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Low-voltage busway—Pow-R-Flex

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Overview

Pow-R-Flex Low-Ampere Busway

Eaton's Pow-R-Flex low-ampere busway is the latest design in a family of innovative busway products and is the newest in the industry. The Pow-R-Flex low-ampere busway is an excellent solution for distributing power throughout facilities, providing the flexibility to easily use the electrical system power where and when it is needed. The Pow-R-Flex low-ampere busway is practical for manufacturing and assembly facilities, machine shops, school and private laboratories, warehouse facilities, and data centers, and will reduce installation time and costs.

The Pow-R-Flex low-ampere busway is a maximum 600 V design that uses the latest in extrusion construction, providing appealing aesthetics without compromising heavy-duty performance.

The design consists of an extruded, all-aluminum housing with silver-plated copper or aluminum conductors. Copper conductors offer ratings from 225–600 A, and aluminum conductors offer ratings from 150–400 A. The Pow-R-Flex low-ampere busway comes in feeder type and plug-in type with a full line of complementary fittings and accessories. Feeder and plug-in busways can be used interchangeably without adapters or special splice plates. Each section is joined using a Pow-R-Bridge joint-compression fitting. The Pow-R-Flex low-ampere busway comes in two color options: ANSI 61 gray or black.

Standards

The Pow-R-Flex low-ampere busway meets the requirements of NEMA, ANSI, UL® 857, and CSA®-C22.2 and is manufactured in an ISO® 9001-certified facility. The feeder, plug-in, fittings and accessories are designed to withstand the short-circuit ratings listed for each ampere rating.

The Pow-R-Flex low-ampere busway is a three-phase design available in three-wire and four-wire configurations with integral housing, internal and isolated internal ground options. Oversized neutral ratings are available on select current ratings. See **Table 24.2-23**.

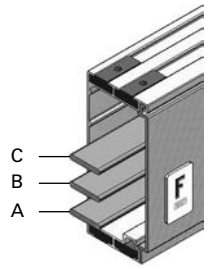
Construction Details

Pow-R-Flex bus bars are fabricated from high-strength 100% to over 200% neutral capacity on select current ratings. The phase and neutral conductors are silver-plated along the entire length of the bus bars. Aluminum bars are silver-plated by the Alstan 88C process, and copper bars are silver-plated through a flashing process. The ground bar for the internal ground option is not plated.

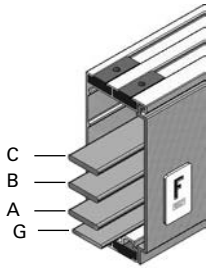
The internal conductors are separated from one another using an air insulation gap between phases, ground and housing. The conductors are supported and braced with a durable, high-strength polycarbonate support block that has a Class B 130 °C insulation rating. The support blocks provide superior fault current bracing.

For a Pow-R-Flex type plug-in busway, there are no special provisions for plug-in unit connections. Each plug-in unit clamps directly onto each phase and neutral conductor. A support block is used at each plug-in provision, providing additional bracing and support around the plug-in unit provision. This provides a more robust, reliable and safe plug-in unit connection.

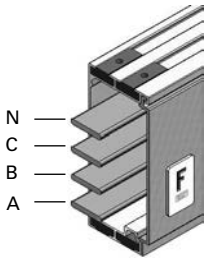
The neutral conductor is made from the same material as the phase conductors and is the same physical size, providing 100% to 200% neutral capacity on select current ratings. See **Table 24.2-23** for neutral capacity by ampere rating.



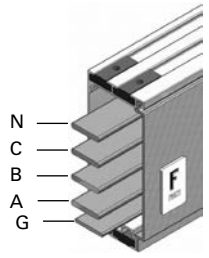
Three-Wire Housing Ground Assembly



Three-Wire Internal Ground Assembly



Four-Wire Housing Ground Assembly



Four-Wire Internal Ground Assembly

Figure 24.2-1. Conductor Configurations

Note: Single-phase configurations are also available. Contact your local Eaton sales representative for additional information.

Ground Options

Integral ground—uses the extruded aluminum housing as the ground/earth path. It has been designed, manufactured and UL listed as a 50% integral ground/earth path and is fully fault rated. The system ground continuity is maintained through each joint by the aluminum joint covers. The joint covers are furnished with ground/earth path contact surfaces on the inside of each cover. When installed, the contact surfaces are bolted directly to the busway ground/earth path. A highly visible label is furnished on each joint cover to alert the installer that the covers must be properly installed to maintain the ground/earth path. The result is a 50% ground/earth path with very low resistance characteristics.

Internal ground—uses a copper ground/earth conductor that is internal to the busway and is UL listed as a 50% ground/earth path. The internal ground/earth continuity is maintained through the Pow-R-Bridge joint in the same fashion as each phase conductor.

Isolated internal ground—uses the 50% internal ground/earth conductor; however, it has been isolated from the busway housing throughout the busway system and is UL listed as a 50% isolated ground/earth path.

Housing Details

The Pow-R-Flex low-ampere busway is constructed with a heavy-duty "U"-shaped aluminum extruded base housing. The front covers are also made from extruded aluminum. The "U"-shaped base and front cover incorporate a unique hinge design to lock in the front covers on the top side. The bottom sides are fastened in place. This maintains short-circuit strength, provides clean lines, and adds to the aesthetic look and feel of the product.

The non-magnetic, all-aluminum housing provides for excellent heat dissipation and a significant reduction in reactance and magnetic flux leakage, as compared to steel, or steel and aluminum combination housings. The integrity and strength of the housing ensures specifiers and users of a safe and durable installation over a broad spectrum of applications.

A protective finish is applied by an electrostatic process. There are two color options: ANSI 61 gray or black.

Pow-R-Bridge

Pow-R-Flex joint connections are made with the Pow-R-Bridge joint package, which is installed on each section of busway prior to shipment. A double-headed, torque-indicating bolt is provided to ensure that the proper installation torque is achieved. Fall-away instruction tags are furnished on the torque-indicating bolt heads to allow for visual inspection from a distance. When the proper torque value is achieved, the top bolt head will shear off and allow the tag to fall to the floor. Any joint that is improperly torqued will retain the highly visible (caution yellow) tag at the bolt head.

The Pow-R-Bridge can provide an adjustment of ±0.50-inch (12.7 mm) at each joint. Overadjustment is prevented by the joint covers, which will only allow a 0.50-inch (12.0 mm) adjustment to be made. The nonrotating design of the Pow-R-Bridge maintains its configuration integrity when it has been removed from a section of busway. The conductors, insulator plates, and insulators will not displace or swivel, making reinstallation of the Pow-R-Bridge quick and easy.

Pow-R-Flex Feeder Busway

- 150–400 A aluminum
- 225–600 A copper

Straight sections of feeder busway can be supplied in any length, at 0.50-inch (12.7 mm) increments, from 24.00 inches (609.6 mm) minimum to 120.00 inches (3048.0 mm) maximum. Each feeder section will include one factory-installed Pow-R-Bridge on the left end of the busway when viewing the front of the busway. For added safety and reliability, there are no openings or access covers along the entire length of each feeder section.

Pow-R-Flex Plug-In Busway

- 150–400 A aluminum
- 225–600 A copper

Straight sections of plug-in busway can be supplied in only 24.00-inch (609.6 mm) increments from 24.00 inches (609.6 mm) minimum, with a maximum of 120.00 inches (3048.0 mm).

For a Pow-R-Flex type plug-in busway, a plug-in/tap-off provision cover is used. This cover hinges into the housing in the same manner as the extruded front covers and is made from the same durable, high-strength polycarbonate material as the support blocks, which are rated as Class B 130 °C insulation. The plug-in provision cover incorporates a shutter design that prevents incidental contact with the conductors inside the busway. The shutter has a positive screw close feature that prohibits the shutter from being operated and opened without the use of a tool. Once the screw is removed, it is mechanically operated by the plug-in unit when a plug-in unit is being inserted onto the busway. This shutter design puts safety first and is IP2X finger safe. One plug-in/tap-off provision cover is provided every 12.00 inches (304.8 mm) along a plug-in busway section. Each feeder section will include one factory-installed Pow-R-Bridge on the left end of the busway when viewing the front of the busway.

Table 24.2-1. Number of Plug-In Openings

Duct Length Inches (mm)	Number of Plug-In Provisions
24.00 (609.6)	1
48.00 (1219.2)	3
72.00 (1828.8)	5
96.00 (2438.4)	7
120.00 (3048.0)	9

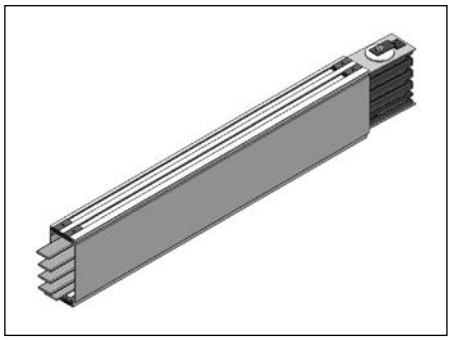


Figure 24.2-2. Feeder Busway

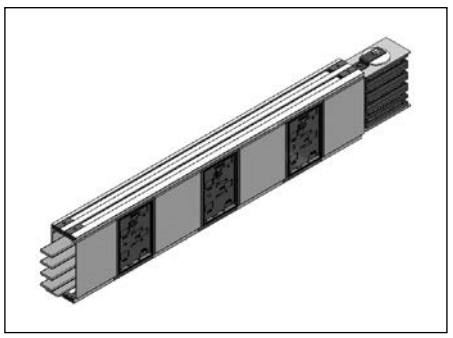


Figure 24.2-3. Plug-In Busway

Fittings

There are various fittings allowing the Pow-R-Flex low-ampere busway to meet every application need: flanges, elbows, offsets, tees, cable tap boxes, adapters, expansion joints, phase transpositions and end closures.

These fittings, along with standard and minimum dimensions, are described on the following pages.

When making field measurements and layouts, it should be remembered that the dimensions are given from the centerline of the busway and the Pow-R-Bridge.

The relationship of fittings to straight lengths (forward, rearward, upward and downward) is illustrated in **Figure 24.2-4**.

All straight lengths and fittings are marked with an "F" label. The "F" marks the front of the busway and will be noted on the construction or the as-built drawings provided by Eaton.

Phasing—the phasing is indicated by the location of the "F" label. When facing the front of the busway, the phasing is N-C-B-A-G top to bottom. See **Figure 24.2-5**.

When installing Pow-R-Flex low-ampere busway, the "F" labels on the front of the busway must be aligned. Failure to do so will result in an improper installation with the phase bars out of sequence.

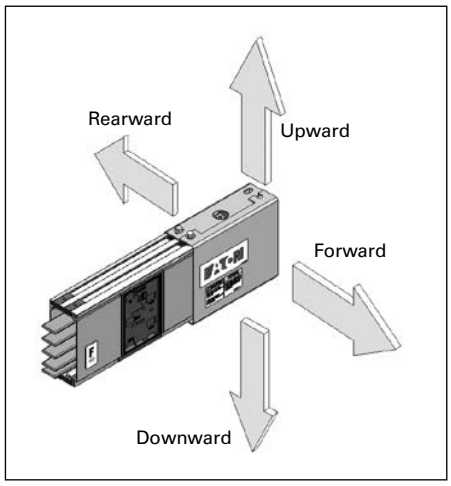


Figure 24.2-4. Busway Orientation

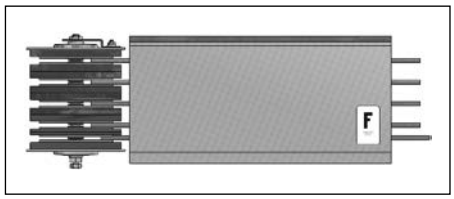


Figure 24.2-5. Busway Phase Sequence

Traditional Elbows

Elbows are used to make 90-degree changes in the direction of the busway layouts. There are four types of elbows available: forward, rearward, upward and downward, allowing the busway layout to turn in any direction.

Figure 24.2-6 shows the standard/minimum leg lengths for each type of elbow for all ratings and configurations. Nonstandard lengths are also available.

All dimensions shown are to the centerline of the Pow-R-Bridge and centerline of the busway.

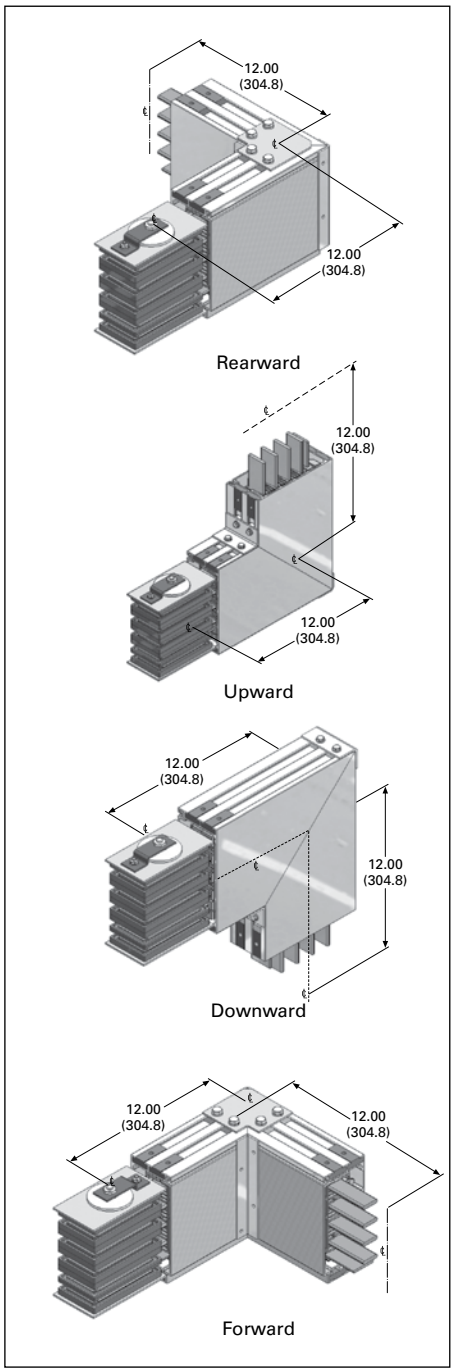


Figure 24.2-6. Traditional Elbows

Standard Flanges

Flanges provide for a direct connection to low-voltage switchgear, switchboards, panelboards, motor control centers and other electrical equipment. Cutout dimensions and drilling plans are provided with the customer installation drawings, and it is the responsibility of the equipment manufacturer to provide the opening, flange drillings, connecting hardware and bus risers in their electrical equipment. For proper coordination between the busway and other equipment, detailed drawings, including equipment orientation, must accompany the order prior to release and manufacture.

Figure 24.2-8 shows the standard/minimum flange length and phase-to-phase dimensions for all ratings and configurations. Nonstandard lengths and phase-to-phase dimensions are also available.

All dimensions shown are to the centerline of the Pow-R-Bridge measured from the top of the flange plate.

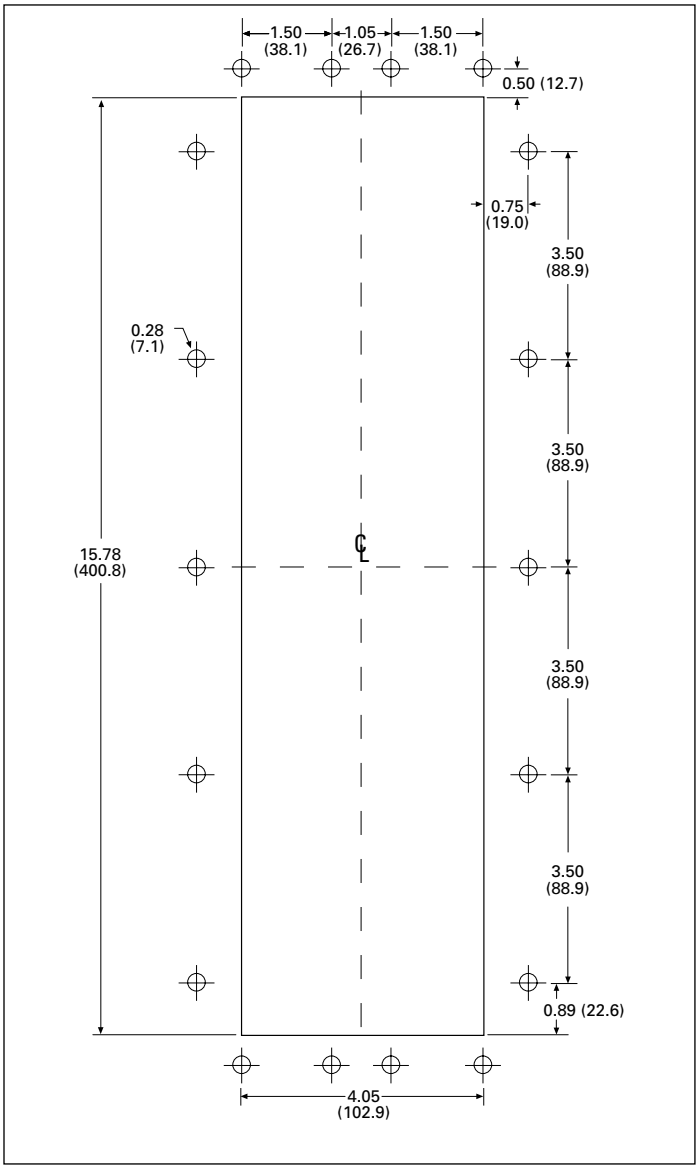


Figure 24.2-7. Flange Cutout Detail

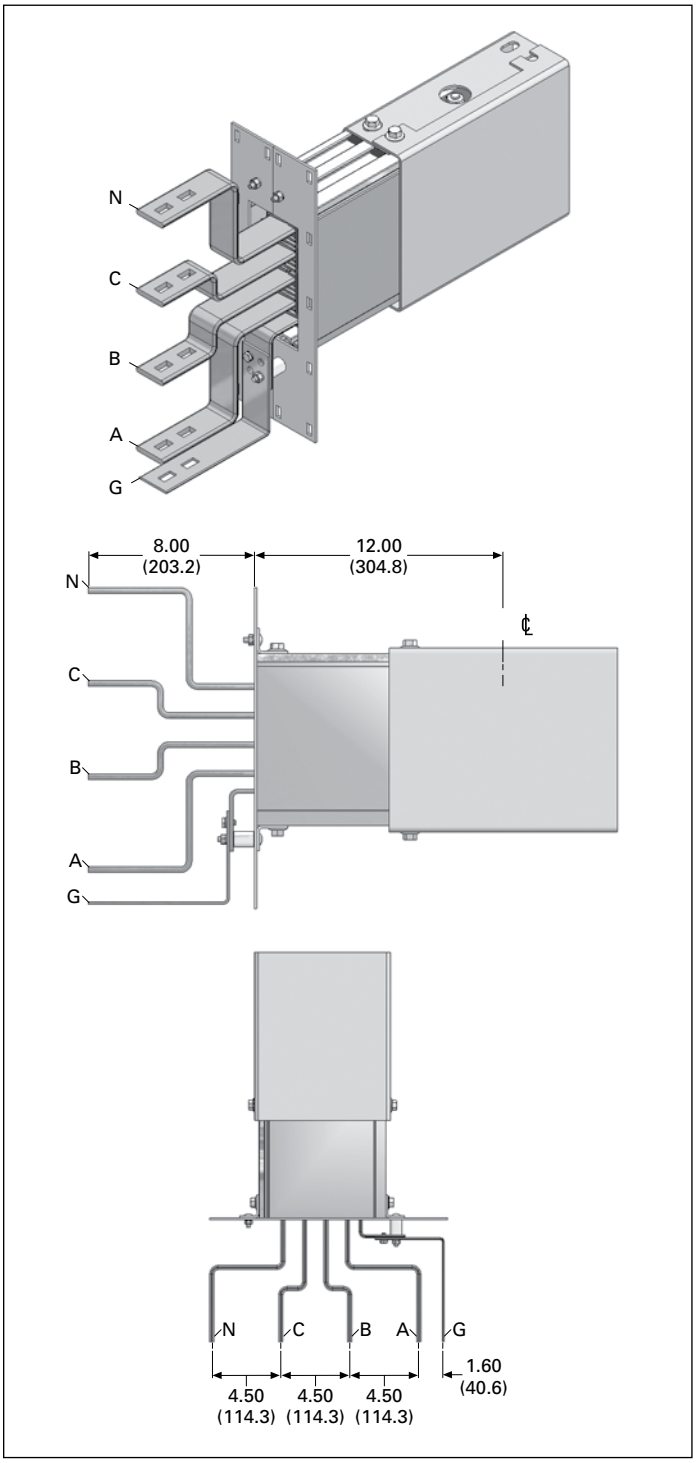


Figure 24.2-8. Standard Flanges

Offsets

An offset is used to allow the busway layout, avoid any obstacles and to conform to the building's structure. It is two elbows fabricated into a single fitting for use where space restrictions prohibit the use of two traditional elbows. There are four types of offsets available: forward, rearward, upward and downward, allowing the busway layout to offset in any direction.

Figure 24.2-9 shows the standard/minimum leg lengths for each type of offset for all ratings and configurations. Nonstandard lengths are also available.

All dimensions shown are to the centerline of the Pow-R-Bridge and centerline of the busway.

Cable Tap Boxes

There are two types of cable tap boxes: end and center. End cable tap boxes are used to feed power to a run of busway with cable and conduit or where loads served by busway are connected without the need of overcurrent protection. There are two designs for end cable tap boxes. One is for a left-hand orientation and one for a right-hand orientation. The two separate designs allow for the bus to be mounted flush against the wall no matter which direction your busway is running. Center cable tap boxes are used to center feed a run of busway with cable and conduit or where loads served by the busway are connected without the need of overcurrent protection.

The front and back covers are removable, improving the ease of cable termination. Top and bottom access plates are removable, allowing easy access to the lugs with tools. See **Figure 24.2-11** and **Figure 24.2-12**. There are two mechanical lugs provided: per phase and one lug for the ground.

Table 24.2-2. Terminal Conductor Range

Rated Current (A)	Number of Lugs per Phase
Copper	
225	Phase and neutral (1) #4–350 kcmil Ground (1) #8–1/0
400	Phase and neutral (2) #4–350 kcmil Ground (1) #8–1/0
500	Phase and neutral (2) #4–350 kcmil Ground (1) #8–1/0
600	Phase and neutral (2) #4–350 kcmil Ground (1) #8–1/0
Aluminum	
150	Phase and neutral(1) #4–350 kcmil Ground (1) #8–1/0
225	Phase and neutral (1) #4–350 kcmil Ground (1) #8–1/0
300	Phase and neutral (1) #4–350 kcmil Ground (1) #8–1/0
400	Phase and neutral (2) #4–350 kcmil Ground (1) #8–1/0

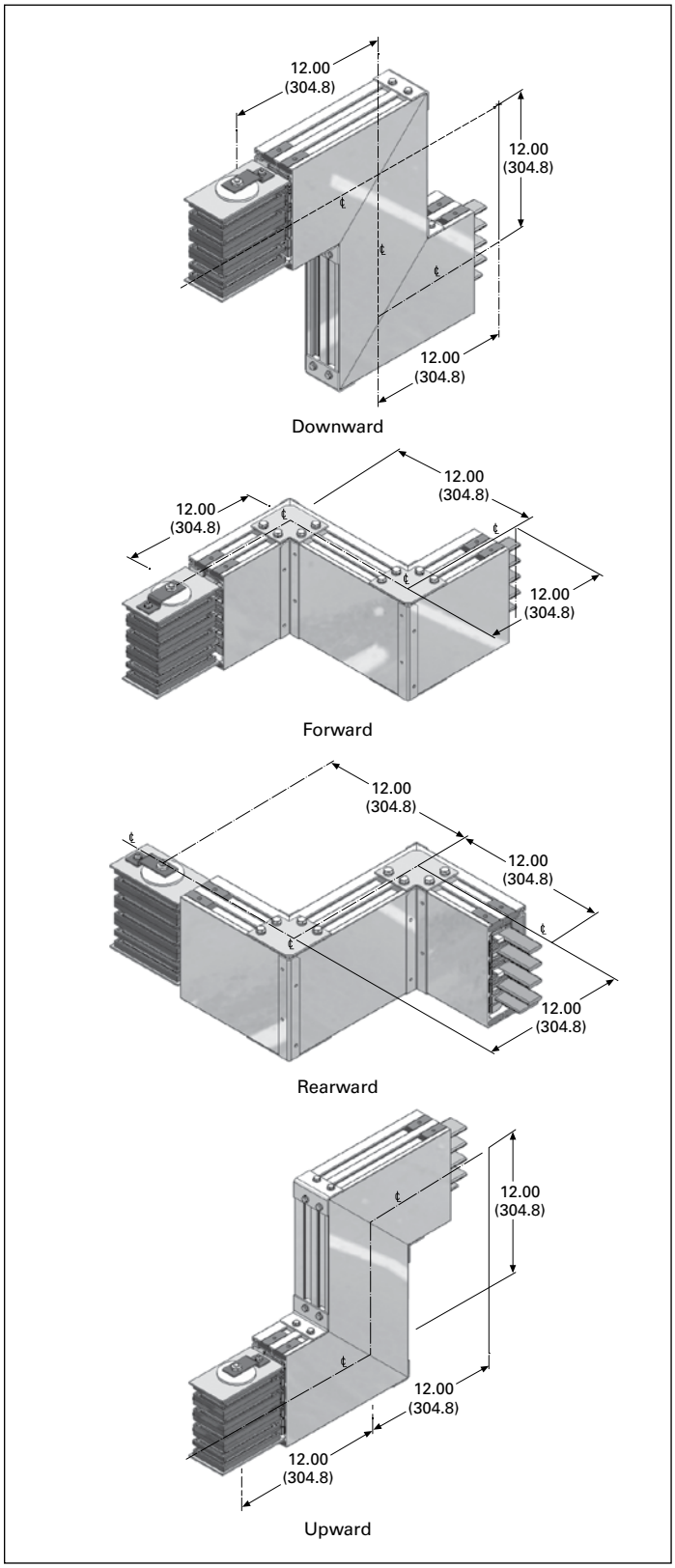


Figure 24.2-9. Offsets

Figure 24.2-11 shows the standard/minimum stub lengths for each type of cable tap box for all ratings and configurations. Nonstandard lengths and enclosure sizes are also available.

All dimensions shown are to the centerline of the Pow-R-Bridge measured from the edge of the box enclosure.

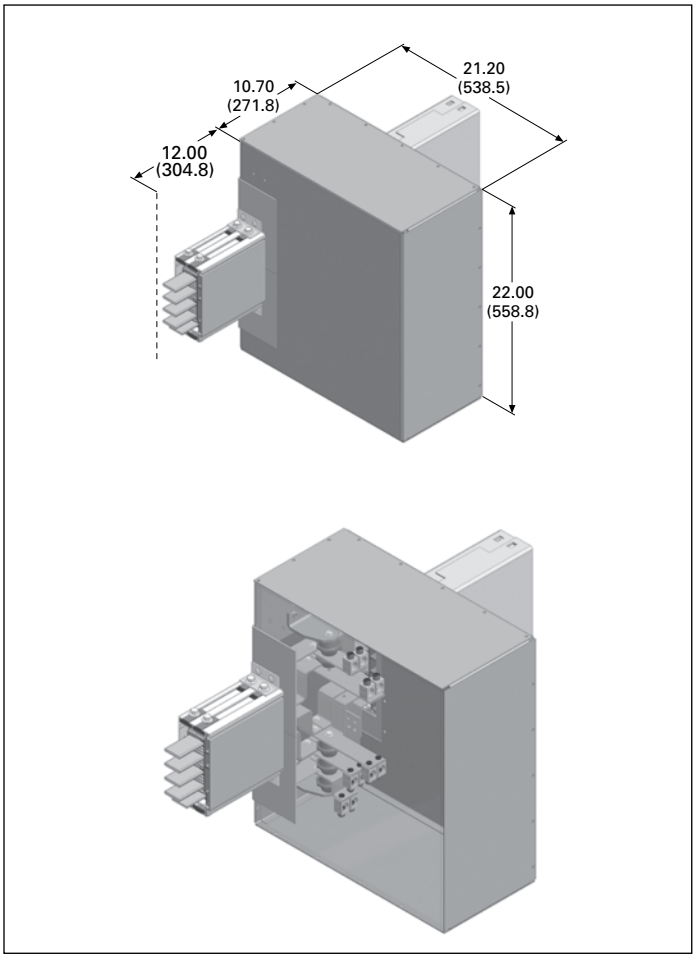


Figure 24.2-10. Center Cable Tap Box

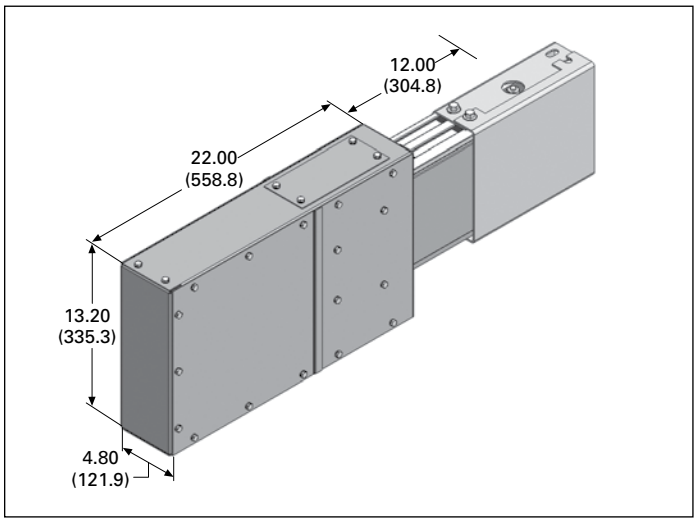


Figure 24.2-11. Left Hand—End Cable Tap Box

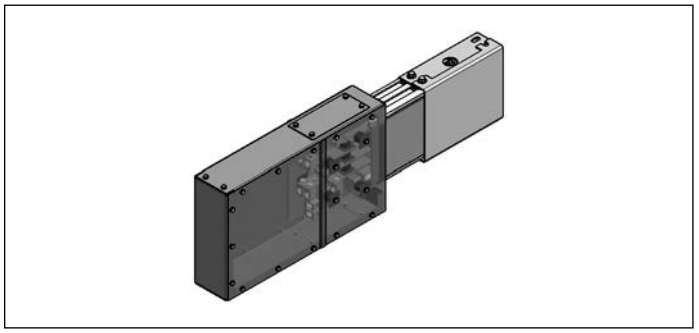


Figure 24.2-12. Left Hand—End Cable Tap Box Detail View

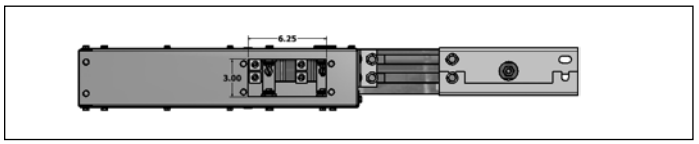


Figure 24.2-13. Left Hand—Tap Box Mechanical Lug Access

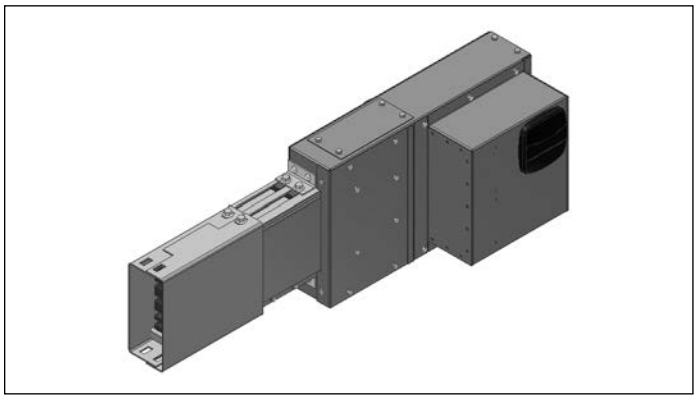


Figure 24.2-14. Right Hand—End Cable Tap Box With IQ Power Meter

Expansion Joints

Expansion joints accommodate the expansion and contraction of bus bars with respect to the enclosure. They accommodate for the difference in the coefficient of expansion of the aluminum housing and copper or aluminum bus bar conductors. Expansion joints must be used whenever a run of busway crosses an expansion joint of a building. They should also be installed in the center of an extremely long straight run of busway; one every 300 feet (91 m) for copper and one every 225 feet (68 m) for aluminum. Usage per footage recommendations are based upon full-load ampere ratings. The use of expansion joints should be engineered for specific applications and installations. Minimum dimensions are shown in **Figure 24.2-15**.

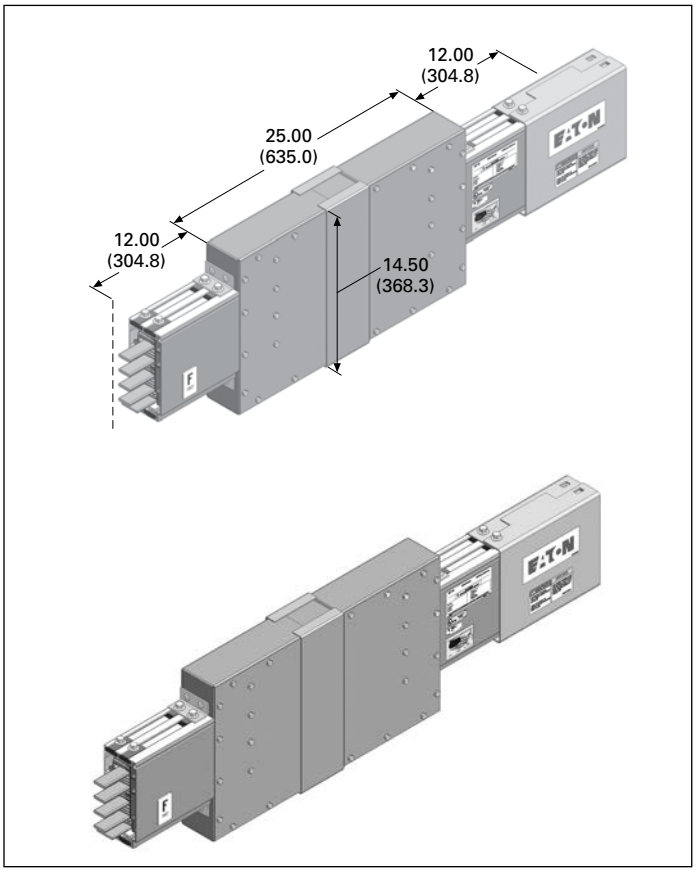


Figure 24.2-15. Expansion Joint

Phase Transpositions

Phase transposition fittings are used in applications where a phase rotation is needed due to a change in phasing from the source equipment to the load equipment. They may also be used to correct plug-in unit orientation when the busway comes out of proper orientation for plug-in units due to the routing of the busway. There are two types of phase transpositions: 90 degree and 180 degree. In both types, all conductors are transposed. See **Figure 24.2-16** and **Figure 24.2-17** for minimum dimensions.

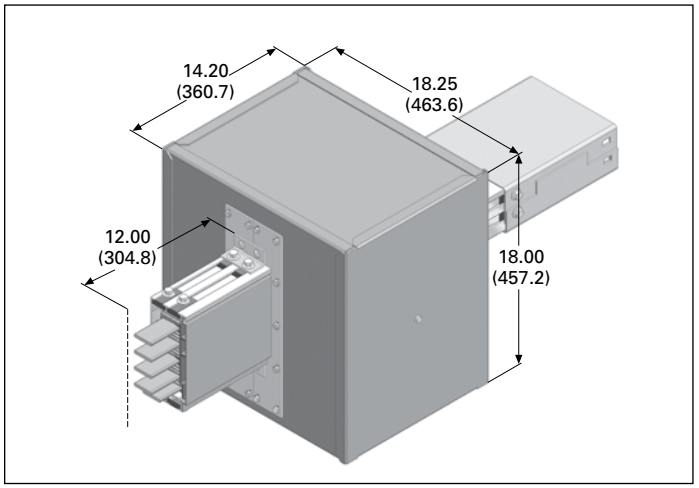


Figure 24.2-16. 90-Degree Phase Transposition

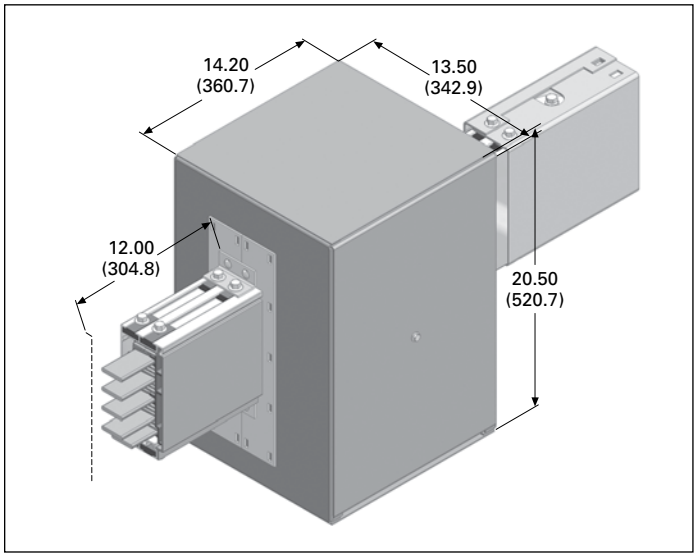


Figure 24.2-17. 180-Degree Phase Transposition

Vapor–Fire Barriers

Vapor–fire barriers hold a two-hour fire rating and are used to seal the busway internally for penetrations through walls, floors, and other fire-rated penetrations, preventing the passage of flame, noxious gas, smoke and moisture. See **Figure 24.2-18** for minimum dimensions.

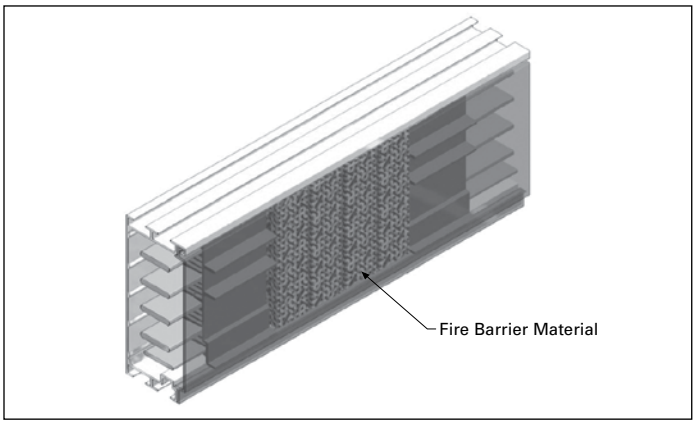


Figure 24.2-18. Vapor–Fire Barrier

Tees (Horizontal)

Tee fittings allow for busway connection in three different horizontal directions. Pow-R-Flex tee fittings consist of special joint covers with instructions on how to place the bridge joint. The through connections connect to the short sides of the bridge joint, and the change connections connect to the long side of the bridge joint.

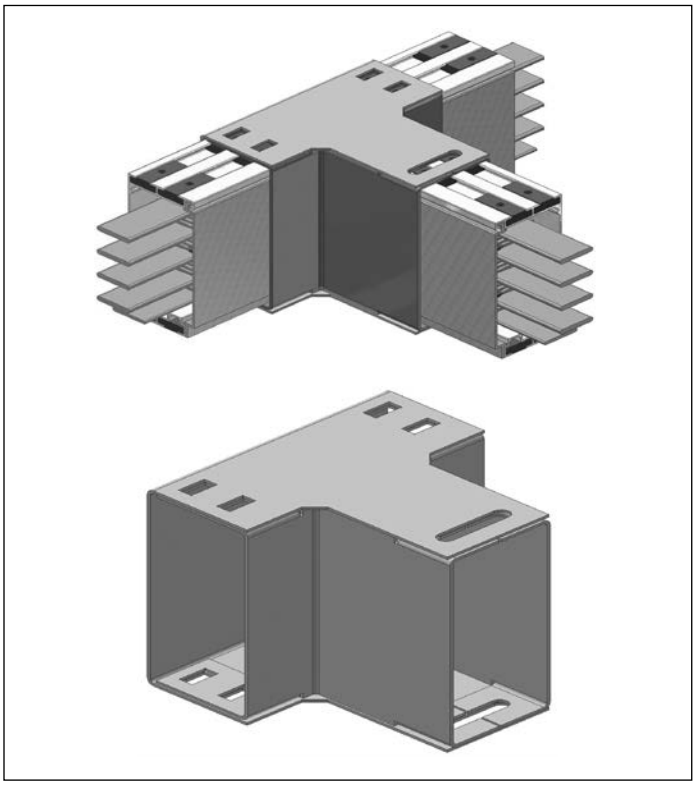


Figure 24.2-19. Horizontal Tees

End Closers

End closers terminate a bus run and can be used to cap off either the left or right end of a section of busway. End closers enclose and prevent incidental contact with live conductors. An end closure adds 0.25 inches to the overall length of the busway run. See **Figure 24.2-20**.

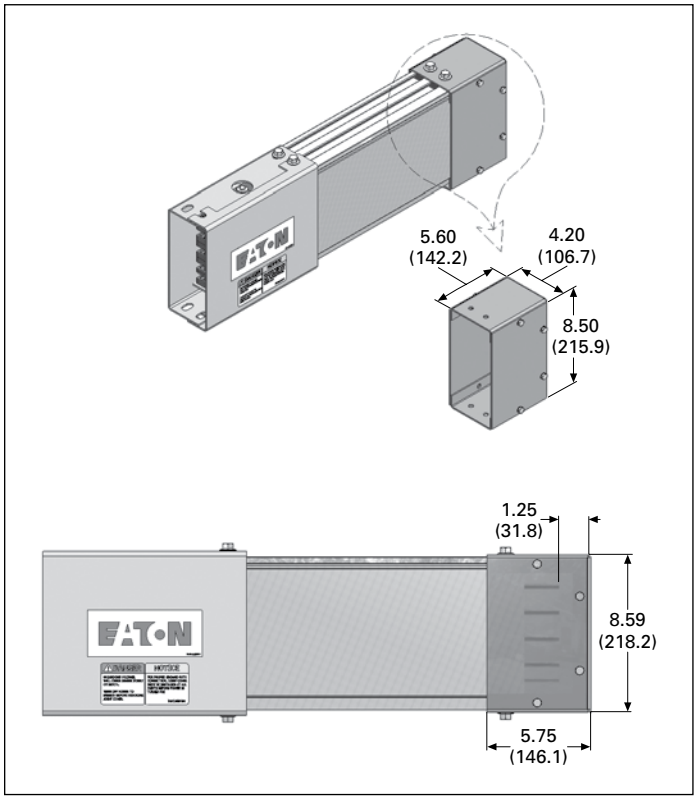


Figure 24.2-20. End Closer

Wall Flanges

Wall flanges fit around the busway and are designed to close off the wall gap opening around the busway, made to allow the busway to pass through a wall. Wall flanges are primarily for cosmetic purposes and do not provide any type of vapor or fire barrier. See **Figure 24.2-21**.

The recommended cutout opening in a wall for the busway should be 2.00 inches (50.8 mm) greater than the busway dimensions or A x B.

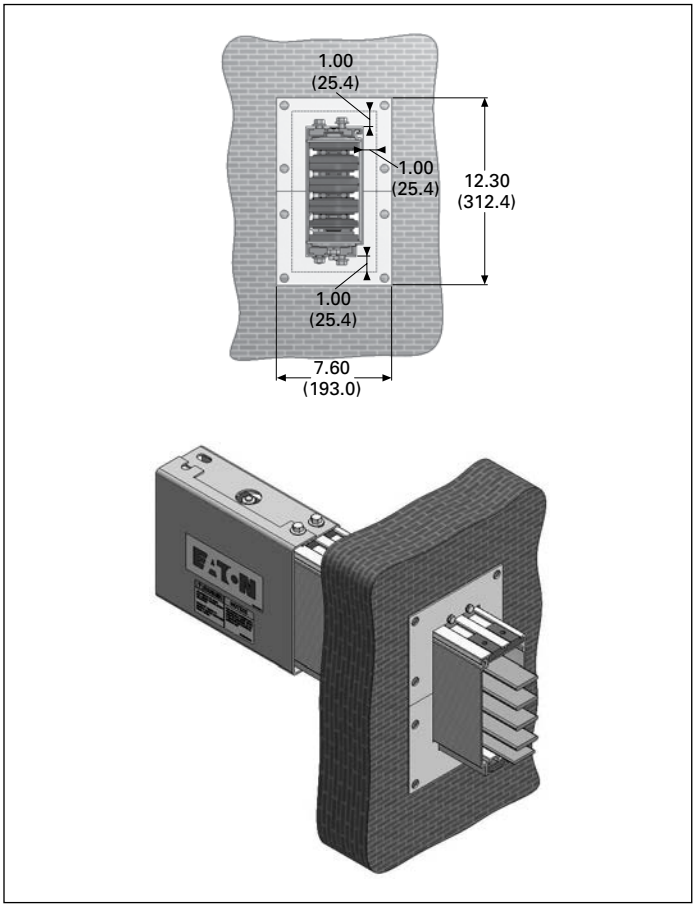


Figure 24.2-21. Wall Flange

Hangers

Type C Wallmount Hanger

The Type C wallmount hanger provides a means to mount the Pow-R-Flex low-ampere busway to a wall, beam, pedestal or other fixed structure. The Type C brackets are installed prior to installing the busway. Each hanger comes with the hardware to mount the hanger to the busway. One hanger should be used every 10 feet (3 m), and the busway span between hangers should not exceed 10 feet (3 m). See **Figure 24.2-22**.

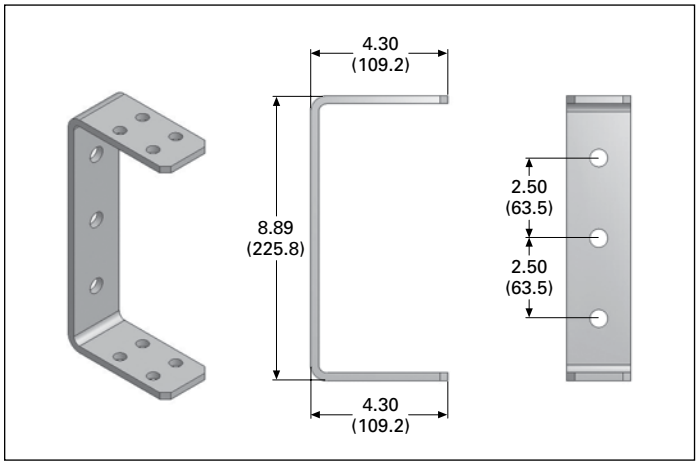


Figure 24.2-22. Type C Wallmount Hanger

Type L Wallmount Hanger

The Type L wallmount hanger provides a means to mount the Pow-R-Flex low-ampere busway flush against a wall. The Type L brackets are sold as a two-piece hanger set and come with the hardware to mount the hanger to the busway. One hanger should be used every 10 feet (3 m), and the busway span between hangers should not exceed 10 feet (3 m). See **Figure 24.2-23**.

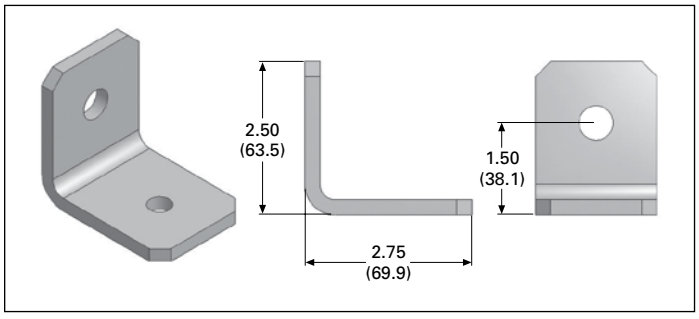


Figure 24.2-23. Type L Wallmount Hanger

Horizontal Hanger—Single

Horizontal hangers provide a means to attach a single 0.50-inch (12.7 mm) threaded drop rod to the busway, suspending the busway from above. Each hanger comes with the hardware to mount the hanger to the busway. One hanger should be used every 10 feet (3 m), and the busway span between hangers should not exceed 10 feet (3 m). See **Figure 24.2-24**.

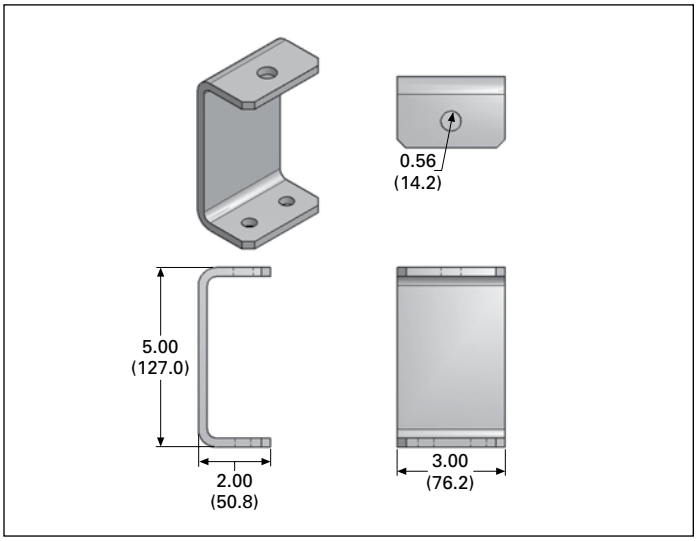


Figure 24.2-24. Single Hanger

Horizontal Hanger—Back-to-Back

The back-to-back horizontal hanger allows two busway runs to be mounted back-to-back and suspended from above, using a single 0.50-inch (12.7 mm) threaded drop rod. Each hanger comes with the hardware to mount the hanger to the busway. One hanger should be used every 10 feet (3 m), and the busway span between hangers should not exceed 10 feet (3 m). See **Figure 24.2-25**.

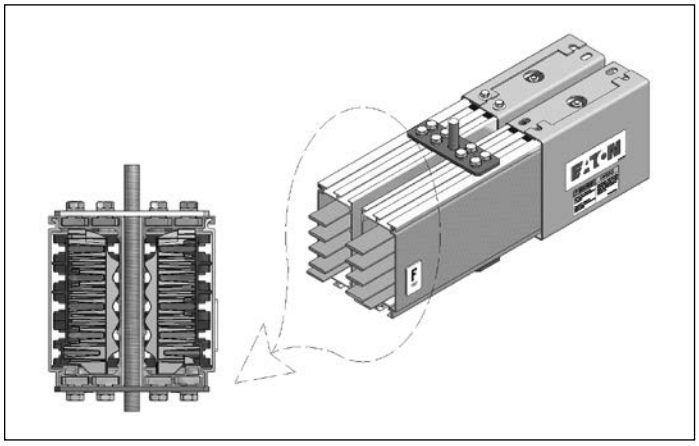


Figure 24.2-25. Back-to-Back Hanger

Sway Braces

Sway brace brackets provide a provision to brace the busway run at a 45-degree angle, restricting the suspended busway from swinging.There are two types of sway brace brackets: single and back-to-back. Each sway brace comes with the hardware to mount the brace to the busway. See **Figure 24.2-26**.

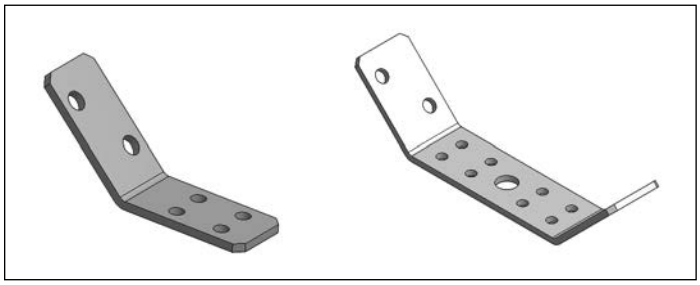


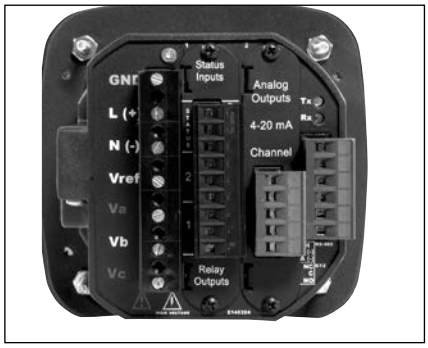
Figure 24.2-26. Sway Braces

Busway Power Monitoring

Eaton's family of IQ electronic power meters is available to monitor each run of busway. Each power meter is attached to the end cable tap box and comes installed, ready for use. The installing contractor will need to wire the CTs to the meter. CTs are included with the power meter.

Each power meter comes with a highly visible LED display, showing metered values for each phase with its three-line display. This display is very easy to read, even if installed at a height or distance. Using the keypad and menus on the local display, users can display a variety of electrical system values or program the meter. Metered data may also be transmitted and configured remotely, depending upon the selected meter and options selected.

IQ Meter (Front)



IQ Power Meter (Rear)

Table 24.2-3. IQ Electronic Power Meters

Features	IQ 130	IQ 140	IQ 150	IQ 250	IQ 260	PXM2000
Current, per phase	■	■	■	■	■	■
Current demand	■	■	■	■	■	■
Calculated neutral current	■	■	■	■	■	■
Voltage, per phase (L-L, L-N)	■	■	■	■	■	■
Min./max. readings (I, V)	■	■	■	■	■	■
Min./max. readings (I, V, PF, F, W, VAR, VA)	—	■	■	■	■	■
Frequency	—	■	■	■	■	■
Real, reactive, apparent power, total (W, VAR, VA)	—	—	■	■	■	■
Power factor, total	—	■	■	■	■	■
Real, reactive, apparent power demand	—	■	■	■	■	■
Real, reactive, apparent energy, total (Wh, VAR, Vah)	—	—	■	■	■	■
Total Harmonic Distortion (THD), per phase (V, I)	—	—	—	Opt	■	■
Set point driven alarm	—	—	—	Opt	■	■
I/O (Digital in/digital out, analog out, KYZ out)	—	—	—	Opt	Opt	Opt
Logging, trend, event	—	—	—	—	—	■
Embeded Web server	—	—	—	—	—	■
Firmware flash update	—	—	—	—	—	■
Waveform display	—	—	—	—	—	■
RS-485	Opt	Opt	Opt	■	■	■
Modbus RTU	Opt	Opt	Opt	■	■	■
Modbus ASCII	Opt	Opt	Opt	■	■	■
KYZ output	Opt	Opt	Opt	■	■	■
DNP 3.0	—	—	—	■	■	■
HTTP, HTTPS	—	—	—	—	—	■
SNMP	—	—	—	—	—	■
SMTP	—	—	—	—	—	■
NTP	—	—	—	—	—	■

Plug-In Unit Overcurrent Protective Devices

A variety of plug-in units have been designed for the Pow-R-Flex low-ampere busway to meet multiple applications and a variety of installation conditions. Plug-in unit devices provide easy and flexible access to a building's electrical power system, while providing safe overcurrent protection to equipment and wiring.

All Pow-R-Flex plug-in units are designed with the safety of the installer and user as the key criteria. The following safety features are standard for all fusible and molded case circuit breaker plug-in units:

- Each plug-in unit ground stab makes positive contact with the busway ground (integral or internal) before the phase or neutral stabs contact the bus bars
- Plug-in unit molded guide tabs are provided in the stab support base. These ensure proper phase alignment and open the busway outlet shutter mechanism
- Each plug-in unit has an interface bracket, which prevents the unit from being installed onto or removed from the busway, while the device is in the on/closed position
- Each plug-in unit has a door interlock, preventing the front cover from being opened while the device is in the on/closed position and preventing accidental closing of the device while the front cover is open
- Line-side barriers are provided over the line-side terminal to help prevent accidental contact with line-side connections
- When the plug-in unit is installed, the stab-base assembly on the plug-in unit is recessed into the busway outlet cover to help seal against moisture and dust
- Each plug-in unit has mounting flanges, which help protect the stab-base assembly and have captive hardware that bolt the unit securely to the busway

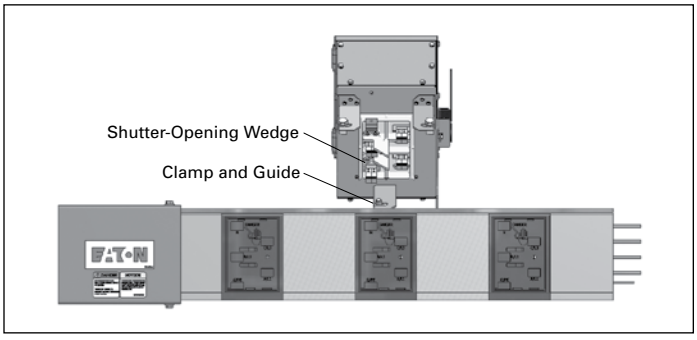


Figure 24.2-27. Plug-In Stab Assembly Details

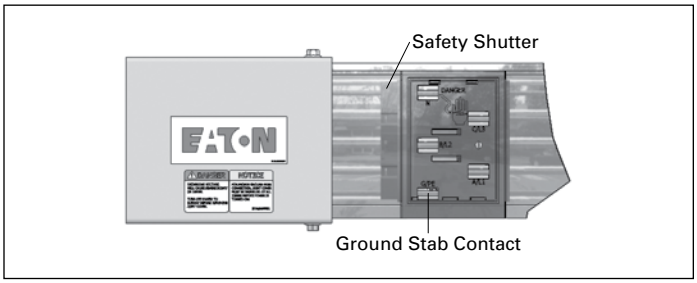


Figure 24.2-28. Plug-In Outlet Details

Plug-In Cable Tap Boxes

Plug-in cable tap boxes are used to back feed power to a run-off busway, or where equipment served by the busway is connected without overcurrent protection. Plug-in cable tap boxes fit into any plug-in provision on a plug-in type busway. See **Figure 24.2-29**.

Table 24.2-4. Plug-In Cable Tap Box Details

Catalog Number	Ampere Rating	Mechanical Lugs (Standard)	Mechanical Lugs (Metric)
LAPTB100MG	100	#6–3Ø	4.11–10.40 mm
LAPTB100MGN	100	#6–3Ø	4.11–10.40 mm
LAPTB200MG	200	#6–3Ø	4.11–10.40 mm
LAPTB200MGN	200	#6–3Ø	4.11–10.40 mm

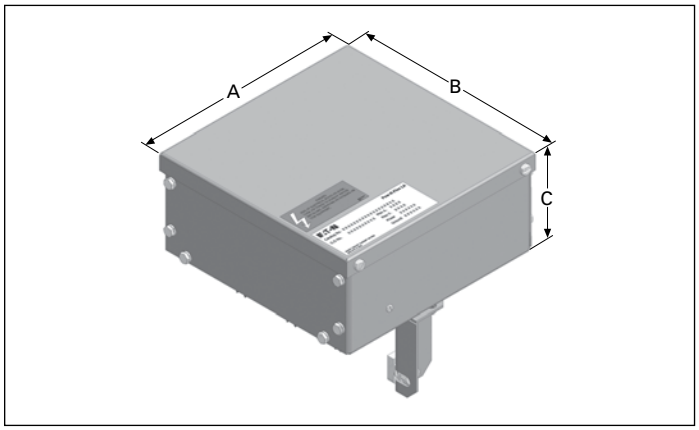


Figure 24.2-29. Plug-In Cable Tap Box

Table 24.2-5. Plug-In Cable Tap Box Dimensions in Inches (mm)

Catalog Number	A	B	C
LAPTB100MG	9.33 (237.0)	18.21 (462.5)	8.18 (207.8)
LAPTB100MGN	9.33 (237.0)	18.21 (462.5)	8.18 (207.8)
LAPTB200MG	9.33 (237.0)	18.21 (462.5)	8.18 (207.8)
LAPTB200MGN	9.33 (237.0)	18.21 (462.5)	8.18 (207.8)

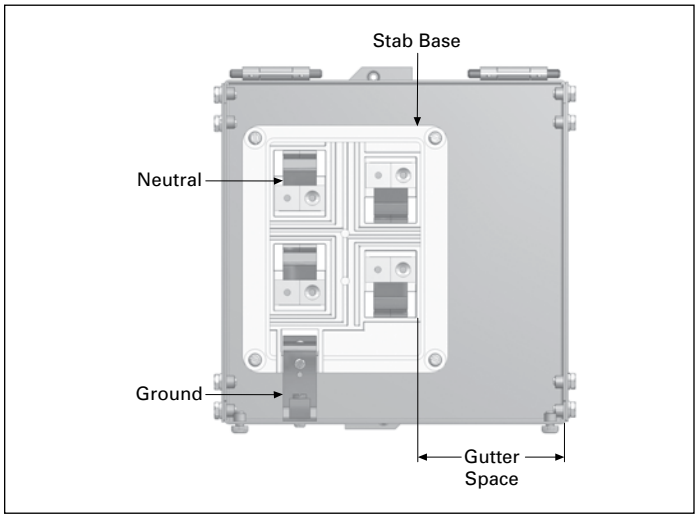


Figure 24.2-30. Plug-In Cable Tap Box Details

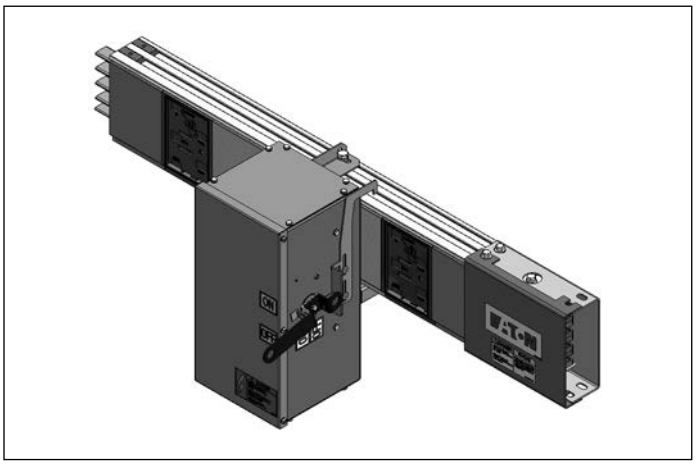


Figure 24.2-31. Plug-In Device Mounting

Circuit Breaker Plug-In Units

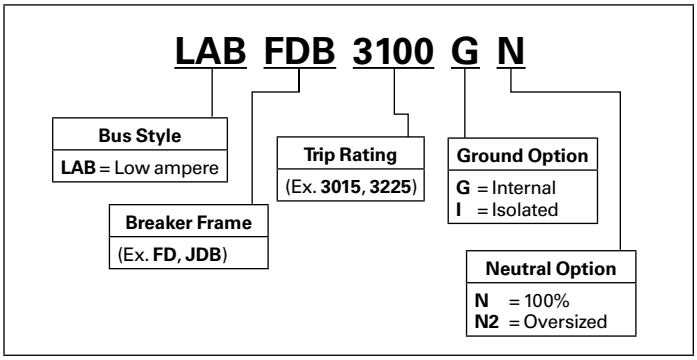
Circuit breaker plug-in units are stock and come with the circuit breaker fully installed, ready for installation and termination. All units are three-phase with three-pole Eaton Series C® molded case circuit breakers.

Table 24.2-6. Circuit Breaker Interrupting Ratings (kA Symmetrical)

Ampere Rating	240 Vac	480 Vac	600 Vac	Breaker Frame
15–225	65	—	—	ED
15–100	18	14	—	EHD
15–150	18	14	14	FDB
15–225	65	35	18	FD
15–225	100	65	25	HFD
70–250	65	35	18	JDB
70–250	65	35	18	JD
70–250	100	65	25	HJD

Note: 100%-rated circuit breakers are not for use in plug-in units.

Table 24.2-7. Breaker Unit Selection Chart



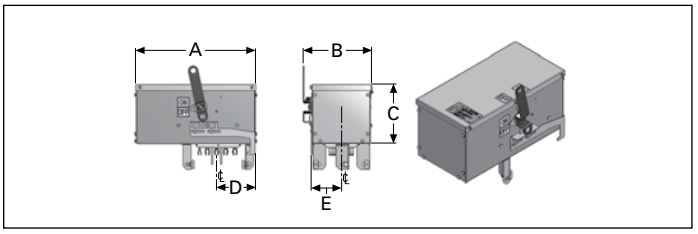


Figure 24.2-32. Circuit Breaker Plug-In Unit Dimensions

Table 24.2-8. Breaker Plug-In Unit Dimensions

Plug-In Unit	Max. Amperes	Max. Voltage	A	B	C	D	E
LABFD (F-Frame)	225	600	18.00 (457.2)	10.80 (274.3)	8.17 (207.5)	5.97 (151.6)	4.80 (121.9)
LABJD (J-Frame)	250	600	18.56 (471.4)	10.80 (274.3)	9.08 (230.6)	5.97 (151.6)	4.61 (117.1)

Table 24.2-9. Breaker Plug-In Unit Physical Data

Plug-In Unit	Mechanical Terminals	Approximate Weight lbs
LABFD (F-Frame)	Cu/Al-(1)#4–4/0	25
LABJD (J-Frame)	Cu/Al-(1)#14–350 kcmil	40

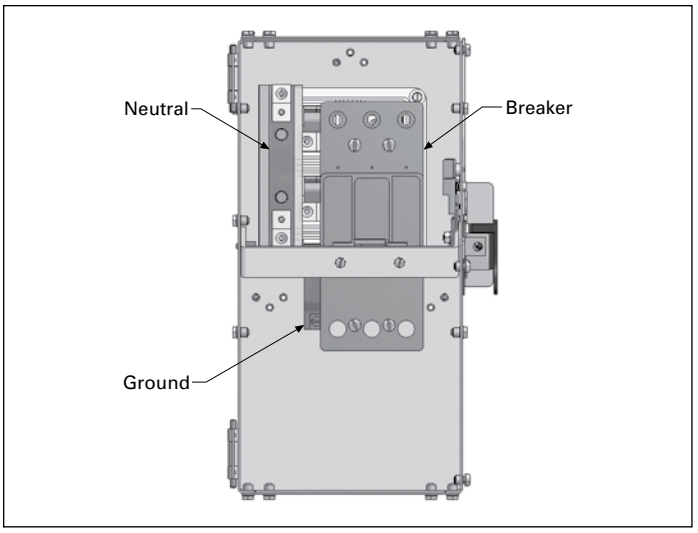


Figure 24.2-33. Circuit Breaker Plug-In Unit Details

Surge Protective Device Plug-In Units

The Pow-R-Flex plug-in device product offering includes surge protective devices (SPD), which are ideal for busway-fed distribution systems. A transient voltage is a random high-energy, short-duration electrical anomaly. These high-energy surges can disrupt, damage, or destroy sensitive microprocessor-based equipment. Eaton has developed the SPD series of products to ensure that quality power is supplied to commercial, industrial, medical, institutional and data-center facilities.

The SPD device not only protects against externally created impulse transients, such as lightning, utility capacitor switching and disturbances emitted by adjacent facilities, but also provides needed protection against internal transients. This type of transient is generated within a facility's own distribution system. Sources of internally generated or ring-wave transients are imaging equipment, variable-frequency drives, lighting dimmers, arc welders, and the switching on and off of electrical distribution equipment.

The SPDs also offer units that filter repetitive electrical line noise (EMI/RFI), which is defined as any unwanted electrical signal that produces undesirable effects in the circuits of sensitive electronic equipment or disturbances that are two times peak voltage. The suppression of AC transients is accomplished through the use of thermally protected metal-oxide varisters (MOVs), which provide a low-impedance path to divert surges away from loads. Electrical line noise and ringing transients are eliminated by adding filtering capacitors to the suppression device.

The benefits of combining SPDs and filtering are reduced MOV stress (resulting in a longer life cycle), lower let-through voltage, better noise attenuation levels and increased reliability.

Because the SPD units are directly connected to the busway, they are able to minimize let-through voltage and isolate critical loads, which are fed from a protected busway run. Due to the integrated design, the SPD plug-in units save the user wall space and greatly reduce the installed project cost. The SPD plug-in units are furnished with a breaker disconnect. For catalog numbers and selection criteria, see **Table 24.2-10**.

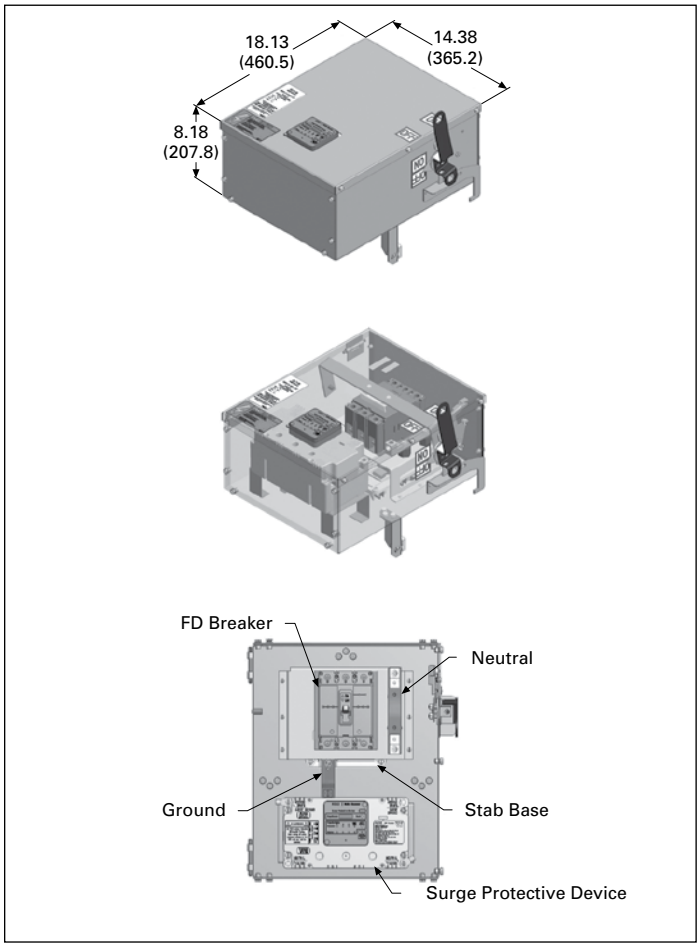


Figure 24.2-34. SPD Plug-In Unit

Table 24.2-10. SPD Plug-In Unit Selection Chart

LABSPD 250 480Y 2 C

Fixed—Do Not Change

Surge Rating (kA/Phase)
50
80
100
120
160
200
250
300
400

Voltage Code
208Y = 208Y/120 V (four-wire + ground)
400Y = 400Y/230 V (four-wire + ground)
480Y = 480Y/277 V (four-wire + ground)
600Y = 600Y/347 V (four-wire + ground)
240D = 240 Delta (three-wire + ground)
480D = 240 Delta (three-wire + ground)
600D = 240 Delta (four-wire + ground)

Fixed—Do Not Change

Option Code
1 = **Basic**—Dual-colored LED per phase to indicate protection status of the N-G mode on units with a neutral wire, single-colored LED to indicate the lack of a neutral wire connection on systems with a neutral wire.
S = **Standard**—Dual-colored LED per phase to indicate protection status of the N-G mode on units with a neutral wire, single-colored LED to indicate the lack of a neutral wire connection on systems with a neutral wire, audible alarm with silence button, and Form C relay contact.
N = **Standard + Surge Counter**—Dual-colored LED per phase to indicate protection status of the N-G mode on units with a neutral wire, single-colored LED to indicate the lack of a neutral wire connection on systems with a neutral wire, 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, and surge counter with reset button.

Receptacle Plug-In Units

Eaton's unique receptacle plug-in unit design makes them the most flexible receptacle units in the industry. Pow-R-Flex receptacle plug-in units come fully assembled and wired, reducing installation time. Each unit is built to order, based upon receptacle type and rating combinations. Additionally, each individual unit has been optimally phased balanced and are also optimally phased balanced for the entire run, based upon the combination of receptacle plug-in units on the run. This eliminates the need to manually phase balance during installation. They are UL 857 and CSA listed, and come in seven different styles with two different breaker options, using standard NEMA receptacle configurations.

Table 24.2-11. Maximum 240 V Plug-In Units

Plug-In Unit Type	Maximum Ampere Rating	Maximum Ampere Rating/Circuit	Number of Circuits	Receptacle Mounting
Single	60	60	1	Fixed/cord
Double	120	60	2	Fixed/cord
Quad	120	60	4	Fixed/cord

Table 24.2-12. Maximum 400/480/600 V Plug-In Units

Plug-In Unit Type	Maximum Ampere Rating	Maximum Ampere Rating/Circuit	Number of Circuits	Receptacle Mounting
Single	60	60	1	Fixed/cord
Double	120	60	2	Fixed/cord
Quad	240	60	4	Fixed/cord

Note: For receptacle options, see receptacle selection chart.

Table 24.2-13. Receptacle Unit Physical Dimensions in Inches (mm)

Plug-In Unit Type	Protective Device	Voltage	Width	Height	Depth
Single	GHC	480	7.50 (190.5)	8.60 (218.4)	4.00 (101.6)
	FD	400	8.50 (215.9)	11.50 (292.1)	6.50 (165.1)
	FD	480	8.50 (215.9)	11.50 (292.1)	6.50 (165.1)
	CCP switch	400	7.50 (190.5)	8.60 (218.4)	4.00 (101.6)
	CCP switch	480	7.50 (190.5)	8.60 (218.4)	4.00 (101.6)
Double	GHC	480	11.80 (299.7)	8.75 (222.3)	4.00 (101.6)
	FD	400	11.00 (279.4)	12.00 (304.8)	6.40 (162.6)
	FD	480	11.00 (279.4)	12.00 (304.8)	6.40 (162.6)
	CCP switch	400	11.80 (299.7)	8.75 (222.3)	4.00 (101.6)
	CCP switch	480	11.80 (299.7)	8.75 (222.3)	4.00 (101.6)
Quad	FD	240	20.50 (520.7)	11.30 (287.0)	7.10 (180.3)
	FD	400	20.50 (520.7)	11.30 (287.0)	7.10 (180.3)
	FD	480	20.50 (520.7)	11.30 (287.0)	7.10 (180.3)

Table 24.2-14. Receptacle Unit Short-Circuit Withstand Rating (rms Symmetrical)

Plug-In Unit Type	Breaker Type	240 V	400 V	480 V
Single	GHC	10,000 A	10,000 A	10,000 A
	FD ①	22,000 A	10,000 A	10,000 A
	CCP switch ②	42,000 A	42,000 A	42,000 A
Double	GHC	10,000 A	10,000 A	10,000 A
	FD ①	22,000 A	10,000 A	10,000 A
	CCP switch ②	42,000 A	42,000 A	42,000 A
Quad	GHC	10,000 A	10,000 A	10,000 A
	FD ①	22,000 A	10,000 A	10,000 A
	CCP switch ②	42,000 A	42,000 A	42,000 A

① 25 kAIC is available for single-phase connectors at 240 V.
② The short-circuit rating of the plug-in unit will match that of the busway that it is installed.

NEMA Receptacle Configurations

Table 24.2-15. Straight-Blade Receptacles

Phase	Voltage	Configuration	15 A	20 A	30 A	50 A	60 A
Single	125 V	Two-pole, three-wire, grounded	5–15R ③	5–20R ③	5–30R	—	—
	250 V	Two-pole, three-wire, grounded	6–15R ③	6–20R ③	6–30R	—	—
	277 V	Two-pole, three-wire, grounded	7–15R	7–20R	—	—	—
Three	250 V	Three-pole, four-wire, grounded	15–15R	15–20R	15–30R	—	—

③ Available in a duplex configuration.

Table 24.2-16. Twist-Lock Receptacles

Phase	Voltage	Configuration	15 A	20 A	30 A	50 A	60 A
Single	125 V	Two-pole, three-wire, grounded	L5–15R ④	L5–20R	L5–30R	CS6360 ⑤	—
	250 V	Two-pole, three-wire, grounded	L6–15R ④	L6–20R	L6–30R	CS8264 ⑤	—
	277 V	Two-pole, three-wire, grounded	L7-15R	L7–20R	L7–30R	—	—
	480 V	Two-pole, three-wire, grounded	—	L8–20R	L8–30R	—	—
Three	250 V	Three-pole, four-wire, grounded	—	L15–20R	L15–30R	CS8364 ⑤	—
	208/ 120 V	Three-pole, five-wire, grounded	—	L21–20R	L21–30R	—	—
	480/ 277 V	Three-pole, five-wire, grounded	—	L22–20R	L22–30R	—	—

④ Available in a duplex configuration.
⑤ California standard receptacles.

Table 24.2-17. Pin and Sleeve Connectors (UL and IEC 309)

Phase	Voltage	Configuration	15 A	20 A	30 A	50 A	60 A
Single	125 V	Two-pole, three-wire, grounded	—	P5–20C	P5–30C	—	P5–60C
	250 V	Two-pole, three-wire, grounded	—	P6–20C	P6–30C	—	P6–60C
	277 V	Two-pole, three-wire, grounded	—	P7–20C	P7–30C	—	P7–60C
Three	250 V	Three-pole, four-wire, grounded	—	P15–20C	P15–30C	—	P15–60C
	208/ 120 V	Three-pole, five-wire, grounded	—	P21–20C	P21–30C	—	P21–60C
	480/ 277 V	Three-pole, five-wire, grounded	—	P22–20C	P22–30C	—	P22–60C

Note: For other receptacle options, contact the factory.
480/277 V receptacles may be applied at 400/230 V.

GHC Single Receptacle Unit (480 V Max.)

The single receptacle unit shown in **Figure 24.2-35** is configured to order based upon the receptacle type and rating. These units are three-phase and can service single- or three-phase loads, 120 V, 240 V, 208/120 V, 400/230 V and 480/277 V. They use Type GHC Series C molded case breaker (10 kAIC), single-, two- or three-pole breakers. Each unit comes with one receptacle, with the breaker sized per the receptacle rating. Each receptacle can be fixed-mounted to the front of the enclosure or cable-mounted to a cord drop coming out of the bottom of the enclosure. See **Figure 24.2-36**. Cord drop lengths may be 1–15 ft in 1-ft increments. Consult NEC Sections 368, 400 and 645 for cord drop applications.

Figure 24.2-35. Single Receptacle Unit (Enclosure Mounted)

Figure 24.2-36. Single Receptacle Unit (Cord Mounted)

GHC Double Receptacle Unit (480 V Max.)

The double receptacle unit shown in **Figure 24.2-37** is configured to order based upon each receptacle type and rating. These units are three-phase and can service single- or three-phase loads, 120 V, 240 V and 208/120 V, 400/230 V and 480/277 V. They use Type GHC Series C molded case breaker (10 kAIC), single-, two- or three-pole breakers. Each unit comes with up to two receptacles, with each breaker sized per the receptacle rating. Each receptacle can be fixed-mounted to the front of the enclosure or cable-mounted to a cord drop coming out of the bottom of the enclosure. See **Figure 24.2-38**. Cord drop lengths may be 1–15 ft in 1-ft increments. Consult NEC Sections 368, 400 and 645 for cord drop applications.

Figure 24.2-37. Double Receptacle Unit (Enclosure Mounted)

Figure 24.2-38. Double Receptacle Unit (Cord Mounted)

CUBEFuse Single Receptacle Unit

The single receptacle unit shown in **Figure 24.2-39** is configured to order based upon the receptacle type and rating. These units are three-phase and can service single- or three-phase loads up to 600 V maximum (120 V, 240 V, 400 V, 480 V, 600 V, 208Y/120 V, 400/230 V, 480/277 V, 600/347 V). They use the compact circuit protector (CCP switch) and CUBEFuse® ①, which can be rated to match the busway that it is being installed on. It can be used in a single-, two- or three-pole fusible switch configuration. Each unit comes with one receptacle, with the switch sized per the receptacle rating. Each receptacle can be fixed-mounted to the front of the enclosure or cable-mounted to a cord drop coming out of the bottom of the enclosure. See **Figure 24.2-40**. Cord drop lengths may be 1–15 ft in 1-ft increments. Consult NEC Sections 368, 400 and 645 for cord drop applications.

① Information on CUBEFuse can be found on **Page 24.2-18**.

Figure 24.2-39. Single Receptacle Unit (Enclosure Mounted)

Figure 24.2-40. Single Receptacle Unit (Cord Mounted)

CUBEFuse Double Receptacle Unit

The double receptacle unit shown in **Figure 24.2-41** is configured to order based upon the receptacle type and rating. These units are three-phase and can service single- or three-phase loads up to 600 V maximum (120 V, 240 V, 400 V, 480 V, 600 V, 208Y/120 V, 400/230 V, 480/277 V, 600/347 V). They use the compact circuit protector (CCP switch) and CUBEFuse, which can be rated to match the busway that it is being installed on. It can be used in a single-, two- or three-pole fusible switch configuration. Each unit comes with one receptacle, with the switch sized per the receptacle rating. Each receptacle can be fixed-mounted to the front of the enclosure or cable-mounted to a cord drop coming out of the bottom of the enclosure. See **Figure 24.2-42**. Cord drop lengths may be 1–15 ft in 1-ft increments. Consult NEC Sections 368, 400 and 645 for cord drop applications.

Figure 24.2-41. Double Receptacle Unit (Enclosure Mounted)

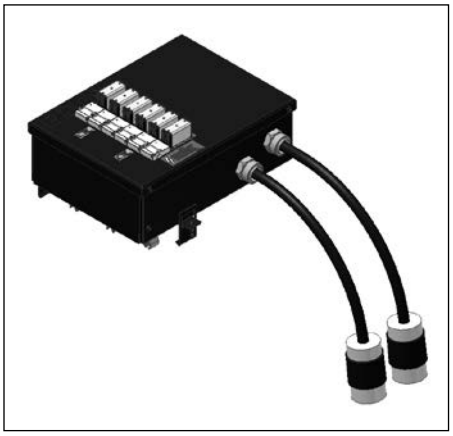


Figure 24.2-42. Double Receptacle Unit (Cord Mounted)

CUBEFuse

The innovative CUBEFuse is available in ampere ratings up to 60 A installed in Pow-R-Flex receptacle plugs. These fuses allow the bus plug to match the short-circuit rating of the bus system that they are installed on. These fuses have been available for over a decade and have the smallest footprint in the industry as well as being finger-safe. The CUBEFuse is available in a time-delay version (TCF), which has a 600 Vac rating and a fast-acting (non-time-delay) (FCF), which also has a 600 Vac rating. Both CUBEFuse versions are very current limiting, resulting in excellent equipment short-circuit protection and arc flash incident energy mitigation. The TCF fuse is available in an on-board indicating version and a non-indicating version. The FCF is available in a non-indicating version.

Figure 24.2-43. CUBEFuse

Features and benefits

- The world's first finger-safe power fuse system
- Meets Class J time-delay electrical performance requirements
- Faster response to damaging faults to help reduce destructive thermal and magnetic forces
- No venting of arc or molten gases during opening
- Low let-through currents under fault conditions
- Easy selective coordination with any other Eaton Bussmann® Low-Peak® Class L, J, and RK1 fuse with simple 2:1 amp ratio between upstream and downstream fuses

Table 24.2-18. CUBEFuse Catalog Numbers (Ampere Rating)

Catalog Number					
Indicating					
TCF6	TCF10	TCF15	TCF17-1/2	TCF20	TCF25
TCF30	TCF35	TCF40	TCF45	TCF50	TCF60
TCF70	TCF80	TCF90	TCF100	—	—
Non-Indicating					
TCF1RN	TCF3RN	TCF6RN	TCF10RN	TCF15RN	TCF17-1/2RN
TCF20RN	TCF25RN	TCF30RN	TCF35RN	TCF40RN	TCF45RN
TCF50RN	TCF60RN	TCF70RN	TCF80RN	TCF90RN	TCF100RN

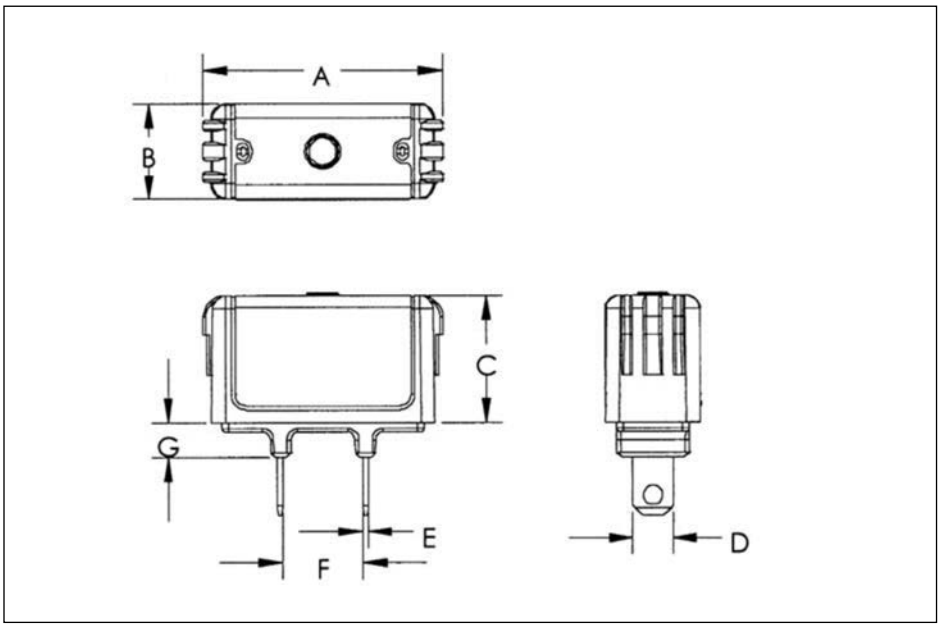


Figure 24.2-44. CUBEFuse Dimensions in Inches (mm)

Table 24.2-19. CUBEFuse Dimensions in Inches (mm)

Fuse Amperes	A	B	C	D	E	F	G
1–15	1.88 (47.8)	0.75 (19.1)	1.00 (25.4)	0.23 (5.8)	0.04 (1.0)	0.63 (16.0)	0.27 (6.9)
17.5–20	1.88 (47.8)	0.75) (19.1)	1.00 (25.4)	0.27 (6.9)	0.04 (1.0)	0.63 (16.0)	0.27 (6.9)
25–30	1.88 (47.8)	0.75 (19.1)	1.00 (25.4)	0.31 (8.0)	0.04 (1.0)	0.63 (16.0)	0.27 (6.9)
35–40	2.13 (54.1)	1.00 (25.4)	1.13 (28.7)	0.36 (9.1)	0.04 (1.0)	0.63 (16.0)	0.38 (9.7)
45–50	2.13 (54.1)	1.00 (25.4)	1.13 (28.7)	0.40 (10.2)	0.04 (1.0)	0.63 (16.0)	0.38 (9.7)
60	2.13 (54.1)	1.00 (25.4)	1.13 (28.7)	0.44 (11.2)	0.04 (1.0)	0.63 (16.0)	0.38 (9.7)

F-Frame Single Receptacle Unit

The single receptacle unit shown in **Figure 24.2-45** is configured to order based upon the receptacle type and rating. These units are three-phase and can service single- or three-phase loads up to 600 V maximum (120 V, 240 V, 400 V, 480 V, 600 V, 208Y/120 V, 400/230 V, 480/277 V, 600/347 V). Type F-Frame bolt-on molded case circuit breakers are used in single-pole, two-pole, or three-pole configurations. Each unit comes with one receptacle, with the breaker sized per the receptacle rating. Each receptacle can be fixed-mounted to the front of the enclosure or cable-mounted to a cord drop coming out of the bottom of the enclosure. See **Figure 24.2-46**. Cord drop lengths may be 1–15 ft in 1-ft increments. Consult NEC Sections 368, 400 and 645 for cord drop applications.

Figure 24.2-45. Single Receptacle Unit (Enclosure Mounted)

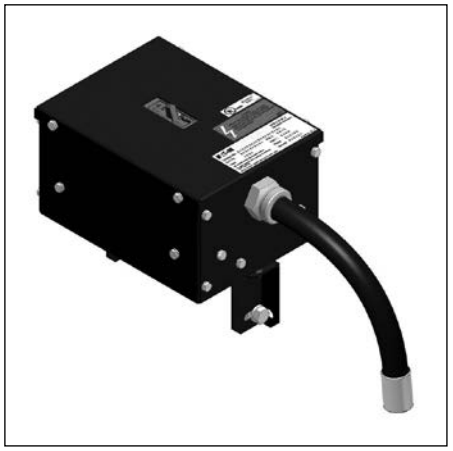


Figure 24.2-46. Single Receptacle Unit (Cord Mounted)

F-Frame Double Receptacle Unit

The double receptacle unit shown in **Figure 24.2-47** is configured to order based upon the receptacle type and rating. These units are three-phase and can service single- or three-phase loads up to 600 V maximum (120 V, 240 V, 400 V, 480 V, 600 V, 208Y/120 V, 400/230 V, 480/277 V, 600/347 V). Type F-Frame bolt-on molded case circuit breakers are used in single-pole, two-pole, or three-pole configurations. Each unit comes with two receptacles, with the breakers sized per the receptacle rating. Each receptacle is cable mounted to a cord drop coming out of the bottom of the enclosure. See **Figure 24.2-48**. Cord drop lengths may be 1–15 ft in 1-ft increments. Consult NEC Sections 368, 400 and 645 for cord drop applications.

Figure 24.2-47. Double Receptacle Unit (Enclosure Mounted)

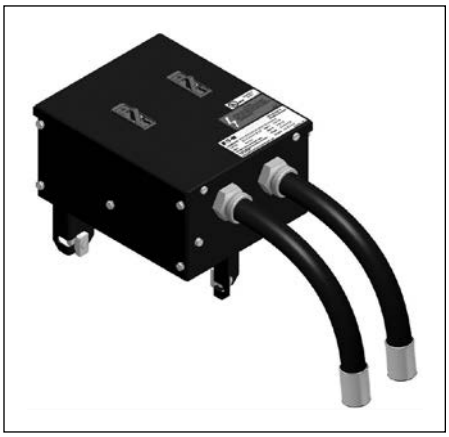


Figure 24.2-48. Double Receptacle Unit (Cord Mounted)

F-Frame Quad Receptacle Unit

The quad receptacle unit shown in **Figure 24.2-49** is configured to order based upon the receptacle type and rating. These units are three-phase and can service single- or three-phase loads up to 600 V maximum (120 V, 240 V, 400 V, 480 V, 600 V, 208Y/120 V, 400/230 V, 480/277 V, 600/347 V). Type F-Frame bolt-on molded case circuit breakers are used in single-pole, two-pole, or three-pole configurations. Each unit comes with up to four receptacles, with the breakers sized per the receptacle rating. Each receptacle can be fixed mounted to the front of the enclosure or cable-mounted to a cord drop coming out of the bottom of the enclosure. See **Figure 24.2-49**. Cord drop lengths may be 1–15 ft in 1-ft increments. Consult NEC Sections 368, 400 and 645 for cord drop applications.

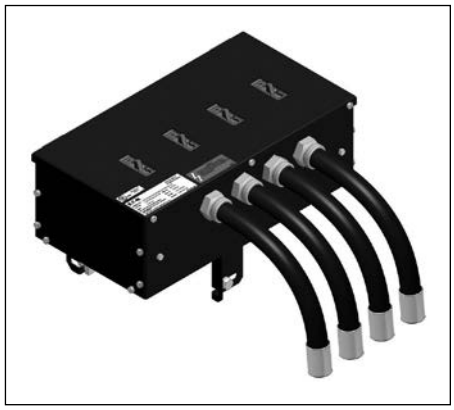
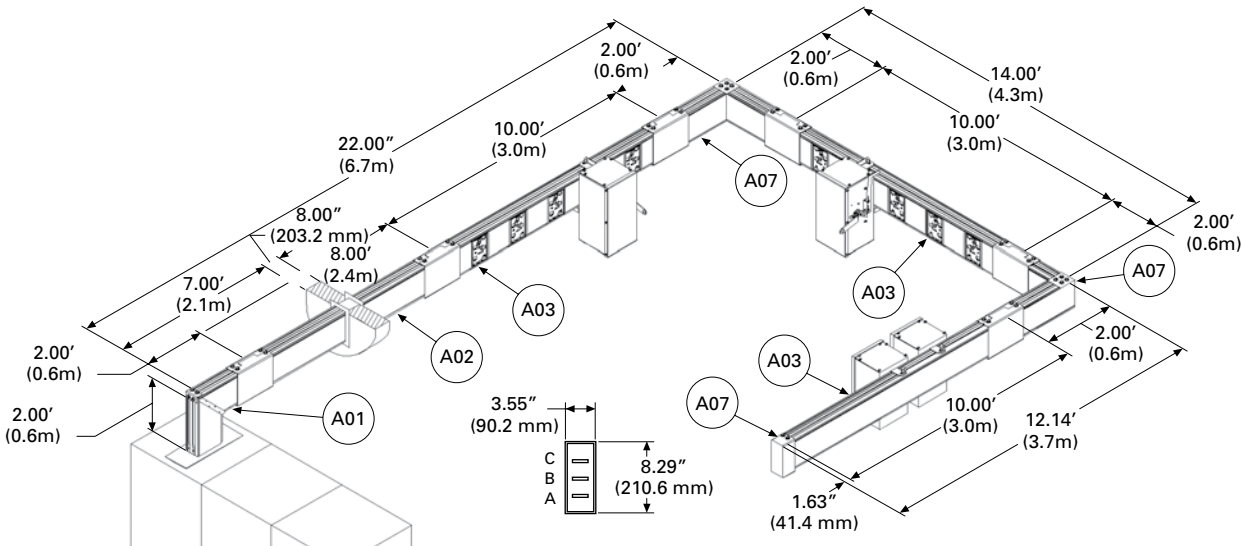


Figure 24.2-49. Quad Receptacle Unit (Cord Mounted)

Installation Drawing Information



Typical Section
Pow-R-Flex Low Ampere Busway
600A. Three-Phase,
Three-Wire Housing Ground
One 0.278″ x 1.75″ Copper Bar per Phase
Duct Weight—12.75 Lbs per Foot

Item	Description	Style # Or S.O. #	Req.
A01	Elbow Flange	LVB01234-A01	1
A02	8′-0″ Feeder	LVB01234-A02	1
A03	10′-0″ Plug In	LVB01234-A03	3
A04	Wall Flange	BVD0892G11	2
A05	Hanger	BVD1274G12	8
A06	Elbow	LVB01234-A07	2
A07	End Closer	BVD7156G08	1

Figure 24.2-50. Sample Installation Drawing

After the layout approval process, installation drawings will be provided just prior to shipment of the busway from the factory. A sample is illustrated in **Figure 24.2-50**. The drawings will contain a complete layout of the entire busway installation and a bill of material that includes the following:

1. The item number of each section, which can be correlated with the layout drawing.
2. A description of each section.
3. The style number of each section, which can be correlated to the nameplate information on each section.
4. The quantity of each style number required.
5. The height, width and weight (per foot) of each ampere rating.
6. Location of "F" markings on the busway.
7. Fitting reference drawings.
8. Electrical equipment/switchgear locations and orientation.
9. Wall and floor locations.
10. The length of each section.

The installer should review the installation drawings prior to and during the installation process. Please note that plug-in units are generally not shown on the installation drawings. The installer will also receive installation instruction leaflets, and operation and maintenance manuals with the drawings.

Electrical Data

Table 24.2-20. Short-Circuit Ratings—Three-Cycle rms Symmetrical

Ampere Rating	Plug-In Short-Circuit Rating	Feeder Short-Circuit Rating
Aluminum		
150	22,000	22,000
225	35,000	35,000
300	35,000	35,000
400	42,000	42,000
Copper		
225	22,000	22,000
400	35,000	35,000
500	42,000	42,000
600	42,000	42,000

Table 24.2-21. Resistance, Reactance and Impedance Milliohms per 100 Feet (30.5 m) Line-to-Neutral, Plug-in and Feeder Busway

Ampere Rating	Resistance R	Reactance X	Impedance Z
Aluminum			
150	9.93	4.56	10.90
225	3.44	2.92	4.57
300	3.44	2.92	4.57
400	2.41	2.50	3.46
Copper			
225	5.30	4.24	6.87
400	1.85	2.96	3.53
500	1.32	2.51	2.75
600	1.32	2.51	2.75

Table 24.2-22. Ground Resistance Values Milliohms per 100 Feet (30.5 m)

Ampere Rating	Integral R	Internal R
Aluminum		
150	0.55	2.86
225	0.55	2.86
300	0.55	2.86
400	0.55	2.86
Copper		
225	0.55	1.44
400	0.55	1.44
500	0.55	1.44
600	0.55	1.44

Table 24.2-23. Oversized Neutral Ratings

Ampere Rating	Neutral Size D x W Inches (mm)	Neutral Rating
Aluminum		
150	0.28 x 1.75 (7.1 x 44.5)	250%
225	0.28 x 1.75 (7.1 x 44.5)	150%
300	0.28 x 1.75 (7.1 x 44.5)	150%
400	0.28 x 1.75 (7.1 x 44.5)	150%
Copper		
225	0.28 x 1.75 (7.1 x 44.5)	250%
400	0.28 x 1.75 (7.1 x 44.5)	150%
500	0.28 x 1.75 (7.1 x 44.5)	100%
600	0.28 x 1.75 (7.1 x 44.5)	100%

Table 24.2-24. Voltage Drop Volts per 100 Feet (30.5 m) Line-to-Neutral, 60 Hz at Rated Current (Varying Power Factors)

Ampere Rating	100%	90%	80%	70%	60%	50%
Aluminum						
150	2.58	2.84	2.77	2.65	2.50	2.32
225	1.34	1.70	1.76	1.75	1.71	1.66
300	1.79	2.27	2.34	2.33	2.29	2.21
400	1.67	2.26	2.37	2.41	2.39	2.33
Copper						
225	2.07	2.58	2.64	2.63	2.56	2.46
400	1.28	2.05	2.26	2.36	2.41	2.42
500	1.14	1.98	2.22	2.35	2.42	2.45
600	1.37	2.37	2.66	2.82	2.91	2.94

Note: Values shown in **Table 24.2-24** are based upon concentrated loads. For plug-in distributed loads, divide the values by 2. See IEEE® 141-13-8.3. For line-to-neutral voltage drop, multiply the values from **Table 24.2-24** by 0.577. For other than rated current, multiply the values from **Table 24.2-24** by actual current/rated current. For total voltage drop, multiply voltage drop by actual length/100 ft (30.5 m).

Physical Data

Table 24.2-25. Physical Dimensions—Width x Height in Inches (mm)

Ampere Rating	Phase Conductor	Ground Conductor	Housing Enclosure
Aluminum			
150	0.28 x 0.50 (7.1 x 12.7)	0.20 x 1.75 (5.1 x 44.5)	3.55 x 8.29 (90.2 x 210.6)
225	0.28 x 1.25 (7.1 x 31.8)	0.20 x 1.75 (5.1 x 44.5)	3.55 x 8.29 (90.2 x 210.6)
300	0.28 x 1.25 (7.1 x 31.8)	0.20 x 1.75 (5.1 x 44.5)	3.55 x 8.29 (90.2 x 210.6)
400	0.28 x 1.75 (7.1 x 44.5)	0.20 x 1.75 (5.1 x 44.5)	3.55 x 8.29 (90.2 x 210.6)
Copper			
225	0.28 x 0.50 (7.1 x 12.7)	0.20 x 1.75 (5.1 x 44.5)	3.55 x 8.29 (90.2 x 210.6)
400	0.28 x 1.25 (7.1 x 31.8)	0.20 x 1.75 (5.1 x 44.5)	3.55 x 8.29 (90.2 x 210.6)
500	0.28 x 1.75 (7.1 x 44.5)	0.20 x 1.75 (5.1 x 44.5)	3.55 x 8.29 (90.2 x 210.6)
600	0.28 x 1.75 (7.1 x 44.5)	0.20 x 1.75 (5.1 x 44.5)	3.55 x 8.29 (90.2 x 210.6)

Table 24.2-26. Weight (lb ft)/Current Density (A/in²)

Ampere Rating	Current Density	Weight Three-Wire	Weight Four-Wire	Add for Ground	Add for Oversized Neutral
Aluminum					
150	1067	6.45	6.60	0.41	0.40
225	640	7.10	7.50	0.41	0.15
300	610	7.55	8.10	0.41	0.15
400	813	7.55	8.10	0.41	—
Copper					
225	1618	7.50	8.00	1.30	1.30
400	1151	9.80	11.05	1.30	0.82
500	1027	11.45	13.25	1.30	—
600	1233	11.45	13.25	1.30	—

Table 24.2-27. Weight (kg/m)/Current Density (A/cm²)

Ampere Rating	Current Density	Weight Three-Wire	Weight Four-Wire	Add for Ground	Add for Oversized Neutral
Aluminum					
150	165	9.60	9.82	0.61	0.60
225	99	10.57	11.16	0.61	0.22
300	132	11.24	12.05	0.61	0.22
400	126	11.24	12.05	0.61	—
Copper					
225	251	11.16	11.91	1.93	1.93
400	178	14.58	16.44	1.93	0.82
500	159	17.04	19.72	1.93	—
600	191	17.04	19.72	1.93	—

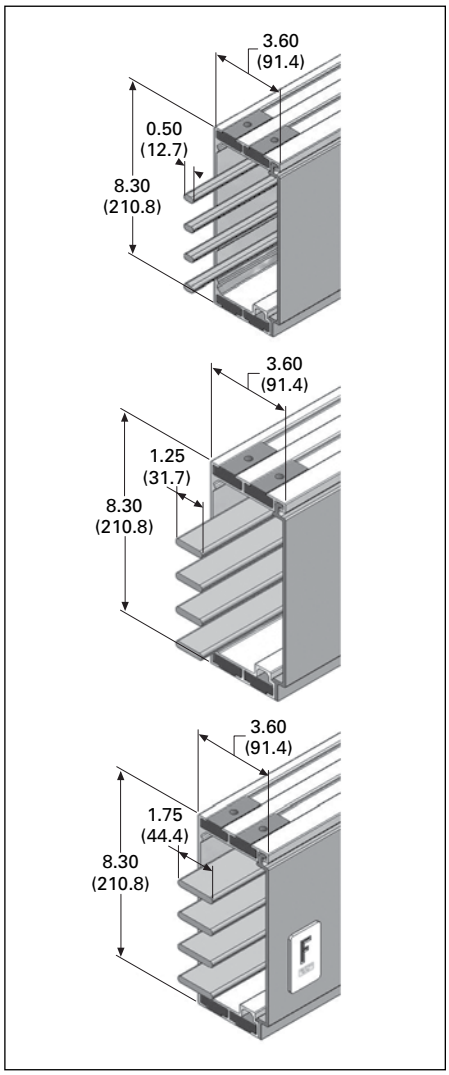


Figure 24.2-51. Conductor Dimensions

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