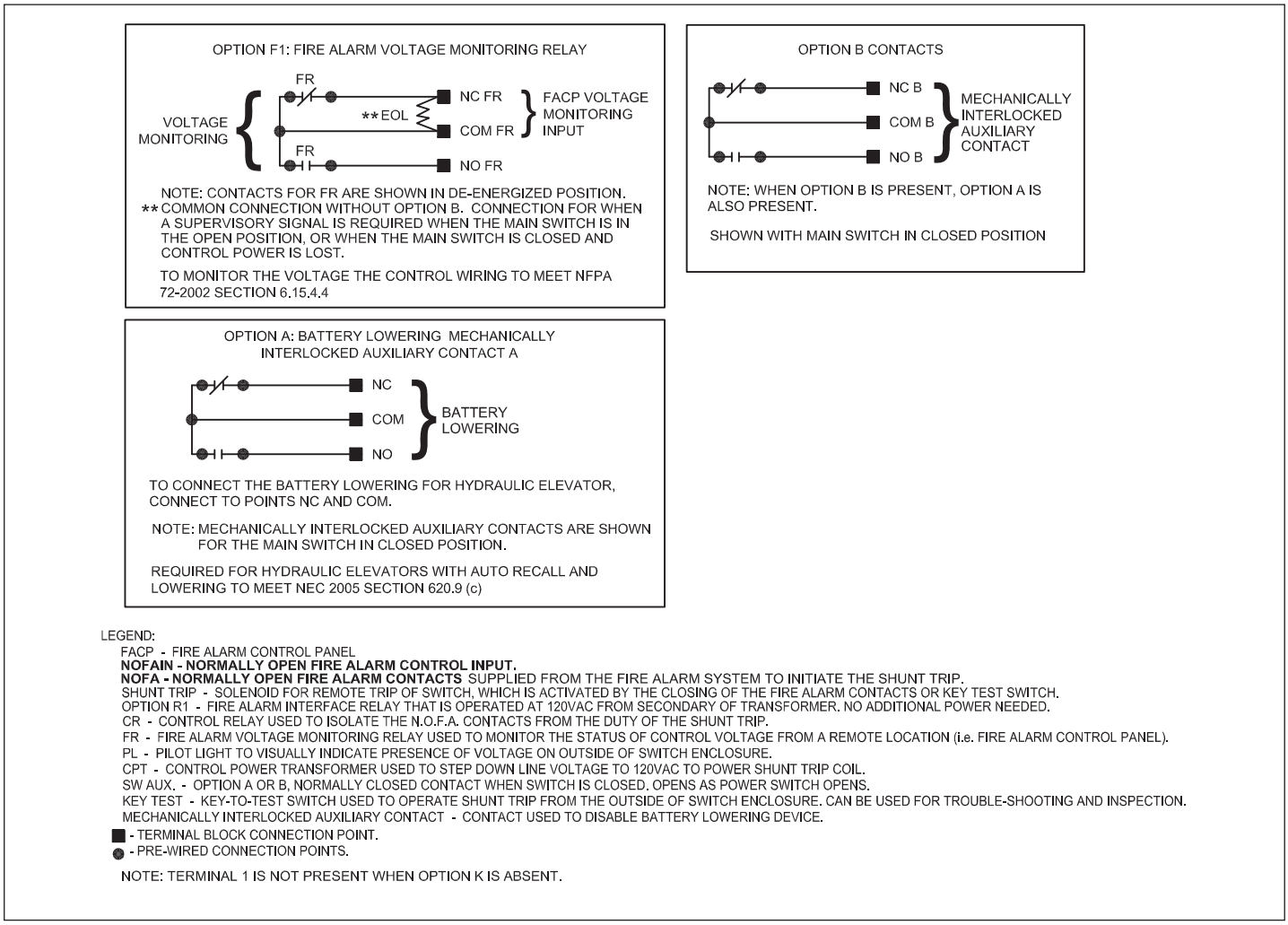


Figure 7. Option F1

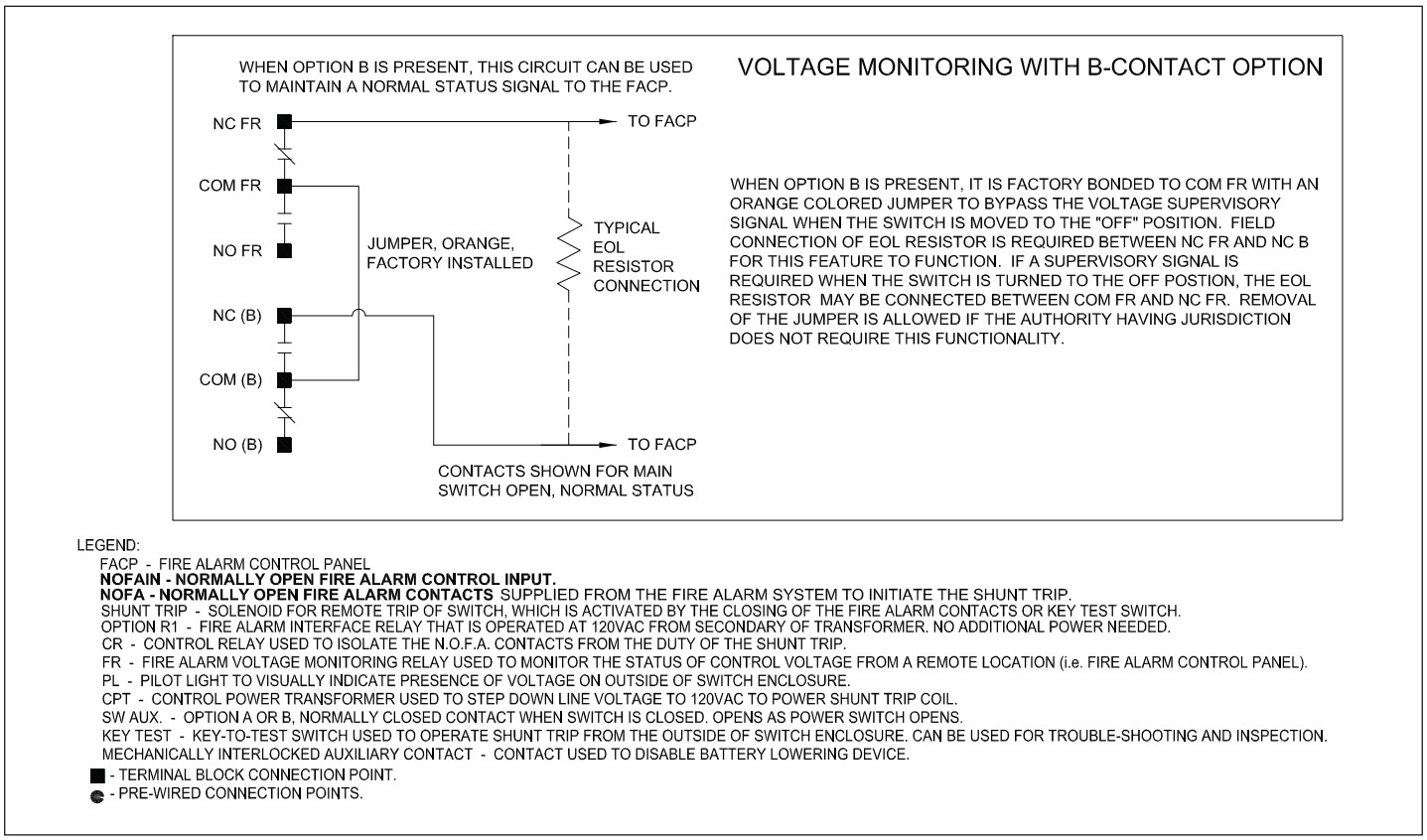


Figure 8. Voltage Monitoring with B-Contact Option.

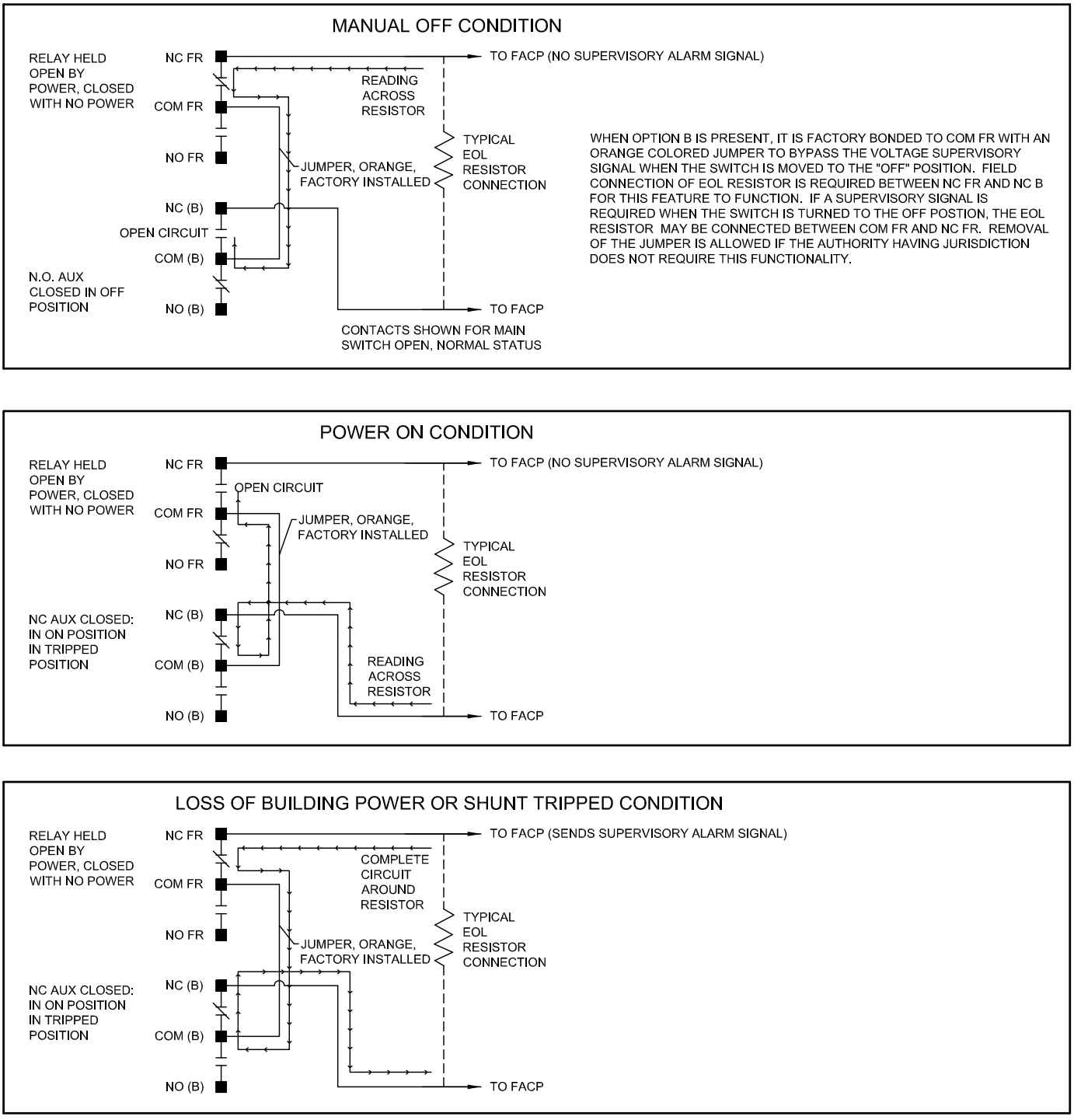


Figure 9. Common Wiring Scheme for AZ, TX, and OR Applications. Elevator Control Option B Detail.

⚠DANGER

ELECTRICAL SHOCK HAZARD. ELECTRICAL EQUIPMENT MAY CONTAIN HAZARDOUS VOLTAGES. THESE CAN CAUSE ELECTRICAL SHOCK, BURN OR DEATH. ONLY QUALIFIED PERSONNEL SHOULD PERFORM PROCEDURES INVOLVING ELECTRICAL EQUIPMENT. ALWAYS PROPERLY GROUND EQUIPMENT AND LOCKOUT ELECTRIC POWER (DE-ENERGIZE) BEFORE ACCESSING ELECTRICAL EQUIPMENT AND ENCLOSURES. ALL DEADFRONTS AND OTHER SHIELDING MUST BE IN PLACE BEFORE ENERGIZING THIS DISCONNECT SWITCH. TAKE NOTE OF AND FOLLOW ALL SAFETY INSTRUCTIONS IN THIS INSTRUCTION LEAFLET.

Maintenance

To properly maintain the Eaton Elevator Control ES Switch, the operation of all components should be tested on an annual basis by a qualified person.

- Take the necessary precautions to notify the occupants of the building that the elevator is under maintenance and has been taken out of service.
- Verify that power is on.
- Activate the Fire Alarm system contacts for the shunt trip.

  Note: A Fire Alarm Technician may be required to exercise this step. If a key test switch is included with the Elevator Control ES switch, it can be used to shunt trip the unit without the Fire Alarm system.
- This will energize the Fire Alarm Isolation Relay and close relay contact points 4 and 7.
- The closure of points 4 and 7 will energize the shunt trip coil, open the contacts of the switch, and place the switch and handle into the "TRIP" position.
- Verify that power has been disconnected and the handle is in the "TRIP" position.
- Pull to the "RESET" position and allow handle to go to the "OFF" position.
- Push to the "ON" position.
- Verify that power has been restored.
- The above sequence verifies that the contents of the Eaton Elevator Control ES Switch are operating properly. If the above sequence is unable to be completed, please contact Eaton.

Preventative Maintenance Measures

- Periodically check lug torque values and keep them in specification.
- An annual review of the Eaton Elevator Control ES Switch is recommended. Preventative maintenance should include a thermal-scan to uncover any portion generating excessive heat that indicates an underlying problem.
- Any unexpected temperature increase, not related to load variations or ambient temperature could signal a lug torque issue.
- Maximum temperature at any lug should never exceed 75°C under any operating condition or load.
- Keep switch exterior and interior clean. Always follow prevailing safety rules when servicing this product throughout the year.

Frequently Asked Questions

For more information or if you have additional questions, please contact EatonCare. 877-ETN-CARE (877-386-2273).

1. What UL-Listings and Agency Standards does the Eaton Elevator Control ES have?

- NFPA-70 (NEC®) 2008 Edition- Section 620.51(A)-(C), 620.62, 620.91(C)
- Canadian Electric Code Part 1 (2006 Edition) Section 38-051, 38-062
- ANSI/ASME A17.1-2007 - Section 2.8.3.3.2 NFPA-72 2007 Edition - Section 6.16.4.4

All work shall be performed in accordance with the latest edition of applicable standards, codes, and laws.

2. What kind of fuses does Eaton recommend?

LPJ_SP or LPJ_SPI (indication version) dual-element, time-delay Class J fuses. The panel's holders only accept this class of fuse. The fuses are current limiting for good short-circuit and motor overload protection, and minimizing are flash hazards. For general fuse sizing the NEC® Article 430.52 allows sizing time-delay fuses used in motor branch circuits to be sized for up to 175% of the motor full load amps.

3. How does the Mechanical Auxiliary Contact Option (Option A) work?

The "A" Option is a set of auxiliary contacts that are mechanically interlocked to the main switch. The contacts are used to enable or disable the Battery Lowering Device (BLD) for maintenance per NFPA code. It is important to note that these contacts can differentiate between manually turned OFF or shunted OFF (see table below). The most common contact is the "NC," normally closed.

Table 3.

Auxiliary Switch Logic						
Main Switch Position	Option A		Option B		Option A *	
	NO	NC	NO	NC	NO	NC
Closed	O	C	O	C	O	C
Tripped	C	C	O	C	C	O
Open	C	O	C	O	C	O

* Auxiliary Switch Logic when blue wire with "+" marker is removed from NC terminal.

4. How does the Mechanical Auxiliary Contact Option (Option B) work?

The "B" Option provides a second set of auxiliary contacts that are mechanically interlocked to the main switch. These contacts are generally used to monitor the status of the switch. It is important to note that these contacts will follow the state of the external handle (see table below and Figure 5).

Table 4.

Main Switch	Contact State		FACP
	NO	NC	NCFR/NCB
OFF, Power Avail	Open	Closed	Open
ON, Power Avail	Closed	Open	Open
OFF, No Power	Open	Closed	Open
ON, No Power	Closed	Open	Closed

5. How does the Special Wiring Option for maintaining Normal Status Signal to the FACP work?

For Arizona and other areas requiring this feature, internal wiring between the molded case switch's auxiliary contacts and the fire relay's contacts implements a logic circuit that monitors the availability of shunt-trip power. The FR relay closes only if the main switch is ON and the shunt-trip power fails. They will not close if the main switch is manually turned OFF for maintenance, the Series B contact will open, thus preventing a false alarm. (Refer to Table 4 and Figure 5).

6. Does the instantaneous trip feature built into the molded case switch create the potential to strand passengers when used on circuits with hydraulic elevators and auxiliary battery lowering?

No, the Battery Lowering Device (BLD) remains operational under a shunt-trip condition. The shunt-trip mechanism within the switch is utilized, not the instantaneous trip feature of the switch. The proper fuse selection will prevent instantaneous trip. Even in the event of an instantaneous trip condition, the alarm relay will respond the same as when the switch is shunted off. There is no potential for stranding passengers when units are installed with the Mechanical Interlock Auxiliary Contact Option (Option A, battery back-up feature).

7. During a power loss, will the state of the switch change state (F1 or F3 option)?

The Eaton Elevator Control ES switch will not change state. The Eaton Elevator Control ES Voltage Monitoring Relay (F1 or F3 Option) does meet NFPA 72 (National Fire Alarm Code) requiring control circuits to be monitored for presence of voltage. The unit is wired to sense the voltage available to initiate the shunt-trip. It will change state if a power loss occurs. It does not rely on the shunt-trip itself. It will send a signal to the FACP upon power loss.

8. How does the Eaton Elevator Control ES switch decide when the elevator needs to be lowered?

The Eaton Elevator Control ES switch does not make that decision. It provides a signaling means to the fire alarm controller and BLD. The Elevator Control switch receives a signal from the FACP to shunt-trip, which in some cases results in the use of the Battery Lowering Device (BLD).

9. Does the Eaton Elevator Control ES switch require any periodic maintenance?

While no specific maintenance is called for, it is always a good practice to annually inspect the unit for any lose fuse clips or connections, or accumulation of foreign material. See "Maintenance" in this document for more details.

10. How do you hook up the dry contacts for the battery back-up (BLD) option?

This will depend on how the Mechanical Auxiliary Contact (Option A) will be connected. The A Option will follow the truth table noted below. The most common connection will be between NC and COM.

Table 5.

Auxiliary Switch Logic						
Main Switch Position	Option A		Option B		Option A *	
	NO	NC	NO	NC	NO	NC
Closed	O	C	O	C	O	C
Tripped	C	C	O	C	C	O
Open	C	O	C	O	C	O

* Auxiliary Switch Logic when blue wire with "+" marker is removed from NC terminal.

Where local authorities having jurisdiction permit, field removal of the blue wire identified by "+" marker will change the Option A switch logic. Removal has the effect of disabling the battery lowering device when the switch is in the tripped position. Field installer must ensure this meets all local codes before removal.

11. Where do you land the shunt-trip control wires on the terminal strip?

For the R1 Option (120Vac), land the wires on Terminals 1 and 3 or NOFAIN and NOFAIN (Normally Open Fire Alarm IN). For the R2 (24Vdc) option, land the positive on Terminal 1 and the closure on Terminal 3, with the return on Terminal 7.

12. Where does the fire alarm get connected for monitoring the status of the switch?

This is commonly referred to as the FR relay and is Option F1 or F3. NCFR/COM FR is the most common. If an end of line (EOL) resistor is used, install it parallel to the wires.

13. If an Eaton Elevator Control ES switch is ordered with a wrong component, can the component be changed in the field?

No. To comply with UL guidelines, product modifications can only be completed by authorized factory personnel. Other modifications will void the Eaton UL listing. One exception is the B-option. It can be ordered and field installed; the part number is ECSBKIT.

14. Can the Eaton Elevator Control ES switch be used as a service entrance switch?

The Eaton Elevator Control ES switch is UL-Listed per UL 98. Yes, it can be used as a service entrance if properly labeled as such and proper ground bond requirements are met.

15. Can the Eaton Elevator Control ES switch be fed in reverse with the line from the bottom and load out the top of the switch?

No, the Eaton Elevator Control ES switch will not properly function.

16. Can the Eaton Elevator Control ES switch be used in an application where no fire alarm exists and can a smoke detector be connected instead?

No, this is not in accordance with the fire code. Commercial smoke detectors must be connected through the FACP.

17. Does the FR Relay (Option F1 or F3) change state during a power loss?

Yes, the FR relay will change state. The FR relay is designed to monitor voltage that is available for the shunt-trip. This is a requirement of NFPA 72.

18. Is the operating handle of the Eaton Elevator Control ES switch lockable in the "OFF" position only?

From the factory the handle can only be locked in the "OFF" position and can accommodate a maximum of three padlocks. Field modification to drill the shroud can allow locking in the "ON" position. Check with your local AHJ for requirements. The switch will shunt trip as usual, even with the handle locked ON.

19. What enclosures are available for the Eaton Elevator Control ES Switch?

All ratings of the Eaton Elevator Control ES switch come standard with a UL (NEMA) Type 1 enclosure. Optional enclosures include UL (NEMA) type 3R, 4, and 12. Consult the factory for other options.

20. Is a CPT always required in an Eaton Elevator Control ES switch?

Yes, to meet NFPA codes, a CPT will be required to supply the 120Vac for shunt-tripping.

21. I lost the keyswitch, can I get another?

Yes. The part number is E22KS2 if the back of the switch says E22. If the back of the switch says M22, the part number is M22-ES-MS1.

These technical data materials are published solely for information purposes and should not be considered all-inclusive. If further information is required, you should consult an authorized Eaton sales representative.

The sale of the product shown in this literature is subject to the terms and conditions outlined in appropriate Eaton selling policies or other contractual agreement between the parties. This literature is not intended to and does not enlarge or add to any such contract. The sole source governing the rights and remedies of any purchaser of this equipment is the contract between the purchaser and Eaton.

NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, OR WARRANTIES ARISING FROM COURSE OF DEALING OR USAGE OF TRADE, ARE MADE REGARDING THE INFORMATION, RECOMMENDATIONS, AND DESCRIPTIONS CONTAINED HEREIN. In no event will Eaton be responsible to the purchaser or user in contract, in tort (including negligence), strict liability or otherwise for any special, indirect, incidental or consequential damage or loss whatsoever, including but not limited to damage or loss of use of equipment, plant or power system, cost of capital, loss of power, additional expenses in the use of existing power facilities, or claims against the purchaser or user by its customers resulting from the use of the information, recommendations and description contained herein.

Eaton Corporation
Electrical Group
1000 Cherrington Parkway
Moon Township, PA 15108
United States
877-ETN-CARE (877-386-2273)
Eaton.com

Printed in USA
Publication No. TD00801003E TBG000266
November 2011

Powering Business Worldwide

Product specifications

Eaton FRS-R-60

Catalog Number: FRS-R-60

Eaton Bussmann series FRS-R fuse, 60 A, Dual, Class RK5, Non-indicating, Ferrule end x ferrule end, 10 sec at 500%, 200 kAIC at 600 V|20 kAIC at 250 Vdc, Standard, 600 V, 250 Vdc

General specifications

Product Name	**Catalog Number**
Eaton Bussmann series FRS-R fuse	FRS-R-60
UPC	**Product Length/Depth**
051712508391	13.38 in
Product Height	**Product Width**
2.88 in	2.88 in
Product Weight	**Warranty**
3.6 lb	Not Applicable
Compliances	
CE Marked	

Electrical rating

Amperage Rating

60 A

Interrupt rating

200 kAIC at 600 Vac

20 kAIC at 250 Vdc

Response time

10 sec at 500%

Voltage rating

600 Vac, 250 Vdc

Physical details

Number of elements

Dual

Packaging type

Standard

General information

Class

Class RK5

Connection

Ferrule end x ferrule end

Fuse indicator

Non-indicating

Resources

Catalogs

Bussmann series full line catalog 1007, section 01- low voltage branch circuit fuses

Multimedia

Bussmann series Fuseology

Specifications and datasheets

Eaton Specification Sheet - FRS-R-60

Technical data sheets

FRS-R-60~FUSETRON DUAL ELEMENT FUSE CLASS RK5

Technical service bulletins

Datasheet - FNQ-30

Eaton Corporation plc
Eaton House
30 Pembroke Road
Dublin 4, Ireland
Eaton.com

Eaton.com/socialmedia

MILBANK®
ENERGY AT WORK

U4497-XL

OBTAIN APPROVAL FROM UTILITY CENTRAL HUDSON.

Catalog Number	U4497-XL
Marketing Product Description	13 Terminal Ringless Small Closing Plate Lever Bypass Test Switch Provision
UPC	784572208216
Length (IN)	4.844
Width (IN)	12
Height (IN)	22
Brand Name	Milbank
Type	Ringless Meter Socket
Application	Meter Socket
Standard	UL Listed;Type 3R
Voltage Rating	600 Volts Alternating Current
Amperage Rating	20 Continuous Ampere
Phase	3 Phase
Frequency Rating	60 Hertz
Size	4.844L x 12W x 22H
Number Of Cutouts	0
Cutout Size	No Main Breaker
Cable Entry	Overhead or Underground
Terminal	Single Mechanical
Insulation	Glass Polyester
Mounting	Surface Mount

Enclosure	G90 Galvanized Steel with Powder Coat Finish
Jaw Quantity	13 Terminal
Bypass Type	Lever Bypass
Number of Meter Positions	1 Position
Equipment Ground	2 Barrel Ground Lug
Hub Opening	Small Closing Plate
Line Side Wire Range	14 - 2 AWG
Load Side Wire Range	14 - 2 AWG
Number Of Receptacles	0

Please consult serving utility for their requirements prior to ordering or installing, as specifications and approvals vary by utility and may require local electrical inspector approval. All installations must be installed by a licensed electrician and must comply with all national and local codes, laws and regulations. Milbank reserves the right to make changes in specifications and features shown without notice or obligation.

MILBANK®
ENERGY AT WORK

U1855-O-NE

OBTAIN APPROVAL FROM UTILITY CENTRAL HUDSON. UTILITY MIGHT PUT CT'S IN UTILITY TRANSFORMER INSTEAD OF SEPARATE CABINET.

Catalog Number	U1855-O-NE
Marketing Product Description	12in-36in-36in Painted Steel Double Front Lift Off Hinged Cover 3 Point Latch Current Transformer Rack Installed With Lugs-3 Per Landing
UPC	784572730076
Length (IN)	12
Width (IN)	36
Height (IN)	36
Weight (LB)	178
Brand Name	Milbank
Type	Hinge Cover
Special Features	Lift Off Hinge Cover; Northeast Utilities; Single Mechanical Line Side and Single Mechanical Load Side
Application	Current Transformer Enclosure
Standard	UL Listed
Material	G90 Galvanized Steel with Powder Coat Finish
Size	12L x 36W x 36H
Color	ANSI 61 Gray
Cable Entry	No Knockouts
Mounting	Wall Mount
NEMA Rating	Type 3R

Door or Cover	Double Door
Back Panel	Ground Stud
Mounting Rack	Current Transformer Mounting Rack Installed with Lugs - 3 per Landing
Depth	12