

# Low Voltage Switchboards and Switchgear

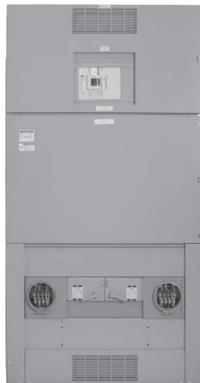
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**CMP-A1 Switchboard**



**CMP-A2 Switchboard**



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## CMP Switchboards

### Product Description

Eaton's CMP switchboard combines all three components of a service entrance application into a single cell, including a main service compartment, a utility metering section and the distribution feeders, providing the most flexible and compact footprint for the entire service entrance switchboard.

### Application Description

Eaton's CMP switchboard is ideally suited to commercial and industrial applications such as:

- Light Commercial
- Retail
- Shopping Plaza
- Shopping Centers
- Institutions / Schools
- Agricultural
- Small buildings
- Sports and entertainment facilities

### Features, Benefits and Functions

The service entrance panel is CSA® approved and completely factory assembled. Barriers are provided to isolate the main disconnect, the utility metering compartment and the distribution section into three separate compartments. The design allows for the assembly to be reversed in the field without modification and to accommodate either top or bottom entry of service entrance cables.

- Freestanding (18"D Only)
- Compact and space-efficient
- Top or bottom entry
- Meets the provincial and municipal metering requirements
- Accommodates a variety of utility CTs and PTs
- CSA approved up to 800A (CMP-A1) and 1200A (CMP-A2) at 600 Vac
- Main breaker maximum 800A (CMP-A1) and 1200A (CMP-A2)
- Breakers are padlockable to ensure maximum security
- Standard enclosure ratings of CSA Type 1 &

- sprinklerproof, & NEMA 3R optional
- Sealing screws, knurled thumb screws and padlock hasp
- Utility ground stud
- Hydro stubs are available
- Distribution cell accommodates Eaton's Series C and Series G breakers, fusible switches (FDPW), metered switches up to 200A (FSMC) and chassis-mounted panelboards
- User metering (refer to Tab 9-Components, or contact Eaton for more information)
- Surge protection devices (refer to Tab 9-Components, or contact Eaton for more information)
- Door-Over-Distribution
- Special Colours

### Enclosure

The service entrance switchboard is standard CSA Type 1 & sprinklerproof, and NEMA 3R is optional. The CSA Type 1 & sprinklerproof options are fabricated from code gauge formed galvanized steel, complete with flat covers to form a rigid deadfront totally enclosed structure.

All compartments are designed to make

components totally front accessible to enable the panel to be installed against the wall. Freestanding option is available for 18" deep enclosure.

All covers are painted ANSI 61 grey.

### Busbar System

- Tin-plated aluminum
- Silver-flashed copper
- Tin-plated copper

### Main Breaker

Eaton type main breaker, maximum 800A (CMP-A1) or 1200A (CMP-A2) with standard thermal-magnetic or solid-state trip units available. The trip unit on the standard thermal-magnetic breaker may be changed; however, all power to the switchboard must be disconnected prior to removal of the breaker cover.

The main breaker section comes complete with provisions for padlocking the main breaker and the sealing screws on the front cover. Grounding is supplied with a removable disconnect link to ground the neutral, the service conduit and the system ground.

# Low Voltage Switchboards and Switchgear

## CMP Switchboards

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### Utility Metering Compartment

The utility metering compartment is designed to meet the provincial and municipal utility requirements. It is busbed and pre-drilled to accept standard bus type current transformers. Utility CTs and PTs can be easily factory or field installed. The compartment has provisions for sealing the front cover, and the cover has a hinged door for easy access.

Metering options include:

- CTs—window type and bar type
- External clamp-on CTs to verify meter
- Up to four PTs in utility compartment
- Neutral and ground studs available

Utility specific options:

- Standard
- BC Hydro
- Hydro Quebec
- Alectra utilities

### Distribution Section

The distribution section accepts the installation of circuit breakers on a Pow-R-Line 4 type interior. A flat cover is supplied and any space not occupied by a feeder breaker has a filler plate, allowing no access to parts when energized.

The distribution section accommodates 14 three-pole breakers ("21X" of circuit breaker distribution space; 1X = 1-3/8 inch).

### Standards and Certifications

- CSA C22.2 No. 31
- CSA C22.2 No. 244
- CSA C22.2 No. 229

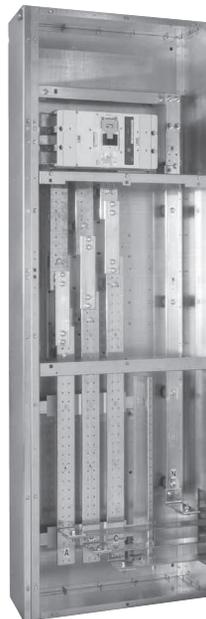


### Product Selection

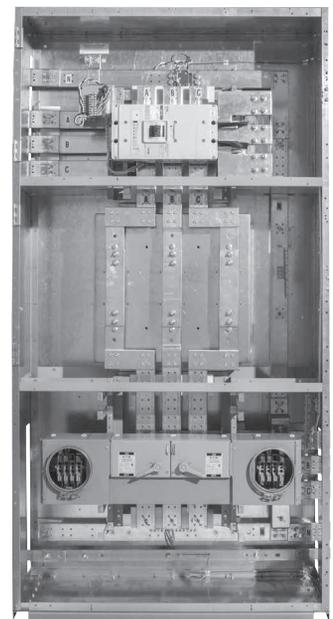
Description	Type
800A maximum at 600 Vac	<b>CMP-A1</b>
1200A maximum at 600 Vac	<b>CMP-A2</b>

### Breaker Accessories

- Padlock hasp
- Visible windows
- Electronic trip units
- Shunt trip
- Auxiliary switch
- Bell alarm
- Undervoltage release



CMP-A1



CMP-A2

### Technical Data and Specifications

#### Rating

The service entrance panel bus is rated to 800A (CMP-A1), 1200A (CMP-A2), 600V, three-phase, four-wire, 60 Hz.

#### Interrupting Rating

- Maximum 65 kA at 600V
- Maximum 200 kA at 240V

#### Breaker Options CMP-A1

Device Type	Ampere Rating	kA Value 240V	600V	Mounting Height
<b>Main Breakers</b>				
KD Frame	70–400 ②	65–200	25–65	4X
LD Frame	300–600	65–200	25–50	6X
LG Frame	250–600	65–200	18–65	4X
MDL Frame	300–800 ③	65–100	25–35	6X
NG Frame	320–800	65–200	25–65	6X
<b>Branch Breakers</b>				
FD Frame	15–225	18–200	14–35	3X
JD Frame	70–250	65–200	18–35	3X
KD Frame	70–400 ②	65–200	25–65	4X
LD Frame	300–600	65–200	25–50	6X
LG Frame	250–600	65–200	18–65	4X

#### FSMC Device Options CMP-A2

Ampere Rating	Single or Twin	X Space ①
30/30	Twin	7X
30/60	Twin	7X
60/30	Twin	7X
60/60	Twin	7X
100/100	Twin	7X
200	Single	7X

#### Breaker Options CMP-A2

Device Type	Ampere Rating	kA Value 240V	600V	Mounting Height ①
<b>Main Breakers</b>				
KD Frame	70–400 ②	65–200	25–65	4X
LD Frame	300–600	65–200	25–50	6X
LG Frame	250–600	65–200	18–65	4X
MDL Frame	300–800 ③	65–100	25–35	6X
NG Frame	500–1200	65–200	25–65	6X
<b>Branch Breakers</b>				
FD Frame	15–225	18–200	14–35	3X
JD Frame	70–250	65–200	18–35	3X
KD Frame	70–400 ②	65–200	25–65	4X
LD Frame	300–600	65–200	25–50	6X
LG Frame	250–600	65–200	18–65	4X
MDL Frame	300–800 ③	65–100	25–35	6X
NG Frame	500–1200	65–200	25–65	6X

#### Branch Fusible Switches-CMP A2

Device Type	Cell Width 38-Inch	44-Inch	Mounting Height ①
30/30A twin	Y	Y	4X
30/60A twin	Y	Y	4X
60/60A twin	Y	Y	4X
100/100A twin	Y	Y	5X
200A (single or twin)	Y	Y	6X
400A	Y	Y	9X
600A	Y	Y	11X
800A	N	Y	11X
1200A	N	Y	15X

#### Notes

- ① 1X = 1-3/8 inch.
- ② Ampere ratings below 100A available with electronic trip unit only.
- ③ Ampere ratings below 400A available with thermal-magnetic only.



Twin 30A, 60A or 100A FSMC Switch



Single 200A FSMC Switch

# Low Voltage Switchboards and Switchgear

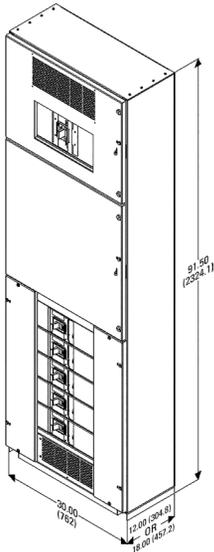
## CMP Switchboards

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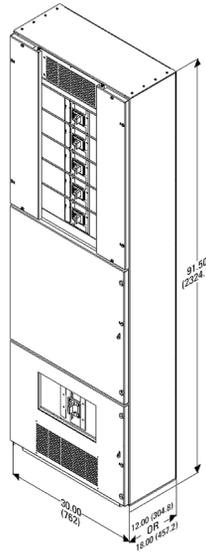
### Dimensions (CSA Type 1 & Sprinklerproof)

Approximate Dimensions in Inches (mm)

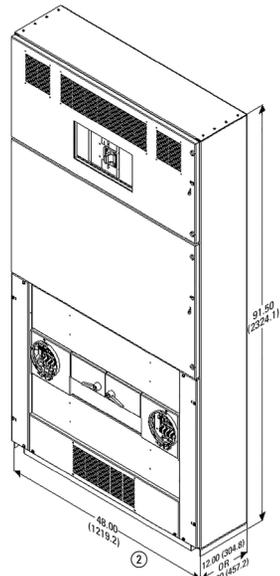
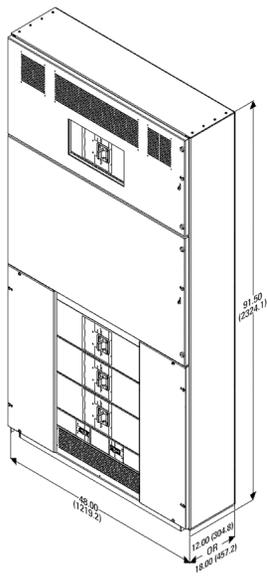
**Layout A: Top-Fed CMP-A1 Main/PUC/21X Distribution (800A Maximum at 600 Vac)**



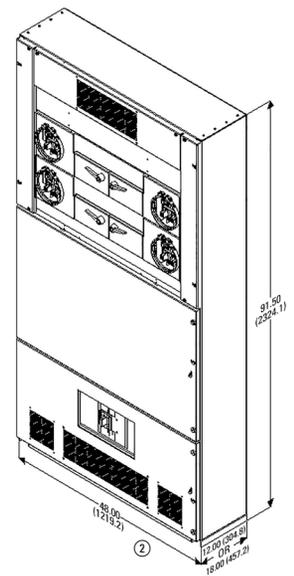
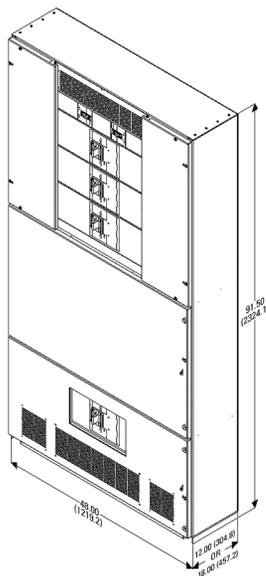
**Layout B: Bottom-Fed CMP-A1 Main/PUC/21X Distribution (800A Maximum at 600 Vac)**



**Layout C: Top-Fed CMP-A2 Main/PUC/21X Distribution (1200A Maximum at 600 Vac)**



**Layout D: Bottom-Fed CMP-A2 Main/PUC/21X Distribution (1200A Maximum at 600 Vac)**



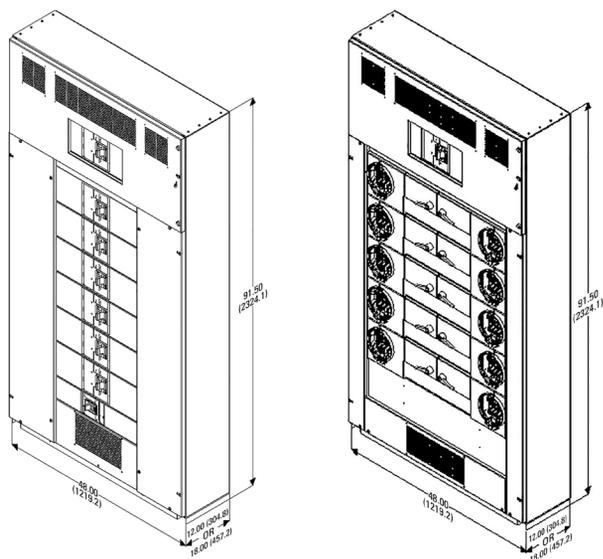
### Notes

- ① 1X = 1-3/8 inch
- ② Bottom-fed: Only 2 rows of twin 100A or single 200A FSMC. Top fed: Only 1 row of single 200A or twin 100A FSMC
- ③ For NEMA 3R dimensions consult your local Eaton sales representative

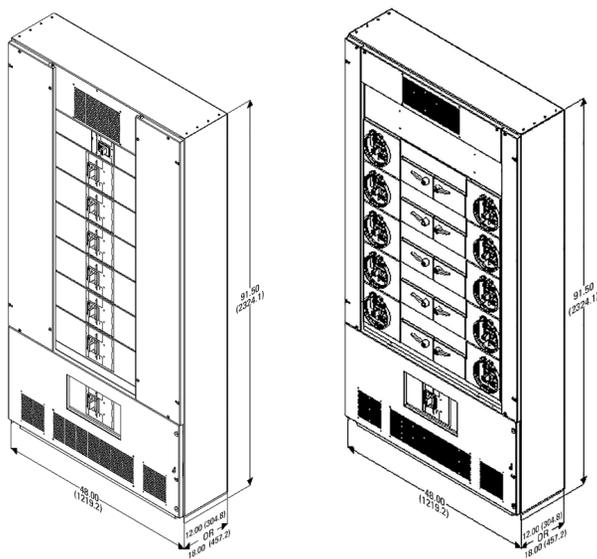
### Dimensions (CSA Type 1 & Sprinklerproof)

Approximate Dimensions in Inches (mm)

**Layout E: Top-Fed CMP-A2 Main/40X  
Distribution (1200A Maximum at 600 Vac)**



**Layout F: Bottom-Fed CMP-A2 Main/40X  
Distribution (1200A Maximum at 600 Vac)**



# Low Voltage Switchboards and Switchgear

## CMP Switchboards

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### Pow-R-Line CS Switchboards



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### Pow-R-Line CS Switchboards

#### Product Description

Eaton's Pow-R-Line CS switchboard is the most compact expandable service entrance and distribution solution in Canada. Eaton's Pow-R-Line CS switchboard is a compact solution that offers main device, utility metering, and distribution in a single cell. Additionally, the switchboard is expandable to include a 75°C or 90°C wireway, sub-main, distribution, and fusible switch metercenter cells for a complete offering. Eaton's Pow-R-Line CS Switchboard uses a space-saving design to provide a smaller footprint than any other comparable switchboards in the market.

#### Application Description

The Pow-R-Line CS switchboard is ideally suited to commercial and industrial applications such as:

- Light Commercial
- Retail
- Shopping Plaza
- Shopping Centers
- Institutions / Schools
- Agricultural
- Small buildings
- Sports and entertainment facilities

#### Features, Benefits and Functions

- Compact and space-efficient
- Top or bottom entry
- Meets the provincial and municipal metering requirements
- Utility ground stud
- 75°C or 90°C wireway
- Main breaker maximum 400, 600, 800, or 1200A
- Optional distribution cell, sub-main cell with utility compartment, wire way, pull boxes, fusible switch meter center (FSMC)
- Convenient space for utility CTs and PTs
- Sealing screws, knurled thumb screws and padlock hasp
- Standard enclosure ratings of CSA Type 1; sprinklerproof optional
- Nema 3R (Available only for single cell or incoming through wireway)
- Breakers are padlockable to ensure maximum security
- Distribution cell accommodates Eaton's Series C and Series G breakers, fusible switches (FDPW), metered switches up to 200A (FSMC) and chassis-mounted panelboards
- User metering (refer to Tab 9-Components, or contact Eaton for more information)
- Surge protection devices (refer to Tab 9-Components, or contact Eaton for more information)
- Door-Over-Distribution
- Special Colours
- Cross-bus for future expansion
- Freestanding (18"D Only)
- Fire pump breaker in wireway (up to 400A)

# Low Voltage Switchboards and Switchgear

## Pow-R-Line CS Switchboards

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### Enclosure

Standard enclosure is CSA® Type 1; sprinklerproof. Nema Type 3R is optional, and available only for single cell or incoming through wireway. Freestanding option is available for 18" deep enclosure.

### Finish

#### Standard:

Galvanized steel tub. All doors and covers have a grey paint finish (ANSI 61) using a modern, completely automated and continuously monitored electrostatic powdered coating. This continually monitored system includes spray de-grease and clean, spray rinse, iron phosphate spray coating rinse, nonchemical seal, oven drying, electrostatic powder spray paint coating and oven curing.

#### Optional:

Assembly can be painted any colour required by the customer.

### Busbar System

- Tin-plated aluminum
- Silver-flashed copper
- Tin-plated copper

### Main Breaker:

Main breaker up to 1200A, 80% or 100% rated.

**Note:** For 100% rating, incoming wireway required.

### Customer Metering:

Full line of Eaton microprocessor-based customer metering and monitoring devices. Please refer to Tab 9—Components, or contact Eaton for more information.

### Surge Protection Device (SPD):

Standard integrated surge protection device with integral disconnect is available if required. Tab 9—Components, or contact Eaton for more information.

### Utility Metering Provisions:

- Meets all provincial and municipal utility metering requirements
- Utility ground studs available
- Utility CTs and PTs can be easily factory or field installed
- PUC Utility metering options include:
  - CTs-window type and bar type
  - External clamp-on CTs to verify meter
  - Up to four PTs in utility compartment
  - Neutral and ground studs available

### Breaker Accessories:

- Padlock hasp
- Visible windows
- Electronic trip units
- Shunt trip
- Auxiliary switch
- Bell alarm
- Undervoltage release

### Arc Flash Considerations:

Arc flash is an ongoing concern in the electrical industry. Eaton offers a variety of solutions to reduce the risk of arc flash such as the Arcflash Reduction Maintenance System™ in Eaton's moulded-case breakers.

### Advanced Metering and Communications:

Eaton has an extensive line of powerful metering products, trip units, controllers and gateways, that can be wired together in switchboards to create an intelligent system and interface with building management and SCADA systems.

### Provision for Future Devices Chassis/Group Mounted:

Where a provision for future circuit protective devices is required, the space and a blank filler plate will be supplied. Connections and mounting hardware are not included.

### Special Dimensions and Configurations:

Eaton has the ability to offer custom dimensions to suit limited space requirements. Special heights, special depths, widths, and corner sections.

### Standards and Certifications:

- CSA C22.2 No. 31
- CSA C22.2 No. 244
- CSA C22.2 No. 229



### Additional Sections:

#### Pow-R-Line CS - Wireway:

- Direct cable connection or wireway
- 75°C rated (standard) or 90°C rated (optional)
- Factory bussing to disconnect / circuit breaker in main assembly
- 30"D X 30"W design available for specific utility requirements
- 12", 18", or 30" depth (30"D available only at 30"W)
- Width options:
  - 800A: 12"W, 18"W, 24"W, 30"W x 30"D
  - 1200A: 24"W, or 30"W x 30"D

#### Pow-R-Line CS - 1200A Main/40X Distribution Cell:

- Service entrance rated main compartment
- Main circuit breaker (400, 600, 800 or 1200A)
- Top or bottom, left or right cable entry
- 1200A, 100% rated main available when a wireway is selected.
- 40X distribution section configurable for metered fusible switches (FSMC), non-metered fusible switches (FDPW) or circuit breakers (not mixed)

- Ability to add surge protection and user metering in the distribution section
- Optional door-over-distribution
- Optional cross-bus for future expansion
- 12" or 18" depth
- 48" width

#### Pow-R-Line CS - 50X Distribution Cell:

- Pow-R-Line 1A / 2A chassis
- 50X distribution section configurable for metered fusible switches (FSMC), non-metered fusible switches (FDPW) or circuit breakers (not mixed)
- Ability to add surge protection and user metering in the distribution section
- Optional door-over-distribution
- Optional cross-bus for future expansion
- 12" or 18" depth
- 30"W, 38"W, or 48"W depending on the feeder device configuration and amperage

#### Pow-R-Line CS - Sub-main cell with 600A max. breaker:

- 80% Rated sub-main disconnect, up to 600A circuit breaker
- Includes reverse fed breaker, utility metering compartment and outgoing lugs
- PUC Utility metering
- Field wiring connection compartment
- Optional door-over-distribution
- Optional cross-bus for future expansion
- 12" or 18" depth
- 30" width

### Technical Data and Specifications

#### Rating

The service entrance panel bus is rated to 800A, 1200A, 600V, three-phase, four-wire, 60Hz.

#### Interrupting Rating

- Maximum 65 kA at 600V
- Maximum 200 kA at 240V

### FSMC Device Options Pow-R-Line CS

Ampere Rating	Single or Twin	X Space ①
30/30	Twin	7X
30/60	Twin	7X
60/30	Twin	7X
60/60	Twin	7X
100/100	Twin	7X
200	Single	7X



*Twin 30A, 60A or 100A FSMC Switch*



*Single 200A FSMC Switch*

### Breaker Options Pow-R-Line CS

Device Type	Ampere Rating	kA Value		Mounting Height ①
		240V	600V	
<b>Main Breakers</b>				
KD Frame	70–400 ②	65–200	25–65	4X
LD Frame	300–600	65–200	25–50	6X
LG Frame	250–600	65–200	18–65	4X
MDL Frame	300–800 ③	65–100	25–35	6X
NG Frame	320–800	65–200	25–65	6X
NG Frame	500–1200	65–200	25–65	6X ④
<b>Branch Breakers</b>				
FD Frame	15–225	18–200	14–35	3X
JD Frame	70–250	65–200	18–35	3X
KD Frame	70–400 ②	65–200	25–65	4X
LD Frame	300–600	65–200	25–50	6X
LG Frame	250–600	65–200	18–65	4X
MDL Frame	300–800 ③	65–100	25–35	6X
NG Frame	320–800	65–200	25–65	6X
NG Frame	500–1200	65–200	25–65	6X ④

### Branch Fusible Switches-Pow-R-Line CS

Device Type	Cell Width		Mounting Height ①
	38-Inch	48-Inch	
30/30A twin	Y	Y	4X
30/60A twin	Y	Y	4X
60/60A twin	Y	Y	4X
100/100A twin	Y	Y	5X
200A (single or twin)	Y	Y	6X
400A	Y	Y	9X
600A	Y	Y	11X
800A	N	Y	11X
1200A	N	Y	15X

#### Notes

- ① 1X = 1-3/8 inch.
- ② Ampere ratings below 100A available with electronic trip unit only.
- ③ Ampere ratings below 400A available with thermal-magnetic only.
- ④ Only available for 1200A Cell

# Low Voltage Switchboards and Switchgear

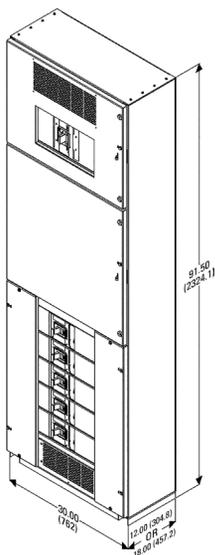
## Pow-R-Line CS Switchboards

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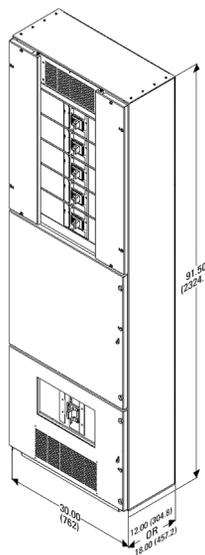
### Dimensions (CSA Type 1 & Sprinklerproof)

Approximate Dimensions in Inches (mm)

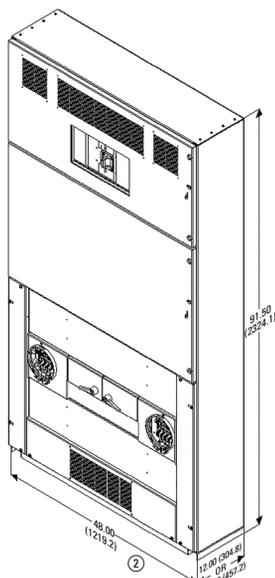
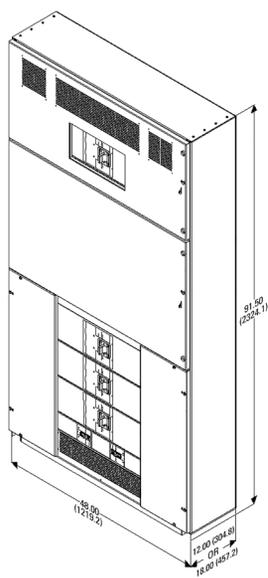
**Layout A: Top-Fed Pow-R-Line CS Main/PUC/21X Distribution (800A Maximum at 600 Vac)**



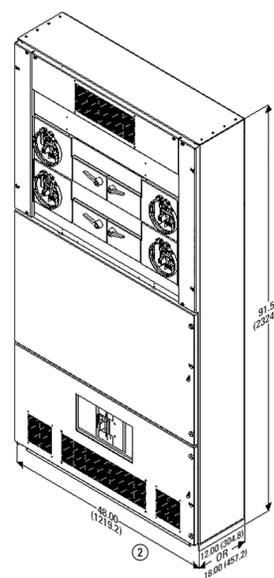
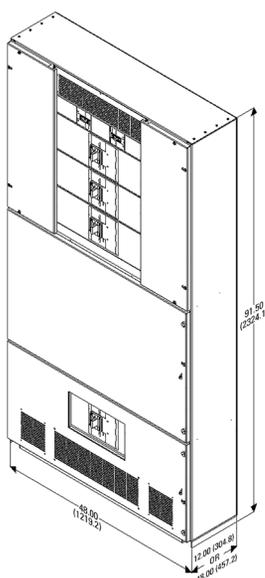
**Layout B: Bottom-Fed Pow-R-Line CS Main/PUC/21X Distribution (800A Maximum at 600 Vac)**



**Layout C: Top-Fed Pow-R-Line CS Main/PUC/21X Distribution (1200A Maximum at 600 Vac)**



**Layout D: Bottom-Fed Pow-R-Line CS Main/PUC/21X Distribution (1200A Maximum at 600 Vac)**



**Notes**

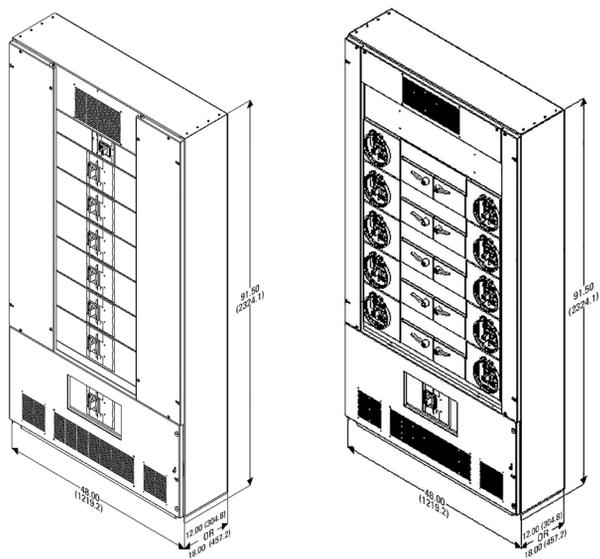
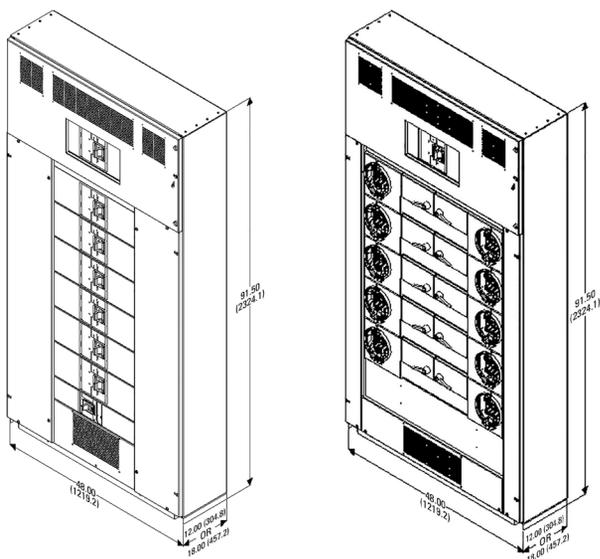
- ① 1X = 1-3/8 inch
- ② Bottom-fed: Only 2 rows of FSMC metered switches. Top-fed: Only 1 row of FSMC metered switches
- ③ For NEMA 3R dimensions consult your local Eaton sales representative

### Dimensions (CSA Type 1 & Sprinklerproof)

Approximate Dimensions in Inches (mm)

**Layout E: Top-Fed Pow-R-Line CS Main/40X Distribution (1200A Maximum at 600 Vac)**

**Layout F: Bottom-Fed Pow-R-Line CS Main/40X Distribution (1200A Maximum at 600 Vac)**



# Low Voltage Switchboards and Switchgear

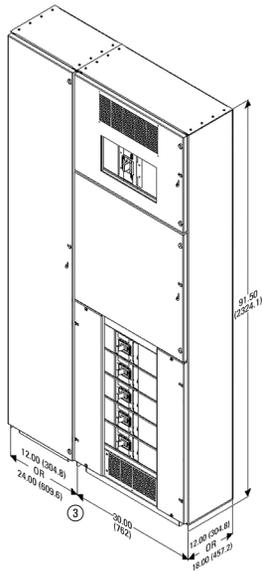
## Pow-R-Line CS Switchboards

### Dimensions

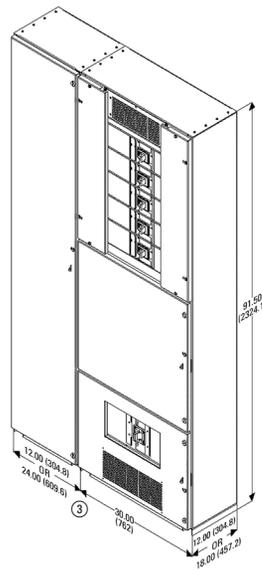
Approximate Dimensions in Inches (mm)

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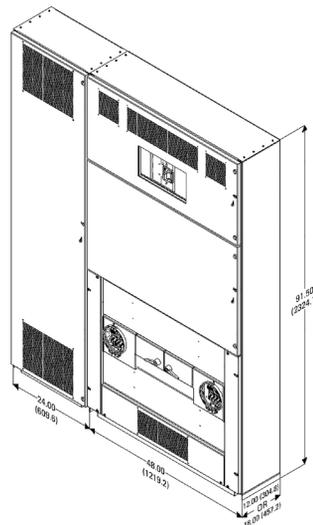
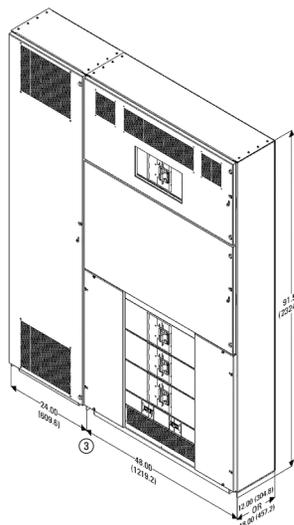
**Layout A: Bottom-Fed Pow-R-Line CS with Incoming Wire Way and Main/PUC/21X Distribution (800A Maximum at 600 Vac)**



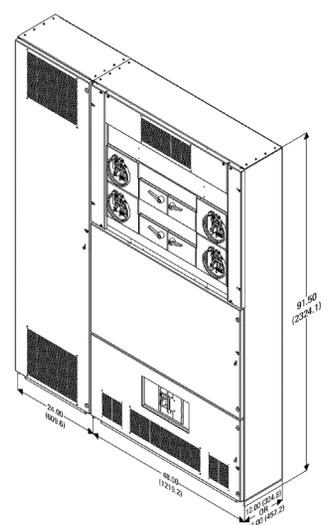
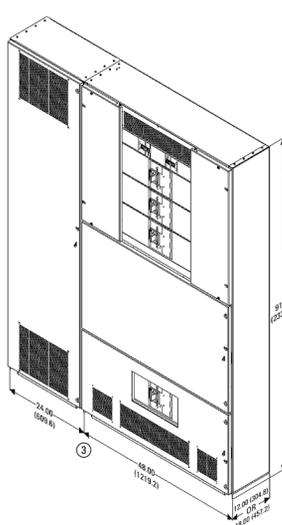
**Layout B: Top-Fed Pow-R-Line CS with Incoming Wire Way and Main/PUC/21X Distribution (800A Maximum at 600 Vac)**



**Layout C: Bottom-Fed Pow-R-Line CS with Incoming Wire Way and Main/PUC/21X Distribution (1200A Maximum at 600 Vac)**



**Layout D: Top-Fed Pow-R-Line CS with Incoming Wire Way and Main/PUC/21X Distribution (1200A Maximum at 600 Vac)**



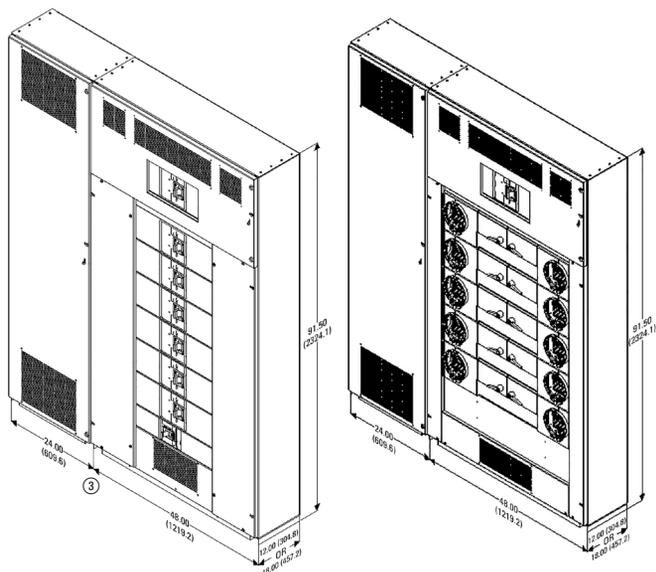
### Notes

- ① 1X = 1-3/8 inch.
- ② Width of cell is determined by breaker size and trip unit type. For fusible switches 800A and above, 48-inch-wide (1219.2 mm) cell is required. Contact Eaton for more information.
- ③ 30"W X 30"D, rear aligned wireway available as an option.

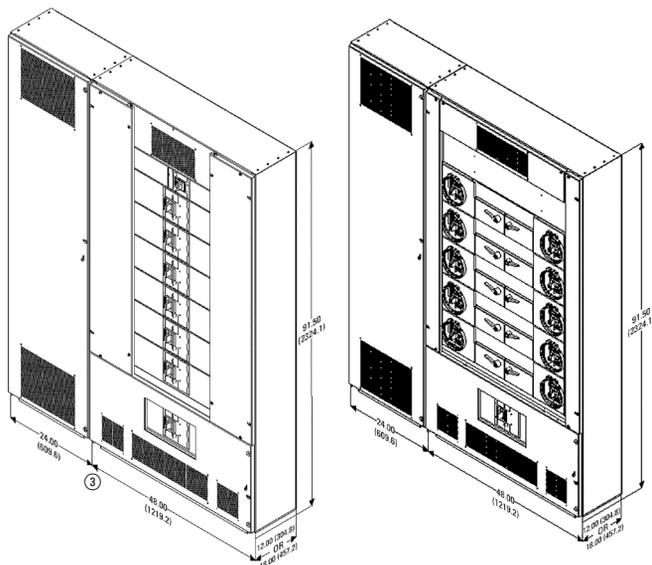
### Dimensions (CSA Type 1 & Sprinklerproof)

Approximate Dimensions in Inches (mm)

**Layout E: Bottom-Fed Pow-R-Line CS Main/40X Distribution (1200A Maximum at 600 Vac)**

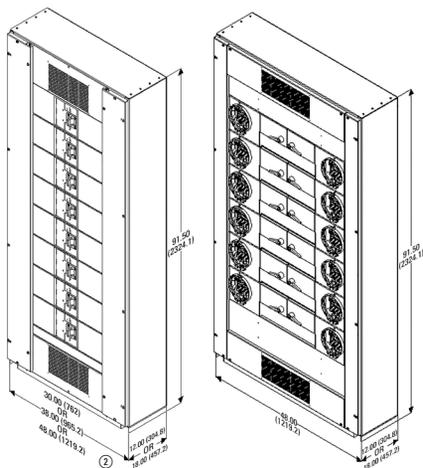


**Layout F: Top-Fed Pow-R-Line CS Main/40X Distribution (1200A Maximum at 600 Vac)**

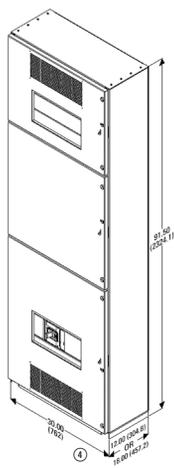


### Additional Cells

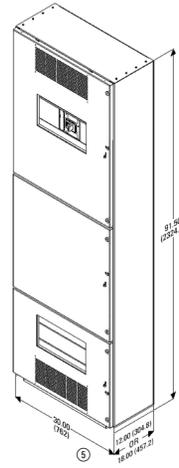
**50X Distribution Cell (1200 Maximum at 600 Vac)**



**Top exit Sub-main cell with 600A maximum breaker**



**Bottom exit Sub-main cell with 600A maximum breaker**



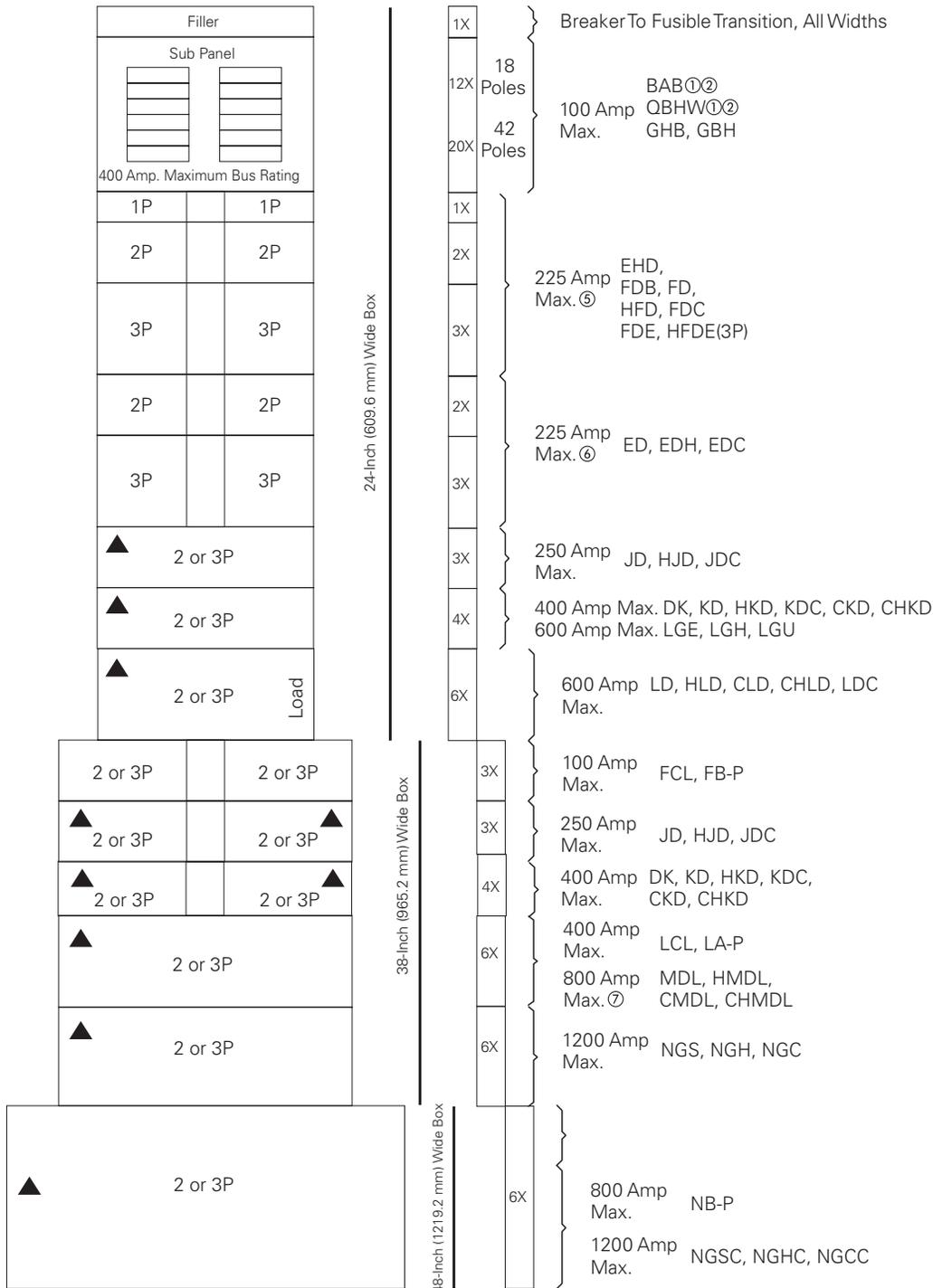
### Notes

- ① 1X = 1-3/8 inch.
- ② Width of cell is determined by breaker size and trip unit type. For fusible switches 800A and above, 44-inch-wide (1117.6 mm) cell is required. Contact Eaton for more information.
- ③ 30"D X 30"W wireway available as an option.
- ④ TBD
- ⑤ TBD

# Low Voltage Switchboards and Switchgear

## Pow-R-Line CS Switchboards

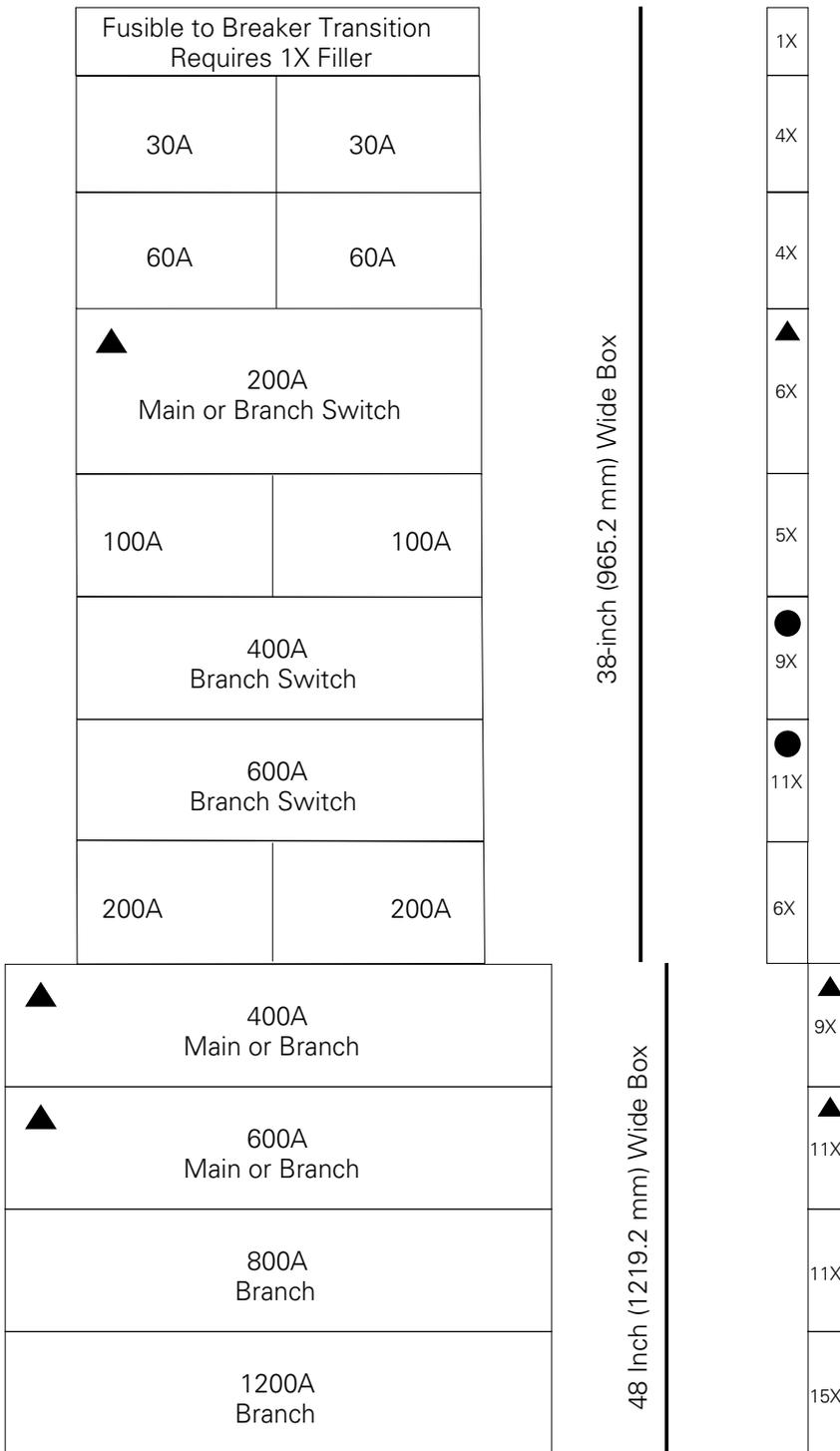
2



▲ Breaker may be used as main.

**Figure 2-4. Layout for Branch and Horizontally Mounted Main Devices – PRLCS**

- ① BAB and QBHW breakers with shunt trips require one additional pole space, i.e., 1-pole is 2-pole size, 2-pole is 3-pole size, and 3-pole is 4-pole size.
- ② If panel contains only BAB or QBHW branch breakers, use a PRL1a panelboard.
- ③ GHB and GBH breakers cannot be mixed on same subchassis as BAB, QBHW.
- ④ If panel contains only GHB and GBH branch breakers, use a PRL2a 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 38-inch (965.2 mm) wide box is required if optional #6 – 300 kcmil lug is required.



**Figure 2-7. Branch and Horizontally Mounted Main Device Layout — PRLCS**

- 400 and 600 ampere horizontally mounted feeder switches in 38-inch (965 mm) or 48-Inch (1219.2 mm) wide box.

# Low Voltage Switchboards and Switchgear

Pow-R-Line CS Switchboards

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### Pow-R-Line C Switchboard



### Contents

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Product Selection .....	<b>3-22</b>
Technical Data and Specifications.....	<b>3-25</b>

## Pow-R-Line C Switchboards

### Product Description

Eaton Pow-R-Line C™ switchboards combine a space-saving design with a modular construction and increased system ratings to provide economical and dependable electrical system distribution and protection.

### Application Description

The Pow-R-Line C switchboard is ideally suited to commercial and industrial applications such as:

- Institutions and school boards
- Office towers
- Health care facilities
- Retail facilities
- Utility
- Solar applications
- Residential
- Commercial
- Industrial

### Features, Benefits and Functions

#### Main Devices

- Magnum DS power circuit breakers, fixed-mounted or drawout, 800A to 6000A at 600 Vac maximum—100% rated
- Eaton fixed-mounted moulded-case circuit breakers up to 2500A, 600 Vac maximum
- Eaton fusible switches up to 1200A, 600 Vac maximum
- Bolted pressure switches up to 4000A
- Ground fault protection on main device if required

#### Distribution Devices

- Moulded-case circuit breakers fixed-mounted up to 2000A, 600 Vac maximum
- Moulded-case circuit breakers drawout up to 600A, 600 Vac maximum
- Fusible switches up to 1200A, 600 Vac maximum
- Fusible switched meter sockets (FSMC) up to 200A (48.00-inch-wide cell only)

- A main moulded-case circuit breaker or a main fusible switch, within the sizes listed for panelboard design, can be included in the panel-mounted assembly in lieu of a separate, individually mounted unit
- Ground fault protection on feeders if required
- Optional 10X (1X = 1-3/8 inch) box available for meters, protection and control devices

Pow-R-Line C designates a family of distribution switchboards, incorporating design concepts that fit the ever-increasing need for applications on high short-circuit systems, while retaining maximum safety and convenience throughout the line.

Feeder circuit protective devices are an assembly of units mounted on a panelboard-type base (panelboard construction). Circuit protective devices are front accessible.

# Low Voltage Switchboards and Switchgear

## Pow-R-Line C Switchboards

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### Enclosure

Standard enclosure is CSA® Type 1; sprinklerproof, Type 2, 3R are optional. Structures and formed doors are made of code gauge steel.

### Standard Finish

Grey paint finish (ANSI 61) using a modern, completely automated and continuously monitored electrostatic powder coating. This continually monitored system includes spray de-grease and clean, spray rinse, iron phosphate spray coating rinse, nonchemical seal, oven drying, electrostatic powder spray paint coating and oven curing.

### Integral Base

The ruggedly formed base greatly increases the rigidity of the structure, reduces the possibility of damage during the installation of the equipment, and is suitable for rolling, jacking and handling. A lifting angle is bolted onto the top of the bus compartment structure for increased strength.

### Front Accessible

Front accessible switchboards align at the rear, enabling them to be placed against a wall (Pow-R-Line C front accessible). If the main section is deeper than others, due to physical size of the main device, the necessary off-set in lineup will occur in front, and the main section will be accessible from the side as well as from the front. Standard front accessible switchboards will align at the front and the rear.

### Rear Accessible

Eaton offers rear accessible switchboards that align at the front and the rear.

### Standard Switchboard Height

The standard Pow-R-Line C switchboard height is 90.00 inches (2286.0 mm). Custom height is available at 78.00 inches (1981.0 mm) high.

Optional base channels 1.00 inch (25.4 mm), 1.50 inches (38.1 mm) (standard option) or 2.00 inches (50.8 mm) high available. Consult Eaton for other options.

### Provision for Future Devices Chassis/Group Mounted

Where a provision for future circuit protective devices is required, the space and a blank filler plate will be supplied. Connections and mounting hardware are not included. Optional insulated main bus is available if required.

### Busbar System

Standard tin-plated aluminum or copper up to 3000A. Standard silver-plated copper for 4000A to 6000A. Tin-plated copper also available. Optional insulated main bus is available.

Standard bus and connectors on all switchboards are rated for use on systems capable of producing up to 50,000A rms symmetrical short-circuit current at the incoming terminals.

Increased bus short-circuit ratings equal to that of connected switchboard devices, up to 200,000A rms symmetrical, are available in most Pow-R-Line C switchboards when approved main devices are installed. Contact Eaton for more information. CSA labeled switchboard sections are marked with their applicable short-circuit rating.

**Note:** The short-circuit rating of the switchboard assembly is limited to the interrupting capacity of the lowest rated branch device.

### Provision for Busway Entrance and Exit

Busway connections to switchboard sections include cutout and drilling in the top of the switchboard with riser connections from the switchboard device or the bus, up to the point where the bus duct enters the switchboard. No connections are furnished external to the switchboard.

In all transactions involving busway attached to switchboards, it is essential that information regarding orientation of the busway with respect to the front of the switchboard be supplied to the coordinating assembly plant.

**Note:** Additional depth to the switchboard may be required.

On Pow-R-Line C switchboards, a bus system is used to connect the bus duct to the individually mounted device, the main or sub-main switchboard bus, or the vertical main bus of the panel-mounted circuit protective device panels.

Side or rear hydro stub, collector bus, utility wireway and transformer coordination to Eaton standard cross bus are available; consult Eaton factory for more information.

### Utility Metering Provisions

- Meets all provincial and municipal utility metering requirements
- Utility ground studs available
- Utility CTs and PTs can be easily factory or field installed

### Customer Metering

Full line of Eaton microprocessor-based customer metering and monitoring devices. Please refer to Tab 9—Components, or contact Eaton for more information.

### Surge Protection Device (SPD)

Standard integrated surge protection device with integral disconnect is available if required. Please refer to Tab 9—Components or contact Eaton for more information.

### Transition Cells

Transition structures are required for connecting switchboards to the secondary of power centre transformer (dry or fluid filled), motor control centres, and for other special switchboard configurations such as “L” or “U” shaped lineups. In some applications, an extra structure complete with connections is required; in others, where switchboard depth and space permit, only the connection conductors are required. Refer to factory for these applications.

### PLC Transfer Schemes

Advanced PLC-based transfer and load shedding schemes can be designed for various applications such as data centres, health care facilities and wastewater treatment plants. HMI is optional for touch screen monitoring and control of incoming, tie and feeder power circuit breakers. Contact an Eaton sales engineer for more information.

### Bus Duct Integration

Custom bus duct can be integrated into switchboard assemblies. Eaton can design and manufacture custom bus duct flanges to coordinate with the bus duct risers of a wide range of amperage.

### ***Transformer and MCC Close-Coupling***

Close-couple dry-type, liquid-filled transformers and motor control centres (MCC) with standard switchboard configurations can be supplied. Transformer unit substations and MCC bus coordination would create a compact lineup and minimization of installation time by eliminating cable installations.

### ***Integrated Transfer Switches***

Eaton automatic transfer switches (contactor, moulded-case circuit breaker or power circuit breaker type, including optional bypass-isolation type) can be integrated into a switchboard lineup. Electrical and mechanical coordination is ensured when transfer switches are integrated into the switchboard.

### ***Advanced Metering and Communications***

Eaton has an extensive line of powerful metering products, trip units, controllers and gateways, that can be wired together in switchboards to create an intelligent system and interface with building management and SCADA systems.

### ***Special Dimensions and Configurations***

Eaton has the ability to offer custom dimensions to suit limited space requirements. Special heights, special depths and widths, corner sections, back-to-back, front access only (on deeper switchboards that normally require rear access), rear access and side access configurations are available.

### ***Arc Flash Considerations***

Arc flash is an ongoing concern in the electrical industry. Eaton offers a variety of solutions to reduce the risk of arc flash such as the Arcflash Reduction Maintenance System™ in moulded-case or power circuit breakers, safety shutters in Magnum drawout power circuit breakers, infrared viewing windows and remote racking accessories.

### **Standards and Certifications**

- CSA C22.2 No. 31
- CSA C22.2 No. 244
- Seismic qualified to Zone 4 per IBC/CBC



# Low Voltage Switchboards and Switchgear

## Pow-R-Line C Switchboards

### Product Selection

For complete application and pricing information, contact your local Eaton sales office.

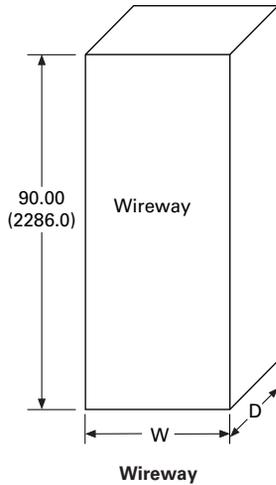
3

### Wireway Cell Layouts

Approximate Dimensions in Inches (mm)

Wireways are front access with rear and side access option, top or bottom incoming, three- or four-wire, aluminum or copper, with bolted cover standard and front door optional.

### Pow-R-Line C Switchboards Wireway Section Layout ①



### Pow-R-Line C Wireway Cells

Ampere Rating	Cell Depth					Cell Width (W)	
	18.00 (457.2)	24.00 (609.6)	30.00 (762.0)	36.00 (914.4)	60.00 to 90.00 (1524.0 to 2286.0)	18.00 (457.2)	24.00 (609.6)
800	■	■	■	■	■	■	■
1200	■	■	■	■	■	■	■
2000	■	■	■	■	■	■	■
2500	■	■	■	■	■		■
3000		■	■	■	■		■
3200		■	■	■	■		■
4000			■	■	■		

#### Notes

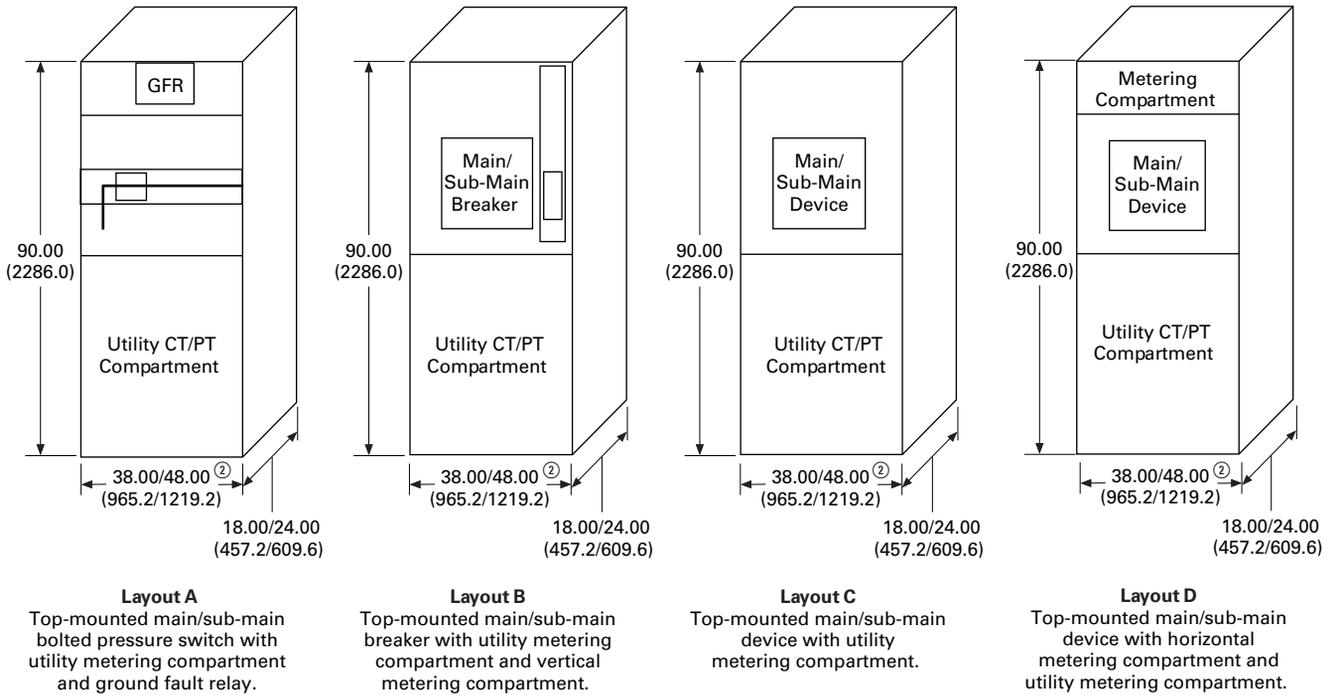
- ① 91.50 inches (2324.1 mm) high with 1.50 inch (38.1 mm) optional base channel.
- Specific municipality code designs available. Consult Eaton for more information.
- Consult Eaton for CSA enclosure rating.
- Custom 78.00 inches (1981.2 mm) high wireways available. Consult Eaton for custom height information.
- Custom lug sizing and spacing available. Consult Eaton for more information.

### Main and Utility Cell Layouts

Approximate Dimensions in Inches (mm)

With copper or aluminum main bus; system incoming by cable or bus duct; available for indoor or outdoor structures.

### Pow-R-Line C Switchboards Main and Utility Section Layouts ①



### Standard Pow-R-Line C Main and Utility Cells—Main Devices

Ampere Rating	Main Device	Frame	Layout A	Layout B	Layout C	Layout D
100–2500	Moulded-case circuit breaker	F, J, K, L, M, N, R		■	■	■
400–1200	Fusible switch	FDP			■	■
1200–2000	Fusible switch	Pringle switch	■		■	
2500–3000 ③	Fusible switch	Pringle switch	■		■	
3000 ③	Fusible switch	Pringle switch	■		■	
800–1200 ③	Power circuit breaker	Fixed mounted		■	■	■
1200–3200 ③	Power circuit breaker	Fixed mounted		■	■	■
4000–6000 ④	Power circuit breaker	Fixed mounted			■	■
800–1200 ④	Power circuit breaker	Drawout			■	■
1200–3200 ④	Power circuit breaker	Drawout			■	■
4000–6000 ④	Power circuit breaker	Drawout			■	■

#### Notes

- ① 91.50 inches (2324.1 mm) high with 1.50 inch (38.1 mm) optional base channel.
  - ② Main devices up to and including 3200A require 38.00-inch-wide (965.2 mm) cells; main devices 4000–6000A require 48.00-inch-wide (1219.2 mm) cells.
  - ③ 24.00 inch (609.6 mm) depth required.
  - ④ Additional depth required. Consult Eaton for more information.
- All layouts shown are top fed. Consult Eaton for top and bottom incoming.  
 Custom 78.00 inches (1981.2 mm) high main utility available. Consult Eaton for custom heights.  
 Consult Eaton for copper or aluminum bussing, CSA enclosure rating, and horizontal and vertical metering.  
 Power Xpert® Metering is not compatible with vertical metering layout (Layout B).

# Low Voltage Switchboards and Switchgear

## Pow-R-Line C Switchboards

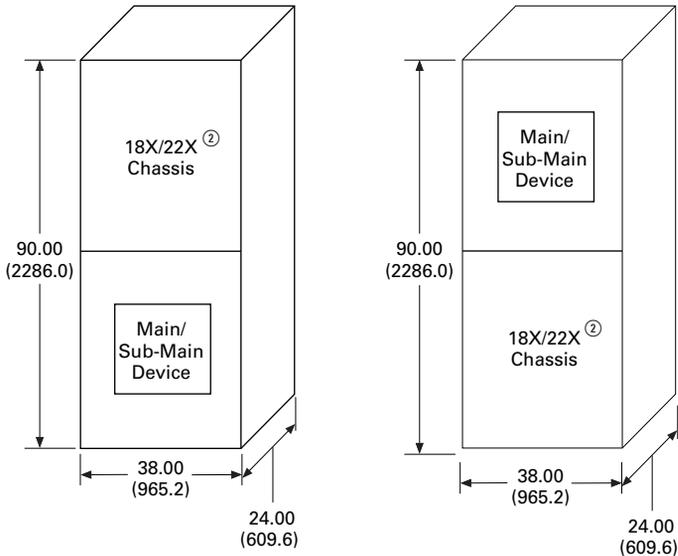
### Main and Half-High Distribution Cell Layouts

Approximate Dimensions in Inches (mm)

With copper or aluminum main bus; system incoming by cable or bus duct; available for indoor or outdoor structures.

3

### Pow-R-Line C Switchboards Main and Half-High Distribution Section Layout ①



Bottom-mounted main/sub-main breaker with distribution chassis.

Top-mounted main/sub-main breaker with distribution chassis.



### Pow-R-Line C Main and Half-High Cells—Main Devices

Ampere Rating	Main Device	Frame	Main/Utility	Distribution Chassis
400–2500	Moulded-case circuit breakers	K, L, M, N, R	Main	18X
400–2500	Moulded-case circuit breakers	K, L, M, N, R	Main	22X
400–1200	Fusible switch	FDP	Main	18X
400–1200	Fusible switch	FDP	Main	22X

#### Notes

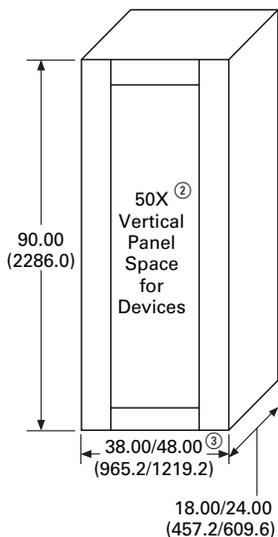
- ① 91.50 inches (2324.1 mm) high with 1.50 inch (38.1 mm) optional base channel.
- ② 1X = 1-3/8 inch.
- Consult Eaton for CSA enclosure rating.
- Consult Eaton for horizontal and vertical metering.
- Consult Eaton for top or bottom incoming and additional layouts.

### Distribution Cell Layouts

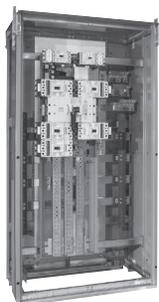
Approximate Dimensions in Inches (mm)

Distribution boards are offered in copper or aluminum, three- or four-wire, with cable in option available.

### Pow-R-Line C Switchboards Distribution Section Layout ①



50X Distribution Chassis



### Standard Pow-R-Line C Distribution Cells—Branch Devices

Ampere Rating	Frame	Feeder Device	Distribution Size
100–1600	F, J, K, L, M, N ④, R ⑤	Moulded-case circuit breaker	18X / 22X / 50X
20–600	JG, LG	Drawout MCCB ⑥	18X / 22X / 50X
30/60	Single	Fusible switch	18X / 22X / 50X
100	Single/twin	Fusible switch	18X / 22X / 50X
200	Single/twin	Fusible switch	18X / 22X / 50X
400	Single	Fusible switch	18X / 22X / 50X
600	Single	Fusible switch	18X / 22X / 50X
800	Single	Fusible switch	18X / 22X / 50X
1200	Single	Fusible switch	18X / 22X / 50X

### Commercial Metering Switchboard

Eaton offers Fusible Switch Metering Centres (FSMC) for commercial metering applications. Please refer to Tab 3—Commercial Metering for more information.

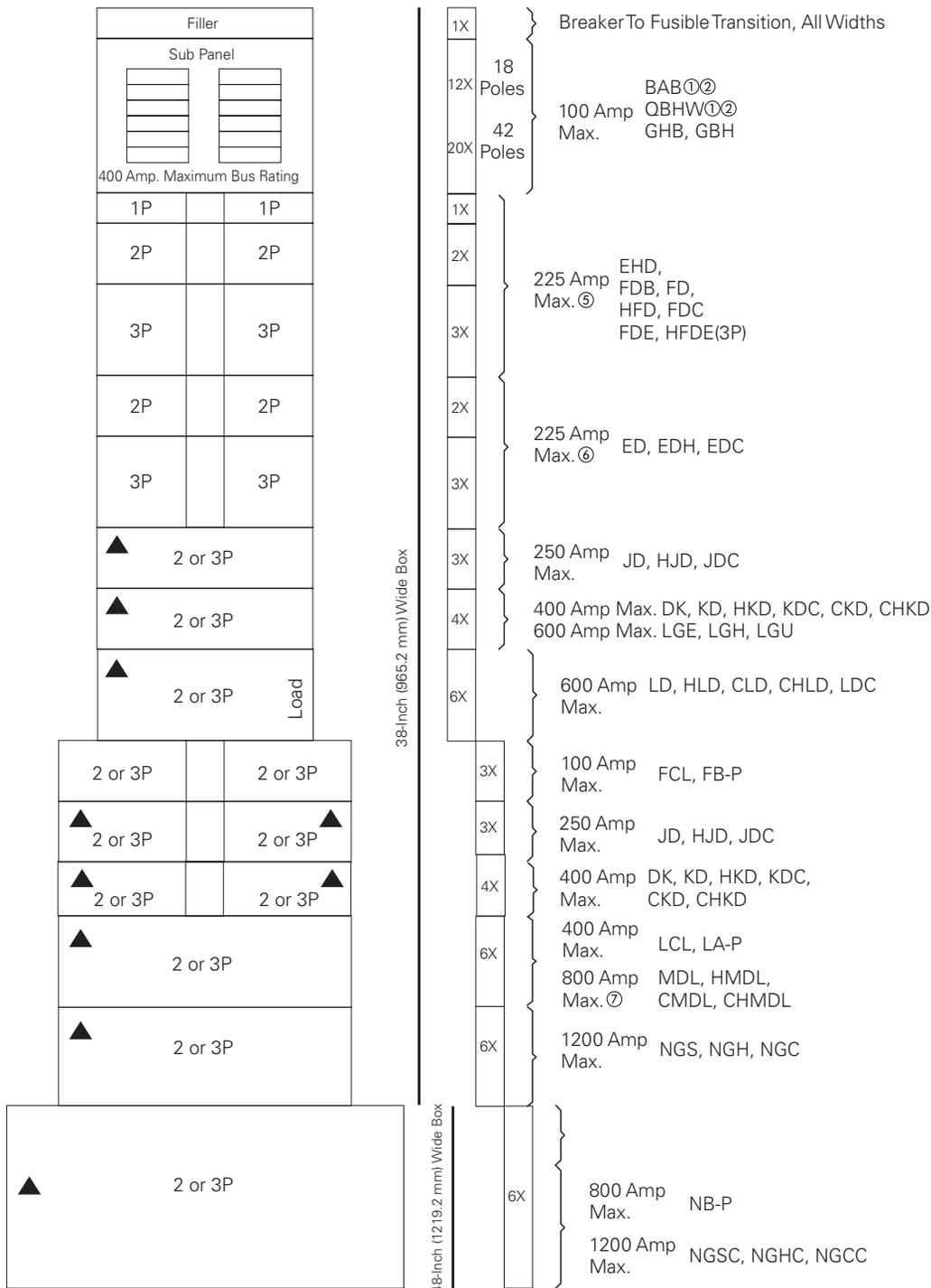
#### Notes

- ① 91.50 inches (2324.1 mm) high with optional base channel.
- ② 1X = 1-3/8 inch.
- ③ Width of cell may require 48.00 inches (1219.2 mm) due to cable sizing or other features; consult Eaton for more information.
- ④ For cable sizing 750 kcmil and greater, 48.00-inch-wide (1219.2 mm) cell required.
- ⑤ Copper bussing and 50 kAIC only.
- ⑥ Refer to Tab 5—Pow-R-Line C Switchboards with Drawout Moulded-Case Circuit Breaker, for more information. Consult Eaton for CSA enclosure rating.

# Low Voltage Switchboards and Switchgear

## Pow-R-Line C Switchboards

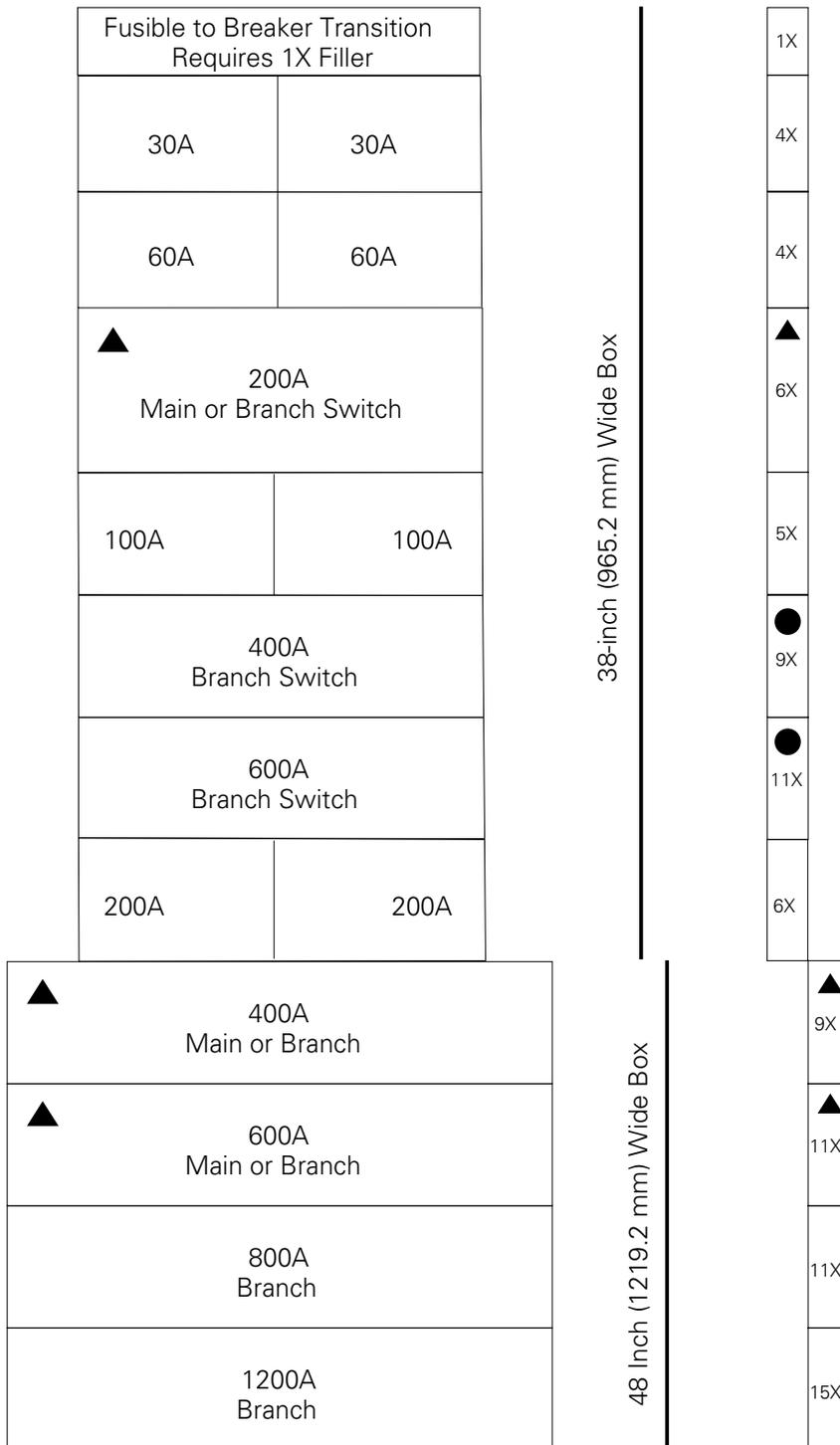
3



▲ Breaker may be used as main.

**Figure 2-4. Layout for Branch and Horizontally Mounted Main Devices — PRLC**

- ① BAB and QBHW breakers with shunt trips require one additional pole space, i.e., 1-pole is 2-pole size, 2-pole is 3-pole size, and 3-pole is 4-pole size.
- ② If panel contains only BAB or QBHW branch breakers, use a PRL1a panelboard.
- ③ GHB and GBH breakers cannot be mixed on same subchassis as BAB, QBHW.
- ④ If panel contains only GHB and GBH branch breakers, use a PRL2a 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 38-inch (965.2 mm) wide box is required if optional #6 – 300 kcmil lug is required.



**Figure 2-7. Branch and Horizontally Mounted Main Device Layout — PRLC**

- ▲ Fusible switch may be used as horizontal main.
- 400 and 600 ampere horizontally mounted feeder switches in 38-inch (965 mm) or 48-Inch (1219.2 mm) wide box. 400 and 600 ampere horizontally mounted main switches only in 44-inch (1117.6 mm) wide box. For vertically mounted main see **Page 2-19** for sizing.

**Note:** See **Page 2-19** for MLO or Neutral and Vertically Mounted Main space requirements.

# Low Voltage Switchboards and Switchgear

Pow-R-Line C Switchboards

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### Commercial Metering Switchboard



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## Commercial Metering Switchboards

### Product Description

Eaton commercial metering switchboards use space-saving design with modular construction, incorporating metering sections with tenant feeder circuits using meter sockets to meet local utility or customer requirements. All meter sockets and associated feeder devices are completely factory prewired and shipped ready for the installation of the meters.

Eaton offers a number of options for commercial metering switchboards. These include assemblies that meet utility requirements for globe type watt-hour meters and electronic tenant metering switchboards.

### Application Description

Commercial multi-metering applications such as:

- Shopping centres
- Office buildings
- Condominium complexes
- Apartment buildings

### Features, Benefits and Functions

The commercial metering switchboard has a free-standing switchboard construction; it is factory assembled and fully integrated.

### Metering Unit / Metering Cell

- Twin-mounted 30A, 60A and 100A metering switches available
- Single-mounted 200A metering switches available
- Metering switches are type FSMC (fusible switch meter sockets), suitable to accept revenue grade, self-contained meters
- Various meter base jaw options available to meet all requirements—most common is Star (Y) type, seven jaw, suitable for four-wire systems up to 347/600V
- Switch jaws are spring reinforced to firmly grip blades
- Maximum quantity of six FSMC twin or single units can be installed in each 90.00 inch (2286.0 mm) high x 48.00-inch-wide (1219.2 mm) enclosure

### Main Bus

- Single-bolt bus joints up to 3000A for ease of installation at shipping splits
- 50 kA bracing standard; 65, 85, 100 kA optional
- Tin-plated aluminum bus is standard with optional silver-plated copper available
- Provision for future extension is provided as standard
- Available with a bus connected, incoming Pow-R-Line C™ main cell or a separate, standalone main lugs only structure
- Channel sills optional

### Enclosure

- Freestanding, front accessible design (rear accessible where required)
- Structures are ANSI 61 light grey baked enamel, code gauge steel with formed doors / removable back sheets; other colours optional
- Standard enclosures are CSA® Type 1; sprinklerproof optional
- Split back sheets for ease of handling
- Single-cell shipping splits available as standard for ease of handling

# Low Voltage Switchboards and Switchgear

## Commercial Metering Switchboards

### Standards and Certifications

- CSA C22.2 No. 229
- CSA C22.2 No. 31
- CSA C22.2 No. 244



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### Product Selection

#### FSMC Device Options

Ampere Rating	Single or Twin	X Space ①
30/30	Twin	7X
30/60	Twin	7X
60/30	Twin	7X
60/60	Twin	7X
100/100	Twin	7X
200	Single	7X

#### Note

① 1X = 1-3/8 inch.

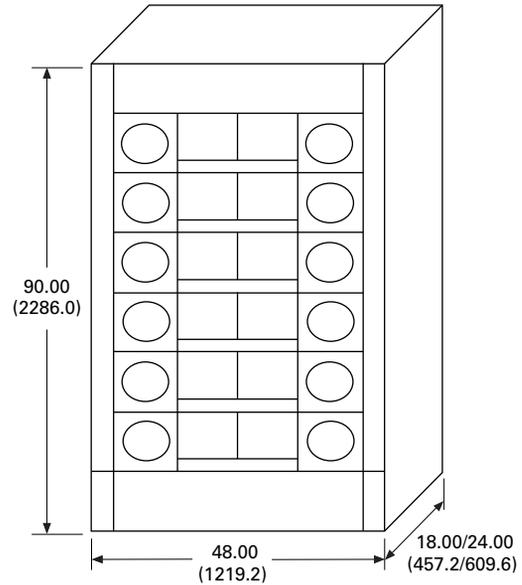


**FSMC Units Installed in Pow-R-Line C Switchboard**

### Dimensions

Approximate Dimensions in Inches (mm)

#### FSMC Layout



**Twin 30A, 60A or 100A FSMC Switch**



**Single 200A FSMC Switch**

### Integrated Facility Switchboards



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### Integrated Facility Switchboards

#### Product Description

Eaton Integrated Facility Switchboards™ (IFS™) utilizes the modular Pow-R-Line C™ switchboard design to integrate traditionally separate electrical distribution and control equipment into a single space-saving factory assembled and connected package.

The service entrance equipment can be integrated with multiple lighting and appliance branch panelboards into a compact front accessible group-mounted switchboard. Where multiple switchboards or panelboards are used in the same electrical room as a conventional distribution system, the integrated design significantly reduces equipment space requirements, as well as minimizes installation time and costs.

Other associated equipment can also be integrated into the assembly, including dry-type distribution transformers, time clock space, lighting control, electronic controls, surge protection devices, metering, automatic transfer switches and energy monitoring devices. Depending upon the application, other user-defined equipment such as a subsystem control package may also be incorporated.

#### Application Description

Eaton Integrated Facility Switchboards are designed to meet specific needs for:

- Retail stores
- Commercial offices
- High rise buildings
- Correctional facilities
- Agricultural facilities
- Industrial facilities
- Hospitals / health care facilities
- Educational facilities

Whether the application is a multi-site prototype or a single application, integrated switchboards offer time and space-saving features.

# Low Voltage Switchboards and Switchgear

## Integrated Facility Switchboards

5

### Features, Benefits and Functions

#### Front Accessible

Integrated facility switchboards are front accessible and align at the rear, enabling them to be placed against a wall. Most switchboards align at the front and the rear. If the main section is deeper than others due to physical size of the main device, the necessary off-set in line-up will occur in the front, and the main section will be accessible from both the front and the side.

#### Standard Switchboard Height

Switchboard height is 90.00 inches (2286.0 mm).

#### Switchboard Shipping Splits

The sections can be shipped as specified by the customer to meet specific requirements.

For retrofit applications, single-piece switchboard structures can be shipped to facilitate movement through limited access doorways, etc.

#### Factory Interconnections

Where interconnections are required within the IFS, power cabling is factory installed and sized per the Canadian Electrical Code.

### Space Savings

The space-saving switchboard installation provides additional usable floor space. For example:

- Retail stores—floor space for sales
- Offices—additional storage, cubicle
- Health care—additional work area
- Retrofits—ability to fit existing rooms

### Site Construction Savings

Timely installation of the electrical system typically is a key element on the critical path for any project.

Along with the time to install the equipment, other expenses include the time to handle all of the loose pieces of equipment arriving on a job site and ensuring it reaches the proper trades person. With Eaton Integrated Facility Switchboards, one piece of equipment is typically shipped to a job site virtually eliminating these issues.

The equipment may also be used for temporary power on job sites, further reducing construction expenses and times.

### Lighting Control

Eaton lighting control panelboards with remote control breakers can be installed in IFS assemblies.

### Busbar System

Standard bus in the switchboards is tin-plated aluminum or silver-plated copper; optional tin-plated copper is available.

### Short-Circuit Rating

Standard bus and connectors on all switchboards are rated for use on systems capable of producing up to 65 kA rms symmetrical short-circuit current at the incoming terminals.

Short-circuit ratings up to 200 kA symmetrical are available when used with approved devices. Contact Eaton for more information.

### Bus Duct Integration

Applications such as condo, commercial office towers and health care facilities may require bus duct. Custom bus duct flanges can be designed and manufactured to coordinate with bus duct risers of a wide range of amperages. The bus duct can even be directly integrated into the switchboard, eliminating the need for bus plugs and therefore creating a more compact footprint.

### Options

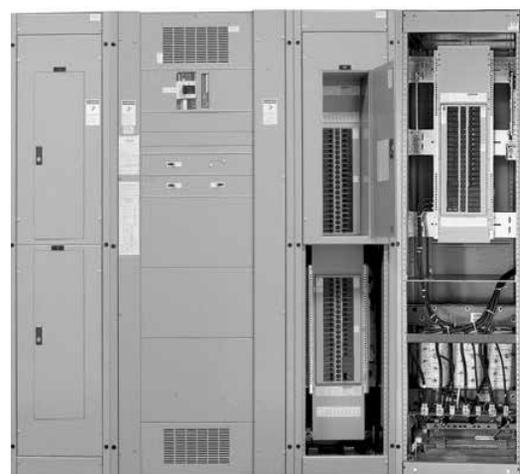
- Automatic transfer switches
- Breakers
- Metering
- Dry-type transformers
- Enclosed control
- Seismic construction
- Surge protection devices
- UPS
- HVAC control
- Harmonic blocking filter
- Power factor correction
- Generator Quick Connect

### Standards and Certifications

- CSA® C22.2 No. 31
- CSA C22.2 No. 244
- Factory wired panelboards and dry-type distribution transformers meet CSA C22.2 No. 31 and the Canadian Electrical Code
- Zone 4 Construction (IBC/CBC Seismic Qualified)



*Traditionally Mounted Equipment*

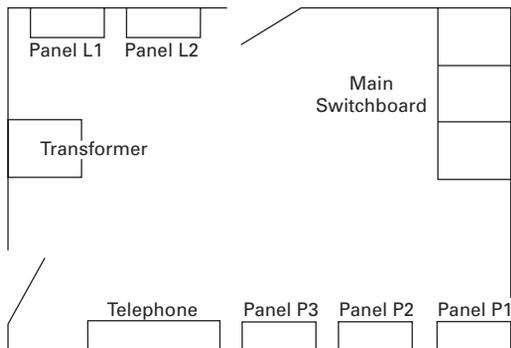


*Integrated Facility Switchboard*

### Product Selection

#### Integrated Facility Switchboard Applications

#### Electrical Room With and Without IFS—Plan View



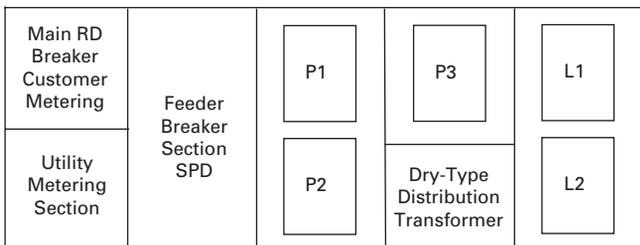
Traditional Electrical Room



IFS Electrical Room

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#### Optimized IFS Layout—Front View



# Low Voltage Switchboards and Switchgear

## Integrated Facility Switchboards

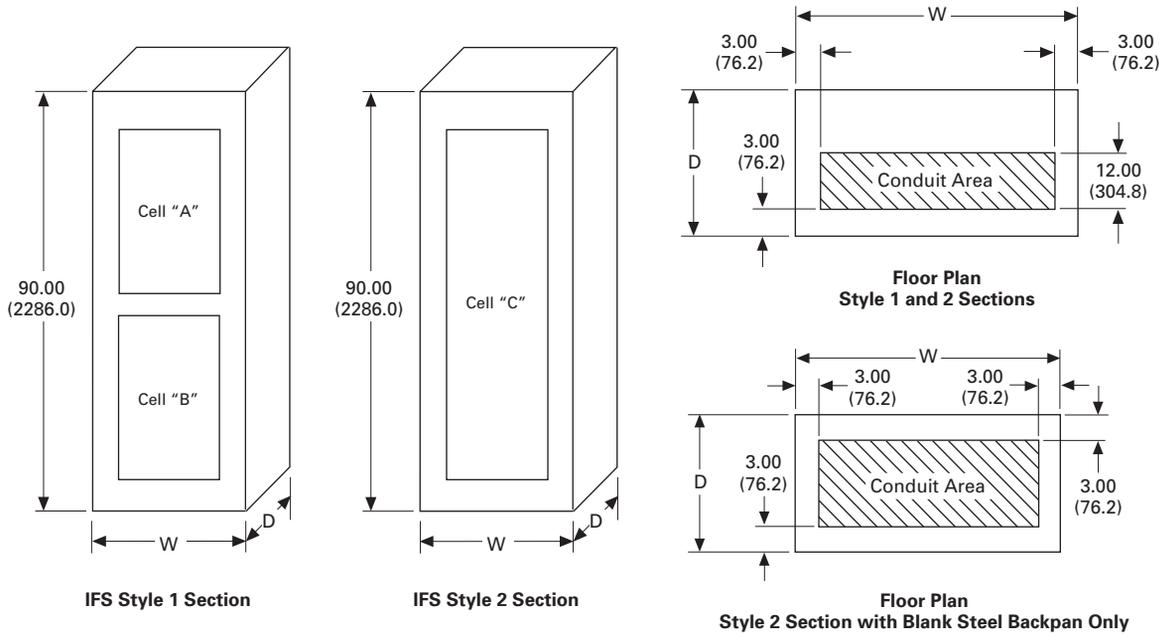
Approximate Dimensions in Inches (mm)

### Integrated Facility Switchboards Distribution Section Layout

Eaton Pow-R-Line panelboard integration—factory wired from feeder device in adjacent section(s) to panelboards. Standard features include lockable trim doors and factory-mounted overcurrent devices.

### Style 1 and 2 Integrated Facility Switchboards Distribution Section Layout

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### IFS Style 1 Allowable Configurations (Select One "Panelboard Type" per Panelboard "Cell")

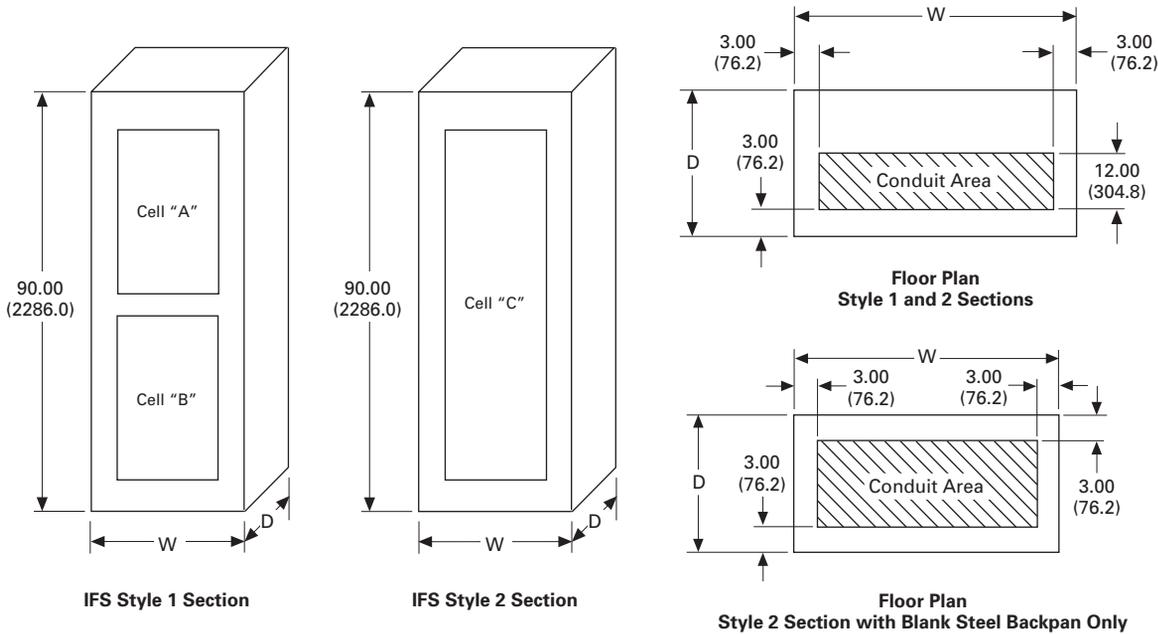
Panel Cell	Panelboard Type	Maximum Vac Rating	Main Device Type	Maximum Main Rating Amperes	Branch Circuit Ampere Range	Allowable Panelboard Modifications	Width (W)		Depth (D)		Section Height
							Standard	Optional	Standard	Optional	
<b>IFS Style 1 Section</b>											
A	Pow-R-Line 1a	240	MLO	600	15–100	①②	26.00 (660.4)	30.00 (762.0)	18.00 (457.2)	24.00 (609.6)	90.00 (2286.0)
			Breaker	225			20.00 (508.0)	26.00 (660.4) 30.00 (762.0)			
	Pow-R-Line 2a	600Y/347	MLO	600	15–100	①②	26.00 (660.4)	30.00 (762.0)	18.00 (457.2)	24.00 (609.6)	
			Breaker	225			20.00 (508.0)	26.00 (660.4) 30.00 (762.0)			
Pow-R-Command™	240 480Y/277	MLO	225	15–100	①②	20.00 (508.0)	26.00 (660.4) 30.00 (762.0)	18.00 (457.2)	24.00 (609.6)		
						Blank steel backpan ③	—			None	—
B	Pow-R-Line 1a	240	MLO	600	15–100	①②	26.00 (660.4)	30.00 (762.0)	18.00 (457.2)	24.00 (609.6)	90.00 (2286.0)
			Breaker	225			20.00 (508.0)	26.00 (660.4) 30.00 (762.0)			
	Pow-R-Line 2a	600Y/347	MLO	600	15–100	①②	26.00 (660.4)	30.00 (762.0)	18.00 (457.2)	24.00 (609.6)	
			Breaker	225			20.00 (508.0)	26.00 (660.4) 30.00 (762.0)			
Pow-R-Command	240 480Y/277	MLO	225	15–100	①②	20.00 (508.0)	26.00 (660.4) 30.00 (762.0)	18.00 (457.2)	24.00 (609.6)		
						Blank steel backpan ③	—			None	—

#### Notes

- ① Copper main lugs, ground bar circuit breaker handle lockoff devices, nameplates, 200% rated neutral through 400A, permanent circuit numbers, directory frames, shunt trip breakers, through-feed lugs to panel immediately above or below.
- ② If panel sizing with non-interchange main is 48.00 inches (1219.2 mm) high or less, the panel will fit in a half section. If it is 72.00 inches (1828.8 mm) high, you must use a full section. If it is 60.00 inches (1524.0 mm) high, contact Eaton for structure dimensions. (One exception is PRL 1a/2a with 400A MLO and 42 circuits, which will fit in half section.)
- ③ Possible uses: HVAC, dimming, contactors, A/V equipment and data rack equipment. Contact Eaton for details.
- ④ Galvanized steel backpan provided for customer specified equipment. Contact Eaton for details.

Approximate Dimensions in Inches (mm)

### Style 1 and 2 Integrated Facility Switchboards Distribution Section Layout



### IFS Style 2 Allowable Configurations (Select One "Panelboard Type" per Panelboard "Cell")

Panel Cell	Panelboard Type	Maximum Vac Rating	Main Device Type	Maximum Main Rating Amperes	Branch Circuit Ampere Range	Allowable Panelboard Modifications	Width (W)		Depth (D)		Section Height
							Standard	Optional	Standard	Optional	
<b>IFS Style 2 Section</b>											
C	Pow-R-Line 1a	240	MLO Breaker	600 400	15-100	①②	26.00 (660.4)	30.00 (762.0)	18.00 (457.2)	24.00 (609.6)	90.00 (2286.0)
	Pow-R-Line 2a	600Y/347	MLO Breaker	600 400	15-100	①②	26.00 (660.4)	30.00 (762.0)	18.00 (457.2)	24.00 (609.6)	90.00 (2286.0)
	Pow-R-Line 3a	600	MLO Breaker	600 400	15-125	①②	26.00 (660.4)	30.00 (762.0)	18.00 (457.2)	24.00 (609.6)	90.00 (2286.0)
	Pow-R-Command	480Y/277	MLO Breaker	400 225	15-100	①②	26.00 (660.4)	30.00 (762.0)	18.00 (457.2)	24.00 (609.6)	90.00 (2286.0)
	Blank steel backpan ③	—	None	—	—	④	20.00 (508.0)	26.00 (660.4) 30.00 (762.0)	18.00 (457.2)	24.00 (609.6)	90.00 (2286.0)

#### Notes

- ① Copper main lugs, ground bar circuit breaker handle lockoff devices, nameplates, 200% rated neutral through 400A, permanent circuit numbers, directory frames, shunt trip breakers, through-feed lugs to panel immediately above or below.
- ② If panel sizing with non-interchange main is 48.00 inches (1219.2 mm) high or less, the panel will fit in a half section. If it is 72.00 inches (1828.8 mm) high, you must use a full section. If it is 60.00 inches (1524.0 mm) high, contact Eaton for structure dimensions. (One exception is PRL 1a/2a with 400A MLO and 42 circuits, which will fit in half section.)
- ③ Possible uses: HVAC, dimming, contactors, A/V equipment and data rack equipment. Contact Eaton for details.
- ④ Galvanized steel backpan provided for customer specified equipment. Contact Eaton for details.

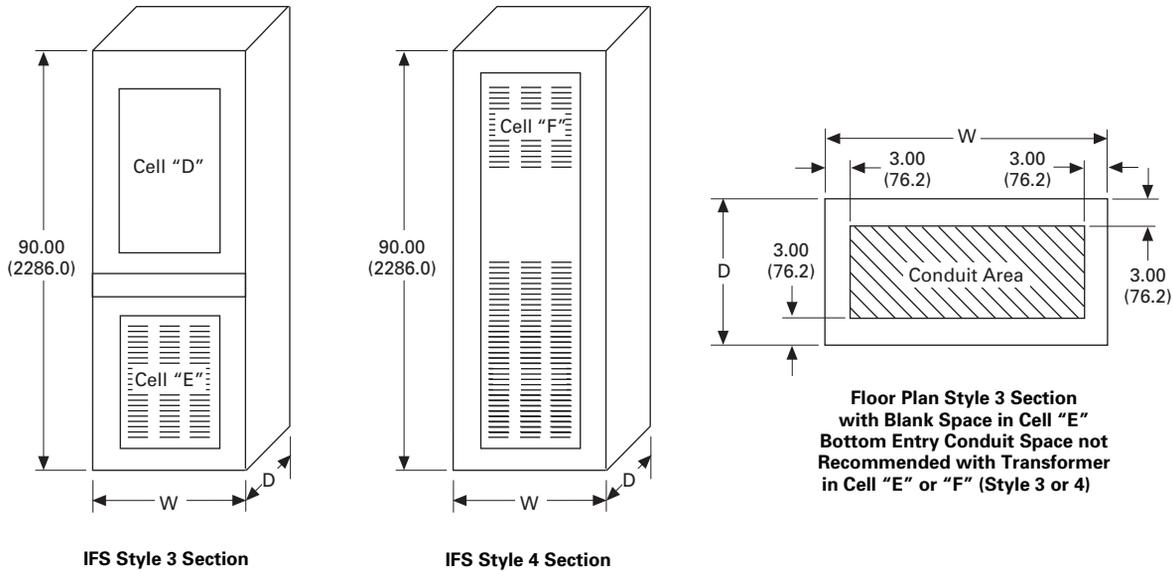
# Low Voltage Switchboards and Switchgear

## Integrated Facility Switchboards

Approximate Dimensions in Inches (mm)

### Style 3 and 4 Integrated Facility Switchboards Distribution Section Layout

5



### IFS Style 3 Allowable Configurations (Select One "Panelboard Type" per Panelboard "Cell")

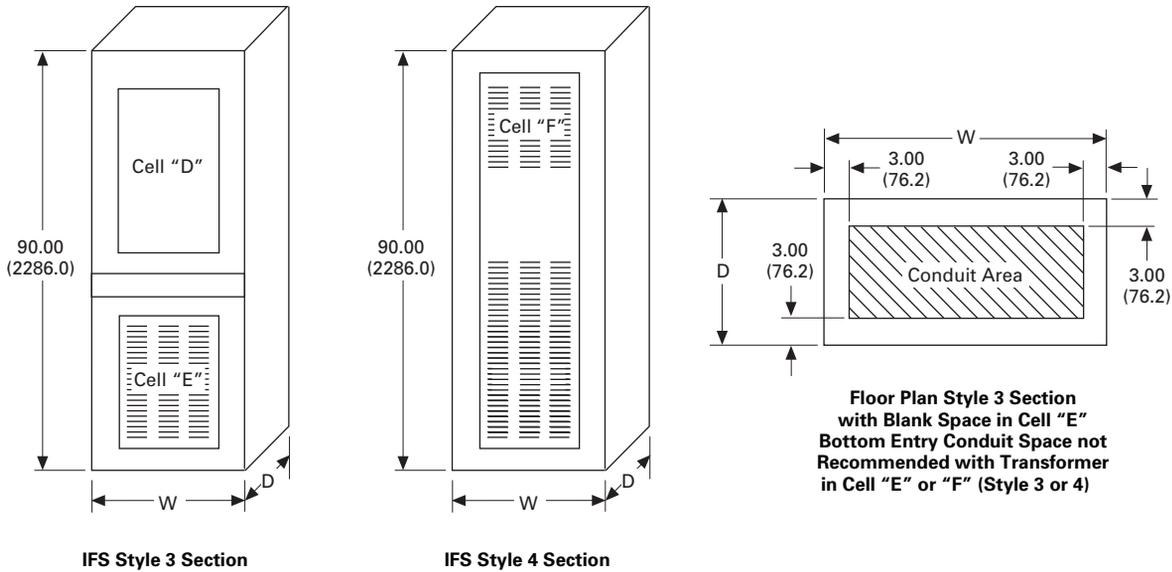
Panel Cell	Panelboard Type	Maximum Vac Rating	Main Device Type	Maximum Main Rating Amperes	Branch Circuit Ampere Range	Allowable Panelboard Modifications	Width (W)		Depth (D)		Section Height
							Standard	Optional	Standard	Optional	
<b>IFS Style 3 Section</b>											
D	Pow-R-Line 1a	240	MLO	600	15–100	①	26.00 (660.4)	30.00 (762.0)	24.00 (609.6)	—	90.00 (2286.0)
	Breaker		225								
	Pow-R-Line 2a	600Y/347	MLO	600	15–100	①	26.00 (660.4)	30.00 (762.0)	24.00 (609.6)	—	90.00 (2286.0)
	Breaker		225								
	Pow-R-Line 3a	600	MLO	600	15–125	①②	26.00 (660.4)	30.00 (762.0)	24.00 (609.6)	—	90.00 (2286.0)
	Pow-R-Line C switchboard chassis	600	MLO	800	15–600	①	26.00 (660.4)	36.00 (914.4)	24.00 (609.6)	—	90.00 (2286.0)
			Breaker	600				30.00 (762.0)			
			MLO or Breaker	800				—			
	Pow-R-Command	240 480Y/277	MLO	225	15–100	①	26.00 (660.4)	30.00 (762.0)	24.00 (609.6)	—	90.00 (2286.0)
	Blank steel backpan	—	None	—	—	③	26.00 (660.4)	30.00 (762.0)	24.00 (609.6)	—	90.00 (2286.0)

#### Notes

- ① Copper main lugs, ground bar circuit breaker handle lockoff devices, nameplates, 200% rated neutral through 400A, permanent circuit numbers, directory frames, shunt trip breakers, through-feed lugs to panel immediately above or below.
  - ② If panel sizing with non-interchange main is 48.00 inches (1219.2 mm) high or less, the panel will fit in a half section. If it is 72.00 inches (1828.8 mm) high, you must use a full section. If it is 60.00 inches (1524.0 mm) high, contact Eaton for structure dimensions. (One exception is PRL 1a/2a with 400A MLO and 42 circuits, which will fit in half section.)
  - ③ Galvanized steel backpan provided for customer specified equipment. Contact Eaton for details.
- Select one "Panelboard Type" or one "Blank Steel Backpan" and either one "Transformer" or one "Blank Space" per "Cell."

Approximate Dimensions in Inches (mm)

### Style 3 and 4 Integrated Facility Switchboards Distribution Section Layout



### IFS Style 3 and 4 General Purpose Dry-Type Distribution Transformers

Panel Cell	Panelboard Type	Temperature Rise	Windings	kVA Range	Full Cap Taps		Allowable Modifications	Width (W)		Depth (D)		Section Height
					FCAN	FCBN		Standard	Optional	Standard	Optional	
<b>IFS Style 3 Section</b>												
E ①②	Transformer ③	150°C only ④	Aluminum	15-45	4-2.5%	2-2.5%	①	26.00 (660.4)	—	24.00 (609.6)	—	90.00 (2286.0)
		150°C only ④	Aluminum	75	4-2.5%	2-2.5%	①	30.00 (762.0)	—	24.00 (609.6)	—	90.00 (2286.0)
		115°C	Aluminum	112.5	4-2.5%	2-2.5%	①	36.00 (914.4)	—	24.00 (609.6)	—	90.00 (2286.0)
<b>IFS Style 4 Section</b>												
F ①	Transformer ③	150°C	Aluminum	150	4-2.5%	2-2.5%	①	36.00 (914.4)	—	30.00 (762.0)	—	90.00 (2286.0)
				225	4-2.5%	2-2.5%	①	44.00 (1117.6)	—	36.00 (914.4)	—	90.00 (2286.0)

**Notes**

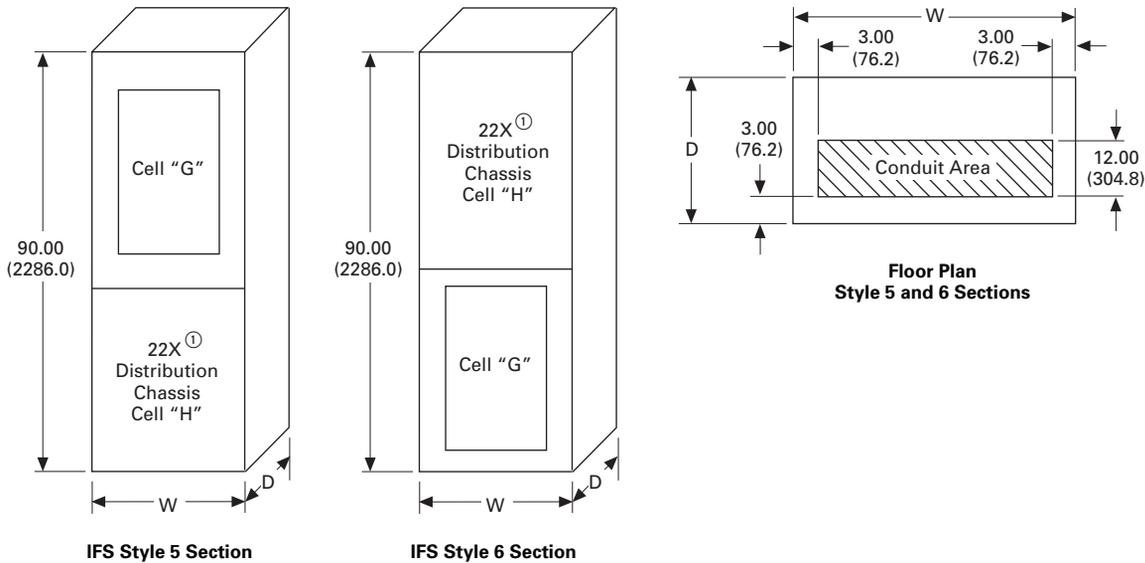
- ① Copper windings, 115°C, 80°C, K-Factor, low sound are available options but may change dimensions.
- ② Either one F Frame or K Frame circuit breaker can be included in any transformer section to be used as a disconnect.
- ③ General purpose CSA C802.2 Energy Efficient.
- ④ Contact Eaton for other temperature rise transformers and special requirements.

# Low Voltage Switchboards and Switchgear

## Integrated Facility Switchboards

Approximate Dimensions in Inches (mm)

### Style 5 and 6 Integrated Facility Switchboards Distribution Section Layout



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### IFS Style 5 and 6 Allowable Configurations (Select One "Panelboard Type" per Panelboard "Cell")

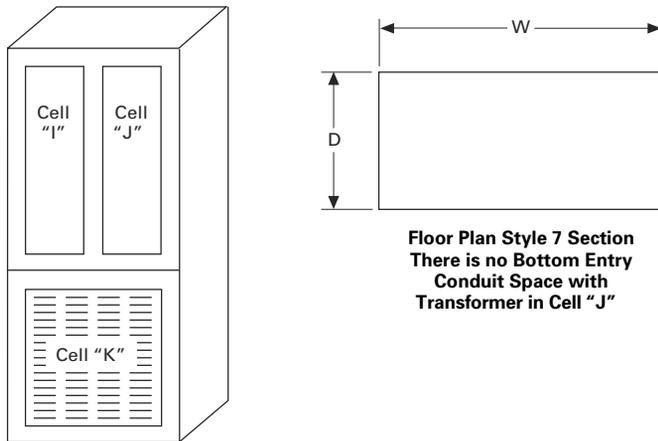
Panel Cell	Panelboard Type	Maximum Vac Rating	Main Device Type	Maximum Main Rating Amperes	Branch Circuit Ampere Range	Allowable Panelboard Modifications	Width (W)		Depth (D)		Section Height
							Standard	Optional	Standard	Optional	
<b>IFS Style 5 and 6 Sections</b>											
G	Pow-R-Line 1a	240	MLO Breaker	600 225	15-100	②③	26.00 (660.4)	30.00 (762.0)	18.00 (457.2)	24.00 (609.6)	90.00 (2286.0)
	Pow-R-Line 2a	600Y/347	MLO Breaker	600 225	15-100	②③	26.00 (660.4)	30.00 (762.0)	18.00 (457.2)	24.00 (609.6)	90.00 (2286.0)
	Pow-R-Line 3a	600	MLO Breaker	600 400	15-125	②③	26.00 (660.4)	30.00 (762.0)	18.00 (457.2)	24.00 (609.6)	90.00 (2286.0)
	Pow-R-Command ②	240 480Y/277	MLO	225	15-100	②	26.00 (660.4)	30.00 (762.0)	18.00 (457.2)	24.00 (609.6)	90.00 (2286.0)
H	Pow-R-Line C switchboard chassis	600	MLO Breaker	800 600	15-600	②	26.00 (660.4)	30.00 (762.0) 36.00 (914.4)	18.00 (457.2)	24.00 (609.6)	90.00 (2286.0)
			Breaker	800	15-600	②	36.00 (914.4)	—	24.00 (609.6)	—	90.00 (2286.0)

#### Notes

- ① 1X = 1-3/8 inch.
- ② Copper main lugs, ground bar circuit breaker handle lockoff devices, nameplates, 200% rated neutral through 400A, permanent circuit numbers, directory frames, shunt trip breakers, through-feed lugs to panel immediately above or below.
- ③ If panel sizing with non-interchange main is 48.00 inches (1219.2 mm) high or less, the panel will fit in a half section. If it is 72.00 inches (1828.8 mm) high, you must use a full section. If it is 60.00 inches (1524.0 mm) high, contact Eaton for structure dimensions. (One exception is PRL 1a/2a with 400A MLO and 42 circuits, which will fit in half section.)

Approximate Dimensions in Inches (mm)

### Style 7 Integrated Facility Switchboards Distribution Section Layout



IFS Style 7 Section

### IFS Style 7 Panelboard Over Dry-Type Transformer (Select One "Panelboard Type" per Panelboard "Cell")

Panel Cell	Panelboard Type	Maximum Vac Rating	Main Device Type	Maximum Main Rating Amperes	Branch Circuit Ampere Range	Allowable Panelboard Modifications	Width (W)		Depth (D)		Section Height
							Standard	Optional	Standard	Optional	
<b>IFS Style 7 Section</b>											
I	Pow-R-Line 1a	240	MLO Breaker	400	15-100	①	36.00 (914.4)	—	24.00 (609.6)	—	90.00 (2286.0)
	Pow-R-Line 2a	600Y/347	MLO Breaker	400	15-100	①	36.00 (914.4)	—	24.00 (609.6)	—	90.00 (2286.0)
J	Pow-R-Line 1a	240	MLO Breaker	400	15-100	①	36.00 (914.4)	—	24.00 (609.6)	—	90.00 (2286.0)
	Pow-R-Line 2a	600Y/347	MLO Breaker	400	15-100	①	36.00 (914.4)	—	24.00 (609.6)	—	90.00 (2286.0)
	Pow-R-Line 3a	600	MLO Breaker	400	15-225	①②	36.00 (914.4)	—	24.00 (609.6)	—	90.00 (2286.0)

### IFS Style 7 General Purpose Dry-Type Distribution Transformers

Panel Cell	Panelboard Type	Temperature Rise	Windings	kVA Range	Full Cap Taps		Allowable Modifications	Width (W)		Depth (D)		Section Height
					FCAN	FCBN		Standard	Optional	Standard	Optional	
<b>IFS Style 7 Section</b>												
K	Transformer ③④	150°C only ⑤	Aluminum	15-75	4-2.5%	2-2.5%	⑥	36.00 (914.4)	—	24.00 (609.6)	—	90.00 (2286.0)
		115°C	Aluminum	112.5	4-2.5%	2-2.5%	⑥	36.00 (914.4)	—	24.00 (609.6)	—	90.00 (2286.0)

**Notes**

- ① Copper main lugs, ground bar circuit breaker handle lockoff devices, nameplates, 200% rated neutral through 400A, permanent circuit numbers, directory frames, shunt trip breakers, through-feed lugs to panel immediately above or below.
- ② If panel sizing with non-interchange main is 48.00 inches (1219.2 mm) high or less, the panel will fit in a half section. If it is 72.00 inches (1828.8 mm) high, you must use a full section. If it is 60.00 inches (1524.0 mm) high, contact Eaton for structure dimensions. (One exception is PRL 1a/2a with 400A MLO and 42 circuits, which will fit in half section.)
- ③ Either one F Frame or K Frame circuit breaker can be included in any transformer section to be used as a disconnect.
- ④ General purpose CSA C802.2 Energy Efficient.
- ⑤ Contact Eaton for other temperature rise transformers and special requirements.
- ⑥ Copper windings, 115°C, 80°C, K-Factor, and harmonic mitigating transformers are available options but may change dimensions.

# Low Voltage Switchboards and Switchgear

## Integrated Facility Switchboards

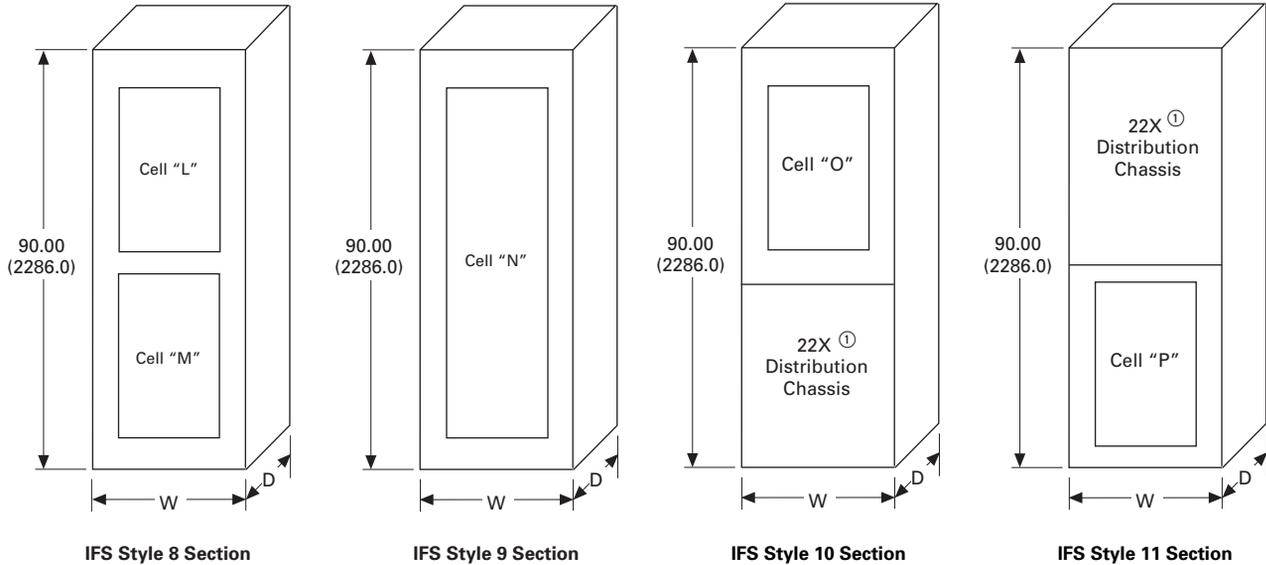
Approximate Dimensions in Inches (mm)

### Integrated Facility Switchboards ATS Section Layout

Eaton Pow-R-Line panelboard and integrated wall-mounted ATS (non-bypass)—factory wired from feeder devices in adjacent sections. Standard features include lockable trim doors and factory-mounted overcurrent devices.

### Style 8, 9, 10 and 11 Integrated Facility Switchboards ATS Section Layout

5



### IFS Style 8, 9, 10 and 11 Contactor-Based, Non-Bypass Transfer Switches (Select One "ATS Type" per ATS "Cell")

ATS Cell	Maximum Vac Rating	Main Rating Amperes	Width				Depth		Standard Terminals Load Side, Normal and Standby Source	Neutral Connection
			20.00 (508.0)	26.00 (660.4)	30.00 (762.0)	36.00 (914.4)	18.00 (457.2)	24.00 (609.6)		
<b>IFS Style 8, 9, 10 and 11 Sections</b>										
L/M/O/P	480	40-100	■	■	■	■	■	■	(1) #14-2/0	(3) #14-1/0
	600	40-100	■	■	■	■	■	■	(1) #6-250 kcmil	(3) #14-1/0
	480	150-200	■	■	■	■	■	■	(1) #6-250 kcmil	(3) 1/0-250 kcmil
	600	150-200	■	■	■	■	■	■	(1) #6-250 kcmil	(3) 1/0-250 kcmil
	480	225-400	■	■	■	■	■	■	(2) 3/0-250 kcmil (1) 3/0-600 kcmil	(6) 250-500 kcmil
N	480	40-100	■	■	■	■	■	■	(1) #14-2/0	(3) #14-1/0
	600	40-100	■	■	■	■	■	■	(1) #6-250 kcmil	(3) #14-1/0
	480	150-200	■	■	■	■	■	■	(1) #6-250 kcmil	(3) 1/0-250 kcmil
	600	150-200	■	■	■	■	■	■	(1) #6-250 kcmil	(3) 1/0-250 kcmil
	480	225-400	■	■	■	■	■	■	(2) 3/0-250 kcmil (1) 3/0-600 kcmil	(6) 250-500 kcmil
	600	225-400			■	■		■	(2) 3/0-250 kcmil (1) 3/0-600 kcmil	(6) 250-500 kcmil
			600-1200			■	■	■	(4) 1/0-750 kcmil	(12) 1/0-750 kcmil
480	600-1200			■	■	■	■	(4) 1/0-750 kcmil	(12) 1/0-750 kcmil	

**Notes**

① 1X = 1-3/8 inch.

All amperages available in three- and four-pole.

Approximate Dimensions in Inches (mm)

## IFS Style 8, 9, 10 and 11 Breaker-Based, Non-Bypass Transfer Switches (Select One "ATS Type" per ATS "Cell")

ATS Cell	Frame Size	Maximum Vac Rating	Main Rating Amperes	Width			Depth	
				26.00 (660.4)	30.00 (762.0)	36.00 (914.4)	18.00 (457.2)	24.00 (609.6)
<b>IFS Style 8, 9, 10 and 11 Sections</b>								
L/M/O/P	F	600	30–150	■	■	■	■	■
		240	30–200					
N	F	600	30–150	■	■	■	■	■
		240	30–200					
	K, L, M	600/240	225–600			■	■	■
	N ①	600/240	800–1200			■	■	■

### Notes

① Please consult Eaton for N size breaker frame.

All amperages available in two-, three- and four-pole.

## Technical Data and Specifications

### Contactors / Motor Control

Consult Eaton for complete application.

### Seismic Construction

Zone 4 seismic is optional.

### Metering

Metering can be installed in the following standard cells:

- Blank steel backpan (20, 26, 30, 36 inches wide)
- Pow-R-Line 4 chassis (minimum 36 inches wide, 22X spacing)

Metering products:

- IQ 100 (130, 140, 150)
- IQ 200 (250, 260)
- PXM (2250, 2260, 2270, 4000, 6000, 8000)
- PXG (400e, 600e, 800e)
- IQ 35M
- Non-Eaton products

Consult Eaton for more information.

# Low Voltage Switchboards and Switchgear

## Integrated Facility Switchboards

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# Low Voltage Switchboards and Switchgear

## Pow-R-Line C Switchboards with Drawout Moulded-Case Circuit Breaker

### Pow-R-Line C Switchboard with Drawout Moulded-Case Circuit Breakers



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### Pow-R-Line C™ Switchboards with Drawout Moulded-Case Circuit Breaker

#### Product Description

Eaton drawout moulded-case circuit breakers are installed in switchboards in a group-mounted manner. Breakers use drawout cassettes and are three-pole with ratings from 20A to 600A. The breakers are inserted and removed via a mechanical system similar to other drawout designs associated with switchgear; however, these breakers are horizontally mounted in a traditional switchboard. Feeder devices are also front accessible and front connected.

Group-mounted drawout moulded-case circuit breakers include Eaton JG and LG breaker families and include standard thermal-magnetic trip units or optional Eaton 310+ electronic trip units.

#### Application Description

Drawout moulded-case circuit breaker switchboards are ideal for applications such as:

- Data centres
- Health care facilities
- Process industry
- Institutions
- Laboratories
- Critical load applications

#### Features, Benefits and Functions

##### Enclosures

CSA® Type 1, sprinklerproof optional. Please consult Eaton for other enclosure types.

##### Base Cassette

The base cassette is permanently factory mounted to the switchboard's chassis. The lineside connections use bus connectors and are factory connected to the switchboard's vertical bus.

The base cassette is designed to accept the drawout cassette that contains the breaker. The loadside feeder conductors are also part of the base cassette, allowing the loadside feeder conductors to remain with the base cassette when the breaker is removed without removing the loadside conductors.

The base cassette contains a drawout racking mechanism, a Connected/Disconnected position indicator and a pull-apart terminal block base (used for connections to the breaker accessories).

**Note:** Per industry practice, all power to the board section must be disconnected at its source before working on any electrical equipment.

Safety features include finger-safe connections to the moulded-case circuit breaker drawout cassette and a mechanism system that will not allow the breaker to be connected or removed while the breaker is in the energized, ON, position.

#### Drawout Cassette

The drawout cassette contains the breaker and is group-mounted. The cassette incorporates a viewing window and an external racking port. The viewing window allows personnel to visually inspect the breaker status and to see whether the breaker is connected to or disconnected from the bus. The window exposes the Connected/Disconnected position indicator on the base cassette. The external racking port allows access to the racking mechanism to draw out the breaker.

The drawout cassette contains handles attached to the deadfront to help easily remove the breaker. The cassette also contains a pigtail wiring harness, which is factory-wired from the breaker accessory ports and contains a pull-apart terminal block that attaches the permanently mounted female terminal block located on the base cassette. External connections on the secondary side of the terminal block are provided by the installer.

# Low Voltage Switchboards and Switchgear

## Pow-R-Line C Switchboards with Drawout Moulded-Case Circuit Breaker

The drawout cassette employs two breaker families—the JG and the LG with standard thermal-magnetic trip unit. Optional 310+ electronic trip units offer ampere ratings from 20A to 250A on the JG and 100A to 600A on the LG.

### Breaker Options

- Electronic trip units
- Infrared viewing windows for the lineside and loadside connections
- Shunt trips
- Auxiliary contacts
- Bell alarm
- Zone selective interlocking
- Arcflash Reduction Maintenance System™

The JG and LG families of drawout breakers are available in either a single group-mounted design or a high-density, twin group-mounted design where two breakers occupy the same vertical space.

### Short-Circuit Rating

The short-circuit current rating of the switchboard is determined by the short-circuit current rating of the lowest rated overcurrent device in the switchboard.

### Busbar System

Standard tin-plated copper bus and silver-plated copper.

### Metering

A full line of Eaton customer metering is available. All options offered in Eaton's standard bolt-on switchboard product are also available with the Pow-R-Line drawout moulded-case circuit breaker switchboard. Refer to Tab 9—Components—or contact Eaton for more information.

### Surge Protection Devices (SPDs)

Eaton SPDs are available. A moulded-case circuit breaker is provided as a lineside disconnect for the SPD. Refer to Tab 9—Components—or contact Eaton for more information.

### Optional Infrared (IR) Viewing Windows

Infrared windows are an available option on both the JG and LG families of single-mounted drawout moulded-case circuit breaker cassettes. Infrared windows can be located to view the lineside and/or loadside connections.

### Arcflash Reduction Maintenance System

The Eaton Arcflash Reduction Maintenance System provides reduced levels of incident arc-flash energy when put in the Maintenance mode. The Arcflash Reduction Maintenance System is available on the LG family of drawout MCCBs, combining the Arcflash Reduction Maintenance System with the Digitrip 310+ electronic trip unit and allowing for the ability to place the trip unit in Maintenance mode to reduce potential arc-flash energy. This is done by a dedicated instantaneous sensing circuit with settings of 2.5 and 4.0 times the current rating of the trip unit. This dedicated analog sensing circuit delivers breaker clearing times that are faster than instantaneous by eliminating microprocessor processing latencies. This provides superior arc flash reduction to competing systems that simply lower the standard instantaneous pickup set point.

When the Eaton Arcflash Reduction Maintenance System is enabled, the resulting reduced arc-flash energy allows for reduced PPE, which improves worker comfort and mobility. With the Arcflash Reduction Maintenance System set at 2.5X or 4.0X, it reduces incident energy levels to allow PPE Category 0 for currents of 2.5X or 4.0X the breaker ampere rating or greater. The initial setting of each Arcflash Reduction Maintenance System trip unit is determined by completing a power system analysis to assess available fault current at the circuit breaker. Based on that analysis, the Maintenance mode protection settings are defined, achieving a reduced level of arc-flash energy. The Maintenance mode is then activated by adjusting the trip unit's instantaneous setting to desired Maintenance mode levels that are determined by the power analysis.

### Electronic Trip Units With Zone Selective Interlocking (ZSI)

Unlike power air circuit breakers, moulded-case circuit breakers do not offer the ability to turn off the instantaneous trip settings. As a result, the coordination between one breaker and another could compromise selectivity (breaker closest to the fault opening first). Zone selective interlocking is designed to mitigate selectivity issues with moulded-case circuit breakers.

Both the JG and LG families of moulded-case circuit breakers offer zone selective interlocking as an option.

Zone selective interlocking provides increased system protection and can reduce arc-flash risk by allowing the breaker closest to the fault to trip without any preset time delays. This is achieved by selecting and setting the trip unit equipped with the zone selective interlocking option. The hardwired connection between the trip units sends a restraining signal upstream, allowing the breaker closest to the fault to act instantaneously. Zone selective interlocking reduces stress on the distribution system and can reduce arc-flash risk by isolating faults without time delays.

### Standards and Certifications

- CSA C22.2 No. 31
- CSA C22.2 No. 244



# Low Voltage Switchboards and Switchgear

## Pow-R-Line C Switchboards with Drawout Moulded-Case Circuit Breaker

### Product Selection

#### Single Group-Mounted Feeder



#### Standard Adjustable Thermal-Magnetic Trip Units

250A JG Frame	600A LG Frame
70A	250A
90A	300A
100A	350A
125A	400A
150A	500A
175A	600A
200A	—
225A	—
250A	—

#### Twin Group-Mounted Feeder



#### Optional 310+ Electronic Trip Units

250A JG Frame	600A LG Frame
20A	100A
25A	125A
30A	150A
40A	175A
45A	200A
50A	225A
70A	250A
80A	300A
90A	350A
100A	400A
110A	450A
125A	500A
150A	600A
175A	—
200A	—
225A	—
250A	—

### Technical Data and Specifications

Eaton Pow-R-Line C switchboard:

- Maximum 4000A rating
- Rated at 240, 480 and 600 Vac
- Maximum interrupting ratings:
  - 200 kAIC at 240 Vac
  - 100 kAIC at 480 Vac
  - 65 kAIC at 600 Vac

### Short-Circuit Current Ratings

Maximum Breaker Ampere Rating	Breaker Frame	Short-Circuit Rating kA Symmetrical by Vac		
		240V	480V	600V
250	JGS	85	35	18
	JGH	100	65	25
	JGC	200	100	35
	JGU	200	150	50
600	LGS	85	35	25
	LGH	100	65	35
	LGC	200	100	50
	LGU	200	150	65

### Optional Accessories

Accessory	Position ①	
	Left	Right
Alarm contact (Make/Break)	—	■
Auxiliary switch (1A/1B)	—	■
Auxiliary switch (2A/2B)	—	■
Auxiliary switch and alarm contact	—	■
Shunt trip (specify voltage)	■	—
Undervoltage release mechanism	■	—

### Dimensions

Approximate Dimensions in Inches (mm)

### Drawout Group-Mounted "X" Space Factors ②

Breaker Family Type and Configuration	Group-Mounted Chassis "X" Space Required	Width	
		38.00 (965.2)	48.00 (1219.2)
JG family, single mount	7X	■	■
JG family, dual/twin mount	7X	—	■
LG family, single mount	9X	■	■
LG family, dual/twin mount	9X	—	■

#### Notes

① Only one accessory per position.

② 1X = 1-3/8 inch.

# Low Voltage Switchboards and Switchgear

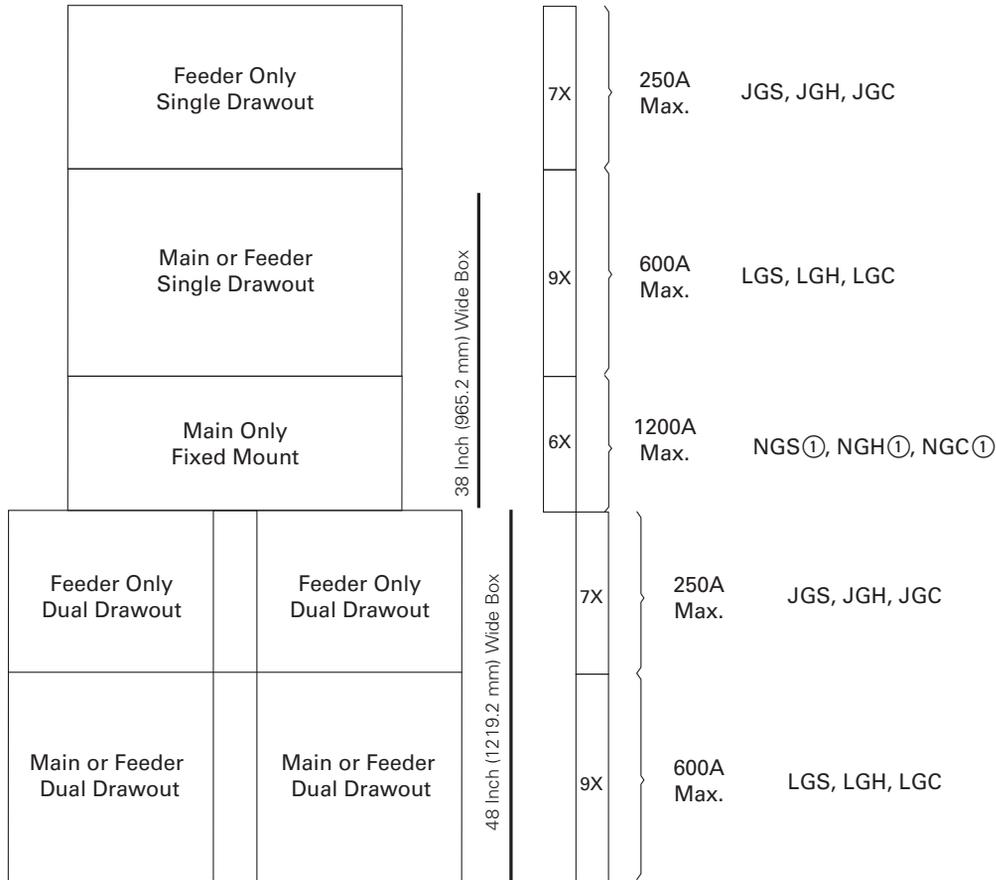
Pow-R-Line C Switchboards with Drawout Moulded-Case Circuit Breaker

## Layout for Branch and Horizontally Mounted Main Devices—PRLC

### 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.

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① 100% rated breaker.

② Optional 750 kcmil terminal requires 44-inch (1117.6 mm) wide box.

③ Contact Eaton for availability.

# Low Voltage Switchboards and Switchgear

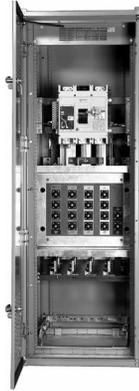
Pow-R-Line C Switchboards with Drawout Moulded-Case Circuit Breaker

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## Typical Generator Quick Connect Assembly



External View



Internal View

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## Generator Quick Connect Switchboards

### Product Description

The Eaton Generator Quick Connect Switchboard is an engineered assembly designed to allow safe and reliable connection of a mobile generator to the facility's electrical system.

The Eaton Quick Connect includes Cam-type receptacles, standard mechanical lugs, a dedicated generator-service disconnect, and a manual key-interlock transfer scheme. The switchboard provides a quick and safe supply of emergency power to parts of the electrical power system that are not covered by the emergency power system; it can also back up existing generators.

Loads connected to the Generator Quick Connect Switchboard can be safely transferred to an alternative power source.

### Application Description

The Generator Quick Connect Switchboard can be applied in both new and retrofit applications.

The switchboard supports all market segments and applications, such as:

- Commercial facilities
- Institutions and school boards
- Retail buildings
- Industrial facilities
- Residential facilities
- Health care facilities
- Wastewater treatment facilities
- Data centres

### Features, Benefits and Functions

#### **Reduced Downtime (Speed of Connection)**

The Generator Quick Connect Switchboard is ready for immediate connection. Once the Quick Connect Switchboard is installed:

- A permanent connection point for temporary mobile power is established
- No additional field modifications to the internal switchboard are required to connect the generator cables
- Modifications to the facility's physical structure to accommodate generator cables (e.g., drilling holes in walls) is not required
- No routing of cables through doorways, windows, hallways or staircases is required

#### **Safer and More Reliable**

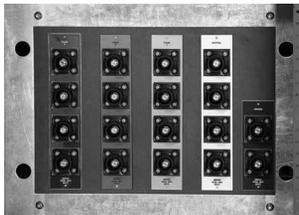
- Reduces the potential safety hazards associated with connecting the mobile generator to the facility's electrical system under lost power conditions
- Eliminates the safety hazards of generator cables lying in the path of customers or employees

#### **Reduced Emergency Costs**

The costs associated with temporarily connecting mobile generators, such as modifying switchboards, making physical modifications to buildings, and routing cables to connect the mobile generator, are eliminated or greatly reduced.

### Decreased Utility Dependency

The Quick Connect Switchboard allows the facility to switch between utility feed and generator feed, without relying on utility for disconnect service.



Cam Lock Receptacles with Colour-Coded Generator Connections



Bottom Flip-Up Cover for Easy Access to Incoming Lugs or Cam Lock Receptacles

### Standards and Certifications

- CSA® C22.2 No. 31



### Product Selection

#### Standard Generator Quick Connect Assembly

- Standard ratings available up to 2000A (80% rated) or 1600A (100% rated)
- Detailed operating instructions mounted on front cover
- The Generator Service Disconnect is a CSA approved circuit breaker key interlocked with the service disconnect
- Accessories include ground fault, shunt trip, auxiliary contacts and alarms
- Colour-coded Cam-type plug receptacles for easy connection to generator
- Mechanical lugs are provided for alternate method of connecting generator cables
- Standard enclosure is CSA Type 1; sprinklerproof, Type 2, 3R are optional
- Pow-R-Line C™ construction similar to Eaton's standard switchboard

#### Custom Generator Quick Connect Assembly

- Accommodates ratings greater than 1600A (100% rated) or 2000A (80% rated); consult Eaton for more information
- Custom integration into switchboard lineups are available; consult Eaton for more information

### Technical Data and Specifications

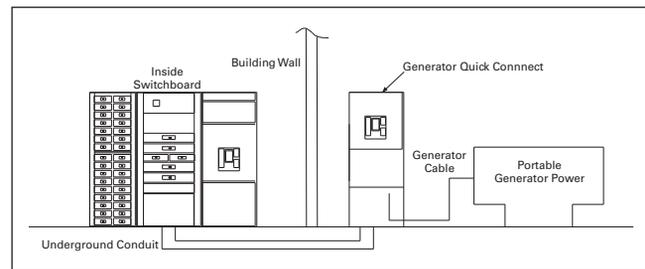
#### Generator Quick Connect kW Ratings (Rated up to 600V) ①

Ampere Rating ②	kW (Maximum) Rating ③			
	80% Rated Generator Disconnect Breaker		100% Rated Generator Disconnect Breaker	
	600V	208V	600V	208V
400	266	92	332	115
600	399	138	498	173
800	531	184	664	230
1200	797	276	996	345
1600	1063	368	1329	461

#### Generator Quick Connect Main Breaker Ratings

Breaker Frame	Maximum Ampere Rating	Interrupting Rating (kA)	
		240V	600V
N-Frame	1200	65, 100	25, 35, 65
R-Frame	1600	125, 200	50, 65
R-Frame	2000 (80% rated)	125, 200	50, 65

#### Generator Quick Connect Schematic



### Dimensions

Approximate Dimensions in Inches (mm)

Standard structures are 24.00 inches (762.0 mm) deep, by 30.00 inches (762.0 mm) wide by 90.00 inches (2286.0 mm) high.

CSA Type 3R enclosures are equipped with a 13.00-inch (330.0 mm) front structure extension.

#### Notes

- ① 50 kAIC standard bus bracing.
- ② Standard ratings up to 1600A; for higher amperages, consult Eaton.
- ③ Calculated using the following: kW (max.) =  $[(V \cdot A \cdot 1.73 \cdot PF) / 1000] \cdot (\text{breaker rating})$  with PF (power factor) equaling 0.8.

## Customer Service Termination Enclosure



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## Customer Service Termination Enclosure

### Product Description

Eaton Customer Service Termination Enclosures (CSTEs) are the splitter connection assemblies between utility transformers and the customer's main distribution for specific utility applications.

### Features, Benefits and Functions

#### Enclosure

Eaton CSTEs are made with code gauge steel construction. Standard enclosures are CSA Type 3R, complete with ventilation and a padlocking handle.

Both pad-mounted and wall-mounted designs are available.

### Busbar System

- Standard aluminum bussing
- Optional copper bussing; please consult Eaton for more information

### Utility Metering

Utility CTs and PTs are installed by others. Optional remote meter assemblies available—EATON #M501.

### Terminations

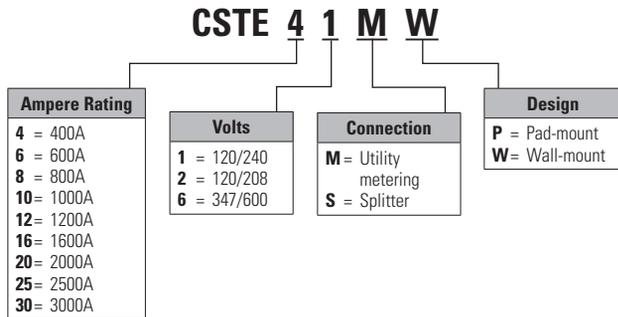
- Load mechanical lugs to suit #2–500 kcmil
- Provisions for utility two-hole compression lugs—on line side

### Standards and Certifications

- CSA C22.2 No. 31



### Catalogue Number Selection



**Note**

Please use catalogue number selection for purchasing.

### Product Selection

Approximate Dimensions in Inches (mm)



#### Wall-Mounted CSTE Available as Splitter Only

Ampere Rating	Width	Depth	Height
400	30.00 (762.0)	10.00 (254.0)	30.00 (762.0)
600–1000	36.00 (914.4)	16.00 (406.4)	46.00 (1168.4)
1200–2000	46.00 (1168.4)	23.00 (584.2)	48.00 (1219.2)
2500–4000	60.00 (1524.0)	30.00 (762.0)	60.00 (1524.0)

#### Wall-Mounted CSTE Available as Splitter with Utility Metering Provisions

Ampere Rating	Width	Depth	Height
400	30.00 (762.0)	10.00 (254.0)	30.00 (762.0)
600–1000	36.00 (914.4)	16.00 (406.4)	46.00 (1168.4)
1200–1600	46.00 (1168.4)	23.00 (584.2)	48.00 (1219.2)
2000–4000	60.00 (1524.0)	30.00 (762.0)	60.00 (1524.0)

#### Pad-Mounted CSTE Available as Splitter Only or Splitter with Utility Metering Provisions

Ampere Rating	Width	Depth	Height
400–1000	36.00 (914.4)	16.00 (406.4)	52.00 (1320.8)
1200–1600	46.00 (1168.4)	23.00 (584.2)	48.00 (1219.2)
2000–4000	60.00 (1524.0)	30.00 (762.0)	60.00 (1524.0)

### Technical Data and Specifications

**Ratings**

- 120/240 Vac
- 208Y/120V
- 600Y/347V
- Ampere ratings of 400, 600, 800, 1000, 1200, 1600, 2000, 2500, 3000A (for ratings above 3000A, consult Eaton)
- Assembly short-circuit rating: 50,000A rms symmetrical

## Roll-Up Generator Quick Connect Assembly



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## Roll-Up Generator Quick Connect Assembly

### Product Description

Eaton's Roll-Up Generator Quick Connect Assembly is the connection assembly between the temporary generator and the customer's main distribution or transfer switch.

Roll-Up Generator Quick Connect Assemblies are splitter connection points housing generator connection points and load connection points.

### Features, Benefits and Functions

#### Enclosure

Eaton Roll-Up Generator Quick Connect Assemblies are made with code gauge steel construction. Standard enclosure is CSA Type 3R with a padlocking handle; Type 4X is optional.

Both pad-mounted and wall-mounted designs are available.

### Busbar System

- Standard aluminum bussing
- Optional copper bussing, please consult Eaton for more information

### Terminations

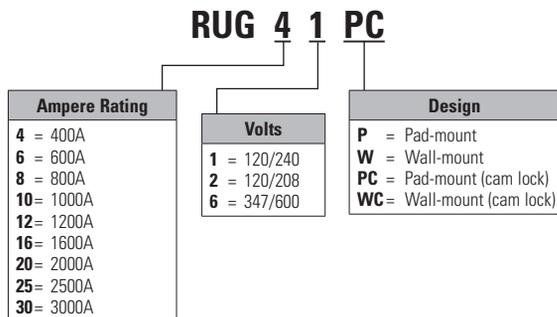
- Accommodates mechanical and compression lugs
- Provisions for two-hole compression lugs or cam lock receptacles

### Standards and Certifications

- CSA C22.2 No. 31



### Catalogue Number Selection



**Note**

Please use catalogue number selection for purchasing. Catalogue number selection is for standard CSA Type 3R enclosure. Consult Eaton for CSA Type 4X enclosures.

### Product Selection

Approximate Dimensions in Inches (mm)



#### Wall-Mounted Roll-Up Generator Quick Connect Assembly Available as Splitter Connection with or without Cam Locks

Ampere Rating	Width	Depth	Height
600–1000	36.00 (914.4)	16.00 (406.4)	46.00 (1168.4)
1200–1600	46.00 (1168.4)	23.00 (584.2)	48.00 (1219.2)
2000–4000	60.00 (1524.0)	30.00 (762.0)	60.00 (1524.0)

#### Pad-Mounted Roll-Up Generator Quick Connect Assembly Available as Splitter Connection without Cam Locks

Ampere Rating	Width	Depth	Height
600–1000	36.00 (914.4)	16.00 (406.4)	58.00 (1473.2)
1200–1600	46.00 (1168.4)	23.00 (584.2)	60.00 (1524.0)
2000–4000	60.00 (1524.0)	30.00 (762.0)	72.00 (1828.8)

#### Pad-Mounted Roll-Up Generator Quick Connect Assembly Available as Splitter Connection with Cam Locks

Ampere Rating	Width	Depth	Height
600–1600	46.00 (1168.4)	23.00 (584.2)	72.00 (1828.8)
2000–4000	60.00 (1524.0)	30.00 (762.0)	72.00 (1828.8)

### Technical Data and Specifications

**Ratings**

- 120/240 Vac
- 208Y/120V
- 600Y/347V
- Ampere ratings of 600, 800, 1000, 1200, 1600, 2000, 2500, 3000A (for ratings above 3000A, consult Eaton)
- Assembly short-circuit rating: 50,000A rms symmetrical

# Low Voltage Switchboards and Switchgear

## Generator Connection Assemblies

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**Pow-R-Line C Switchgear**



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**Pow-R-Line C Switchgear**

**Product Description**

Eaton’s Pow-R-Line C™ switchgear is an assembly of metal enclosures, each housing drawout or fixed mounted low voltage power circuit breakers.

The Canadian switchgear is particularly designed for the construction market such as data centres, hospitals, retail, office buildings and commercial applications. In addition to power breakers, the switchgear includes control and measuring devices such as relays, instruments, meters, instrument transformers and control power transformers.

**Application Description**

Switchgear is used to protect, control and monitor low voltage distribution systems. Primarily used as “standalone” distribution assemblies, they can also be incorporated into secondary unit substations: UPS systems and generator systems. Switchgear is ideally suited to applications such as construction, commercial and utility with distribution systems rated 600V or below, 200 kAIC or below bus bracing, and 12,000A or below continuous loads (cross bus).

**Features, Benefits and Functions**

- Lower installation and maintenance costs
- Higher interrupting ratings and withstand ratings
- Better coordination capability
- Increased tripping sensitivity
- Enhanced safety measures
- Higher quality, reliability and maintainability
- Communications and power quality monitoring and measuring capabilities

Pow-R-Line C switchgear provides:

- 100% rated, fully selective protection
- Integral microprocessor-based breaker tripping systems
- Two-step stored-energy breaker closing

- Standard 100 kA short-circuit bus bracing
- Optional 150 and 200 kA short-circuit bus bracing
- Optional insulating barriers to isolate the cable compartment from the bus compartment
- Both indoor and outdoor walk-in and non-walk-in enclosures; standard enclosure is CSA Type 1; optional enclosures are CSA Type 2, 3R; sprinklerproof optional
- Full range of safety solutions dealing with arc flash hazards by using Eaton Arcflash Reduction Maintenance System features

Maximum ratings for Pow-R-Line C switchgear are 600 Vac, 12,000A continuous cross bus and 200,000A short-circuit capacity.

**Structure Features**

**Standard finish:** Grey paint finish (ANSI 61) using a modern, completely automated and continuously monitored electrostatic powder coating. This continually monitored system includes spray de-grease and clean, spray rinse, iron phosphate spray coating spray rinse, non-chemical seal, oven drying, electrostatic powder spray paint coating and oven curing.

**Integral base:** The ruggedly formed base greatly increases the rigidity of the structure, reduces the possibility of damage during the installation of the equipment, and is suitable for rolling, jacking and handling. A lifting angle is bolted onto the top of the bus compartment structure for increased strength.

**Heavy-duty door hinges:**

Each breaker door is mounted with hinge pins. Removal of the door is easily accomplished by just lifting the hinge pin. This allows easy access to the breaker internal compartment for inspection and maintenance.

# Low Voltage Switchboards and Switchgear

## Pow-R-Line C Switchgear

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**Rear cover/doors:** In Pow-R-Line C switchgear, standard rear bolted covers are provided. 48.00-inch-wide (1219.2 mm) cells are split into two sections to facilitate handling during removal and installation. Optional rear doors are also available.

**Through-the-door design:** The following functions may be performed without the need to open the circuit breaker door—lever the breaker between positions (drawout), operate manual charging system and view the spring charge status flag, close and open breaker, view and adjust trip unit and read the breaker rating nameplate.

**Cassette design:** The breaker cassette supports the breaker in the cell, as well as on the movable extension rails when the breaker is placed into or removed from the cell. The extension rails allow the breaker to be drawn out without having to de-energize the entire switchgear lineup.

**Accessibility:** When the rear door is open or removed, each breaker compartment provides front access to isolated, vertical wireways, primary disconnects and other breaker compartment accessories for ease of field wiring and troubleshooting field connections.

**Four-position drawout:** Breakers can be in connected, test, disconnected or removed position. The breaker can be moved between the connected, test and disconnected positions while the compartment door is closed.

**Closing spring automatic discharge:** Mechanical interlocking automatically discharges the closing springs when the breaker is removed from its compartment.

**Optional safety shutters:** Positive acting safety shutters that isolate the breaker connections to the main bus when the breaker is withdrawn from the cell is an option offered for additional safety beyond our standard design. They reduce the potential of accidental contact with live bus. Optional insulating covers (“boots”) are furnished on live main stationary disconnecting contacts in compartments equipped for future breakers.

**Breaker inspection:** When withdrawn on the rails, breaker is completely accessible for visual inspection; tilting is not necessary. The rails are permanent parts of every breaker cassette.

**Interference interlocks:** Supplied on breakers and in compartments where the compartments are of the same physical size. Interference interlocks ensure an incorrect breaker cannot be inserted.

**Optional key interlock (cassette mounted):** This mechanism holds the breaker cell mechanically trip-free to prevent electrical or manual closing. Breaker can be stored in compartment, and completely removed for maintenance or for use as a spare without disturbing the interlock. Modification of the breaker is not required. Single- or double-cylinder cassette-mounted key interlock is available as an option.

Single-cylinder key interlock can be installed on the breaker. Accessible on the faceplate of the breaker, the device can be ordered to lock the breaker in the open or closed position.

### Bus Features

**Buses and connections:** Vertical and cross bus ratings in Pow-R-Line C switchgear are based on a CSA® and ANSI standard temperature rise of 65°C above a maximum ambient air temperature of 40°C.

**Bus ampacities:** Vertical and cross bus ratings in Pow-R-Line C switchgear are 2000, 3000, 4000, 5000 and 6000A. In addition, an 8000, 10,000 and 12,000A cross bus rating is available.

**Bus bracing:** Vertical bus configuration provides an optional industry-leading short-circuit withstand rating of 200,000A. Standard bracing is 100,000A. It has been verified through testing to maximum withstand 200,000A short-circuit for a full 30 cycles.

**Note:** Short-circuit rating of switchgear assembly is limited to the interrupting capacity of the lowest rated branch device.

**Plating:** Bolted, silver-plated copper main buses are standard. The plating is over the entire length of the bar, not just at the joints. Optional tin-plated copper buses are available.

**Full neutral:** For four-wire applications, the neutral bus is rated 100% of main bus rating as standard. Neutral cross bus ratings up to a maximum of 12,000A are available as an option. Additionally, four-pole breakers can be used in conjunction with four-wire systems.

**Ground:** A ground bus is furnished the full length of the switchgear assembly and is fitted with terminals for purchaser's connections.

**Glass reinforced polyester and bus bracing and support insulation system:** Glass reinforced polyester is a total system providing exceptional mechanical and dielectric withstand strength, as well as high resistance to heat, flame and moisture. Substantial testing to demonstrate accelerated effects of heating and cooling on the mechanical and dielectric properties of this system prove it to provide superior performance for decades of trouble-free operation.

**Optional bus insulation:** Insulated bus systems with removable PVC boots for inspection and maintenance.

**Barriers:** Optional vented polypropylene barriers isolate the main bus and connections from the cable compartment providing added safety to the workers while reducing the potential of objects falling into the bus compartment. In addition, vertical barriers between cable sections can be added to reduce potential hazards. Barriers are removable to give access to the bus compartment for inspection and maintenance.

### Wiring Features

#### Cable compartment:

The cable compartment gives ample room for terminating the power cables. Removable top roof sheets allow for easy conduit hub installation. The floor of the cable compartment is open to allow cable entry from underground duct banks. Optional bottom plates are available.

In addition to cable, custom busway and nonsegregated bus duct can be terminated in the compartment.

**Lug pad:** The lugs are located on the breaker run-backs to accommodate lug orientations at an optional 45-degree angle. This reduces the bending radius of the cable needed for making the connections, thus reducing installation and maintenance time. Mechanical setscrew type lugs are standard. Optional NEMA two-hole compression lugs are available.

**Control raceway:** A vertical wireway is provided for routing of factory wiring in each switchgear section. Breaker secondary terminal blocks are mounted as standard above each circuit breaker. The terminal blocks are rated 30A, and will accept bare wire, ring or spade terminals for wire size maximum of No. 10.

Control circuits may be wired in all cells without removing the circuit breaker. In addition, power circuits may be connected in the rear of the switchgear at the same time control circuits are being wired in the front of the switchgear.

For applications involving excessive wiring, or nonstandard terminal blocks, terminal blocks are optionally mounted on the rear frame with the power cables where they are readily accessible for customer's connections and inspection.

**Control wire:** Standard wire is Type SIS insulated stranded copper, extra flexible No. 14 AWG minimum.

**Control wire marking:** Control wire marking is provided as a standard at each end of the wire. As an option, wire marking can be added to the control wiring by using heat shrink sleeve type marking. This marking is designed to be a permanent, one-piece, heat-shrink sleeve designed to provide clear, durable identification of wires and cables.

**Secondary terminal compartment:** There are 72 finger-safe secondary connections for a standard frame Pow-R-Line C breaker. The customer's secondary terminal connections are located at the front of the structure behind an optional separate door, providing access to these connections without the need to open the breaker compartment door.

**Short-circuiting terminal blocks:** Based on customer specific requirement. Consult Eaton for more information.

**Shipping split connection:** As an option, at each shipping split, the control connections are made with plug-in terminal blocks rated 300V, 10A. The terminal blocks mechanically interlock without removing the line or load connections. This method of making the shipping split control connections increases the speed of installation and reduces the potential of incorrect connections.

#### Surge Protection Device (SPD)

Standard integrated surge protection device with integral disconnect is available if required. The SPD is mounted on the back pan, and the removable display is mounted on the door; the SPD is protected by a small 30A fusible rotary switch. Please refer to Tab 9—Components or contact Eaton for more information.

#### PLC Transfer Schemes

Advanced PLC-based transfer and load shedding schemes can be designed for various applications such as data centres, health care facilities and waste water treatment plants. HMI is optional for touch screen monitoring and control of incoming, tie and feeder power circuit breakers. Contact Eaton for more information.

#### Bus Duct Integration

Custom bus duct can be integrated into switchgear assemblies. Eaton can design and manufacture custom bus duct flanges to coordinate with the bus duct risers of a wide range of amperage.

#### Transformer and MCC Close-Coupling

Close-couple dry type, liquid-filled transformers or motor control centres (MCC) with standard switchgear configurations can be supplied. Transformer unit-substations and MCC bus-coordination would create a most compact lineup and minimization of installation time by eliminating cable installations.

#### Integrated Transfer Switches

Eaton automatic transfer switches (using power circuit breakers, including optional bypass-isolation type) can be integrated into a switchgear lineup. Electrical and mechanical coordination is ensured when power circuit breaker transfer switches are integrated into the switchgear. Maximum selectivity is achieved due to the high withstand rating of the power circuit breaker transfer switch.

#### Advanced Metering and Communications

Eaton has an extensive line of powerful metering products, trip units, controllers and gateways that can be wired together in switchgears to create an intelligent system and interface with Building Management and SCADA Systems.

#### Special Dimensions and Configurations

Eaton has the ability to offer custom dimensions to suit limited space requirements. Special heights, special depths and widths, corner sections, back-to-back and front-access-only configurations are available.

#### Arc Flash Considerations

Arc flash is an ongoing concern in the electrical industry. Eaton can offer a variety of solutions to reduce the risk of arc flash such as Arcflash Reduction Maintenance System in power circuit breakers, safety shutters in Magnum drawout power circuit breakers, infrared viewing windows and remote racking accessories.

# Low Voltage Switchboards and Switchgear

## Pow-R-Line C Switchgear

### Standards and Certifications

- CSA® C22.2 No. 31
- ANSI C37.20.1
- Built in an ISO® certified facility



Eaton's Magnum DS Power Circuit Breakers comply with:

- ANSI C37.13
- ANSI C37.16
- ANSI C37.17
- ANSI C37.50

**Note:** Consult Eaton for Seismically Qualified designs and for ANSI certified designs.

### Optional Breaker Accessories

#### **Shunt Trip Device**

The shunt trip opens the circuit breaker instantaneously when its coil is energized by a voltage input. A total of two shunt trips can be mounted on an Eaton power circuit breaker.

#### **Electrical Motor Operator**

A motor operator is an electric motor assembly internally mounted in the circuit breaker. It charges the closing springs electrically for remote or local operation. The motor operator can be factory or site installed.

#### **Spring Release Device**

The spring release remotely closes the circuit breaker when the coil is energized by a voltage input. The closing spring must already be charged for the device to work.

#### **Bubble Cover**

Plexiglass breaker covers for security and dust ingress protection.

#### **Undervoltage Release**

The undervoltage release opens the circuit breaker when its supply voltage falls below 70%. If the release is not energized to 85% of its supply voltage, the circuit breaker cannot be reclosed electrically or manually.

### Lifting Device Options

Eaton provides a variety of lifting options such as breaker lifting yokes and portable lift trucks. Please refer to Eaton catalogue PG01301002E (Miscellaneous Accessories) for more information.

### Auxiliary Switch

An auxiliary switch provides remote electrical indication if the circuit breaker is open or closed. Up to three auxiliary switches can be mounted in the circuit breaker. Each switch has two normally open ("a") and two normally closed ("b") contacts for a total of 12 available contacts.

### Mechanical Trip Indicator Flag

A red, pop-out mechanical trip flag is located just above the trip unit in the circuit breaker's front cover. It operates by popping out to indicate that the circuit breaker opened in response to an overcurrent condition. The flag is manually reset by pushing it back into position. The circuit breaker can be reclosed, even if the flag is not reset. An optional overcurrent trip switch, however, can be used as an electrical lockout.

### Bell Alarm / Overcurrent Trip Switch

An overcurrent trip switch (bell alarm) provides an electrical indication when a circuit breaker trips as a result of an overcurrent condition. Opening as a result of a circuit breaker's manual open button, shunt trip or undervoltage release does not cause the overcurrent trip switch to operate.

### Padlockable Pushbutton Cover

A padlockable cover is available to limit access to the ON and OFF pushbuttons.

### Mechanical Operations Counter

The operations counter is a mechanical device used to provide a record of the number of circuit operations. It is mounted in the lower right portion of the circuit breaker and can be viewed through the front cover.

### Key Off Lock Provisions

The key off lock secures the circuit breaker in the OFF position. It is mounted in the lower right portion of the circuit breaker and can be viewed through the front cover. The customer supplies the key lock. The provisions available are for Kirk.

### Latch Check Switch

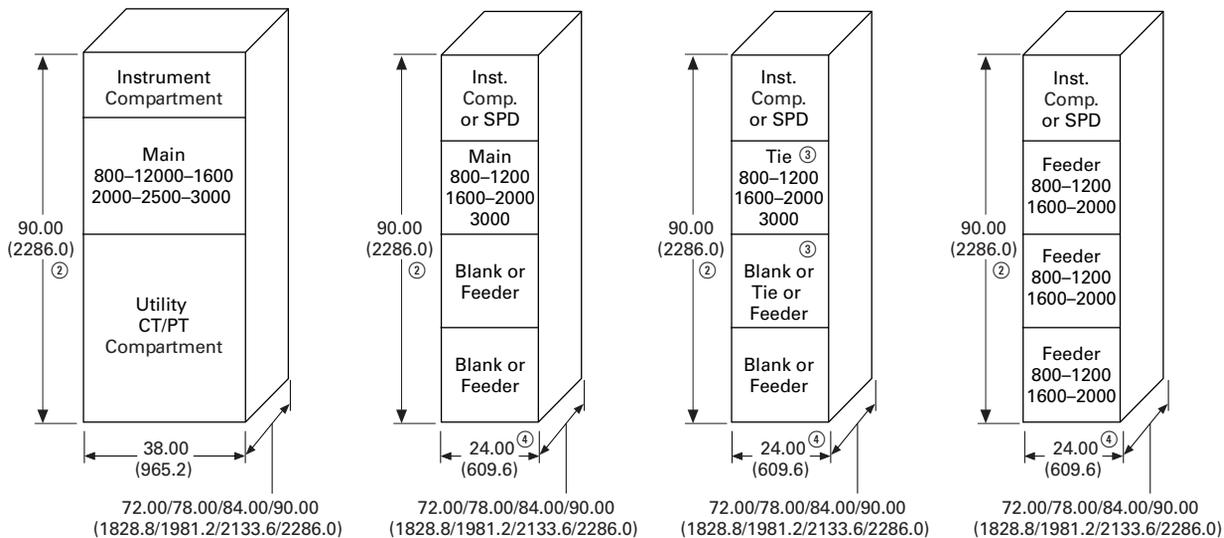
A latch check switch (LCS) indicates when the circuit breaker is "ready to close". The internal version of the LCS is wired to the spring release. It will not permit activation of the spring release until the circuit breaker is fully charged and the trip latch is reset.

### Cassettes

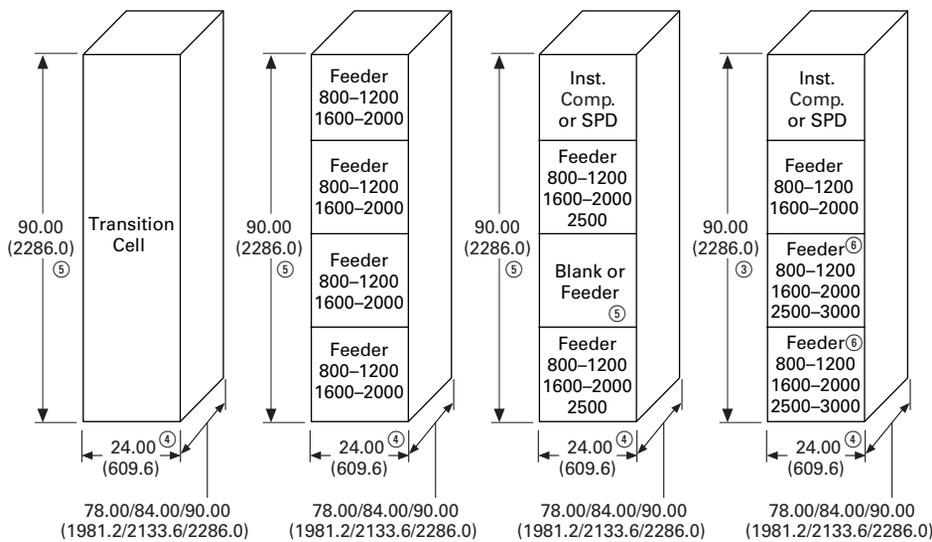
For information on breaker cassettes, refer to Eaton catalogue RP01301001E.

## Pow-R-Line C Switchgear—Typical Cell Configurations

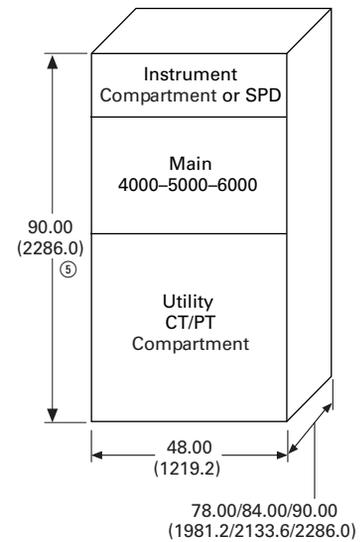
### Maximum 3000A Cross Bus ①



### 3000A Maximum, 3200A, 4000A, 5000A, 6000A, 8000A Cross Bus ①



### 4000A, 5000A, 6000A Cross Bus ①



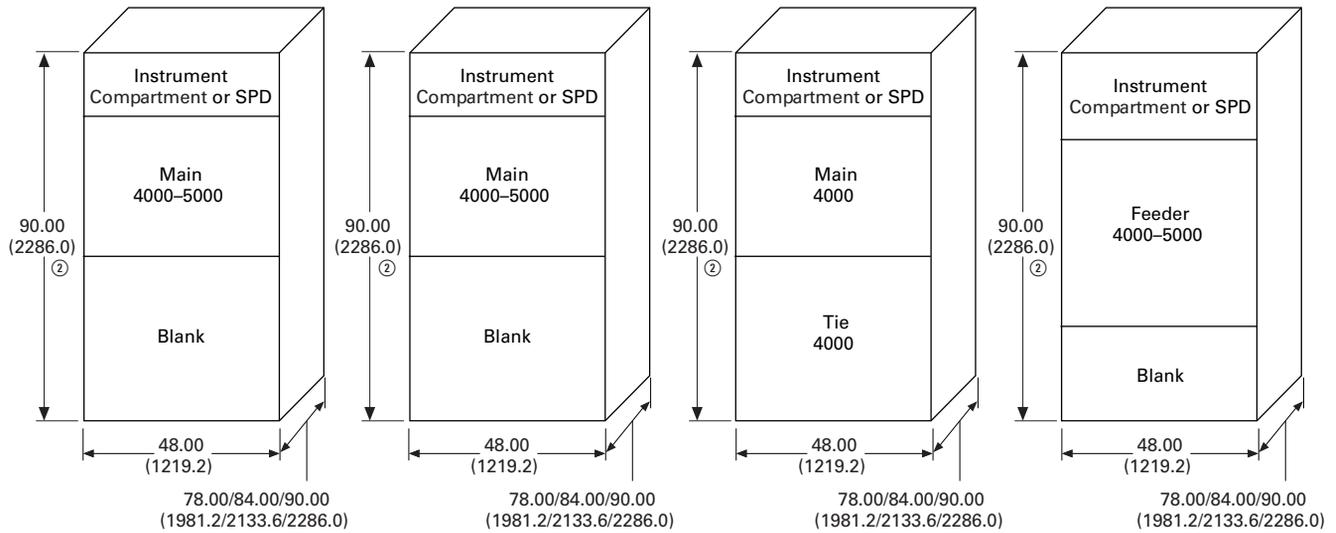
### Notes

- ① Higher bus ampacities available; please contact Eaton for more information.
  - ② 90.00-inch (2286.0 mm) height does not include optional base channel. Standard height is 1.50 inches (38.1 mm), custom height of 2.00 inches (50.8 mm) or 4.00 inches (101.6 mm) available.
  - ③ Maximum one tie breaker per cell.
  - ④ 30.00-inch-wide (762.0 mm) cells are available for certain applications. Contact Eaton for more information.
  - ⑤ Feeder can be 800, 1200, 1600, 2000A; blank if there are two 2500A feeders in the same distribution section.
  - ⑥ Maximum one 3000A feeder per cell.
- Consult Eaton for custom layouts.

# Low Voltage Switchboards and Switchgear

## Pow-R-Line C Switchgear

### 4000A, 5000A, 6000A Cross Bus ①



#### Notes

① Higher bus ampacities available; please contact Eaton for more information.

② 90.00 inch (2286.0 mm) height does not include optional base channel. Standard height is 1.50 inches (38.1 mm), custom height of 2.00 inches (50.8 mm) or 4.00 inches (101.6 mm) available. Main breaker can be in cell B, C or D.

Consult Eaton for custom layouts.

### Dimensions

Approximate Dimensions in Inches (mm)

#### Switchgear Dimensions

Cell Width	Pow-R-Line C Breaker Frame	Interrupting Rating	Short-Time Rating
24.00 (609.6) or 30.00 (762.0)	800A, 1600A, 2000A, 3000A, 3200A	Maximum 100 kA	85 kA for 60 cycles
48.00 (1219.2)	4000A, 5000A, 6000A	Maximum 100 kA	100 kA for 60 cycles

#### Breaker Frame Size

Ampere Rating	Height	Depth	Width
800–3200	16.40 (416.6)	15.40 (391.2)	16.30 (414.0)
4000–6000	16.40 (416.6)	15.40 (391.2)	34.20 (868.7)

### Switchboard Accessories and Modifications



Series C Moulded-Case Circuit Breaker Product Family

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## Moulded-Case Circuit Breakers

### Quick Reference—Series C® Circuit Breakers ①

Circuit Breaker Type	Cont. Amp. Rating @ 40°C	No. of Poles	Volts		Trip Type ②	CSA® Listed Interrupting Ratings rms Symmetrical Amperes (kA)								Vdc Ratings ③			
			AC	DC		Vac Ratings								125	250	125/250	
						120	120/240	240	277	347	480Y/277	480	600Y/347	600			
<b>F-Frame</b>																	
ED	100–225	2, 3	240	125	N.I.T.	—	—	65	—	—	—	—	—	—	10	—	—
EDH	100–225	2, 3	240	125	N.I.T.	—	—	100	—	—	—	—	—	—	10	—	—
EDC	100–225	2, 3	240	125	N.I.T.	—	—	200	—	—	—	—	—	—	10	—	—
EHD	15–100	1	277	125	N.I.T.	—	—	—	14	—	—	—	—	—	10	—	—
EHD	15–100	2, 3	480	250	N.I.T.	—	—	18	—	—	—	14	—	—	—	10	—
FDB	15–150	1	347	125	N.I.T.	—	—	—	—	14	—	—	—	—	10	—	—
FDB	15–225	2, 3	600	250	N.I.T.	—	—	18	—	—	—	14	—	14	—	10	—
FDB	15–225	4	600	250	N.I.T.	—	—	18	—	—	—	14	—	14	—	10	—
FD	15–150	1	347	125	N.I.T.	—	—	—	35	18	—	—	—	—	10	—	—
FD	15–225	2, 3	600	250	N.I.T.	—	—	65	—	—	—	35	—	18	—	10	—
FD	15–225	4	600	250	N.I.T.	—	—	65	—	—	—	35	—	18	—	10	—
FDE	15–225	3	600	—	N.I.T.	—	—	65	—	—	—	35	—	18	—	—	—
HFD	15–30	1	347	125	N.I.T.	—	—	—	65	25	—	—	—	—	10	—	—
HFD	15–225	2,3	600	250	N.I.T.	—	—	100	—	—	—	65	—	25	—	22	—
HFD	15–225	4	600	250	N.I.T.	—	—	100	—	—	—	65	—	25	—	22	—
HFDE	15–225	3	600	—	N.I.T.	—	—	100	—	—	—	65	—	25	—	—	—
FDC ④	15–30	1	347	125	N.I.T.	—	—	—	—	30	—	—	—	—	10	—	—
FDC ④	15–225	2, 3	600	250	N.I.T.	—	—	200	—	—	—	100	—	35	—	22	—
FDC ④	15–225	4	600	250	N.I.T.	—	—	200	—	—	—	100	—	35	—	22	—
FDCE ④	15–225	3	600	—	N.I.T.	—	—	200	—	—	—	100	—	25	—	—	—
FD-LFD	15–150	3	600	—	N.I.T.	—	—	200	—	—	200	—	—	200	—	—	—

#### Notes

- ① Refer to catalogue no. PG01200001K for complete Series C Moulded-Case Circuit Breaker information.
- ② N.I.T. is non-interchangeable trip unit and I.T. is interchangeable trip unit.
- ③ Two-pole circuit breaker, or two poles of three-pole circuit breaker at 250 Vdc.
- ④ Current limiting.

# Low Voltage Switchboards and Switchgear

## Switchboard Accessories and Modifications

### Quick Reference—Series C Circuit Breakers ①, continued

Circuit Breaker Type	Cont. Amp. Rating @ 40°C	No. of Poles	Volts		Trip Type ②	CSA Listed Interrupting Ratings rms Symmetrical Amperes (kA)						Vdc Ratings ③		
			AC	DC		Vac Ratings			Vdc Ratings ③					
						120	120/240	240	277	480	600	125	250	125/250
<b>J-Frame</b>														
JD	70–250	2, 3, 4	600	250	I.T.	—	—	65	—	35	18	—	10	—
HJD	70–250	2, 3, 4	600	250	I.T.	—	—	100	—	65	25	—	22	—
JDC ④	70–250	2, 3, 4	600	250	I.T.	—	—	200	—	100	35	—	22	—
<b>K-Frame</b>														
DK	250–400	2, 3	240	250	I.T.	—	—	65	—	—	—	—	10	—
KD	100–400	2, 3, 4	600	250	I.T.	—	—	65	—	35	25	—	10	—
CKD	100–400	2, 3, 4	600	250	I.T.	—	—	65	—	35	25	—	10	—
HKD	100–400	2, 3, 4	600	250	I.T.	—	—	100	—	65	35	—	22	—
CHKD	100–400	2, 3, 4	600	250	I.T.	—	—	100	—	65	35	—	22	—
KDC ④	100–400	2, 3, 4	600	250	I.T.	—	—	200	—	100	65	—	22	—
<b>L-Frame</b>														
LD	300–600	2, 3, 4	600	250	I.T.	—	—	65	—	35	25	—	22	—
CLD	300–600	2, 3, 4	600	250	I.T.	—	—	65	—	35	25	—	22	—
HLD	300–600	2, 3, 4	600	250	I.T.	—	—	100	—	65	35	—	25	—
CHLD	300–600	2, 3, 4	600	250	I.T.	—	—	100	—	65	35	—	25	—
LDC ④	300–600	2, 3, 4	600	250	I.T.	—	—	200	—	100	50	—	25	—
CLDC ④	300–600	2, 3, 4	600	250	I.T.	—	—	200	—	100	50	—	25	—
<b>MDL-Frame</b>														
MDL	300–800	2, 3	600	250	I.T.	—	—	65	—	50	25	—	22	—
CMDL	300–800	2, 3	600	250	I.T.	—	—	65	—	50	25	—	22	—
HMDL	300–800	2, 3	600	250	I.T.	—	—	100	—	65	35	—	25	—
CHMDL	300–800	2, 3	600	250	I.T.	—	—	100	—	65	35	—	25	—
<b>N-Frame</b>														
ND	400–1200	3, 4	600	—	N.I.T.	—	—	65	—	50	25	—	—	—
CND	400–1200	3, 4	600	—	N.I.T.	—	—	65	—	50	25	—	—	—
HND	400–1200	3, 4	600	—	N.I.T.	—	—	100	—	65	35	—	—	—
CHND	400–1200	3, 4	600	—	N.I.T.	—	—	100	—	65	35	—	—	—
NDC	400–1200	3, 4	600	—	N.I.T.	—	—	200	—	100	65	—	—	—
CNDC	400–1200	3, 4	600	—	N.I.T.	—	—	200	—	100	65	—	—	—
<b>R-Frame</b>														
RD 1600	800–1600	3, 4	600	—	N.I.T.	—	—	125	—	65	50	—	—	—
CRD 1600	800–1600	3, 4	600	—	N.I.T.	—	—	125	—	65	50	—	—	—
RD 2000	1000–2000	3, 4	600	—	N.I.T.	—	—	125	—	65	50	—	—	—
CRD 2000	1000–2000	3, 4	600	—	N.I.T.	—	—	125	—	65	50	—	—	—
RD 2500	1200–2500	3, 4	600	—	N.I.T.	—	—	125	—	65	50	—	—	—
RDC 1600	800–1600	3, 4	600	—	N.I.T.	—	—	200	—	100	65	—	—	—
CRDC 1600	800–1600	3, 4	600	—	N.I.T.	—	—	200	—	100	65	—	—	—
RDC 2000	1200–2500	3, 4	600	—	N.I.T.	—	—	200	—	100	65	—	—	—
CRDC 2000	1000–2000	3, 4	600	—	N.I.T.	—	—	200	—	100	65	—	—	—
RDC 2500	1200–2500	3, 4	600	—	N.I.T.	—	—	200	—	100	65	—	—	—
<b>HMCP Motor Circuit Protectors</b>														
<b>Current Limit-R® Current Limiting Circuit Breakers—Non-Fused Type</b>														
LCL	125–400	2, 3	600	—	N.I.T.	—	—	200	—	200	100	—	—	—
<b>TRI-PAC® Current Limiting Circuit Breakers—Fused Type</b>														
FB	15–100	2, 3	600	250	N.I.T.	—	—	200	—	200	200	—	—	—
LA	70–400	2, 3	600	250	I.T.	—	—	200	—	200	200	—	—	—
NB	300–800	2, 3	600	250	I.T.	—	—	200	—	200	200	—	—	—

#### Notes

- ① Refer to catalogue no. PG01200001K for complete Series C Moulded-Case Circuit Breaker information.
- ② N.I.T. is non-interchangeable trip unit and I.T. is interchangeable trip unit.
- ③ Two-pole circuit breaker, or two poles of three-pole circuit breaker at 250 Vdc.
- ④ Current limiting.

### Quick Reference—Series G® Circuit Breakers ①

Circuit Breaker Type	Max. Rated Current (Amperes)	No. of Poles	Breaker Capacity (kA rms) Vac 50–60 Hz				Ampere Range	Trip Units ③		Thermal-Magnetic		Electronic RMS ④				
			CSA Vac Ratings			Vdc Ratings		FT-AM /AT-AM Electronic (Digitrip™ RMS 310)	Fixed Thermal	Adjustable Thermal	Magnetic	LS	LSI	LSG	LSIG	
			240	480	600	125/250 ②		Interchangeable	Built-In							
<b>JG-Frame</b>																
E	250	2, 3, 4	65	25	18	10	20–250	■	■	■	■	Adjustable	■	■	■	■
S	250	2, 3, 4	85	35	18	22	20–250	■	■	■	■	Adjustable	■	■	■	■
H	250	2, 3, 4	100	65	25	22	20–250	■	■	■	■	Adjustable	■	■	■	■
C	250	3, 4	200	100	35	42	20–250	■	■	■	■	Adjustable	■	■	■	■
U	250	3, 4	200	150	50	50	20–250	■	■	■	■	Adjustable	■	■	■	■
<b>LG-Frame</b>																
E	600	3, 4	65	35	18	22	100–600	■	■	■	■	Adjustable	■②	■②	■②	■②
S	600	3, 4	85	50	25	22	100–600	■	■	■	■	Adjustable	■②	■②	■②	■②
H	600	3, 4	100	65	35	42	100–600	■	■	■	■	Adjustable	■②	■②	■②	■②
C	600	3, 4	200	100	50	42	100–600	■	■	■	■	Adjustable	■②	■②	■②	■②
U	600	3, 4	200	150	65	50	100–600	■	■	■	■	Adjustable	■②	■②	■②	■②

### Quick Reference—Series G Circuit Breakers, continued

Circuit Breaker Type	Max. Rated Current (Amperes)	No. of Poles	Breaker Capacity (kA rms) Vac 50–60 Hz				Ampere Range	Trip Units		Electronic ④							
			CSA Vac Ratings			Electronic (Digitrip RMS 310+)		Electronic (Digitrip RMS 310+, 610 and 910)	LI	LS	LSI	LIG	LSG	LSIG	ALSI	ALSIG	
			240	480	600	Built-In		Built-In									
<b>NG-Frame</b>																	
S	800, 1200	2, 3, 4	85	50	25	320–1200	■	—	—	■	■	—	■	■	■	■	
H	800, 1200	2, 3, 4	100	65	35	320–1200	■	—	—	■	■	—	■	■	■	■	
C	800, 1200	2, 3, 4	200	100	65	320–1200	■	—	—	■	■	—	■	■	■	■	
<b>RG-Frame</b>																	
H	1600, 2000, 2500	3, 4	125	65	50	800–2500	—	■	■⑤	■	■	■⑤	■	■	■	■	
C	1600, 2000, 2500	3, 4	200	100	65	800–2500	—	■	■⑤	■	■	■⑤	■	■	■	■	

**Notes**

① Refer to catalogue no. CA08100005E for complete Series G Moulded-Case Circuit Breaker information.

② Two poles in series.

③ F = Fixed, A = Adjustable, T = Thermal, M = Magnetic.

④ Not suitable for DC application. Four-pole ground fault not available.

⑤ Available only on Digitrip 610 and 910 trip units.

# Low Voltage Switchboards and Switchgear

## Switchboard Accessories and Modifications

### Magnum Power Circuit Breakers

#### Magnum DS® Low Voltage Power Circuit Breaker Family ANSI Rated for Switchgear Applications



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#### Magnum DS Switchgear Low Voltage Power Circuit Breakers

rms Symmetrical Current Ratings kA 50/60 Hz ①

Frame Amperes	Breaker Type Catalogue Number	Frame Type	Interrupting at 254 Vac	Interrupting at 508 Vac	Interrupting at 635 Vac	Short-Time Withstand	Fixed Internal Instantaneous Trip	Available Current Sensor and Rating Plugs for Digitrip RMS Trip Unit (Establishes Breaker I <sub>n</sub> Rating)
800	MDS-408	Standard	42	42	42	42	—	200, 250, 300, 400, 600, 800
	MDS-608	Standard	65	65	65	65	—	
	MDS-808	Standard	85	85	85	85	—	
	MDS-C08	Standard	100	100	100	85	85	
	MDS-L08 ②	Standard	200	200	200	—	—	
1200	MDS-412	Standard	42	42	42	42	—	200, 250, 300, 400, 600, 800, 1000, 1200
	MDS-512	Standard	50	50	50	50	—	
	MDS-612	Standard	65	65	65	65	—	
	MDS-812	Standard	85	85	85	85	—	
	MDS-C12	Standard	100	100	100	85	—	
1600	MDS-616	Standard	65	65	65	65	—	200, 250, 300, 400, 600, 800, 1000, 1200, 1600
	MDS-816	Standard	85	85	85	85	—	
	MDS-C16	Standard	100	100	100	85	85	
	MDS-L16 ②	Standard	200	200	200	—	—	
2000	MDS-620	Standard	65	65	65	65	—	200, 250, 300, 400, 600, 800, 1000, 1200, 1600, 2000
	MDS-820	Standard	85	85	85	85	—	
	MDS-C20	Standard	100	100	100	85	85	
	MDS-L20 ②	Standard	200	200	200	—	—	
3200	MDS-632	Standard	65	65	65	65	—	200, 250, 300, 400, 600, 800, 1000, 1200, 1600, 2000, 2500, 3000, 3200
	MDS-832	Standard	85	85	85	85	—	
	MDS-C32	Standard	100	100	100	85	85	
4000	MDS-840	Double	85	85	85	85	—	2000, 2500, 3200, 4000
	MDS-C40	Double	100	100	100	100	—	
5000	MDS-850	Double	85	85	85	85	—	2500, 3200, 4000, 5000
	MDS-C50	Double	100	100	100	100	—	

#### Notes

① Interrupting ratings shown based on breaker equipped with integral Digitrip RMS trip unit. Interruption ratings for non-automatic breakers are equal to the published short-time withstand rating. These interruption ratings are based on the standard duty cycle consisting of an open operation, a 15-second interval and a close-open operation, in succession, with delayed tripping in case of short-delay devices. The standard duty cycle for short-time ratings consists of maintaining the rated current for two periods of 1/2 seconds each, with a 15-second interval of zero current between the two periods.

② Magnum MDSL current limiting power circuit breaker with integral current limiters. Current limiter selected determines short-time and fixed instantaneous trip rating. Maximum voltage rating is 600 Vac.

### Trip Units

#### Moulded-Case Digitrip Selection Guide

Trip Unit Type	Digitrip RMS 310+		Digitrip RMS 310		Digitrip RMS 510	Digitrip RMS 610	Digitrip RMS 810	Digitrip RMS 910	Digitrip OPTIM 550	Digitrip OPTIM 1050
rms sensing	Yes		Yes		Yes	Yes	Yes	Yes	Yes	Yes
<b>Breaker Type</b>										
Frame	FDE, JG, K, LG, NG, RG ①		K, L, M, N, R		R	R, RG	R	R, RG	K, L, N	K, L, N, R
Ampere range	15–2500		15–2500		800–5000	800–5000	800–5000	800–5000	70–1200	70–5000
Interrupting rating at 480V	35, 65, 100, 150 kA		35, 65, 100 kA		65, 100 kA	65, 100 kA	65, 100 kA	65, 100 kA	35, 65, 100 kA	35, 65, 100 kA
<b>Protection</b>										
Ordering options	LS, LSG	LSI, LSIG	LS, LSG	LSI, LSIG	LI, LS, LSI, LIG, LSG, LSIG	LI, LS, LSI, LIG, LSG, LSIG	LI, LS, LSI, LIG, LSG, LSIG	LI, LS, LSI, LIG, LSG, LSIG	LSI, LSI (A), LSIG	LSI (A), LISG
Arcflash Reduction Maintenance System™	No	ALSI, ALSIG ②	No	No	No	No	No	No	No	No
Fixed rated plug (I <sub>n</sub> )	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Overtemperature trip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Long Delay Protection (L)</b>										
Adjustable rating plug (I <sub>n</sub> )	No		Yes		No	No	No	No	No	No
Long delay pickup	40–100% frame		0.5–1.0 (I <sub>n</sub> ) ③		0.5–1.0 x (I <sub>n</sub> )	0.4–1.0 x (I <sub>n</sub> )	0.4–1.0 x (I <sub>n</sub> )			
Long delay time I <sup>2</sup> t	2–24 seconds		10 seconds		2–24 seconds	2–24 seconds	2–24 seconds	2–24 seconds	2–24 seconds	2–24 seconds
Long delay time I <sup>1</sup> t	No		No		No	No	No	No	1–5 seconds	1–5 seconds
Long delay thermal memory	Yes		Yes		Yes	Yes	Yes	Yes	Yes	Yes
High load alarm	Yes		No		No	0.85 x I <sub>r</sub>	0.85 x I <sub>r</sub>	0.85 x I <sub>r</sub>	0.5–1.0 x I <sub>r</sub>	0.5–1.0 x I <sub>r</sub>
<b>Short Delay Protection (S)</b>										
Short delay pickup	Varies by frame ④		200–800% x (I <sub>n</sub> )		200–600% S1 and S2 x (I <sub>r</sub> )	200–600% S1 and S2 x (I <sub>r</sub> )	200–600% S1 and S2 x (I <sub>r</sub> )	200–600% S1 and S2 x (I <sub>r</sub> )	150–800% x (I <sub>r</sub> )	150–800% x (I <sub>r</sub> )
Short delay time I <sup>2</sup> t	Yes	No	100 ms	No	100–500 ms	100–500 ms	100–500 ms	100–500 ms	100–500 ms	100–500 ms
Short delay time flat	No	Inst–300 ms	No	Inst–300 ms	100–500 ms	100–500 ms	100–500 ms	100–500 ms	100–500 ms	100–500 ms
Short delay time ZSI	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Optional	Yes
<b>Instantaneous Protection (I)</b>										
Instantaneous pickup	No	Varies by frame ④	No	200–800% x (I <sub>n</sub> )	200–600% M1 and M2 x (I <sub>n</sub> )	200–600% M1 and M2 x (I <sub>n</sub> )	200–600% M1 and M2 x (I <sub>n</sub> )	200–600% M1 and M2 x (I <sub>n</sub> )	200–800% x (I <sub>n</sub> )	200–800% x (I <sub>n</sub> )
Discriminator	No		No		Yes ⑤	Yes ⑤	Yes ⑤	Yes ⑤	Yes	Yes
Instantaneous override	Yes		Yes		Yes	Yes	Yes	Yes	Yes	Yes
<b>Ground Fault Protection (G)</b>										
Ground fault alarm	Yes		Yes		No	No	No	No	20/25–100% ⑥	20/25–100% ⑦⑧
Ground fault pickup	20–100% frame ⑥		Var/frame ⑥		25–100% x I <sub>n</sub> ⑥	20/25–100% ⑥	20/25–100% ⑦⑧			
Ground fault delay I <sup>2</sup> t	No		No		100–500 ms	100–500 ms	100–500 ms	100–500 ms	100–500 ms	100–500 ms
Ground fault delay flat	Inst–300 ms		Inst–500 ms		100–500 ms	100–500 ms	100–500 ms	100–500 ms	100–500 ms	100–500 ms
Ground fault ZSI	Yes		No		Yes	Yes	Yes	Yes	Optional	Yes
Ground fault thermal memory	Yes		Yes		Yes	Yes	Yes	Yes	Yes	Yes
<b>System Diagnostics</b>										
Cause of trip LEDs	No		No		Yes	Yes	Yes	Yes	Yes	Yes
Magnitude of trip information	No		No		No	Yes	Yes	Yes	Yes	Yes
Remote signal contacts	No		No		No	Yes	Yes	Yes	No	Yes

#### Legend

BIM = Breaker Interface Module  
 I<sub>s</sub> = Sensor Rating  
 I<sub>n</sub> = Rating Plug  
 I<sub>r</sub> = LDPU Setting x I<sub>n</sub>

#### Notes

- ① No rating plugs necessary.
- ② Only available on LG, NG and RG breaker.
- ③ Adjust by rating plug.
- ④ FDE and JG 200–1200% x I<sub>n</sub>  
 LG 200–1200% x I<sub>n</sub>  
 NG 200–900% x I<sub>n</sub>  
 RG 200–800% x I<sub>n</sub>
- ⑤ LS/LSG only.
- ⑥ Not to exceed 1200A.
- ⑦ L- and N-Frames \*20–100% x I<sub>s</sub>.  
 R-Frame \*25–100% x I<sub>n</sub>.
- ⑧ By OPTIMizer/BIM.

# Low Voltage Switchboards and Switchgear

## Switchboard Accessories and Modifications

### Moulded-Case Digitrip Selection Guide, continued

Trip Unit Type	Digitrip RMS 310+	Digitrip RMS 310	Digitrip RMS 510	Digitrip RMS 610	Digitrip RMS 810	Digitrip RMS 910	Digitrip OPTIM 550	Digitrip OPTIM 1050
<b>System Monitoring</b>								
Digital display	No	No	No	Yes	Yes	Yes	Yes ①	Yes ①
Current	No	No	No	Yes	Yes	Yes	Yes	Yes
Voltage	No	No	No	No	No	Yes	No	No
Power and energy	No ②	No ③	No	No	Yes	Yes	No	Yes
Power quality harmonics	No	No	No	No	No	Yes	No	Yes
Power factor	No	No	No	No	Yes (over PowerNet only)	Yes	No	Yes
<b>Communications</b>								
PowerNet™	No	No	No	No	Yes	Yes	Optional	Yes
<b>Testing</b>								
Testing method	Test kit	Test set	Integral	Integral	Integral	Integral	OPTIMizer, BIM, PowerNet (optional)	OPTIMizer, BIM, PowerNet

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#### Legend

BIM = Breaker Interface Module  
 $I_s$  = Sensor Rating  
 $I_n$  = Rating Plug  
 $I_r$  = LDPU Setting x  $I_n$

#### Notes

- ① By OPTIMizer/BIM.
- ② Yes, with addition of Power Monitoring/Metering Module (PM3).
- ③ Yes, with addition of Energy Sentinel.

### Digitrip Trip Units for Magnum DS Power Circuit Breakers

Digitrip 520



Digitrip 520M



Digitrip 520MC



Digitrip 1150+ ①



#### Trip Unit Type

Ampere range	200–6000A	200–6000A	200–6000A	200–6000A
Interrupting rating at 480V	42–200 kA	42–200 kA	42–200 kA	42–200 kA
rms sensing	Yes	Yes	Yes	Yes

#### Protection and Coordination

Protection	Ordering options	LI, LSI, LSIG	LSI, LSIG, LSI A	LSI, LSIG, LSI A	LSI, LSIG, LSI A
	Fixed rating plug ( $I_n$ )	Yes	Yes	Yes	Yes
	Overtemperature trip	Yes	Yes	Yes	Yes
Long delay protection (L)	Long delay pickup	0.4–1.0 x ( $I_n$ )			
	Long delay time $I^2t$ at 6 x $I_L$	2–24 seconds	2–24 seconds	2–24 seconds	2–24 seconds
	Long delay time $I^t$	No	No	No	1–5 seconds
	IEEE curves	No	No	No	Yes
	Long delay thermal memory	Yes	Yes	Yes	Yes
	High load alarm	No	No	No	0.5–1.0 x ( $I_L$ )
Short delay protection (S)	Short delay pickup	200–1000% x ( $I_L$ ) and M1			
	Short delay time $I^2t$ at 8 x $I_L$	100–500 ms	100–500 ms	100–500 ms	100–500 ms
	Short delay time flat	100–500 ms	100–500 ms	100–500 ms	100–500 ms
	Short delay time ZSI	Yes	Yes	Yes	Yes
Instantaneous protection (I)	Instantaneous pickup	200–1000% x ( $I_L$ ) and M1			
	Making current release	Yes	Yes	Yes	Yes
	Off position	LSI and LSIG	Yes	Yes	Yes
Ground fault protection (G) ②	Ground fault alarm	No	Yes	Yes	Yes
	Ground fault pickup	25–100% x ( $I_n$ )	25–100% x ( $I_n$ )	25–100% x ( $I_n$ )	24–100% x ( $I_n$ )
	Ground fault delay $I^2t$ at 0.625 x $I_n$	100–500 ms	100–500 ms	100–500 ms	100–500 ms
	Ground fault delay flat	100–500 ms	100–500 ms	100–500 ms	100–500 ms
	Ground fault ZSI	Yes	Yes	Yes	Yes
	Ground fault thermal memory	Yes	Yes	Yes	Yes
Disable ground fault protection	No	No	No	No	
Neutral protection (N)	Model LSI	Model LSI	Model LSI	Model LSI	

#### Legend

$I_n$  = Rating Plug and Sensor Rating  
 $I_L$  = Long Delay Pickup Setting

#### Notes

① Over and undervoltage alarm or trip, over and underfrequency alarm or trip, voltage unbalance alarm or trip, reverse power trip, and phase rotation alarm are included.

② 1200A maximum ground fault setting per UL/NEC®

# Low Voltage Switchboards and Switchgear

## Switchboard Accessories and Modifications

### Digitrip Trip Units for Magnum DS Power Circuit Breakers, continued

Digitrip 520



Digitrip 520M



Digitrip 520MC



Digitrip 1150+ ①



**Trip Unit Type**

**System Diagnostics**

Cause-of-trip LEDs	Yes	Yes	Yes	Yes
Magnitude of trip information	No	Yes	Yes	Yes
Remote signal contacts	No	Yes	Yes	Yes
Programmable contacts	No	No	No	Yes

**System Monitoring**

Digital display	No	4-character LCD	4-character LCD	24-character LED
Current (%) full scale sensor	No	Yes ±2%	Yes ±2%	Yes ±1%
Voltage (%) L to L	No	No	No	Yes ±1%
Power and energy (%)	No	No	No	Yes ±2%
Apparent power kVA and demand	No	No	No	Yes
Reactive power kVAR	No	No	No	Yes
Power factor	No	No	No	Yes
Crest factor	No	No	No	Yes
Power quality—harmonics	No	No	No	Yes
% THD, waveform capture	No	No	No	Yes

**System Communications**

Type	No	No	INCOM™	INCOM/TripLink
Power supply in breaker	—	Optional	Standard	Standard

**Additional Features**

Trip log (three events)	No	No	No	Yes
Electronic operations counter	No	No	No	Yes
Testing method ②	Test set	Test set	Test set	Integral and test set
Waveform capture	No	No	No	Yes
Arcflash Reduction Maintenance System	No	No	Yes	Yes
Breaker health monitor	No	No	No	Yes
Protective relay functions	No	No	No	Yes ①

**Legend**

$I_n$  = Rating Plug and Sensor Rating  
 $I_r$  = Long Delay Pickup Setting

**Notes**

① Over and undervoltage alarm or trip, over and underfrequency alarm or trip, voltage unbalance alarm or trip, reverse power trip, and phase rotation alarm are included.

② Test set for secondary injection.

### Digitrip Trip Units for Magnum DS Power Circuit Breakers, continued

**Digitrip 520*i***



**Digitrip 520M*i***



**Digitrip 520MC*i***



**Digitrip 1150i+<sup>①</sup>**



**Trip Unit Type**

Ampere range	200–6300A	200–6300A	200–6300A	200–6300A
Interrupting rating at 690V	40–100 kA	40–100 kA	40–100 kA	40–100 kA
rms sensing	Yes	Yes	Yes	Yes

**Protection and Coordination**

Protection	Ordering options	LI, LSI, LSIG	LSI, LSIG, LSIA	LSI, LSIG, LSIA	LSI, LSIG, LSIA
	Fixed rating plug ( $I_n$ )	Yes	Yes	Yes	Yes
	Overtemperature trip	Yes	Yes	Yes	Yes
Long delay protection (L)	Long delay setting	0.4–1.0 x ( $I_n$ )			
	Long delay time $I^2t$ at 8 x $I_n$	2–24 sec	2–24 sec	2–24 sec	2–24 sec
	Long delay time $I^2t$	No	No	No	1–5 sec
	IEC Type A, B, C curves	No	No	No	Yes
	Long delay thermal memory	Yes	Yes	Yes	Yes
	High load alarm	No	No	No	0.7–1.0 x $I_n$
Short delay protection (S)	Short delay pickup	200–1000% x ( $I_n$ ) and M1	200–1000% x ( $I_n$ ) and M1	200–1000% x ( $I_n$ ) and M1	150–1000% x ( $I_n$ ) and M1
	Short delay time $I^2t$ at 8 x $I_n$	100–500 ms	100–500 ms	100–500 ms	100–500 ms
	Short delay time flat	100–500 ms	100–500 ms	100–500 ms	100–500 ms
	Short delay time ZSI	Yes	Yes	Yes	Yes
Instantaneous protection (I)	Instantaneous pickup	200–1000% x ( $I_n$ ) and M1			
	Making current release	Yes	Yes	Yes	Yes
	Off position	Yes	Yes	Yes	Yes
Earth fault protection (G)	Earth fault alarm	No	Yes	Yes	Yes
	Earth fault pickup	25–100% x ( $I_n$ )	25–100% x ( $I_n$ )	25–100% x ( $I_n$ )	24–100% x ( $I_n$ )
	Earth fault delay $I^2t$ at 0.625 x $I_n$	100–500 ms	100–500 ms	100–500 ms	100–500 ms
	Earth fault delay flat	100–500 ms	100–500 ms	100–500 ms	100–500 ms
	Earth fault ZSI	Yes	Yes	Yes	Yes
	Earth fault memory	Yes	Yes	Yes	Yes
Disable ground fault protection	No	No	No	Yes	
Neutral protection (N)	Model LSI	Model LSI	Model LSI	Model LSI	

**Legend**

$I_n$  = Rating Plug and Sensor Rating  
 $I_L$  = Long Delay Pickup Setting  
*i* = Trip units are only used on IEC breakers with earth fault

**Note**

① Over and undervoltage alarm or trip, over and underfrequency alarm or trip, voltage unbalance alarm or trip, reverse power trip, and phase rotation alarm are included.

# Low Voltage Switchboards and Switchgear

## Switchboard Accessories and Modifications

### Digitrip Trip Units for Magnum DS Power Circuit Breakers, continued

Digitrip 520*i*



Digitrip 520M*i*



Digitrip 520MC*i*



Digitrip 1150H<sup>①</sup>



#### Trip Unit Type

Trip Unit Type	Digitrip 520 <i>i</i>	Digitrip 520M <i>i</i>	Digitrip 520MC <i>i</i>	Digitrip 1150H <sup>①</sup>
<b>System Diagnostics</b>				
Cause of trip LEDs	Yes	Yes	Yes	Yes
Magnitude of trip information	No	No	No	Yes
Remote signal contacts	No	Yes	Yes	Yes
Programmable contacts	No	No	No	2
<b>System Monitoring</b>				
Digital display	No	4-Character LCD	4-Character LCD	24-Character LED
Current (%) full scale sensor	No	Yes ± 2%	Yes ± 2%	Yes ± 1%
Voltage (%) L to L	No	No	No	Yes ± 1%
Power and energy (%)	No	No	No	Yes ± 2%
Apparent power kVA and demand	No	No	No	Yes
Reactive power kVAR	No	No	No	Yes
Power factor	No	No	No	Yes
Crest factor	No	No	No	Yes
Power quality—harmonics	No	No	No	Yes
% THD	No	No	No	Yes
<b>System Communications</b>				
Type	—	—	INCOM/PowerNet/Modbus <sup>②</sup> /PROFIBUS <sup>②</sup>	INCOM/PowerNet/TripLink/Modbus <sup>②</sup> /PROFIBUS <sup>②</sup>
Power supply in breaker	N/A	Optional	Standard	Standard
<b>Additional Features</b>				
Trip log (three events)	No	No	No	Yes
Electronic operations counter	No	No	No	Yes
Testing method <sup>③</sup>	Test set	Test set	Test set	Integral and test set
Waveform capture	No	No	No	Yes
ARMs (Arcflash Reduction Maintenance System Mode)	No	No	Yes	Yes <sup>④</sup>
Breaker health monitor	No	No	No	Yes
Programmable relay functions	No	No	No	Yes <sup>①</sup>

#### Legend

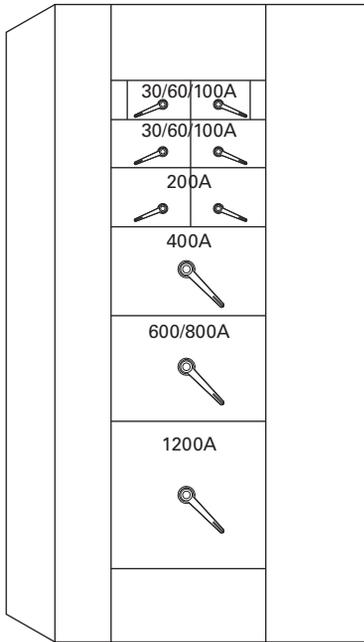
$I_n$  = Rating Plug and Sensor Rating  
 $I_L$  = Long Delay Pickup Setting  
 $i$  = Trip units are only used on IEC breakers with earth fault

#### Note

- ① Over and undervoltage alarm or trip, over and underfrequency alarm or trip, voltage unbalance alarm or trip, reverse power trip, and phase rotation alarm are included
- ② Requires externally mounted MMINT or PMINT module.
- ③ Test set for secondary injection.
- ④ Contact Eaton for availability.

### Fusible Switches

#### Horizontally Mounted Fusible Switches



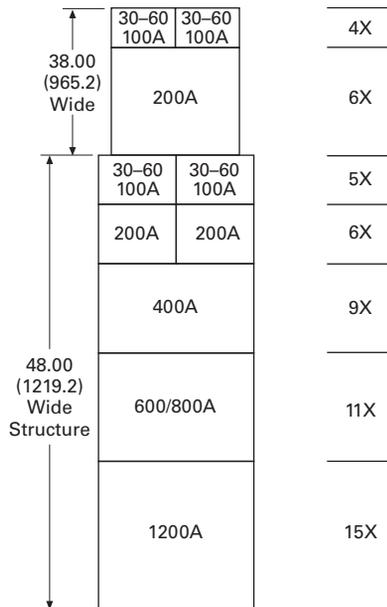
#### Fusible Switch Ratings

Rating (Amperes/Voltage)	Fuse Type	Unit Size ①	Horizontally Mounted	
30	250 AC or DC	R	4X	Twin
	600 AC	R, J	4X	Twin
60	250 AC or DC	R	4X	Twin
	600 AC	R, J	4X	Twin
100	250 AC or DC	R	4X	Twin
	600 AC	R, J	5X	Twin
200	250 AC or DC	R, T	6X	Single or twin
	600 AC	R, J, T	6X	Single or twin
400	250 AC or DC	R, T	9X	Single
	600 AC	R, J, T	9X	Single
600	250 AC	R, T	11X	Single
	600 AC	R, J, T	11X	Single
800	250 AC	T	11X	Single
	600 AC	L, T	11X	Single
1200	250 AC	T	15X	Single
	600 AC	L	15X	Single

**Note**

① 1X = 1-3/8 inch.

#### Horizontally Mounted Fusible Switches—X Spacing ①



**Note:** 200A, 600V with Class R fuses available as a single unit only.

# Low Voltage Switchboards and Switchgear

## Switchboard Accessories and Modifications

### Fusible Switch Selection Guide

Dimensions in Inches (mm)

#### 30/60/100A

##### 18.00 (457.2) Wide, 4X High, Twin Fusible Switch

Ampere Rating			
Unit 1	Unit 2	Fuse Type	Catalogue Number
<b>240 Vac or 250 Vdc</b>			
30	30	R	FDPWT3211R
30	60	R	FDPWT3212R
30	100	R	FDPWT3213R
60	60	R	FDPWT3222R
60	100	R	FDPWT3223R
100	100	R	FDPWT3233R
<b>600 Vac</b>			
30	30	R	FDPWT3611R
30	30	J	FDPWT3611J
30	60	R	FDPWT3612R
30	60	J	FDPWT3612J
60	60	R	FDPWT3622R
60	60	J	FDPWT3622J

##### 22.00 (558.8) Wide, 5X High, Twin Fusible Switch

Ampere Rating			
Unit 1	Unit 2	Fuse Type	Catalogue Number
<b>600 Vac</b>			
30	100	R	FDPWT3613R
60	100	R	FDPWT3623R
100	100	R	FDPWT3633R

#### 200A

##### 22.00 (558.8) Wide, 6X High, Twin Fusible Switch

Ampere Rating			
Unit 1	Unit 2	Fuse Type	Catalogue Number
<b>240 Vac or 250 Vdc</b>			
200	200	R	FDPBT3244R
200	200	R	FDPBT3244RDS
<b>600 Vac</b>			
200	200	J	FDPBT3644J
200	200	J	FDPBT3644JDS

##### 18.00 (457.2) Wide, 6X High, Single Fusible Switch

Ampere Rating		Fuse Type	Catalogue Number
<b>240 Vac or 250 Vac</b>			
200		T	FDPBS324F
200		R	FDPBS324R
<b>600 Vac</b>			
200		R	FDPBS364R
200		J	FDPBS364J
200		T	FDPBS364F

#### 400A

##### 22.00 (558.8) Wide, 9X High, Single Fusible Switch ①

Ampere Rating	Fuse Type	Catalogue Number
<b>240 Vac or 250 Vac</b>		
400	R	FDPW325R
400 (Main)	R	FDPW325MR
<b>600 Vac</b>		
400	R	FDPW365R
400 (Main)	R	FDPW365MR
400	J	FDPW365J
400 (Main)	J	FDPW365MJ

##### 18.00 (457.2) Wide, 16X High—Top Feed Main ①

Ampere Rating	Fuse Type	Catalogue Number
<b>240 Vac or 250 Vac</b>		
400	R	FDPW325TR
<b>600 Vac</b>		
400	R	FDPW365TR
400	J	FDPW365TJ

##### 18.00 (457.2) Wide, 16X High—Bottom Feed Main ①

Ampere Rating	Fuse Type	Catalogue Number
<b>240 Vac or 250 Vac</b>		
400	R	FDPW325BR
<b>600 Vac</b>		
400	R	FDPW365BR
400	J	FDPW365BJ

#### Note

① For cable-in/cable-out application of a branch switch, additional terminals are required. Order the terminal kit TA750FDPW. The kit contains three terminals and hardware.

### 600A

#### 22.00 (558.8) Wide, 11X High, Single Fusible Switch ①

Ampere Rating	Fuse Type	Catalogue Number
<b>240 Vac or 250 Vac</b>		
600	R	FDPW326R
600 (Main)	R	FDPW326MR
<b>600 Vac</b>		
600	R	FDPW366R
600 (Main)	R	FDPW366MR
600	J	FDPW366J
600 (Main)	J	FDPW366MJ

#### 18.00 (457.2) Wide, 16X High—Top Feed Main ①

Ampere Rating	Fuse Type	Catalogue Number
<b>240 Vac or 250 Vac</b>		
600	R	FDPW326TR
<b>600 Vac</b>		
600	R	FDPW366TR
600	J	FDPW366TJ

#### 18.00 (457.2) Wide, 16X High—Bottom Feed Main ①

Ampere Rating	Fuse Type	Catalogue Number
<b>240 Vac or 250 Vac</b>		
600	R	FDPW326BR
<b>600 Vac</b>		
600	R	FDPW366BR
600	J	FDPW366BJ

### 800A

#### 22.00 (558.8) Wide, 11X High, Single Fusible Switch ②

Ampere Rating	Fuse Type	Catalogue Number
<b>240 Vac</b>		
800	T	FDPW327F
800 (Main)	T	FDPW327MF
<b>600 Vac</b>		
800	L	FDPW367
800 (Main)	L	FDPW367M

#### 18.00 (457.2) Wide, 16X High—Top Feed Main ②

Ampere Rating	Fuse Type	Catalogue Number
<b>240 Vac</b>		
800	T	FDPW327TF
<b>600 Vac</b>		
800	L	FDPW367T

#### 18.00 (457.2) Wide, 16X High—Bottom Feed Main ②

Ampere Rating	Fuse Type	Catalogue Number
<b>240 Vac</b>		
800	T	FDPW327BF
<b>600 Vac</b>		
800	L	FDPW367B

### 1200A

#### 22.00 (558.8) Wide, 15X High, Single Fusible Switch ③

Ampere Rating	Fuse Type	Catalogue Number
<b>240 Vac</b>		
1200	T	FDPW328F
1200 (Main)	T	FDPW328MF
<b>600 Vac</b>		
1200	L	FDPW368
1200 (Main)	L	FDPW368M

#### 22.00 (558.8) Wide, 16X High—Top Feed Main ③

Ampere Rating	Fuse Type	Catalogue Number
<b>240 Vac</b>		
1200	T	FDPW328TF
<b>600 Vac</b>		
1200	L	FDPW368T

#### 22.00 (558.8) Wide, 16X High—Bottom Feed Main ③

Ampere Rating	Fuse Type	Catalogue Number
<b>240 Vac</b>		
1200	T	FDPW328BF
<b>600 Vac</b>		
1200	L	FDPW368B

#### Notes

- ① For cable-in/cable-out application of a branch switch, additional terminals are required. Order two of the terminal kit TA750FDPW. Each kit contains three terminals and hardware.
- ② For cable-in/cable-out application of a branch switch, additional terminals are required. Order three of the terminal kit TA750FDPW. Each kit contains three terminals and hardware.
- ③ For cable-in/cable-out application of a branch switch, additional terminals are required. Order four of the terminal kit TA750FDPW. Each kit contains three terminals and hardware.

# Low Voltage Switchboards and Switchgear

## Switchboard Accessories and Modifications

### FDPW Switch Ratings

Ampere Rating	Voltage	Short-Circuit Rating kAIC	Horsepower Rating		Fuse Type	Size and Type of Cu/Al Conductor per Phase
			Standard	Maximum		
30A switch	240 Vac	200	3	7.5	R	#14 to 1/0
	480 Vac	200	5	15	R, J	#14 to 1/0
	600 Vac	200	7.5	20	R, J	#14 to 1/0
	250 Vdc	10	5	5	①	#14 to 1/0
60A switch	240 Vac	200	7.5	15	R	#14 to 1/0
	480 Vac	200	15	30	R, J	#14 to 1/0
	600 Vac	200	15	50	R, J	#14 to 1/0
	250 Vdc	10	10	10	①	#14 to 1/0
100A switch	240 Vac	200	15	30	R	#14 to 1/0
	480 Vac	200	25	60	R, J	#14 to 1/0
	600 Vac	200	30	75	R, J	#14 to 1/0
	250 Vdc	10	20	20	①	#14 to 1/0
200A switch ②	240 Vac	200	25	60	R, T	#4 to 300 kcmil
	480 Vac	200	50	125	R, J, T	#4 to 300 kcmil
	600 Vac	200	60	150	R, J, T	#4 to 300 kcmil
	250 Vdc	10	40	40	①	#4 to 300 kcmil
400A switch	240 Vac	200	50	125	R, T	250 to 750 kcmil or (2) 3/0 to 250 kcmil ③
	480 Vac	200	100	250	R, J, T	250 to 750 kcmil or (2) 3/0 to 250 kcmil ③
	600 Vac	200	125	350	R, J, T	250 to 750 kcmil or (2) 3/0 to 250 kcmil ③
	250 Vdc	10	50	50	①	250 to 750 kcmil or (2) 3/0 to 250 kcmil ③
600A switch	240 Vac	200	75	200	R, T	(2) #4 to 600 kcmil or (4) 3/0 to 250 kcmil
	480 Vac	200	150	400	R, J, T	(2) #4 to 600 kcmil or (4) 3/0 to 250 kcmil
	600 Vac	200	200	500	R, J, T	(2) #4 to 600 kcmil or (4) 3/0 to 250 kcmil
800A switch	240 Vac	200	N/A	N/A	T	(3) 250 to 750 kcmil or (6) 3/0 to 250 kcmil
	480 Vac	200	N/A	N/A	L, T	(3) 250 to 750 kcmil or (6) 3/0 to 250 kcmil
	600 Vac	200	N/A	N/A	L, T	(3) 250 to 750 kcmil or (6) 3/0 to 250 kcmil
1200A switch	240 Vac	200	N/A	N/A	T	(4) 250 to 750 kcmil or (8) 3/0 to 250 kcmil
	480 Vac	200	N/A	N/A	L	(4) 250 to 750 kcmil or (8) 3/0 to 250 kcmil
	600 Vac	200	N/A	N/A	L	(4) 250 to 750 kcmil or (8) 3/0 to 250 kcmil

#### Notes

① Contact fuse manufacturer for UL listed DC fuses.

② Switch type FDPB (breaker based).

③ Lug size conversion kit available for: 1 x 750 kcmil (600A FDP), 2 x 750 kcmil (600A FDPW), 3 x 350 kcmil (600A CFDOW SW).

N/A = Not Applicable

### Surge Protection Devices

#### 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	0.5W
400Y, 480Y and 480D voltage codes	1.1W
600Y and 600D voltage codes	1.3W
Power consumption (standard and standard with surge counter units):	
208Y, 220Y, 240S, 240D and 240H voltage codes	0.6W
400Y, 480Y and 480D basic voltage codes	1.7W
600Y and 600D voltage codes	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	150 L-N, 150 L-G, 150 N-G, 300 L-L
400Y and 480Y MCOV	320 L-N, 320 L-G, 320 N-G, 640 L-L
600Y MCOV	420 L-N, 420 L-G, 420 N-G, 840 L-L
240D MCOV	320 L-G, 320 L-L
480D MCOV	640 L-G, 640 L-L
600D MCOV	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
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

#### Feature Package Comparison

Feature	Basic	Standard	Standard with Surge Counter
Surge protection using thermally protected MOV technology	■	■	■
Dual-coloured protection status indicators for each phase	■	■	■
Dual-coloured 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			■

# Low Voltage Switchboards and Switchgear

## Switchboard Accessories and Modifications

### Metering

#### Metering Selection Chart

**Power Xpert® Meter  
4000/6000/8000 Series**



**Power Xpert Meter 2000 Series**



**Power Xpert Meter 1000 Series**



**IQ 250/260 Series**



**Device Name**

**Electrical Parameters**

Volts	0.1% of reading + 0.02% FS	0.1% of reading	0.2% of reading	0.1% of reading
Amperes	0.05% of reading + 0.01% FS	0.1% of reading	0.2% of reading	0.1% of reading
Current range (% of nominal)	0.005–20A (400%)	0.1–200%	5 mA–50000 A (120–200%)	0.1–200%
Watts	0.1% of reading + 0.0025% FS	0.2% of reading	0.2% of reading	0.2% of reading
VARs	0.1% of reading + 0.0025% FS	0.2% of reading	0.2% of reading	0.2% of reading
VA	0.1% of reading + 0.0025% FS	0.2% of reading	0.2% of reading	0.2% of reading
PF-apparent	0.1%	0.2% of reading	0.2% of reading	0.2% of reading
PF-displacement	0.1%	—	—	—
Frequency	±0.01 Hz	±0.03 Hz	0.2% Hz	±0.03 Hz
THD-voltage	127th	40th ②③④⑤	31 <sup>st</sup> , 63 <sup>rd</sup> ⑫⑬⑭	40th ⑥
THD-current	127th	40th ②③④⑤	31 <sup>st</sup> (PXM 1000), 63 <sup>rd</sup>	40th ⑥
Watt-hours	±0.2% per ANSI C12.20 0.2 Class ①	±0.2% per ANSI C12.20 0.2 Class	±0.2% per ANSI C12.20 0.2 Class	±0.2% per ANSI C12.20 0.2 Class
VAR-hours	±0.2% per ANSI C12.20 0.2 Class ①	±0.2% per ANSI C12.20 0.2 Class	±0.2% per ANSI C12.20 0.2 Class	±0.2% per ANSI C12.20 0.2 Class
VA-hours	±0.2% per ANSI C12.20 0.2 Class ①	±0.2% per ANSI C12.20 0.2 Class	±0.2% per ANSI C12.20 0.2 Class	±0.2% per ANSI C12.20 0.2 Class
Ampere-demand	0.05% of reading + 0.01% FS	±0.1% per ANSI C12.20 0.2 Class	±0.1% per ANSI C12.20 0.2 Class	±0.1% per ANSI C12.20 0.2 Class
Watt-demand	±0.2% per ANSI C12.20 0.2 Class ①	±0.2% per ANSI C12.20 0.2 Class	±0.2% per ANSI C12.20 0.2 Class	±0.2% per ANSI C12.20 0.2 Class
VAR-demand	±0.2% per ANSI C12.20 0.2 Class ①	±0.2% per ANSI C12.20 0.2 Class	±0.2% per ANSI C12.20 0.2 Class	±0.2% per ANSI C12.20 0.2 Class
VA-demand	±0.2% per ANSI C12.20 0.2 Class ①	±0.2% per ANSI C12.20 0.2 Class	±0.2% per ANSI C12.20 0.2 Class	±0.2% per ANSI C12.20 0.2 Class
Revenue accuracy	±0.2% per ANSI C12.20 0.2 Class ①	ANSI C12.20 (0.2%)	±0.2% per ANSI C12.20 0.2 Class	ANSI C12.20 (0.2%)
Individual ampere harmonics	85th ⑦	40th ③④⑤	31 <sup>st</sup> (PXM 1000), 63 <sup>rd</sup>	—
Individual voltage harmonics	85th ⑦	40th ③④⑤	31 <sup>st</sup> (PXM 1000), 63 <sup>rd</sup>	—
Interharmonics	Yes ⑧⑨	—	—	—

**Minimum and/or Maximum Values**

Volts	L-L, L-N, N-G, VAUX L-L	L-L, L-N	L-L, L-N	L-L, L-N
Current	A, B, C, N, G	A, B, C, N	A, B, C	A, B, C
Power	Watt, VAR, VA	Watt, VAR, VA	Watt, VAR, VA	Watt, VAR, VA
Power Factor	Apparent/displacement	Apparent	Apparent	Apparent
Frequency	Hz	Hz	Hz	Hz
THD	Amperes/volts (L-L, L-N, AUX L-L)	Amperes/volts ②③④⑤	Amperes/volts	Amperes/volts ⑥
Demand values	kW, kVAR, kVA, amperes	kW, kVAR, kVA, amperes	kW, kVAR, kVA, amperes	kW, kVAR, kVA, amperes
Trend analysis	2 / 4 ⑧ / 8 ⑨ GB	256 / 512 ② / 768 ③④⑤ MB	8 ⑫⑬ / 16 ⑭ MB	⑩
Event logging	2 / 4 ⑧ / 8 ⑨ GB	100,000 alarms/events with timestamp	8 MB ⑭	128 KB ⑩
Disturbance recording	2 / 4 ⑧ / 8 ⑨ GB, 60 cycles per event	768 MB up to 64 cycles per event ④⑤	—	—

**Legend**

PG = Programmable  
 FS = Full scale  
 RV = Read value  
 Auxiliary Voltage (Optional) = Provides three additional voltage inputs to the meter: Va2, Vb2, Vc2  
 Interharmonics = Power Xpert Meter 6000/8000 supported

**Notes**

① Under typical operating conditions.  
 ② PXM 2260 only.  
 ③ PXM 2270 only.  
 ④ PXM 2280 only.  
 ⑤ PXM 2290 only.

⑥ IQ 260 only.  
 ⑦ Individual values reported to 85th harmonic; anti-alias filtering prevents higher frequencies from distorting readings (see IEC 61000-4-7).

⑧ PXM 6000 only.  
 ⑨ PXM 8000 only.  
 ⑩ At computer only.  
 ⑪ Optional.

⑫ PXM 1100 only  
 ⑬ PXM 1200 only  
 ⑭ PXM 1300 only

# Low Voltage Switchboards and Switchgear

## Switchboard Accessories and Modifications

### Metering Selection Chart, continued

**Power Xpert® Meter  
4000/6000/8000 Series**



**Power Xpert Meter 2000 Series**



**Power Xpert Meter 1000 Series**



**IQ 250/260 Series**



**Device Name**

**Other Features**

Storage	2 / 4 ① / 8 ② GB	256 / 512 ③ / 768 ④⑤⑥ MB Standard 8 MB ⑩⑪ / 16 MB ⑫	128 KB for logging, up to 8 parameters every 15 minutes for 30 days ⑦
PG output relays	5 maximum	Optional (2) Form C, 5 A or (4) Form A, 120 mA	Optional (2) Form C, 5 A or (4) Form A, 120 mA
PG analogue outputs	—	Optional (4) 4–20 mA or (4) 0–1 mA	Optional (4) 4–20 mA or (4) 0–1 mA
Discrete contact inputs	8	Optional (2) or (4)	Optional (2) or (4)
Analogue inputs	—	—	Input range: 0-5 V / 1-5 V, 0-20 mA / — 4-20 mA (optional) Accuracy: 0.2% Temperature drift: 50 ppm / °C typical Isolation voltage: 500 Vdc
Synch-input kW utility	Via status input	Via end of interval pulse with optional digital inputs	Via end of interval pulse with optional digital inputs
Auxiliary voltage	Yes	—	Yes
kWh pulse initiator	Yes	Yes	—
Waveform display	Local/computer	⑧	At computer
Waveform capture, samples/cycle	Yes, 512 (4096 oversampling)	Yes, up to 64 ⑤, up to 512 ⑥	Yes, up to 32 ②
Frequency distribution display	—	—	—
Display type	LCD	Red LED	Backlit LCD
Display lines/character	Graphic (320 x 240 pixels)	3 lines, 4 characters	Main Display Area: 4 lines, 4 characters Bottom Display Area: 1 line, 9 characters
Display character height	5.5 mm H x 4 mm W	0.56 (14.2) H	1 line
Communications	Serial: Modbus® RTU, Modbus ASCII Network: Modbus TCP, Ethernet TCP/IP, HTTP, SNMP, SMTP, FTP	Serial: Modbus RTU, Modbus ASCII, DNP 3.0 Network: Modbus TCP, BACnet/IP, Ethernet TCP/IP, HTTP, HTTPS, SNMP, SMTP, Waveform FTP ⑤⑥	Modbus® RTU, Modbus TCP Option, BACnet/IP Option, Web/HTTP Push Option, Ability to connect to Eaton's Power Xpert Gateway 900
Setup configuration	Via Web browser/display	Via Web browser/display	Via configuration software/display/ Web Page
Dimensions in inches (mm)	Meter: 8.82 (224.0) H x 8.22 (208.8) W x 4.85 (123.2) D Display: 9.02 (229.1) H x 7.80 (198.1) W x 2.49 (63.2) D	4.85 (123.2) H x 4.85 (123.2) W x 4.97 (126.2) D	3.78 (96.0) H x 3.78 (96.0) W x 1.99 (50.7) D
Operating temperature range	-20° to 60°C display unit -20° to 70°C meter base unit ⑨	-20° to 70°C	-25° to 70°C
Reference literature	TD02601007E	TD02601017E	TD026079EN

**Legend**

PG = Programmable  
FS = Full scale  
RV = Read value  
Auxiliary Voltage (Optional) = Provides three additional voltage inputs to the meter: Va2, Vb2, Vc2  
Interharmonics = Power Xpert Meter 6000/8000 supported

**Notes**

① PXM 6000 only.  
② PXM 8000 only.  
③ PXM 2260 only.  
④ PXM 2270 only.  
⑤ PXM 2280 only.  
⑥ PXM 2290 only.  
⑦ Optional.  
⑧ At computer only.  
⑨ Using <10 VA meter sourced 24V power.  
⑩ PXM 1100 only  
⑪ PXM 1200 only  
⑫ PXM 1300 only

# Low Voltage Switchboards and Switchgear

## Switchboard Accessories and Modifications

### Metering Selection Chart, continued

**IQ Analyzer 6000 Series**



**IQ DP-4000 Series**



**IQ 230 Series**



**Device Name**

**Electrical Parameters**

Volts	±0.2% FS ①	±0.3% FS	±0.5% FS
Amperes	±0.2% FS ①	±0.3% FS	±0.5% FS
Current range (% of nominal)	3–800%	10–250%	1–200%
Watts	0.4% FS, 6 Reading ②	±0.6% FS	±1.0% FS
VARs	0.4% FS, 6 Reading ③	±0.6% FS	±1.0% FS
VA	0.4% FS, 6 Reading ②	±0.6% FS	±1.0% FS
PF-apparent	0.8% FS ①	±1.0% FS	±2.0% FS
PF-displacement	0.8% FS ①	±1.0% FS	±2.0% FS
Frequency	0.04% ① or 0.01 Hz	±0.17% FS	±0.1% Hz
THD-voltage	50th	31st	—
THD-current	50th	31st	—
Watt-hours	0.5% reading ②	±0.6% FS	±1.0% per ANSI C12
VAR-hours	1% reading ③	±0.6% FS	±1.0% per ANSI C12
VA-hours	0.5% reading ②	±0.6% FS	±1.0% per ANSI C12
Ampere-demand	±0.2% FS ①	±0.3%	±0.5% per ANSI C12
Watt-demand	±0.4% FS ①	±0.6%	±1.0% per ANSI C12
VAR-demand	±0.4% FS ①	±0.6%	±1.0% per ANSI C12
VA-demand	±0.4% FS ①	±0.6%	±1.0% per ANSI C12
Revenue accuracy	ANSI C12.20 (0.5%)	—	ANSI C12.1 (1%)
Individual ampere harmonics	50th	—	—
Individual voltage harmonics	50th	—	—
Interharmonics	—	—	—

**Minimum and/or Maximum Values**

Volts	L-L, L-N	L-L, L-N	L-L, L-N
Current	A, B, C, N, G	A, B, C	A, B, C
Power	Watt, VAR, VA	Watt, VAR, VA	Watt, VAR, VA
Power factor	Apparent/displacement	Apparent/displacement	Apparent/displacement
Frequency	Hz	Hz	Hz
THD	Amperes/volts	Amperes/volts	—
Demand values	All	All	All
Trend analysis	Time/date	2 alarms	④
Event logging	504 events w/timestamp	④	④
Disturbance recording	10 waveform events	—	—

**Legend**

PG = Programmable  
 FS = Full scale  
 RV = Read value  
 Auxiliary Voltage (Optional) = Provides three additional voltage inputs to the meter: Va2, Vb2, Vc2  
 Interharmonics = Power Xpert Meter 6000/8000 supported

**Notes**

- ① From 3 to 300% of FS.
- ② At unity power factory and 5–300% of FS.
- ③ At a power factor <±0.5 and 5–300% of FS.
- ④ At computer only.

### Metering Selection Chart, continued

**IQ Analyzer 6000 Series**



**IQ DP-4000 Series**



**IQ 230 Series**



**Device Name**

**Other Features**

Storage	90 KB	15 parameters	—
PG output relays	(4) 10 A Form C ①	(3) 10 A Form C ②	(2) 100 mA Form A
PG analogue outputs	(4) 0–10/4–20 mA	—	—
Discrete contact inputs	(3) +30 Vdc differential	(1) kW demand ②	(2) +30 Vdc differential
Analogue inputs	(1) 0–20/4–20 mA	—	(1) 4–20 mA
Synch-input kW Utility	At device or via communications	At device or via communications ②	Via communications only
Auxiliary voltage ③	—	—	—
kWh pulse initiator	Yes	Yes ②	Yes
Waveform display	Local ②/computer	—	—
Waveform capture, samples/cycle	Yes, 128	—	—
Frequency distribution display	Local ②/computer	—	—
Display type	Graphic LCD with LED backlight	7 Segment LED	Backlit LCD
Display lines/character	7 lines, 147 characters	1 line, 7 characters	4 lines, 20 characters
Display character height	Up to 7 lines	1 line	1.60 (40.6) H x 0.09 (2.3) W
Communications	Serial: INCOM ④ Network: via Power Xpert Gateway ④	Serial: INCOM ④ Network: via Power Xpert Gateway ④	Serial: INCOM, Modbus RTU ⑤ Network: via Power Xpert Gateway
Setup configuration	Via configuration software/display	Via configuration software/display	Via configuration software/display
Dimensions in inches (mm)	6.70 (170.2) W x 10.30 (261.6) H x 5.40 (137.2) D ⑥	6.70 (170.2) W x 10.30 (261.6) H x 5.40 (137.2) D ⑥	Refer to TD.17.06.TE
Operating temperature range	–20° to 70°C	–20° to 70°C	0° to 50°C
Reference literature	—	—	—

**Legend**

PG = Programmable  
 FS = Full scale  
 RV = Read value

Auxiliary Voltage (Optional) = Provides three additional voltage inputs to the meter: Va2, Vb2, Vc2

Interharmonics = Power Xpert Meter 6000/8000 supported

**Notes**

- ① Relays programmable to operate on any measured function.
- ② Optional.
- ③ The auxiliary voltage option adds three additional voltage input channels to Power Xpert Meters.
- ④ An IPONI is required.
- ⑤ IQ 230M only.
- ⑥ Dimensions in mm = 170.2 W x 261.6 H x 137.2 D.

# Low Voltage Switchboards and Switchgear

## Switchboard Accessories and Modifications

### Metering Selection Chart, continued

**IQ 130/140/150 Series**



**Power Xpert Meter 350 Series**



**IQ 150S/250S Series**



**Power Monitoring / Metering Module (PM3)**



**Device Name**

**Electrical Parameters**

Volts	0.25% of reading	0.5% of reading	0.1% of reading	±0.5% of reading
Amperes	0.25% of reading	0.5% of reading	0.1% of reading	±0.5% of reading
Current range (% of nominal)	0.1–200%	10 mA–500000 A (200 %)	0.1–200%	—
Watts	0.5% of reading ①	0.5% of reading	0.2% of reading	±1.0% of reading
VARs	0.5% of reading ①	0.5% of reading	0.2% of reading	±1.0% of reading
VA	0.5% of reading ①	0.5% of reading	0.2% of reading	±1.0% of reading
PF-apparent	0.5% of reading ①	0.5% of reading	0.2% of reading	±2.0% of reading
PF-displacement	—	—	—	—
Frequency	±0.03 Hz ①	0.2% of reading	±0.03 Hz	±0.1 Hz
THD-voltage	—	—	—	—
THD-current	—	—	—	—
Watt-hours	±0.5% per ANSI C12.20 0.5 Class ②	±0.5% per ANSI C12.20 0.5 Class	±0.2% per ANSI C12.20 0.2 Class	±1.0% per ANSI C12.1
VAR-hours	±0.5% per ANSI C12.20 0.5 Class ②	±0.5% per ANSI C12.20 0.5 Class	±0.2% per ANSI C12.20 0.2 Class	±1.0% of reading
VA-hours	±0.5% per ANSI C12.20 0.5 Class ②	±0.5% per ANSI C12.20 0.5 Class	±0.2% per ANSI C12.20 0.2 Class	±1.0% of reading
Ampere-demand	±0.25% per ANSI C12.20 0.5 Class ①	±0.25% per ANSI C12.20 0.5 Class	±0.1% per ANSI C12.20 0.2 Class	—
Watt-demand	±0.5% per ANSI C12.20 0.5 Class ①	±0.5% per ANSI C12.20 0.5 Class	±0.2% per ANSI C12.20 0.2 Class	—
VAR-demand	±0.5% per ANSI C12.20 0.5 Class ①	±0.5% per ANSI C12.20 0.5 Class	±0.2% per ANSI C12.20 0.2 Class	—
VA-demand	±0.5% per ANSI C12.20 0.5 Class ①	±0.5% per ANSI C12.20 0.5 Class	±0.2% per ANSI C12.20 0.2 Class	—
Revenue accuracy	ANSI C12.20 (0.5%)	±0.5% per ANSI C12.20 0.5 Class	ANSI C12.20 (0.2%)	±1.0% per ANSI C12.1
Individual ampere harmonics	—	—	—	—
Individual voltage harmonics	—	—	—	—
Interharmonics	—	—	—	—

**Minimum and/or Maximum Values**

Volts	L-L, L-N	L-L, L-N	L-L, L-N	—
Current	A, B, C	A, B, C, N, (on Bi-Directional Energy Models)	A, B, C,	—
Power	Watt, VAR, VA ①	Watt, VAR, VA	Watt, VAR, VA	—
Power factor	Apparent ①	Apparent	Apparent	—
Frequency	Hz ①	Hz	Hz	—
THD	—	—	—	—
Demand values	kW, kVAR, kVA, amperes ①	kW, kVAR, kVA, amperes	kW, kVAR, kVA, amperes	—
Trend analysis	③	—	2 MB ⑤	—
Event logging	③	③	2 MB ⑤	—
Disturbance recording	—	—	—	—

**Legend**

PG = Programmable  
FS = Full scale  
RV = Read value

**Auxiliary Voltage (Optional)**

= Provides three additional voltage inputs to the meter: Va2, Vb2, Vc2

Interharmonics = Power Xpert Meter 6000/8000 supported

**Notes**

- ① IQ 140/150.
- ② IQ 150 only.
- ③ At computer only.
- ④ Optional.
- ⑤ IQ 250S only.

### Metering Selection Chart, continued

**IQ 130/140/150 Series**



**Power Xpert Meter 350 Series**



**IQ 150S/250S Series**



**Power Monitoring / Metering Module (PM3)**



**Device Name**

**Other Features**

Storage	—	—	2 MB ②	—
PG output relays	—	KYZ Pulse output, Relay Output	—	—
PG analogue outputs	—	—	—	—
Discrete contact inputs	—	—	—	Circuit breaker status
Analogue inputs	—	—	—	—
Synch-input kW utility	—	—	—	—
Auxiliary voltage ③	—	—	—	—
kWh pulse initiator	①	—	Yes	—
Waveform display	—	—	—	—
Waveform capture	—	—	—	—
Frequency distribution display	—	—	—	—
Display type	Red LED	Backlit LCD	Red LED	—
Display lines/character	3 lines, 4 characters	1 line, 6 characters	3 lines, 4 characters	—
Display character height	0.56 (14.2) H	1 line	0.56 (14.2) H	—
Communications	Serial: Modbus RTU, Modbus ASCII ① Network: Modbus TCP ① ④	Modbus®-RTU, BACnet MS/ TP, Ability to connect to Eaton's Power Xpert Gateway 900	Serial: Modbus RTU, Modbus ASCII, DNP 3.0 Network: Modbus TCP, wired or wireless	Serial: INCOM, Modbus RTU ④ Network: via Power Xpert Gateway
Setup configuration	Via configuration software/display	Via configuration software/display	Via configuration software/display	—
Dimensions in inches (mm)	4.85 (123.2) H x 4.85 (123.2) W x 4.97 (126.2) D	2.92 (74.0) D x 3.54 (90.0) H x 4.25 (108.0) W	7.90 (200.7) H x 7.50 (190.5) W x 3.10 (78.7) D	Refer to IL01219085E -25° to 70°C
Operating temperature range	-20° to 70°C	-25° to 70°C	-20° to 70°C	—
Reference literature	TD02601016E	TD150024EN	TD02601019E	—

**Legend**

PG = Programmable  
 FS = Full scale  
 RV = Read value  
 Auxiliary Voltage (Optional) = Provides three additional voltage inputs to the meter: Va2, Vb2, Vc2  
 Interharmonics = Power Xpert Meter 6000/8000 supported

**Notes**

- ① Optional.
- ② IQ 250S only.
- ③ The auxiliary voltage option adds three additional voltage input channels to Power Xpert Meters.
- ④ Contact Eaton for availability.

# Low Voltage Switchboards and Switchgear

## Switchboard Accessories and Modifications

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