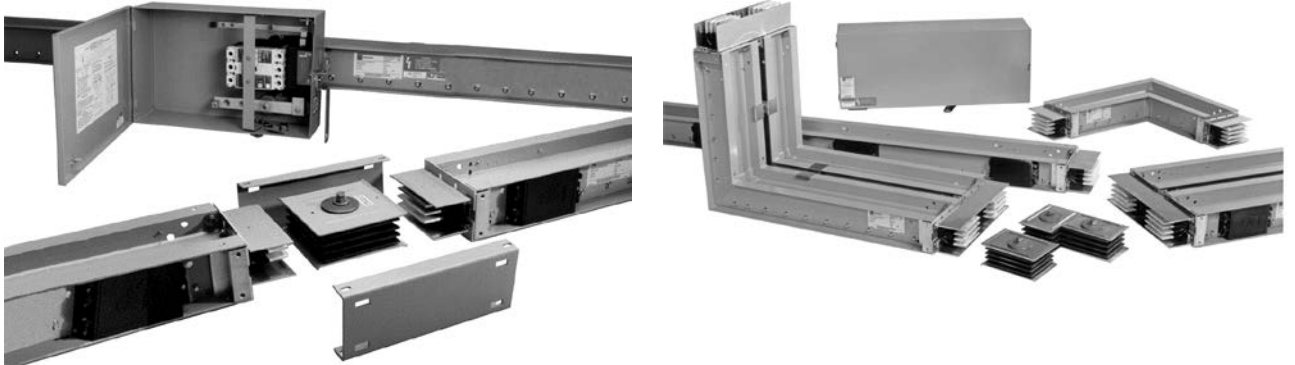


# UL low-voltage busway Pow-R-Way III



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Powering Business Worldwide

### General description

Eaton's Pow-R-Way III® is a 600 V, totally enclosed, non-ventilated, sandwich bus design available with copper bus bars in ratings from 225 to 5000 A or with aluminum bus bars from 225 to 4000 A. Pow-R-Way III is available in outdoor feeder, indoor feeder, indoor plug-in, and indoor sprinkler-proof configurations. All four types can be used interchangeably without adapters or special splice plates, provided they are of the same current and system rating. The short-circuit withstand ratings for plug-in busway are equal to those of indoor and outdoor feeder busway. For IEC ratings and data, see TD01701005E.

### Standards

Pow-R-Way III meets the requirements of NEMA®, UL® 857, CSA® C22.2 No. 27-94, IEEE®, ANSI, IEC, CE, and is manufactured in an ISO® 9001 certified facility. Pow-R-Way III is also certified for Seismic Withstand Capability in accordance with the earthquake requirements as specified in both the International Building Code (IBC) and the California Building Code. Pow-R-Way III exceeds the worst-case Zone 4 required levels and meets all applicable seismic standards for the International Building Code (IBC).

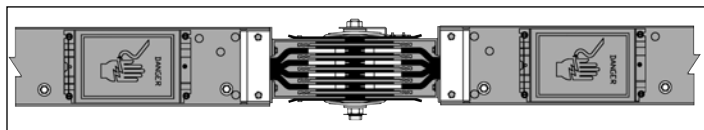


Figure 1. Pow-R-Way III joint design

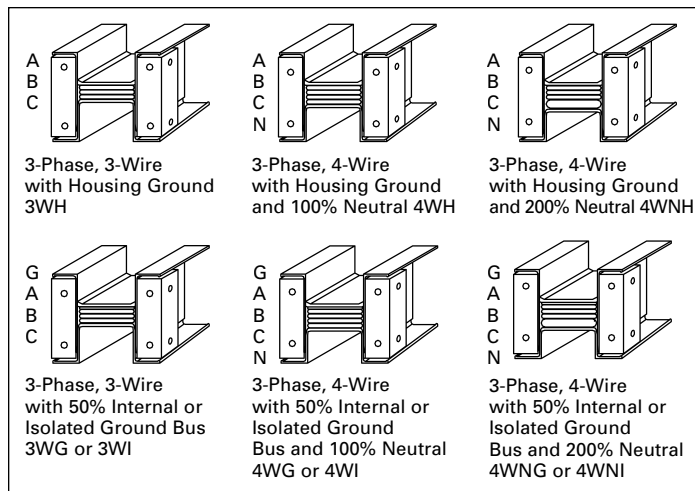


Figure 2. Conductor configurations

Table 1. Pow-R-Way designations (see Figure 2)

**Available conductor configurations including grounding and neutral options**

3WG	Three-phase, three-wire, 50% internal ground
3WI	Three-phase, three-wire, 50% isolated internal ground
3WH	Three-phase, three-wire, 50% integral housing ground
3WHG	Three-phase, three-wire, 100% ground ①
4WG	Three-phase, four-wire, 50% internal ground, 100% neutral
4WI	Three-phase, four-wire, 50% isolated internal ground, 100% neutral
4WH	Three-phase, four-wire, 50% integral housing ground, 100% neutral
4WHG	Three-phase, four-wire, 100% ground ①, 100% neutral
4WNG	Three-phase, four-wire, 50% internal ground, 200% neutral
4WNI	Three-phase, four-wire, isolated internal ground, 200% neutral
4WNH	Three-phase, four-wire, 50% integral housing ground, 200% neutral
4WNHG	Three-phase, four-wire, 100% ground ①, 200% neutral

① 100% Ground consists of the 50% integral housing ground combined with a 50% internal ground bus.

### Construction details (Figure 3)

#### Conductor/insulation system

Bus bars are fabricated from high-strength, 99.9% conductivity copper or 57% conductivity aluminum. The joint edge of each busway conductor bar is beveled while the Pow-R-Bridge™ conductor bars have full rounded edges. This makes for a smooth and easy connection between the busway and Pow-R-Bridge joint. The phase and neutral bars are insulated with Class B 130 °C epoxy insulation. The epoxy powder is applied by an automated fluidized bed process to ensure uniform thickness. The epoxy powder is applied over the full length of the preheated bar except for the joint and plug-in contact surfaces. After the powder has been fused to the bus bar, the bars enter an oven to cure. This process ensures that all of the epoxy powder cross links and hardens to the bus bar.

Fluidized bed applied epoxy provides resistance to water absorption and chemical erosion. Epoxy has outstanding heat transfer characteristics and is ideally suited for sandwich bus applications. The uniform thickness and smooth surface provided by epoxy ensures that the insulation will have no cavities or voids, and also provides excellent edge coverage to the bars. Epoxy has excellent dielectric strength, is flame-retardant and resists impacts that other Class B insulating material could not withstand.

Bus bars for plug-in applications have full-sized welded conductor tabs at the contact location points of the plug-in outlet. The tabs are of the same thickness as the conductor bars for all three-wire and 100% neutral configurations. The plug-in conductor tabs extend into the plug-in outlet, maintaining a true sandwich design throughout the entire busway length.

The result is improved heat dissipation, better bracing, and elimination of the need to separate, or flare, the conductor bars at the plug-in opening. Maintaining a true sandwich design also eliminates potential pathways for the propagation of flame, smoke, and gas through the busway housing, commonly referred to as the “chimney effect.”

Silver- or tin-plating is applied to all joint and contact surfaces after the fluidized bed epoxy is applied. Aluminum bus bars are plated by the Alstan® 88C process. Copper bus bars are plated with a flashing process. The plating of the conductor tabs provides an extremely durable contact surface for the spring-loaded connections of bus plug stab assemblies.

#### Housing details (see Figure 3)

Pow-R-Way III is constructed with a rugged two-piece extruded aluminum housing. There are no seams or welds across the top or bottom sides of the housing. The housing is bolted along the bottom sides below the bus bars with high tensile strength zinc-plated hardware. No fastening bolts or screws penetrate the housing or enter the bus bar package.

Pow-R-Way III achieves the highest 6-cycle short-circuit withstand ratings available in the industry today. The non-magnetic, all-aluminum housing provides for excellent heat dissipation and a significant reduction in reactance and magnetic flux leakage as compared to a steel or steel and aluminum combination housing. The integrity and strength of the housing ensures specifiers and users of a safe and durable installation over a broad spectrum of industrial and commercial applications.

A protective finish of ANSI 61, epoxy powder paint is applied by an automated electrostatic process.

#### Integral ground

The two-piece, extruded aluminum housing is designed, manufactured, and UL Listed as a 50% integral ground path (integral earth) and is fully fault rated. The system ground continuity is maintained through each joint by the ground path end blocks, ground path plates, and joint covers. The aluminum joint covers are furnished with ground path contact surfaces on the inside of each end. When the covers are installed, the contact surfaces are bolted directly to the ground path end blocks with four 3/8-16 0.50 inch (12.7 mm) hex bolts per cover.

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 path. The result is a 50% ground path that ensures ground continuity with very low resistance characteristics.

#### Internal ground

Pow-R-Way III offers a 50% ground bus (copper or aluminum) that is internal to the busway.

#### Isolated ground option

To meet the growing demand for grounding isolation, Pow-R-Way III offers a 50% isolated ground bus that is insulated and internal to the busway. This option is available for application to operations with heavy microprocessor-based loads or large computer installations where grounding isolation is essential.

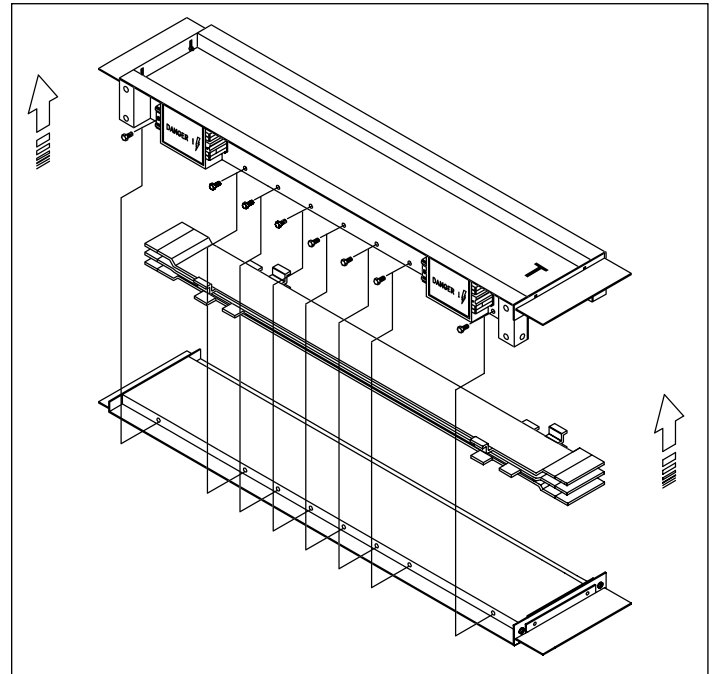


Figure 3. Housing assembly

**200% neutral option (Figure 4)**

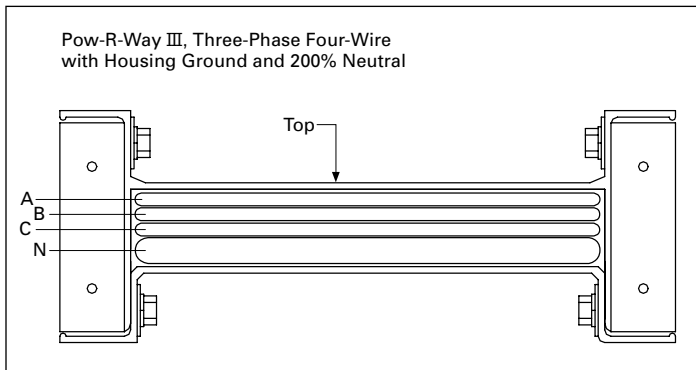
Pow-R-Way III offers a fully rated, 200% neutral bus option for busway fed distribution systems with nonlinear loads. The additional neutral capacity prevents the overheating caused by zero sequence harmonic currents. The Pow-R-Way III 200% neutral is manufactured with a single 0.50 inch (12.7 mm) thick bus bar that receives the same silver-plating and Class B, 130 °C Epoxy insulation as the phase bars.

Power system harmonics are generated by various types of non-linear loads. A sinusoidal voltage applied to a nonlinear load will result in a non-sinusoidal current and waveform distortion. Loads that are switched or pulsed, such as rectifiers, thyristors, and switch-mode power supplies, are nonlinear. With the proliferation of electronics into industrial, commercial, and institutional applications, nonlinear loads have become a significant and critical component of most modern distribution and control systems. Examples of nonlinear loads are personal computers, UPS systems, variable frequency motor controllers, electronic lighting ballasts, fax and copying machines, medical test equipment, and many other microprocessor-based apparatus.

Nonlinear load currents typically are extremely high in harmonic content. The harmonics create numerous problems in electrical systems and equipment. Some harmonics are negative sequence with 120° phase displacement (this means the phase rotation is ACB instead of ABC). Positive sequence harmonics have 120° phase displacement, but are of the same rotation as the distribution system. Certain nonlinear loads cause odd triplen harmonics, which are zero sequence with no phase displacement.

Balancing the phase load currents in a three-phase, four-wire system will normally reduce neutral currents to zero if load currents have an undistorted sinusoidal waveform. However, because zero sequence harmonics are additive and will not cancel each other in the neutral, the neutral current can be as high as 1.73 times the phase current, even with the phase currents perfectly balanced. This can result in overheated neutrals and lead to deterioration of equipment performance and a shortened equipment life cycle.

The Computer and Business Equipment Manufacturers Association (CBEMA) recommends that neutrals be oversized to at least 173% of the ampacity of the phase conductors to prevent problems. Pow-R-Way III offers a fully rated, 200% neutral bus option for busway fed distribution systems with non-sinusoidal loads. The additional neutral capacity prevents the overheating caused by high harmonic neutral currents.



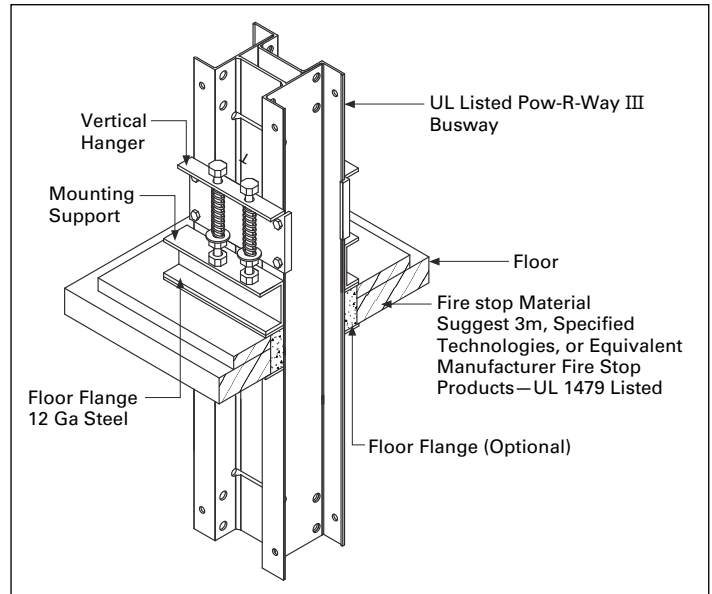
**Figure 4. 200% Neutral cross section**

**UL fire stop system**

Pow-R-Way III busway may be used in UL Listed through-penetration fire stop systems. Systems applicable to busway e.g., system number C-AJ-6002) are listed in the UL Fire Resistance Directory under “Through-Penetration Fire Stop Systems” and have met the ASTM E814 (UL 1479) criteria.

For typical installations shown in **Figure 5**, the installing contractor uses mineral wool batt and fire stop sealant. In riser applications, the system is used in combination with Pow-R-Way III vertical spring hangers and a floor flange. In horizontal applications, the system is used in combination with two wall flanges, one on each side of the wall, and sealant.

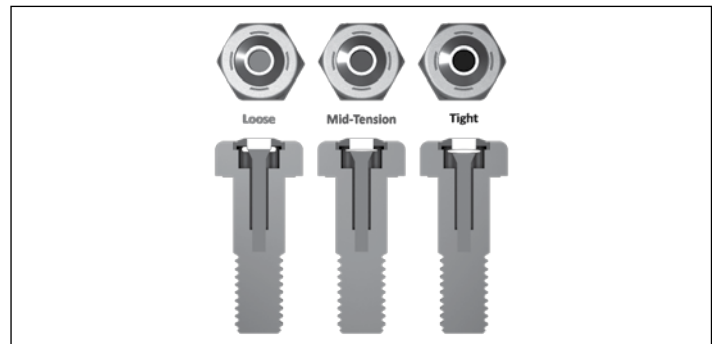
**Note:** This information is provided as a guideline for typical fire stop systems. Consult the fire stop system sealant manufacturer for the UL file number and specific product information.



**Figure 5. Typical installations of Pow-R-Way III in fire stop systems**

**DTI SmartBolts**

DTI SmartBolts® are an optional torque/tension indicating bolt that can be used in any standard Pow-R-Way III bridge joint (see **page 5**, Pow-R-Bridge Joint). In place of checking each joint connection with a torque wrench, DTI SmartBolts® provide a visible indication of a loose or tensioned condition. The bright red indication of a loose fastener will gradually darken as the fastener is tightened until it turns to a deep black color, indicating that the joint has been tightened to the proper torque/tension. Standard preventive maintenance becomes a simple and safe visual inspection.



**Figure 6. DTI SmartBolts**

**Pow-R-Bridge (Figure 7)**

Pow-R-Way III 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 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.

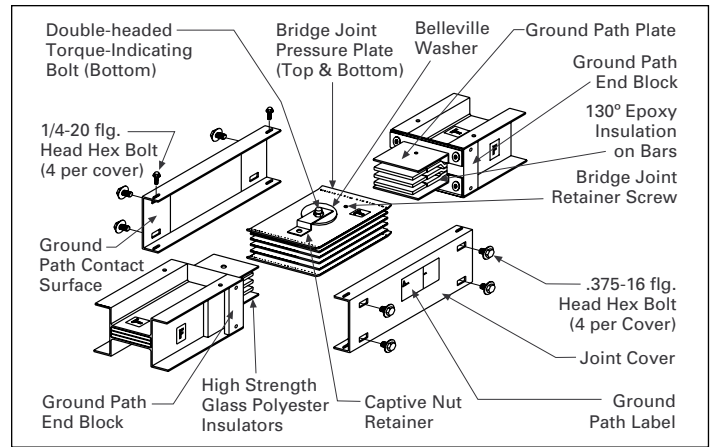
The Pow-R-Bridge can provide an adjustment of ±0.50 inch (12.7 mm) at each joint. Over adjustment is prevented by the joint covers, which will only allow a 0.50 inch (12.7 mm) adjustment to be made and by stopping lances on the conductor bars of the Pow-R-Bridge. The non-rotating design of the Pow-R-Bridge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

**Outdoor Pow-R-Bridge (Figure 8)**

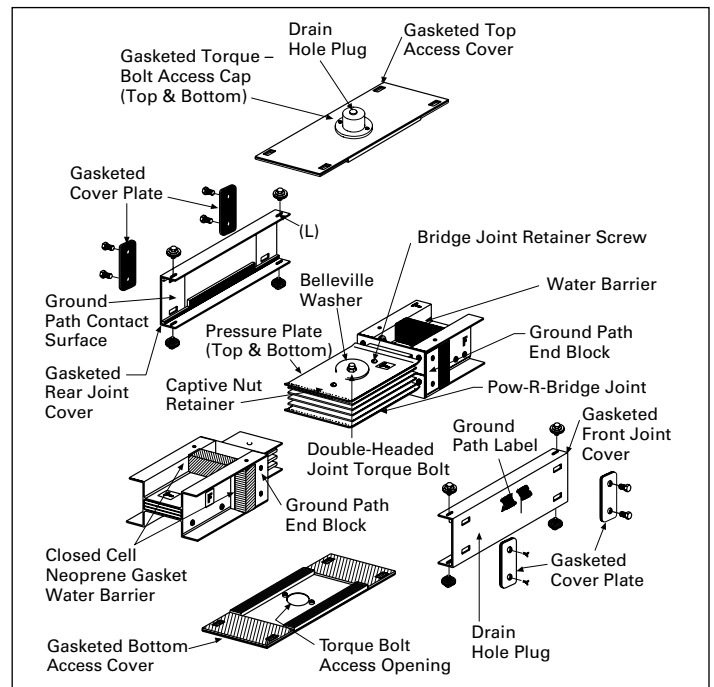
Joint connections for outdoor feeder busway are made with a weatherized version of the Pow-R-Bridge joint. Aluminum water barriers, 1/16 inch (1.6 mm) thick, are provided across the "T" and "T opposite" sides of both joint ends on each section of outdoor busway. Closed cell, neoprene gaskets are applied to the top of each water barrier and to the inside of the aluminum side access covers. The aluminum side access covers overlap the top and bottom access covers and bolt directly onto the end blocks. The outdoor Pow-R-Bridge has the same ±0.50 inch (12.7 mm) adjustability and features as the indoor unit and is UL Listed.

**Table 2. Busway Pow-R-Bridge joint dimensions**

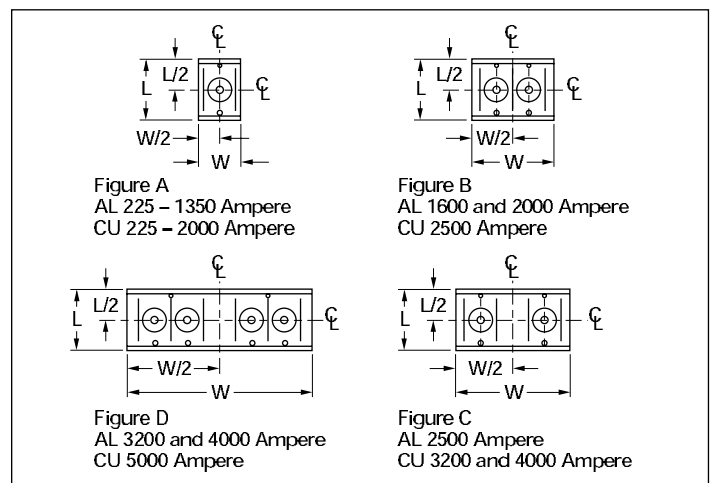
UL 857 ampere rating	Figure 9 configurations	Dimensions in inches (mm)	
		W	L
<b>Copper</b>			
225	A	4.50 (114.3)	7.38 (187.5)
400	A	4.50 (114.3)	7.38 (187.5)
600	A	4.50 (114.3)	7.38 (187.5)
800	A	4.50 (114.3)	7.38 (187.5)
1000	A	5.12 (130.0)	7.38 (187.5)
1200	A	5.62 (142.8)	7.38 (187.5)
1350	A	6.12 (155.4)	7.38 (187.5)
1600	A	7.12 (180.9)	7.38 (187.5)
2000	A	8.38 (212.9)	7.38 (187.5)
2500	B	10.88 (276.4)	7.38 (187.5)
3200	C	15.88 (403.4)	7.38 (187.5)
4000	C	18.38 (466.9)	7.38 (187.5)
5000	D	23.41 (594.6)	7.38 (187.5)
<b>Aluminum</b>			
225	A	4.50 (114.3)	7.38 (187.5)
400	A	4.50 (114.3)	7.38 (187.5)
600	A	4.50 (114.3)	7.38 (187.5)
800	A	5.62 (142.8)	7.38 (187.5)
1000	A	6.12 (155.4)	7.38 (187.5)
1200	A	7.12 (180.9)	7.38 (187.5)
1350	A	8.38 (212.9)	7.38 (187.5)
1600	B	9.12 (231.6)	7.38 (187.5)
2000	B	10.88 (276.4)	7.38 (187.5)
2500	C	18.38 (466.9)	7.38 (187.5)
3200	D	19.88 (505.0)	7.38 (187.5)
4000	D	23.41 (594.6)	7.38 (187.5)



**Figure 7. Indoor bridge joint features**



**Figure 8. Outdoor bridge joint features**



**Figure 9. Pow-R-Bridge joint**

**Pow-R-Way III feeder busway (Figure 10 and Table 3)**

- 225 to 5000 A copper
- 225 to 4000 A aluminum

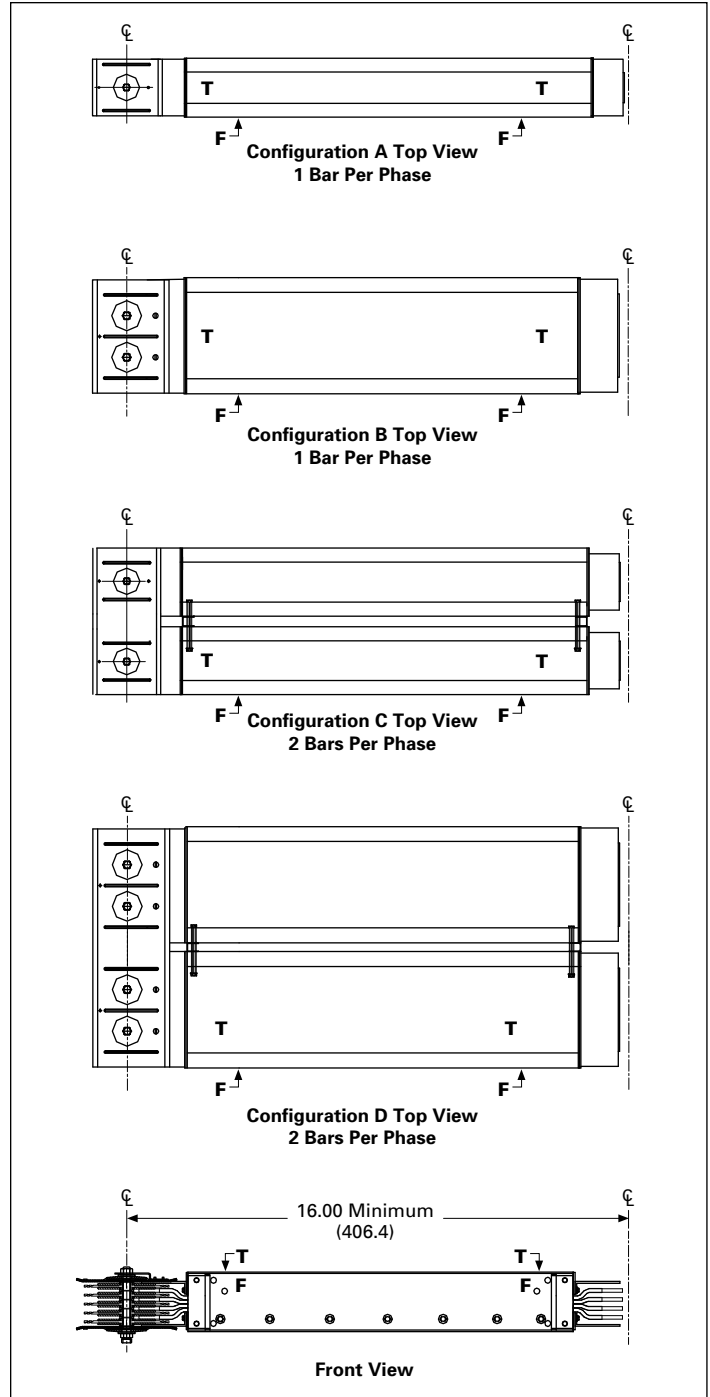
Straight sections of feeder busway can be supplied in any length, at 1/8 inch (3.2 mm) increments, from a 16.00 inch (406.4 mm) minimum to a 10 ft (3 m) maximum. **Figure 10** illustrates the configuration of feeder busway and Pow-R-Bridge for the available ampere ratings. See **Table 3** below for reference to the proper configuration.

**Table 3. Feeder busway configuration**

**UL 857 ampere rating**

Cu	Al	Figure 10 configuration
225	225	A
400	400	A
600	600	A
800	—	A
1000	—	A
1200	800	A
1350	1000	A
1600	1200	A
2000	1350	A
—	1600	B
2500	2000	B
3200	—	C
4000	2500	C
—	3200	D
5000	4000	D

Each section will include one, factory-installed Pow-R-Bridge mounted to the left end of the busway (with the "T" to the top, when viewing the bus from the "F" side). Each Pow-R-Bridge will have a "T" label that must always match the "T" orientation of the busway.



**Figure 10. Feeder busway**

**Pow-R-Way III plug-in busway (Figure 11 and Table 4 and Table 5)**

- 225 to 5000 A copper
- 225 to 4000 A aluminum

Straight sections of plug-in busway are made only in 24.00 inch (609.6 mm) incremental lengths with a maximum length of 10 ft (3 m). **Figure 11** depicts the configuration of plug-in busway and Pow-R-Bridge for the available ampere ratings. See **Table 4** below for reference to the proper configuration.

**Table 4. Configuration**

UL 857 ampere rating		Figure 10 configuration
Cu	Al	
225	225	A
400	400	A
600	600	A
800	—	A
1000	—	A
1200	800	A
1350	1000	A
1600	1200	A
2000	1350	A
—	1600	B
2500	2000	B
3200	—	C
4000	2500	C
—	3200	D
5000	4000	D

**Table 5** below illustrates the quantity of plug-in openings per side that are available per standard section.

**Table 5. Number of plug-in openings**

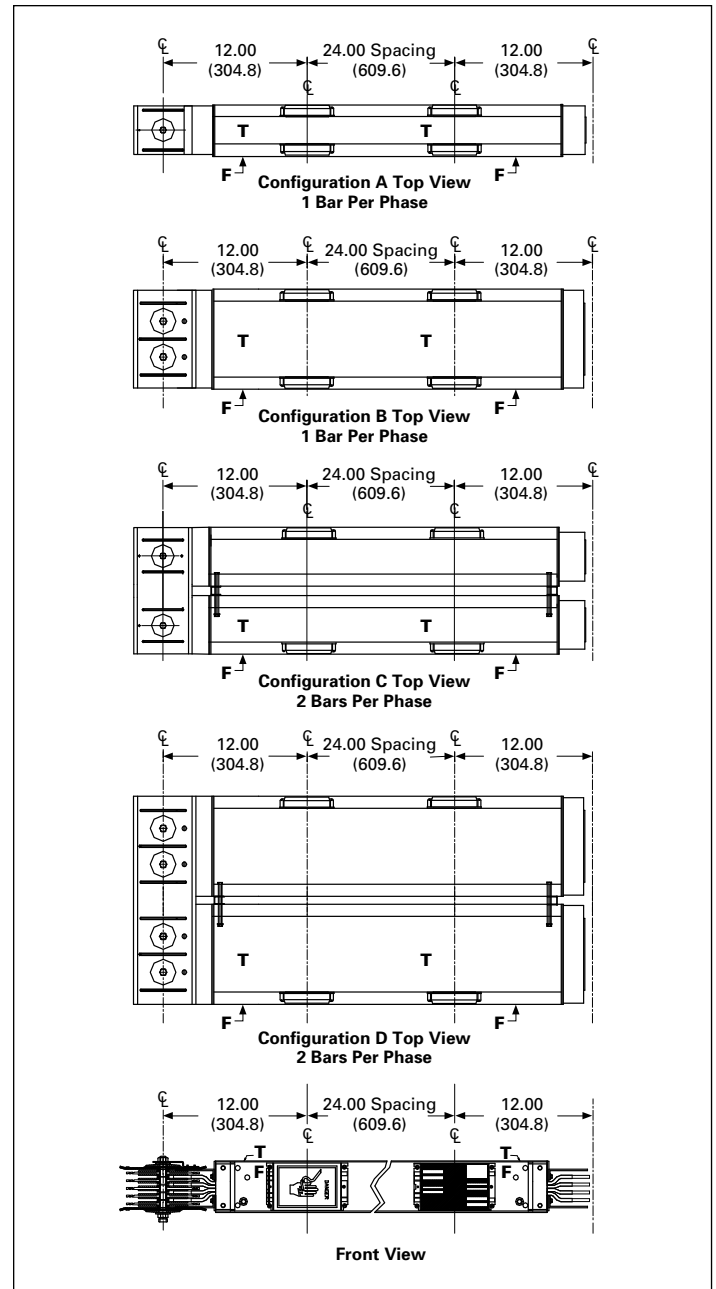
Dimensions in inches (mm)	Number of plug-in openings	
	Front	Back
24.00 (609.6)	1	1
48.00 (1219.2)	2	2
72.00 (1828.8)	3	3
96.00 (2438.4)	4	4
120.00 (3048.0)	5	5

Each section will include one, factory-installed Pow-R-Bridge mounted to the left end of the busway (with the "T" label to the top, when viewing the bus from the "F" side). Each Pow-R-Bridge will have a "T" label that must always match the "T" orientation of the busway.

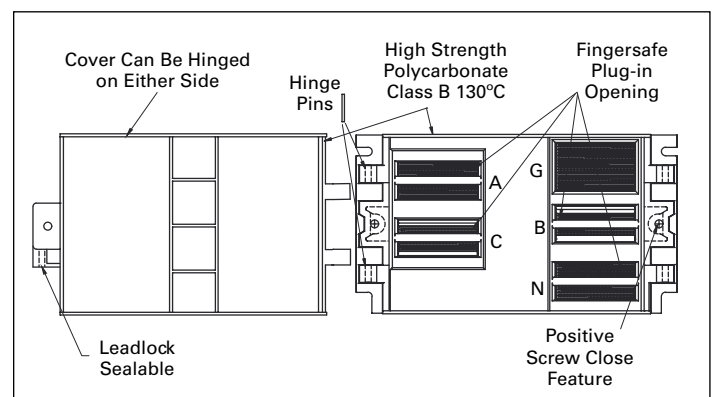
**Plug-in outlet**

The plug-in outlet and cover are made from a durable, high-strength, polycarbonate material, which is rated as Class B, 130 °C, insulation. The plug-in cover is designed to protect the contact surfaces and to prevent the entry of dirt, dust, or moisture. The cover has a positive screw close feature that prohibits the opening of the cover without the use of a tool. The cover is also Utility "leadlock" sealable.

As a countermeasure to the effects of thermal expansion and mechanical vibration, the plug-in outlet is secured to the busway housing with high tensile strength locking hardware.



**Figure 11. Plug-in busway**



**Figure 12. Plug-in outlet cover**

## Electrical data

**Table 6. Short-circuit rating**

UL 857 ampere rating	6-cycle rms symmetrical short-circuit rating		Maximum Class L fuse needed to achieve 6-cycle rms series rating	
	Plug-in	Feeder	100 kA	200 kA
<b>Aluminum</b>				
225	85,000	85,000	2000	1200
400	85,000	85,000	2000	1200
600	85,000	85,000	2000	1200
800	100,000	100,000	—	2500
1000	100,000	100,000	—	2500
1200	125,000	125,000	—	2500
1350	150,000	150,000	—	4000
1600	150,000	150,000	—	4000
2000	150,000	150,000	—	4000
2500	200,000	200,000	—	—
3200	200,000	200,000	—	—
4000	200,000	200,000	—	—
<b>Copper</b>				
225	85,000	85,000	2000	1600
400	85,000	85,000	2000	1600
600	85,000	85,000	2000	1600
800	85,000	85,000	2000	1600
1000	100,000	100,000	—	3000
1200	100,000	100,000	—	3000
1350	100,000	100,000	—	3000
1600	125,000	125,000	—	3000
2000	150,000	150,000	—	4000
2500	150,000	150,000	—	4000
3200	200,000	200,000	—	—
4000	200,000	200,000	—	—
5000	200,000	200,000	—	—

**Table 7. Resistance, reactance, and impedance—aluminum**

Milliohms per 100 ft (30.5 m) line-to-neutral aluminum plug-in and feeder busway

UL 857 ampere rating	Resistance R	Reactance X	Impedance Z
225	4.38	1.17	4.54
400	4.38	1.17	4.54
600	4.38	1.17	4.54
800	2.67	0.99	2.84
1000	2.29	0.84	2.44
1200	1.76	0.64	1.87
1350	1.39	0.49	1.47
1600	1.25	0.43	1.32
2000	1.01	0.34	1.07
2500	0.71	0.27	0.76
3200	0.62	0.24	0.67
4000	0.50	0.19	0.54

**Table 8. Resistance, reactance, and impedance—copper**

Milliohms per 100 ft (30.5 m) line-to-neutral copper plug-in and feeder busway

UL 857 ampere rating	Resistance R	Reactance X	Impedance Z
225	2.30	1.20	2.59
400	2.30	1.20	2.59
600	2.30	1.20	2.59
800	2.30	1.20	2.59
1000	1.67	0.95	1.93
1200	1.39	0.78	1.60
1350	1.20	0.66	1.37
1600	0.94	0.50	1.07
2000	0.76	0.39	0.85
2500	0.55	0.26	0.61
3200	0.47	0.31	0.57
4000	0.38	0.24	0.45
5000	0.27	0.16	0.32

**Table 9. Resistance values for integral housing ground (only) milliohms per 100 ft (30.5 m)**

UL 857 ampere rating	Aluminum phase conductors	Copper phase conductors
225	1.04	1.04
400	1.04	1.04
600	1.04	1.04
800	0.95	1.04
1000	0.92	0.99
1200	0.85	0.95
1350	0.72	0.92
1600	0.68	0.85
2000	0.61	0.72
2500	0.36	0.61
3200	0.34	0.43
4000	0.30	0.36

### Derating table for higher ambient temperatures

Pow-R-Way III busway may be operated continuously at its assigned ratings without exceeding the maximum hot spot temperature rise of 55 °C, provided the ambient temperature does not exceed 40 °C. For higher ambient temperatures, the ratings should be reduced by applying the appropriate multiplier shown in the following table.

**Table 10. Higher ambient temperature multipliers**

Ambient temperature	Multiplier
40 °C (104 °F)	1.00
45 °C (113 °F)	0.95
50 °C (122 °F)	0.90
55 °C (131 °F)	0.85
60 °C (140 °F)	0.80
65 °C (149 °F)	0.74
70 °C (158 °F)	0.67



## Electrical data (continued)

### Line-to-line voltage drop

The table below gives average three-phase voltage drop per 100 ft (30.5 m) at rated current and varying power factor. Line-to-neutral voltage drop is obtained by multiplying the line value by 0.577.

**Table 11. Line-to-line voltage drop**

UL 857 ampere rating	Percent power factor										
	0	10	20	30	40	50	60	70	80	90	100
<b>Copper</b>											
225	0.47	0.56	0.64	0.72	0.79	0.85	0.91	0.96	1.00	1.01	0.90
400	0.83	0.99	1.14	1.27	1.40	1.52	1.62	1.71	1.78	1.80	1.60
600	1.25	1.48	1.70	1.91	2.10	2.28	2.44	2.57	2.66	2.70	2.39
800	1.67	1.98	2.27	2.55	2.80	3.04	3.25	3.42	3.55	3.60	3.19
1000	1.65	1.93	2.20	2.45	2.68	2.88	3.07	3.21	3.32	3.34	2.91
1200	1.62	1.90	2.17	2.42	2.65	2.86	3.04	3.19	3.30	3.32	2.91
1350	1.54	1.82	2.08	2.32	2.54	2.75	2.93	3.08	3.18	3.21	2.82
1600	1.40	1.65	1.90	2.12	2.33	2.52	2.69	2.84	2.94	2.97	2.62
2000	1.35	1.61	1.85	2.08	2.29	2.49	2.66	2.81	2.92	2.96	2.63
2500	1.16	1.39	1.62	1.83	2.02	2.20	2.37	2.51	2.62	2.66	2.40
3200	1.73	1.98	2.22	2.44	2.64	2.81	2.96	3.07	3.14	3.12	2.63
4000	1.68	1.93	2.17	2.39	2.59	2.77	2.92	3.04	3.11	3.10	2.63
5000	1.44	1.67	1.89	2.09	2.28	2.44	2.59	2.71	2.78	2.79	2.40
<b>Aluminum</b>											
225	0.46	0.63	0.79	0.95	1.10	1.25	1.39	1.52	1.64	1.74	1.71
400	0.81	1.11	1.40	1.69	1.96	2.22	2.47	2.71	2.92	3.09	3.04
600	1.22	1.67	2.11	2.53	2.94	3.33	3.71	4.06	4.38	4.63	4.56
800	1.38	1.74	2.09	2.42	2.74	3.04	3.32	3.57	3.79	3.93	3.70
1000	1.46	1.85	2.22	2.58	2.93	3.25	3.55	3.82	4.05	4.21	3.98
1200	1.34	1.70	2.04	2.37	2.69	2.99	3.26	3.52	3.73	3.87	3.66
1350	1.16	1.48	1.79	2.08	2.37	2.63	2.88	3.11	3.30	3.44	3.26
1600	1.21	1.55	1.88	2.20	2.50	2.79	3.05	3.30	3.50	3.65	3.47
2000	1.18	1.53	1.87	2.19	2.50	2.79	3.06	3.31	3.53	3.69	3.52
2500	1.20	1.50	1.79	2.06	2.33	2.58	2.81	3.01	3.18	3.30	3.08
3200	1.35	1.69	2.01	2.33	2.62	2.90	3.16	3.39	3.59	3.71	3.48
4000	1.32	1.66	2.00	2.31	2.62	2.90	3.17	3.41	3.61	3.75	3.53

**Note:** Voltage drop =  $\sqrt{3} I (R \cos \phi + X \sin \phi)$  Volts/100 ft (30.5 m)—concentrated load, where  $\cos \phi$  = power factor.

**Note:** For plug-in distributed loads, divide the voltage drop by 2. See IEEE Standard 141-13-8.3.

**Note:** Actual voltage drop for loads less than full rated current and different lengths may be calculated by multiplying the values from **Table 11** by (actual/rated current) x (actual length/100 ft (30.5 m)).

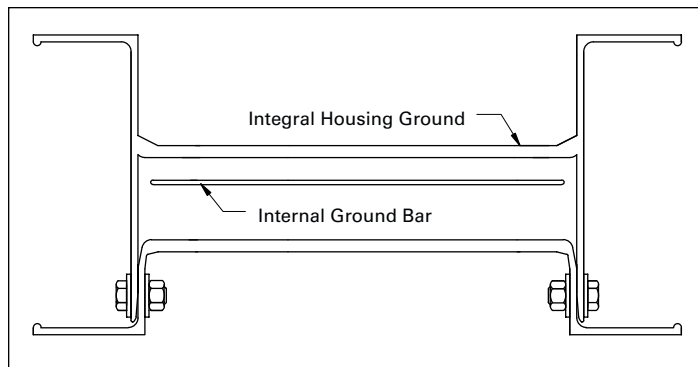
**Electrical data (continued)**

**Housing ground vs. internal ground**

Eaton’s Pow-R-Way III busway offers a variety of grounding options. Two of which are 50% integral housing ground and 50% internal ground.

The 50% internal ground option has a separate ground conductor internal to the housing, which is rated 50% of the phase conductor.

The integral housing ground is where the extruded aluminum housing is used as the ground path and no internal ground conductor is provided. The housing is UL Listed as a 50% integral ground path. This type of ground path is as effective as a ground conductor as an internal ground bar. **Table 12** shows a cross-sectional comparison between the aluminum housing and internal ground bar. The integral housing ground provides a larger ground path that is over 100% of the cross-sectional area of the phase conductors. **Figure 13** illustrates the difference between the two grounding options.



**Figure 13. Housing ground vs. internal ground**

**Table 12. Housing ground vs. Internal ground comparison**

UL 857 ampere rating				Cross-sectional area (sq in)	
Cu	Al	Bar size (in)	Bar per phase	Internal ground	Housing ground
225	225	0.13 x 1.63	1	0.20	2.37
400	400	0.13 x 1.63	1	0.20	2.48
600	600	0.13 x 1.63	1	0.20	2.48
800	—	0.13 x 1.63	1	0.20	2.48
1000	—	0.13 x 2.25	1	0.28	2.54
1200	800	0.13 x 2.75	1	0.34	2.69
1350	1000	0.13 x 3.25	1	0.41	2.83
1600	1200	0.13 x 4.25	1	0.53	3.11
2000	1350	0.13 x 5.50	1	0.69	3.46
—	1600	0.13 x 6.25	1	0.78	3.68
2500	2000	0.13 x 8.00	1	1.00	4.17
3200	—	0.13 x 4.25	2	1.06	6.22
4000	2500	0.13 x 5.50	2	1.38	6.92
—	3200	0.13 x 6.25	2	1.56	7.36
5000	4000	0.13 x 8.00	2	2.00	8.34

## Physical data

### Dimensions—bus bar and housing

**Table 13. Three-wire with no neutral**

UL 857 ampere rating		Phase bar size (depth and width) inches (mm)	Bar per phase	Conductor configuration and housing size (width x height) inches (mm)			Figure 14 config. ②
Cu	Al			50% integral housing ground 3WH	50% internal ground bus 3WHG ①	50% internal isolated ground 3WI	
225	225	0.25 x 1.62 (6.4 x 41.1)	1	4.75 x 4.38 (120.7 x 111.3)	4.75 x 4.50 (120.7 x 114.3)	4.75 x 4.55 (120.7 x 115.6)	A
400	400	0.25 x 1.62 (6.4 x 41.1)	1	4.75 x 4.38 (120.7 x 111.3)	4.75 x 4.50 (120.7 x 114.3)	4.75 x 4.55 (120.7 x 115.6)	A
600	600	0.25 x 1.62 (6.4 x 41.1)	1	4.75 x 4.38 (120.7 x 111.3)	4.75 x 4.50 (120.7 x 114.3)	4.75 x 4.55 (120.7 x 115.6)	A
800	—	0.25 x 1.62 (6.4 x 41.1)	1	4.75 x 4.38 (120.7 x 111.3)	4.75 x 4.50 (120.7 x 114.3)	4.75 x 4.55 (120.7 x 115.6)	A
1000	—	0.25 x 2.25 (6.4 x 57.2)	1	5.38 x 4.38 (136.7 x 111.3)	5.38 x 4.50 (136.7 x 114.3)	5.38 x 4.55 (136.7 x 115.6)	A
1200	800	0.25 x 2.75 (6.4 x 69.9)	1	5.88 x 4.38 (149.3 x 111.3)	5.88 x 4.50 (149.3 x 114.3)	5.88 x 4.55 (149.3 x 115.6)	A
1350	1000	0.25 x 3.25 (6.4 x 82.6)	1	6.38 x 4.38 (162.1 x 111.3)	6.38 x 4.50 (162.1 x 114.3)	6.38 x 4.55 (162.1 x 115.6)	A
1600	1200	0.25 x 4.25 (6.4 x 108.0)	1	7.38 x 4.38 (187.5 x 111.3)	7.38 x 4.50 (187.5 x 114.3)	7.38 x 4.55 (187.5 x 115.6)	A
2000	1350	0.25 x 5.50 (6.4 x 139.7)	1	8.64 x 4.38 (219.5 x 111.3)	8.64 x 4.50 (219.5 x 114.3)	8.64 x 4.55 (219.5 x 115.6)	A
—	1600	0.25 x 6.25 (6.4 x 158.8)	1	9.40 x 4.38 (238.8 x 111.3)	9.40 x 4.50 (238.8 x 114.3)	9.40 x 4.55 (238.8 x 115.6)	A
2500	2000	0.25 x 8.00 (6.4 x 203.2)	1	11.17 x 4.38 (283.7 x 111.3)	11.17 x 4.50 (283.7 x 114.3)	11.17 x 4.55 (283.7 x 115.6)	A
3200	—	0.25 x 4.25 (6.4 x 108.0)	2	16.14 x 4.38 (410.0 x 111.3)	16.14 x 4.50 (410.0 x 114.3)	16.14 x 4.55 (410.0 x 115.6)	B
4000	2500	0.25 x 5.50 (6.4 x 139.7)	2	18.64 x 4.38 (473.5 x 111.3)	18.64 x 4.50 (473.5 x 114.3)	18.64 x 4.55 (473.5 x 115.6)	B
—	3200	0.25 x 6.25 (6.4 x 158.8)	2	20.16 x 4.38 (512.1 x 111.3)	20.16 x 4.50 (512.1 x 114.3)	20.16 x 4.55 (512.1 x 115.6)	B
5000	4000	0.25 x 8.00 (6.4 x 203.2)	2	23.70 x 4.38 (602.0 x 111.3)	23.70 x 4.50 (602.0 x 114.3)	23.70 x 4.55 (602.0 x 115.6)	B

① 100% ground available with same dimensions, which uses 50% internal ground and 50% internal housing ground.

② Refer to **Figure 13** on **Page 12** for configuration A and B.

**Table 14. Four-wire with 100% neutral**

UL 857 ampere rating		Phase and neutral bar size (depth and width) inches (mm)	Bar per phase	Conductor configuration and housing size (width x height) inches (mm)			Figure 14 config. ②
Cu	Al			50% integral housing ground 4WH	50% internal ground bus 4WHG ①	50% internal isolated ground 4WI	
225	225	0.25 x 1.62 (6.4 x 41.1)	1	4.75 x 4.38 (120.7 x 111.3)	4.75 x 4.50 (120.7 x 114.3)	4.75 x 4.55 (120.7 x 115.6)	A
400	400	0.25 x 1.62 (6.4 x 41.1)	1	4.75 x 4.38 (120.7 x 111.3)	4.75 x 4.50 (120.7 x 114.3)	4.75 x 4.55 (120.7 x 115.6)	A
600	600	0.25 x 1.62 (6.4 x 41.1)	1	4.75 x 4.38 (120.7 x 111.3)	4.75 x 4.50 (120.7 x 114.3)	4.75 x 4.55 (120.7 x 115.6)	A
800	—	0.25 x 1.62 (6.4 x 41.1)	1	4.75 x 4.38 (120.7 x 111.3)	4.75 x 4.50 (120.7 x 114.3)	4.75 x 4.55 (120.7 x 115.6)	A
1000	—	0.25 x 2.25 (6.4 x 57.2)	1	5.38 x 4.38 (136.7 x 111.3)	5.38 x 4.50 (136.7 x 114.3)	5.38 x 4.55 (136.7 x 115.6)	A
1200	800	0.25 x 2.75 (6.4 x 69.9)	1	5.88 x 4.38 (149.3 x 111.3)	5.88 x 4.50 (149.3 x 114.3)	5.88 x 4.55 (149.3 x 115.6)	A
1350	1000	0.25 x 3.25 (6.4 x 82.6)	1	6.38 x 4.38 (162.1 x 111.3)	6.38 x 4.50 (162.1 x 114.3)	6.38 x 4.55 (162.1 x 115.6)	A
1600	1200	0.25 x 4.25 (6.4 x 108.0)	1	7.38 x 4.38 (187.5 x 111.3)	7.38 x 4.50 (187.5 x 114.3)	7.38 x 4.55 (187.5 x 115.6)	A
2000	1350	0.25 x 5.50 (6.4 x 139.7)	1	8.64 x 4.38 (219.5 x 111.3)	8.64 x 4.50 (219.5 x 114.3)	8.64 x 4.55 (219.5 x 115.6)	A
—	1600	0.25 x 6.25 (6.4 x 158.8)	1	9.40 x 4.38 (238.8 x 111.3)	9.40 x 4.50 (238.8 x 114.3)	9.40 x 4.55 (238.8 x 115.6)	A
2500	2000	0.25 x 8.00 (6.4 x 203.2)	1	11.17 x 4.38 (283.7 x 111.3)	11.17 x 4.50 (283.7 x 114.3)	11.17 x 4.55 (283.7 x 115.6)	A
3200	—	0.25 x 4.25 (6.4 x 108.0)	2	16.14 x 4.38 (410.0 x 111.3)	16.14 x 4.50 (410.0 x 114.3)	16.14 x 4.55 (410.0 x 115.6)	B
4000	2500	0.25 x 5.50 (6.4 x 139.7)	2	18.64 x 4.38 (473.5 x 111.3)	18.64 x 4.50 (473.5 x 114.3)	18.64 x 4.55 (473.5 x 115.6)	B
—	3200	0.25 x 6.25 (6.4 x 158.8)	2	20.16 x 4.38 (512.1 x 111.3)	20.16 x 4.50 (512.1 x 114.3)	20.16 x 4.55 (512.1 x 115.6)	B
5000	4000	0.25 x 8.00 (6.4 x 203.2)	2	23.70 x 4.38 (602.0 x 111.3)	23.70 x 4.50 (602.0 x 114.3)	23.70 x 4.55 (602.0 x 115.6)	B

① 100% ground available with same dimensions, which uses 50% internal ground and 50% internal housing ground.

② Refer to **Figure 14** on **page 12** for configuration A and B.

## Physical data (continued)

### Dimensions—bus bar and housing (continued)

Table 15. Four-wire with 200% neutral

UL 857 ampere rating			Conductor configuration and housing size (width x height) inches (mm)				Figure 14 config. ③
Cu	Al	Phase bar size (depth and width) inches (mm) ①	Bar per phase	50% integral housing ground 4WH	50% internal ground bus 4WHG ②	50% internal isolated ground 4WI	
225	225	0.25 x 1.62 (6.4 x 41.1)	1	4.75 x 4.92 (120.7 x 125.0)	4.75 x 5.05 (120.7 x 128.2)	4.75 x 5.10 (120.7 x 129.5)	A
400	400	0.25 x 1.62 (6.4 x 41.1)	1	4.75 x 4.92 (120.7 x 125.0)	4.75 x 5.05 (120.7 x 128.2)	4.75 x 5.10 (120.7 x 129.5)	A
600	600	0.25 x 1.62 (6.4 x 41.1)	1	4.75 x 4.92 (120.7 x 125.0)	4.75 x 5.05 (120.7 x 128.2)	4.75 x 5.10 (120.7 x 129.5)	A
800	—	0.25 x 1.62 (6.4 x 41.1)	1	4.75 x 4.92 (120.7 x 125.0)	4.75 x 5.05 (120.7 x 128.2)	4.75 x 5.10 (120.7 x 129.5)	A
1000	—	0.25 x 2.25 (6.4 x 57.2)	1	5.38 x 4.92 (136.7 x 125.0)	5.38 x 5.05 (136.7 x 128.2)	5.38 x 5.10 (136.7 x 129.5)	A
1200	800	0.25 x 2.75 (6.4 x 69.9)	1	5.88 x 4.92 (149.3 x 125.0)	5.88 x 5.05 (149.3 x 128.2)	5.88 x 5.10 (149.3 x 129.5)	A
1350	1000	0.25 x 3.25 (6.4 x 82.6)	1	6.38 x 4.92 (162.1 x 125.0)	6.38 x 5.05 (162.1 x 128.2)	6.38 x 5.10 (162.1 x 129.5)	A
1600	1200	0.25 x 4.25 (6.4 x 108.0)	1	7.38 x 4.92 (187.5 x 125.0)	7.38 x 5.05 (187.5 x 128.2)	7.38 x 5.10 (187.5 x 129.5)	A
2000	1350	0.25 x 5.50 (6.4 x 139.7)	1	8.64 x 4.92 (219.5 x 125.0)	8.64 x 5.05 (219.5 x 128.2)	8.64 x 5.10 (219.5 x 129.5)	A
—	1600	0.25 x 6.25 (6.4 x 158.8)	1	9.40 x 4.92 (238.8 x 125.0)	9.40 x 5.05 (238.8 x 128.2)	9.40 x 5.10 (238.8 x 129.5)	A
2500	2000	0.25 x 8.00 (6.4 x 203.2)	1	11.17 x 4.92 (283.7 x 125.0)	11.17 x 5.05 (283.7 x 128.2)	11.17 x 5.10 (283.7 x 129.5)	A
3200	—	0.25 x 4.25 (6.4 x 108.0)	2	16.14 x 4.92 (410.0 x 125.0)	16.14 x 5.05 (410.0 x 128.2)	16.14 x 5.10 (410.0 x 129.5)	B
4000	2500	0.25 x 5.50 (6.4 x 139.7)	2	18.64 x 4.92 (473.5 x 125.0)	18.64 x 5.05 (473.5 x 128.2)	18.64 x 5.10 (473.5 x 129.5)	B
—	3200	0.25 x 6.25 (6.4 x 158.8)	2	20.16 x 4.92 (512.1 x 125.0)	20.16 x 5.05 (512.1 x 128.2)	20.16 x 5.10 (512.1 x 129.5)	B
5000	4000	0.25 x 8.00 (6.4 x 203.2)	2	23.70 x 4.92 (602.0 x 125.0)	23.70 x 5.05 (602.0 x 128.2)	23.70 x 5.10 (602.0 x 129.5)	B

① Neutral bar is 0.50 (12.7) x width shown.

② 100% ground available with same dimensions, which uses 50% internal ground and 50% integral housing ground.

③ Refer to **Figure 14** for Configuration A and B.

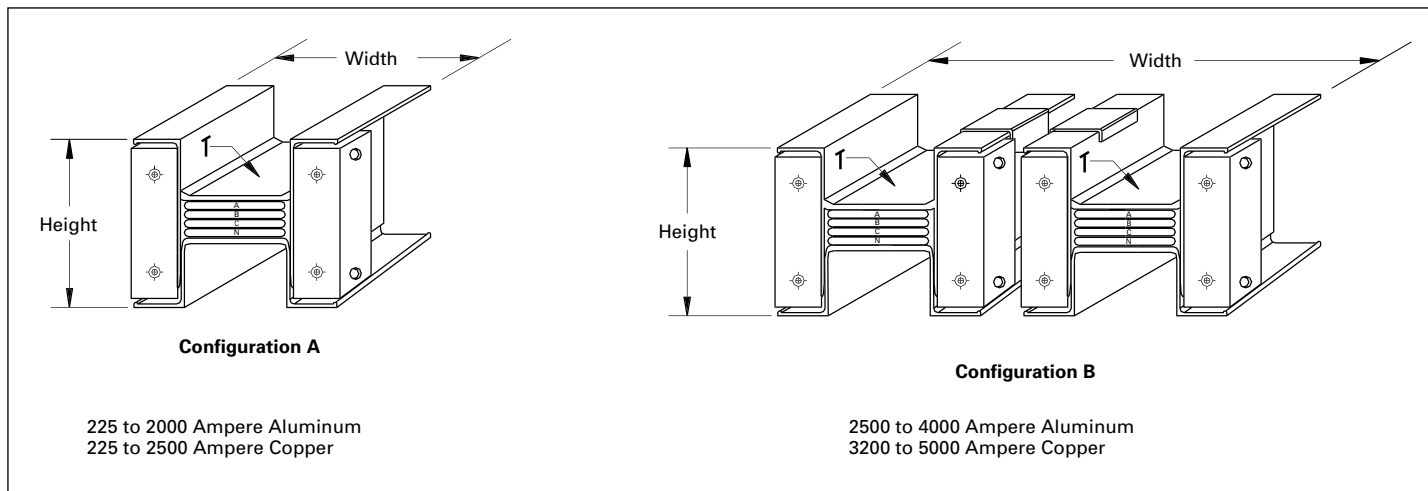


Figure 14. Pow-R-Way III cross-section dimensions

**Physical data (continued)**

**Weights**

**Table 16. Weight (pounds/ft) and current density (amperes/in<sup>2</sup>)**

UL 857 ampere rating		UL 857 Current density amperes/in <sup>2</sup>		Weight—including integral housing ground (pounds/ft)							
				Three-wire		Four-wire 100% neutral		Four-wire 200% neutral		Add for internal ground	
Cu	Al	Cu	Al	Cu	Al	Cu	Al	Cu	Al	Cu	Al
225	225	554	554	8	5	10	6	11	7	0.78	0.23
400	400	985	985	8	5	10	6	11	7	0.78	0.23
600	600	1477	—	8	—	10	—	11	—	0.78	—
800	—	1969	1477	8	5	10	6	11	7	0.78	0.23
1000	—	1778	—	10	—	12	—	14	—	1.08	—
1200	800	1745	1164	12	6	15	7	17	8	1.33	0.40
1350	1000	1662	1231	14	7	17	8	20	9	1.57	0.47
1600	1200	1506	1129	17	8	21	10	25	11	2.05	0.62
2000	1350	1455	982	23	11	28	12	33	13	2.66	0.80
—	1600	—	1024	—	12	—	13	—	15	—	0.91
2500	2000	1250	1000	29	14	36	16	42	18	3.87	1.17
3200	—	1505	—	34	—	42	—	49	—	4.11	—
4000	2500	1455	909	45	21	56	24	66	27	5.32	1.61
—	3200	—	960	—	23	—	26	—	29	—	1.83
5000	4000	1250	1000	63	28	72	32	85	36	7.74	2.35

**Table 17. Weight (kg/m) and current density (amperes/cm<sup>2</sup>)**

UL 857 ampere rating		UL 857 current density amperes/cm <sup>2</sup>		Weight—including integral housing ground (kg/m)							
				Three-wire		Four-wire 100% neutral		Four-wire 200% neutral		Add for internal ground	
Cu	Al	Cu	Al	Cu	Al	Cu	Al	Cu	Al	Cu	Al
225	225	86	86	12	7	15	9	17	11	1.17	0.35
400	400	153	153	12	7	15	9	17	11	1.17	0.35
600	600	229	—	12	—	15	—	17	—	1.17	—
800	—	305	229	12	7	15	9	17	11	1.17	0.35
1000	—	276	—	15	—	18	—	21	—	1.62	—
1200	800	270	180	18	9	22	11	26	12	1.98	0.60
1350	1000	258	191	21	11	25	12	30	14	2.34	0.71
1600	1200	233	175	25	12	32	15	37	16	3.06	0.92
2000	1350	226	152	34	16	42	18	49	20	3.96	1.20
—	1600	—	159	—	18	—	20	—	22	—	1.36
2500	2000	194	155	43	21	54	24	63	27	5.76	1.75
3200	—	233	—	51	—	63	—	73	—	6.12	—
4000	2500	226	140	67	32	83	36	98	40	7.92	2.40
—	3200	—	149	—	34	—	39	—	43	—	2.73
5000	4000	194	155	94	42	108	48	126	54	11.53	3.50

## Physical data (continued)

**Table 18. Ampere ratings needed to be at or below 1000 amperes/sq in density**

UL 857 ampere rating			Copper			Aluminum		
Cu	Al	Bar size	Standard density	1000 A/sq in density	Adjusted rating	Standard density	1000 A/sq in density	Adjusted rating
225	225	1.62	556	556	None	556	556	None
400	400	1.62	988	988	None	988	988	None
600	600	1.62	1481	873	1200	—	—	—
800	—	1.62	1975	985	1350	1481	873	800
1000	—	2.25	1778	941	1600	—	—	—
1200	800	2.75	1745	873	2000	1164	985	1000
1350	1000	3.25	1662	982	2000	1231	941	1200
1600	1200	4.25	1506	800	2500	1129	873	1350
2000	1350	5.50	1455	1000	2500	982	864	1600
—	1600	6.25	—	—	—	1024	800	2000
2500	2000	8.00	1250	909	4000	1000	1000	None
3200	—	2.00 x 4.25	1506	800	5000	—	—	—
4000	2500	2.00 x 5.50	1455	1000	5000	909	909	None
—	3200	2.00 x 6.25	—	—	—	1024	800	4000
5000	4000	2.00 x 8.00	1250	N/A	N/A	1000	1000	None

### Application note

The above table is meant to help the user and specifier select the higher busway ratings to meet the performance specification of a current density value no higher than 1000 A per sq inch. The current density values of our standard busway offerings based upon temperature rise are listed in the 4th and 7th columns of the table. These ratings are UL Listed and labeled, and safe to apply. However, certain jurisdictions or applications require a better margin of safety, and choose to use a 1000 A/sq inch density standard.

When the lower than standard densities are required, such as 1000 A/sq inch, then the only option is to oversize the busway from the standard bar sizes and ampacity ratings. Oversizing provides more bus bar material in cross-sectional area, and results in lower current densities and lower temperature rises for a given value of load current.

By example, take the case of 1600 A copper busway. The standard product uses a bar size of 0.25 x 4.25 inches (1.0625 sq inch in area) and which results in 1506 A sq inch density (calculated by 1600 A/1.0625 sq inch = 1506 A/sq inches), as listed in the table. If a project or application using bus runs expected to carry 1600 A of load current stipulated that the current densities experienced by the busway should be no greater than 1000 A/sq inch, then oversizing to busway bars used in the standard 2500 A rating using 0.25 x 8.00 inch bars (2.0 sq inch area) yields a current density of 1600 A/2.0 sq inches. 800 A/sq inches for the 1600 A of load current.

Why not just oversize to 2000 A busway? The 2000 A bar size is 0.25 x 5.50 inches or 1.375 sq inches. Computing the new density yields 1600 A/1.375 sq inch = 1164 A/sq inch, which is higher than the desired value of no greater density than 1000 A/sq inch.

Therefore, the table provides a quick method of determining the ampacity of busway required to meet current density values no greater than 1000 A/sq inch for given values of load current. The most important columns of data are the 1st, 7th, and 10th.

Eaton warrants that the Pow-R-Way III product will perform as intended regardless of the method of selection, either temperature rise only or current density. Eaton encourages specifiers who use current density as the criteria for busway selection to select and specify the busway ratings recommended in the above table under the Adjusted Rating column, and to not rely upon the contractors or bidders to resolve the matter in the later stages of a project. If sizing busway is strictly based upon current density, do not specify or use the standard ampacity values based upon the UL and NEMA temperature rise standard on Contract Drawings.

**Physical data (continued)**

**Fittings**

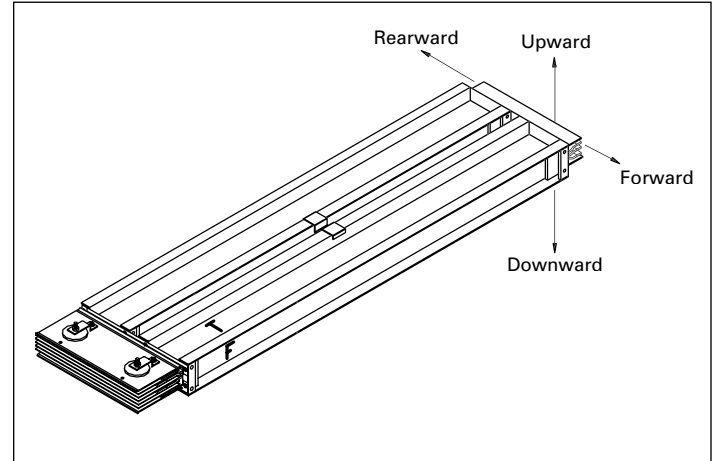
There is a fitting to meet every application need: flanges, elbows, offsets, tees, cable tap boxes, weatherheads, transformer connections, power take-off sections, reducers, adapter cubicles, expansion joints, and end closures.

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

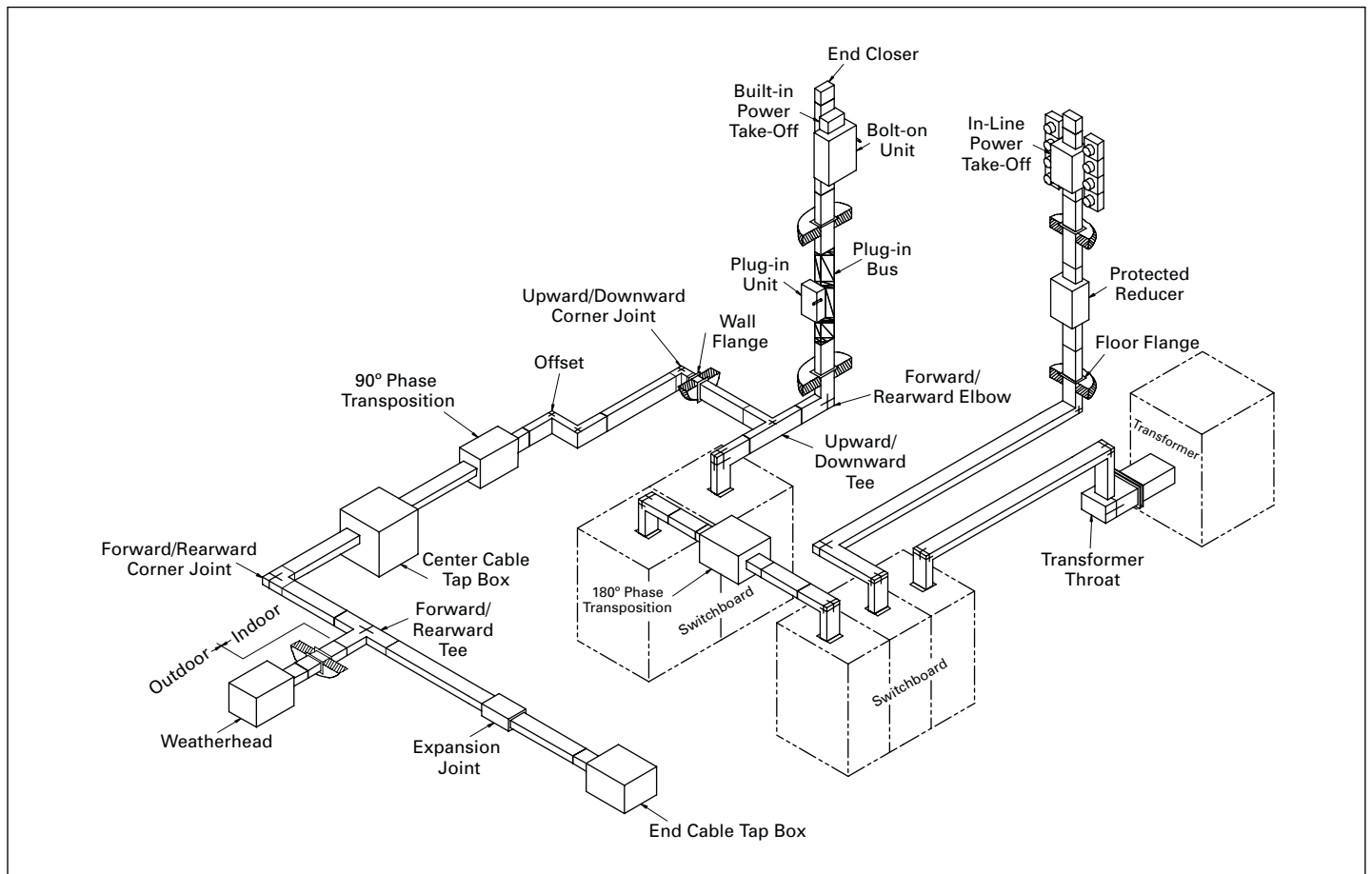
When making field measurements and layouts, it should be remembered that the dimensions are given from the centerline of the Pow-R-Bridge.

The relationship of fittings to straight lengths (forward, rearward, upward, and downward) is illustrated in **Figure 15**.

All straight lengths and fittings are marked with a "T" label and an "F" label. The "T" and "F" locations will also be noted on the construction, or the as-built, Eaton drawings furnished. **When installing the busway, the "T" and "F" markings of each section must match. Failure to do so will result in an improper installation with the phase bars out of sequence.**



**Figure 15. Typical busway components**



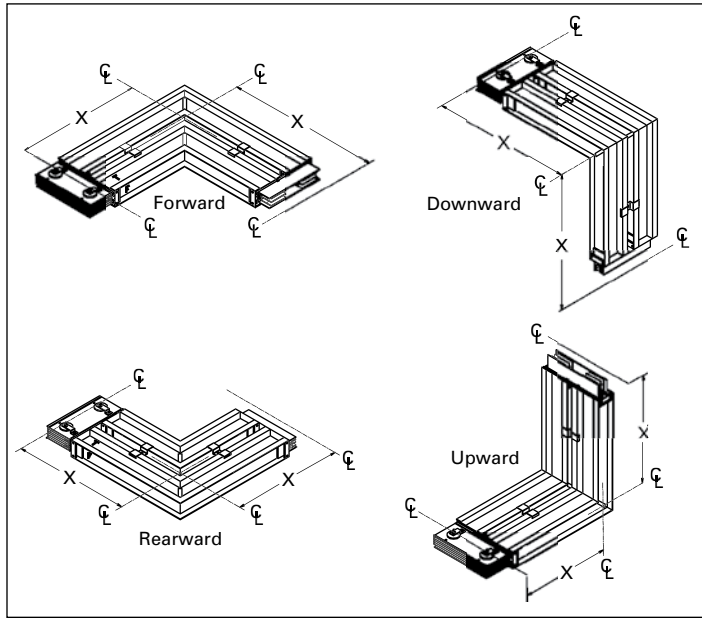
**Figure 16. "T" and "F" orientation for fittings**

## Physical data (continued)

### Traditional indoor and outdoor elbows (Figure 17)

Elbows are used to make 90° changes in the direction of busway runs. The four types that are available are forward, rearward, upward, and downward. See minimum leg lengths listed for each type in **Table 19** and **Table 20**.

**Note:** All dimensions are to the centerline of the Pow-R-Bridge.



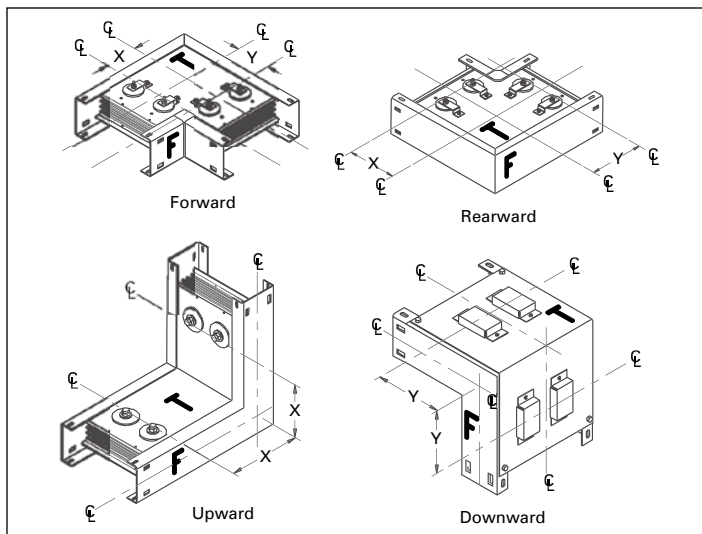
**Figure 17. Traditional elbows**

### Corner joint elbows (Figure 18)

The Pow-R-Way III corner joint elbow can be installed in areas where a traditional 90° turn could never have been accomplished before.

Pow-R-Way III corner joint elbows can solve any serious pathway problem and contribute to successful layouts with minimal space requirements. The corner joint elbow is UL Listed for indoor applications only and is also certified for seismic withstand capability to worst-case, Zone 4 levels.

**Note:** All dimensions are to the centerline of the corner joint connection.



**Figure 18. Corner joint elbows (for indoor applications only)**

**Table 19. Forward and rearward elbows**

UL 857 ampere rating		Dimensions in inches (mm)	
Cu	Al	Minimum leg lengths X	
225	225	13.00 (330.2)	
400	400	13.00 (330.2)	
600	600	13.00 (330.2)	
800	—	13.00 (330.2)	
1000	—	13.00 (330.2)	
1200	800	13.50 (342.9)	
1350	1000	13.50 (342.9)	
1600	1200	14.00 (355.6)	
2000	1350	14.50 (368.3)	
—	1600	15.00 (381.0)	
2500	2000	16.00 (406.4)	
3200	—	18.50 (469.9)	
4000	2500	19.50 (495.3)	
—	3200	20.50 (520.7)	
5000	4000	22.50 (571.5)	

**Table 20. Upward and downward elbows**

UL 857 ampere rating		Dimensions in inches (mm)	
Cu	Al	Minimum leg lengths X	
		Upward	Downward
225	225	10.00 (254.0)	13.00 (330.2)
400	400	10.00 (254.0)	13.00 (330.2)
600	600	10.00 (254.0)	13.00 (330.2)
800	—	10.00 (254.0)	13.00 (330.2)
1000	—	10.00 (254.0)	13.00 (330.2)
1200	800	10.00 (254.0)	13.00 (330.2)
1350	1000	10.00 (254.0)	13.00 (330.2)
1600	1200	10.00 (254.0)	13.00 (330.2)
2000	1350	10.00 (254.0)	13.00 (330.2)
—	1600	10.00 (254.0)	13.00 (330.2)
2500	2000	10.00 (254.0)	13.00 (330.2)
3200	—	12.00 (304.8)	13.00 (330.2)
4000	2500	12.00 (304.8)	13.00 (330.2)
—	3200	12.00 (304.8)	13.00 (330.2)
5000	4000	12.00 (304.8)	13.00 (330.2)

**Table 21. Forward/rearward corner joints**

UL 857 ampere rating		Dimensions in inches (mm)	
Cu	Al	X	Y
225	225	0.94 (23.9)	5.38 (136.7)
400	400	0.94 (23.9)	5.38 (136.7)
600	600	0.94 (23.9)	5.38 (136.7)
800	—	0.94 (23.9)	5.38 (136.7)
1000	—	1.25 (31.8)	5.69 (144.5)
1200	800	1.50 (38.1)	5.94 (150.9)
1350	1000	1.75 (44.5)	6.19 (157.2)
1600	1200	2.25 (57.2)	6.69 (169.9)
2000	1350	2.88 (73.2)	7.31 (185.7)
—	1600	3.25 (82.6)	7.70 (195.6)
2500	2000	4.12 (104.7)	8.57 (217.7)
3200	—	6.64 (168.7)	11.07 (281.2)
4000	2500	7.89 (200.4)	12.32 (312.9)
—	3200	8.65 (219.7)	13.08 (332.2)
5000	4000	10.42 (264.7)	14.85 (377.2)



**Table 22. Upward/downward corner joints**

UL 857 ampere rating		Dimensions in inches (mm)					
		Housing ground		Internal ground		Isolated ground	
Cu	Al	X	Y	X	Y	X	Y
<b>Three-wire</b>							
225	225	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
400	400	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
600	600	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
800	—	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
1000	—	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
1200	800	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
1350	1000	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
1600	1200	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
2000	1350	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
—	1600	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
2500	2000	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
3200	—	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
4000	2500	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
—	3200	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
5000	4000	4.70 (119.6)	4.35 (110.5)	4.77 (121.2)	4.41 (112.0)	5.27 (133.9)	4.43 (112.5)
<b>Four-wire (100%)</b>							
225	225	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
400	400	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
600	600	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
800	—	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
1000	—	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
1200	800	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
1350	1000	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
1600	1200	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
2000	1350	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
—	1600	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
2500	2000	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
3200	—	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
4000	2500	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
—	3200	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
5000	4000	4.71 (119.6)	5.00 (127.0)	4.77 (121.2)	5.07 (128.8)	5.28 (134.1)	5.09 (129.3)
<b>Four-wire (200%)</b>							
225	225	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)
400	400	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)
600	600	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)
800	—	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)
1000	—	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)
1200	800	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)
1350	1000	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)
1600	1200	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)
2000	1350	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)
—	1600	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)
2500	2000	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)
3200	—	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)
4000	2500	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)
—	3200	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)
5000	4000	4.98 (126.5)	5.10 (129.5)	5.04 (128.0)	5.17 (131.3)	5.55 (141.0)	5.19 (131.8)

**Physical data (continued)**

**Special angle elbows**

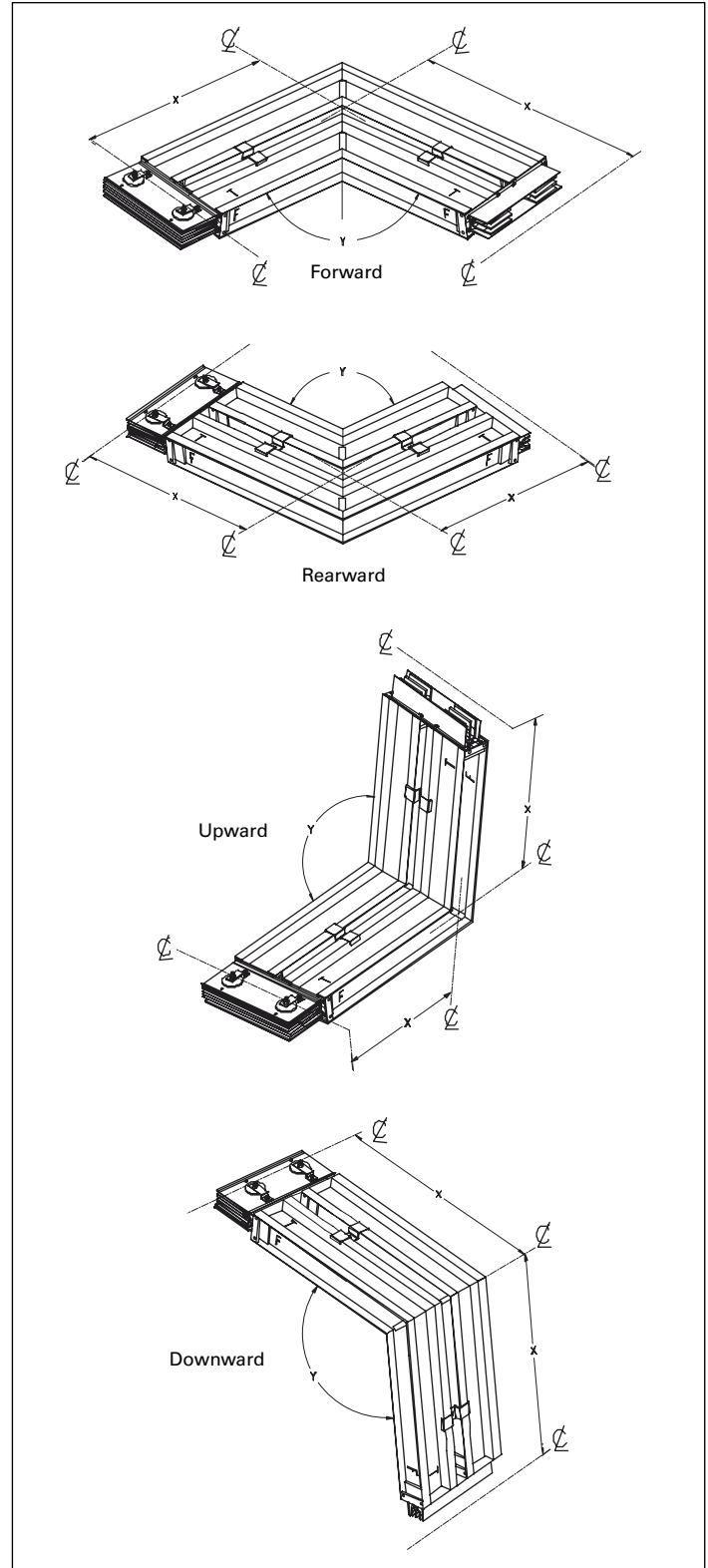
Special angle elbows are traditional elbows that allow the direction of the busway runs to change at angles greater than 90°. They allow easy routing through non-traditional corridors. The four types offered are forward, rearward, upward, and downward. See minimum leg lengths for each type listed in **Table 23** and **Table 24**.

**Table 23. Forward and rearward elbows**

UL 857 ampere rating		Dimensions in inches (mm)	
Cu	Al	Minimum leg lengths X	
225	225	13.00 (330.2)	
400	400	13.00 (330.2)	
600	600	13.00 (330.2)	
800	—	13.00 (330.2)	
1000	—	13.00 (330.2)	
1200	800	13.50 (342.9)	
1350	1000	13.50 (342.9)	
1600	1200	14.00 (355.6)	
2000	1350	14.50 (368.3)	
—	1600	15.00 (381.0)	
2500	2000	16.00 (406.4)	
3200	—	18.50 (469.9)	
4000	2500	19.50 (495.3)	
—	3200	20.50 (520.7)	
5000	4000	22.50 (571.5)	

**Table 24. Upward and downward elbows**

UL 857 ampere rating		Dimensions in inches (mm)	
Cu	Al	Upward	Downward
225	225	10.00 (254.0)	13.00 (330.2)
400	400	10.00 (254.0)	13.00 (330.2)
600	600	10.00 (254.0)	13.00 (330.2)
800	—	10.00 (254.0)	13.00 (330.2)
1000	—	10.00 (254.0)	13.00 (330.2)
1200	800	10.00 (254.0)	13.00 (330.2)
1350	1000	10.00 (254.0)	13.00 (330.2)
1600	1200	10.00 (254.0)	13.00 (330.2)
2000	1350	10.00 (254.0)	13.00 (330.2)
—	1600	10.00 (254.0)	13.00 (330.2)
2500	2000	10.00 (254.0)	13.00 (330.2)
3200	—	12.00 (304.8)	13.00 (330.2)
4000	2500	12.00 (304.8)	13.00 (330.2)
—	3200	12.00 (304.8)	13.00 (330.2)
5000	4000	12.00 (304.8)	13.00 (330.2)



**Figure 19. Special angle elbows**

**Physical data (continued)**

**Standard and flush flanges (Figure 20)**

Flanges provide a direct connection to low-voltage switchgear, switchboards, motor control centers, and other apparatus. Cutout dimensions and drilling plans are provided with the customer drawings and it is the responsibility of the switchgear manufacturer to provide the opening, flange drillings, connecting hardware, and bus risers in their equipment. For proper coordination between busway and other equipment, detailed drawings, including switchgear orientation, must accompany the order. A standard flange can be supplied to the left or right of a section, as required. A flush flange is used when the busway must lay close to the top of a switchboard. The edge of the busway is 1.25 inches (31.8 mm) from the top of the switchboard.

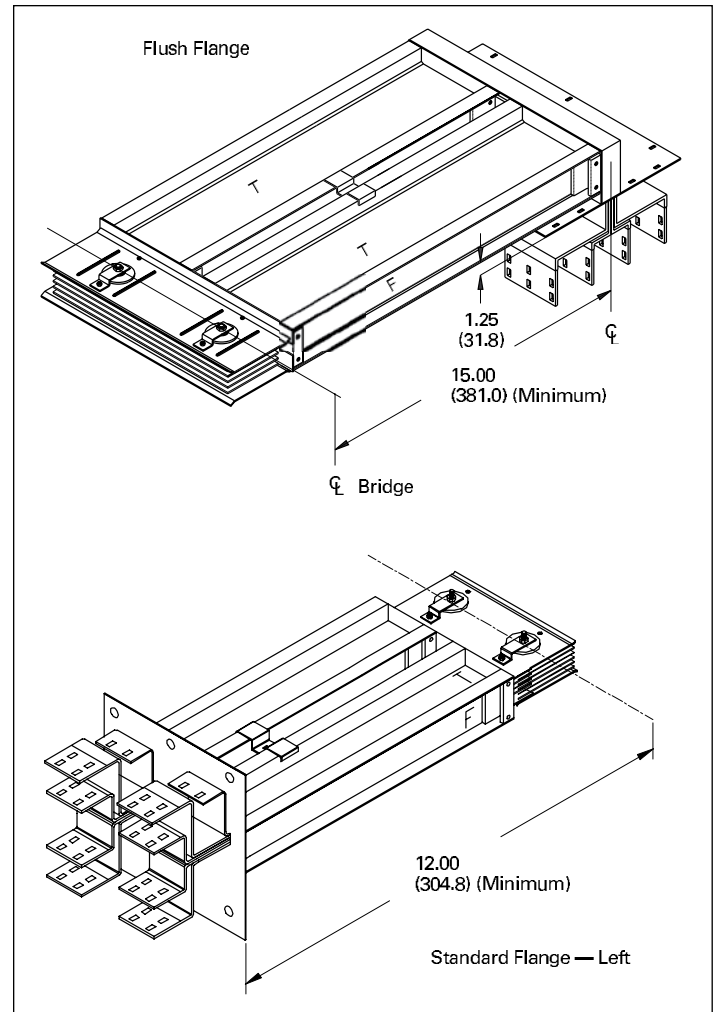
**Note:** All dimensions are to the centerline of the Pow-R-Bridge.

**Table 25. Switchboard flanges**

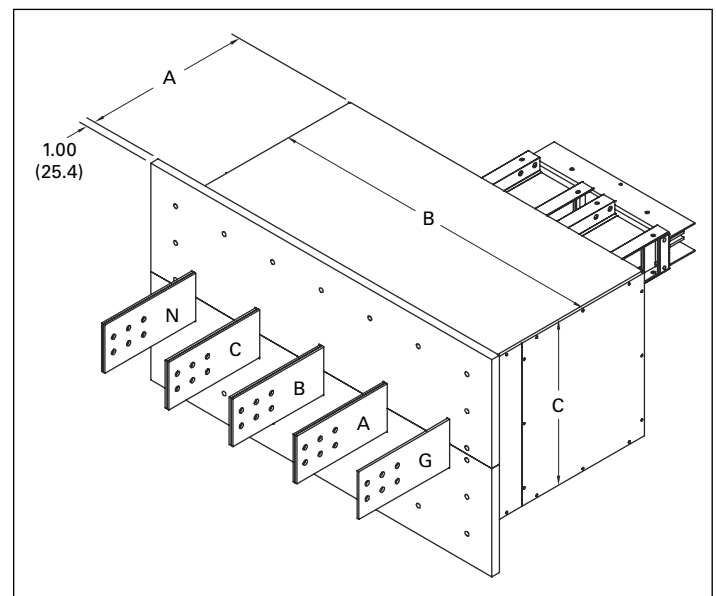
UL 857 ampere rating		Dimensions in inches (mm)	
Cu	Al	Flush flange min. leg length X	Standard flange min. leg length X
225	225	15.00 (381.0)	12.00 (304.8)
400	400	15.00 (381.0)	12.00 (304.8)
600	600	15.00 (381.0)	12.00 (304.8)
800	—	15.00 (381.0)	12.00 (304.8)
1000	—	15.00 (381.0)	12.00 (304.8)
1200	800	15.00 (381.0)	12.00 (304.8)
1350	1000	15.00 (381.0)	12.00 (304.8)
1600	1200	15.00 (381.0)	12.00 (304.8)
2000	1350	15.00 (381.0)	12.00 (304.8)
—	1600	15.00 (381.0)	12.00 (304.8)
2500	2000	15.00 (381.0)	12.00 (304.8)
3200	—	15.00 (381.0)	12.00 (304.8)
4000	2500	15.00 (381.0)	12.00 (304.8)
—	3200	15.00 (381.0)	12.00 (304.8)
5000	4000	15.00 (381.0)	12.00 (304.8)

**Vault flanges**

Vault flanges are used to enter a utility vault for termination to the utility transformer. Each vault flange is custom designed to meet each specific utility specification. Vault flanges may look similar to those shown in **Figure 21**. Please consult the factory for specific dimensions based upon utility specifications.



**Figure 20. Flanges**



**Figure 21. Vault flanges**

**Physical data (continued)**

**Elbow flanges (Figure 22)**

An elbow flange is a combination of a standard elbow and a standard flange fabricated into a single fitting. Elbow flanges are typically used when the minimum leg lengths for either the standard elbow or standard flange cannot be maintained. Minimum leg lengths are listed in **Table 26** and **Table 27**.

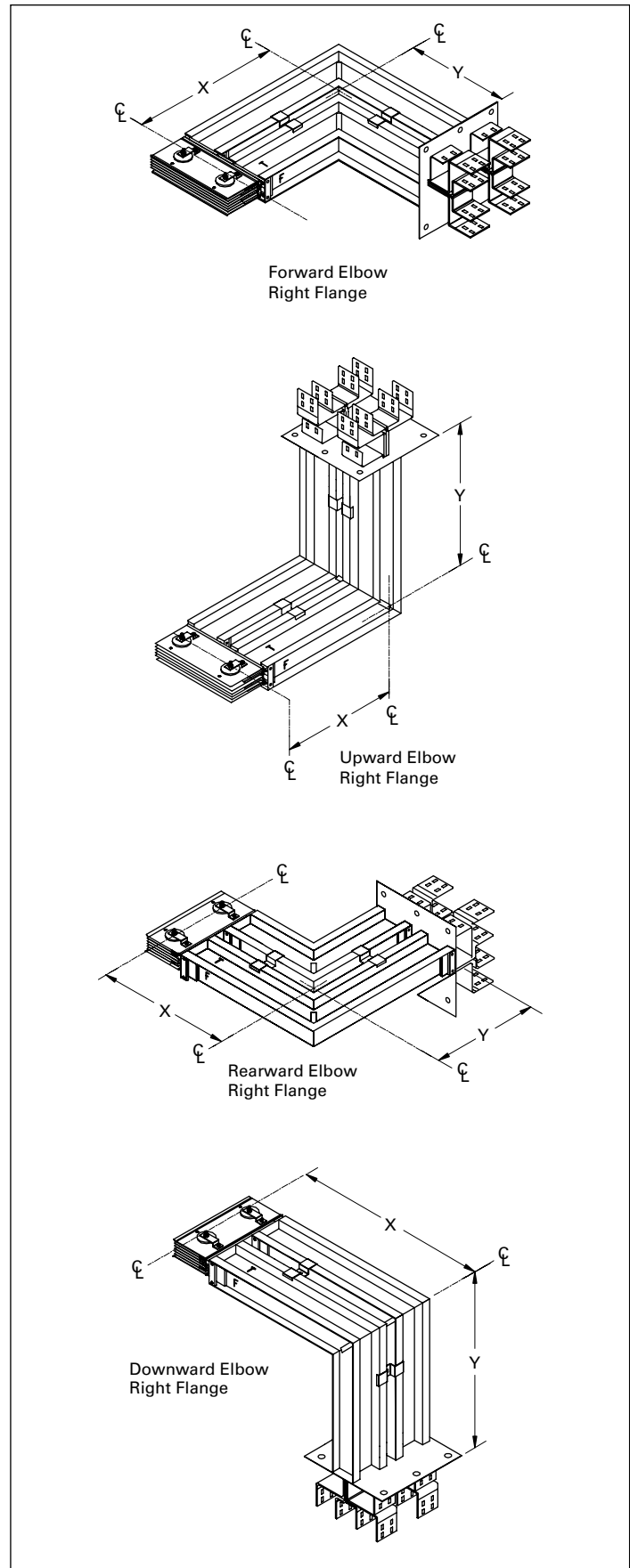
**Note:** All dimensions are to the centerline of the Pow-R-Bridge.

**Table 26. Forward and rearward elbow flanges**

UL 857 ampere rating		Minimum dimensions in inches (mm)	
Cu	Al	Joint leg X	Flange leg Y
225	225	13.00 (330.2)	8.75 (222.3)
400	400	13.00 (330.2)	8.75 (222.3)
600	600	13.00 (330.2)	8.75 (222.3)
800	—	13.00 (330.2)	8.75 (222.3)
1000	—	13.00 (330.2)	8.75 (222.3)
1200	800	13.50 (342.9)	9.25 (235.0)
1350	1000	13.50 (342.9)	9.25 (235.0)
1600	1200	14.00 (355.6)	9.75 (247.7)
2000	1350	14.50 (368.3)	10.25 (260.4)
—	1600	15.00 (381.0)	10.75 (273.1)
2500	2000	16.00 (406.4)	11.75 (298.5)
3200	—	18.50 (469.9)	14.00 (355.6)
4000	2500	19.50 (495.3)	15.25 (387.4)
—	3200	20.50 (520.7)	16.00 (406.4)
5000	4000	22.50 (571.5)	17.75 (450.9)

**Table 27. Upward and downward elbow flanges**

UL 857 ampere rating		Minimum dimensions in inches (mm)			
Cu	Al	Joint leg X		Flange leg Y	
		Up	Down	Up	Down
225	225	10.00 (254.0)	13.00 (330.2)	5.75 (146.1)	8.75 (222.3)
400	400	10.00 (254.0)	13.00 (330.2)	5.75 (146.1)	8.75 (222.3)
600	600	10.00 (254.0)	13.00 (330.2)	5.75 (146.1)	8.75 (222.3)
800	—	10.00 (254.0)	13.00 (330.2)	5.75 (146.1)	8.75 (222.3)
1000	—	10.00 (254.0)	13.00 (330.2)	5.75 (146.1)	8.75 (222.3)
1200	800	10.00 (254.0)	13.00 (330.2)	5.75 (146.1)	8.75 (222.3)
1350	1000	10.00 (254.0)	13.00 (330.2)	5.75 (146.1)	8.75 (222.3)
1600	1200	10.00 (254.0)	13.00 (330.2)	5.75 (146.1)	8.75 (222.3)
2000	1350	10.00 (254.0)	13.00 (330.2)	5.75 (146.1)	8.75 (222.3)
—	1600	10.00 (254.0)	13.00 (330.2)	5.75 (146.1)	8.75 (222.3)
2500	2000	10.00 (254.0)	13.00 (330.2)	5.75 (146.1)	8.75 (222.3)
3200	—	12.00 (304.8)	13.00 (330.2)	7.75 (196.9)	8.75 (222.3)
4000	2500	12.00 (304.8)	13.00 (330.2)	7.75 (196.9)	8.75 (222.3)
—	3200	12.00 (304.8)	13.00 (330.2)	7.75 (196.9)	8.75 (222.3)
5000	4000	12.00 (304.8)	13.00 (330.2)	7.75 (196.9)	8.75 (222.3)



**Figure 22. Elbow flanges**

**Physical data (continued)**

**Offsets (Figure 23)**

An offset is used to avoid 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 standard 90° elbows. The minimum leg lengths are listed in **Table 28** and **Table 29**.

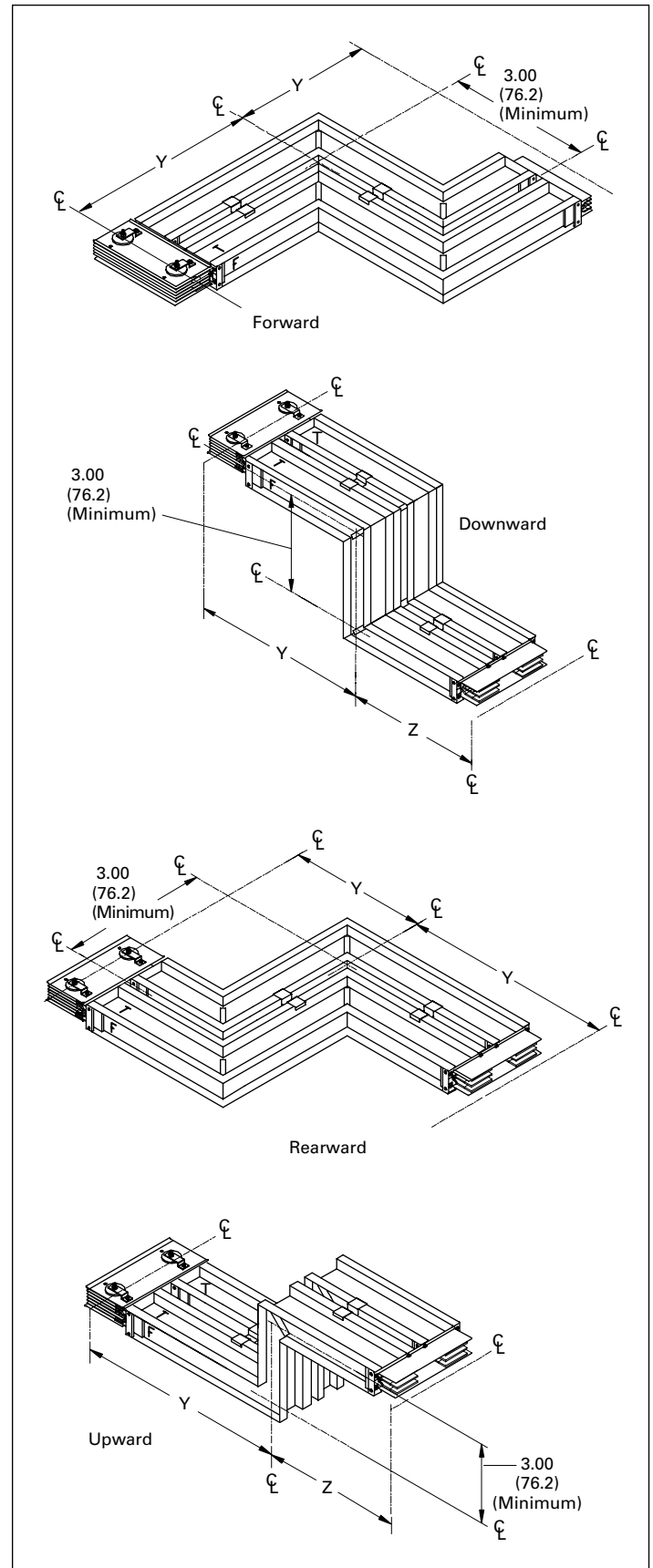
**Note:** All dimensions are to the centerline of the Pow-R-Bridge.

**Table 28. Forward and rearward offsets**

UL 857 ampere rating			Minimum dimensions Y in inches (mm)
Cu	Al		
225	225		13.00 (330.2)
400	400		13.00 (330.2)
600	600		13.00 (330.2)
800	—		13.00 (330.2)
1000	—		13.00 (330.2)
1200	800		13.50 (342.9)
1350	1000		13.50 (342.9)
1600	1200		14.00 (355.6)
2000	1350		14.50 (368.3)
—	1600		15.00 (381.0)
2500	2000		16.00 (406.4)
3200	—		18.50 (469.9)
4000	2500		19.50 (495.3)
—	3200		20.50 (520.7)
5000	4000		22.50 (571.5)

**Table 29. Upward and downward offsets**

UL 857 ampere rating		Minimum dimensions in inches (mm)			
Cu	Al	Upward		Downward	
		Y	Z	Y	Z
225	225	10.00 (254.0)	13.00 (330.2)	13.00 (330.2)	10.00 (254.0)
400	400	10.00 (254.0)	13.00 (330.2)	13.00 (330.2)	10.00 (254.0)
600	600	10.00 (254.0)	13.00 (330.2)	13.00 (330.2)	10.00 (254.0)
800	—	10.00 (254.0)	13.00 (330.2)	13.00 (330.2)	10.00 (254.0)
1000	—	10.00 (254.0)	13.00 (330.2)	13.00 (330.2)	10.00 (254.0)
1200	800	10.00 (254.0)	13.00 (330.2)	13.00 (330.2)	10.00 (254.0)
1350	1000	10.00 (254.0)	13.00 (330.2)	13.00 (330.2)	10.00 (254.0)
1600	1200	10.00 (254.0)	13.00 (330.2)	13.00 (330.2)	10.00 (254.0)
2000	1350	10.00 (254.0)	13.00 (330.2)	13.00 (330.2)	10.00 (254.0)
—	1600	10.00 (254.0)	13.00 (330.2)	13.00 (330.2)	10.00 (254.0)
2500	2000	10.00 (254.0)	13.00 (330.2)	13.00 (330.2)	10.00 (254.0)
3200	—	12.00 (304.8)	13.00 (330.2)	13.00 (330.2)	12.00 (304.8)
4000	2500	12.00 (304.8)	13.00 (330.2)	13.00 (330.2)	12.00 (304.8)
—	3200	12.00 (304.8)	13.00 (330.2)	13.00 (330.2)	12.00 (304.8)
5000	4000	12.00 (304.8)	13.00 (330.2)	13.00 (330.2)	12.00 (304.8)



**Figure 23. Offsets**

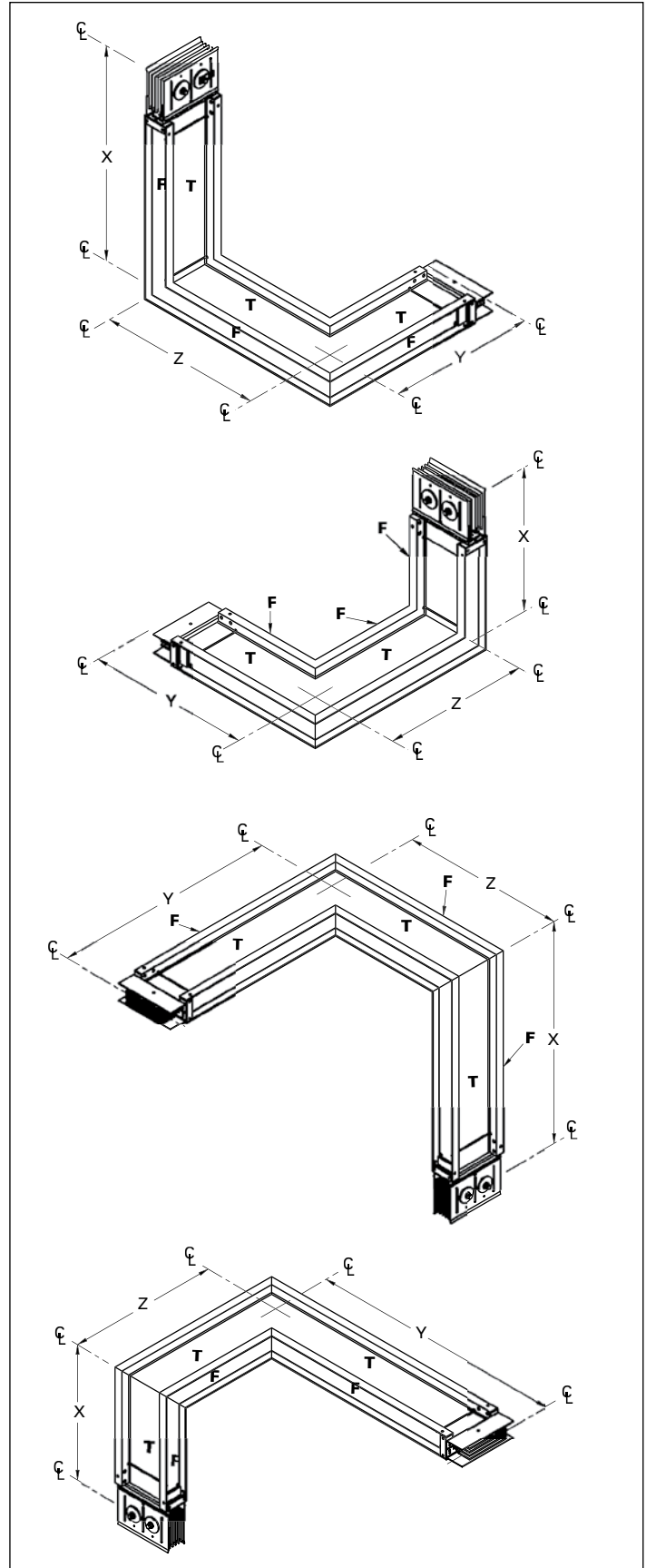
## Physical data (continued)

### Combination offsets (Figure 24)

Combination offsets are used to conform to the building's structure and change direction, using a small amount of space. They are two different oriented elbows fabricated into a single fitting. Forward or rearward directions are determined by the "T" and "F" locations. Please refer to **page 15**. Minimum leg lengths are listed in **Table 30**.

**Table 30. Combination offsets**

Dimensions in inches (mm)						
UL 857 ampere rating		X	Y	Three-wire/ four-wire Z	Four-wire 200% N Z	
Cu	Al				Z	Z
<b>Upward/forward/rearward</b>						
225	225	10.00 (254.0)	13.00 (330.2)	7.00 (177.8)	7.00 (177.8)	
400	400	10.00 (254.0)	13.00 (330.2)	7.00 (177.8)	7.00 (177.8)	
600	600	10.00 (254.0)	13.00 (330.2)	7.00 (177.8)	7.00 (177.8)	
800	—	10.00 (254.0)	13.00 (330.2)	7.00 (177.8)	7.00 (177.8)	
1000	—	10.00 (254.0)	13.00 (330.2)	7.00 (177.8)	7.50 (190.5)	
1200	800	10.00 (254.0)	13.50 (342.9)	7.50 (190.5)	7.50 (190.5)	
1350	1000	10.00 (254.0)	13.50 (342.9)	7.50 (190.5)	8.00 (203.2)	
1600	1200	10.00 (254.0)	14.00 (355.6)	8.00 (203.2)	8.50 (215.9)	
2000	1350	10.00 (254.0)	14.50 (368.3)	9.00 (228.6)	9.00 (228.6)	
—	1600	10.00 (254.0)	15.00 (381.0)	9.00 (228.6)	9.50 (241.3)	
2500	2000	10.00 (254.0)	16.00 (406.4)	10.00 (254.0)	10.50 (266.7)	
3200	—	12.00 (304.8)	18.50 (469.9)	12.50 (317.5)	13.00 (330.2)	
4000	2500	12.00 (304.8)	19.50 (495.3)	14.00 (355.6)	14.00 (355.6)	
—	3200	12.00 (304.8)	20.50 (520.7)	14.50 (368.3)	15.00 (381.0)	
5000	4000	12.00 (304.8)	22.50 (571.5)	16.50 (419.1)	16.50 (419.1)	
<b>Downward/forward/rearward</b>						
225	225	13.00 (330.2)	13.00 (330.2)	7.00 (177.8)	7.00 (177.8)	
400	400	13.00 (330.2)	13.00 (330.2)	7.00 (177.8)	7.00 (177.8)	
600	600	13.00 (330.2)	13.00 (330.2)	7.00 (177.8)	7.00 (177.8)	
800	—	13.00 (330.2)	13.00 (330.2)	7.00 (177.8)	7.00 (177.8)	
1000	—	13.00 (330.2)	13.00 (330.2)	7.00 (177.8)	7.50 (190.5)	
1200	800	13.00 (330.2)	13.50 (342.9)	7.50 (190.5)	7.50 (190.5)	
1350	1000	13.00 (330.2)	13.50 (342.9)	7.50 (190.5)	8.00 (203.2)	
1600	1200	13.00 (330.2)	14.00 (355.6)	8.00 (203.2)	8.50 (215.9)	
2000	1350	13.00 (330.2)	14.50 (368.3)	9.00 (228.6)	9.00 (228.6)	
—	1600	13.00 (330.2)	15.00 (381.0)	9.00 (228.6)	9.50 (241.3)	
2500	2000	13.00 (330.2)	16.00 (406.4)	10.00 (254.0)	10.50 (266.7)	
3200	—	13.00 (330.2)	18.50 (469.9)	12.50 (317.5)	13.00 (330.2)	
4000	2500	13.00 (330.2)	19.50 (495.3)	14.00 (355.6)	14.00 (355.6)	
—	3200	13.00 (330.2)	20.50 (520.7)	14.50 (368.3)	15.00 (381.0)	
5000	4000	13.00 (330.2)	22.50 (571.5)	16.50 (419.1)	16.50 (419.1)	



**Figure 24. Combination offsets**

**Physical data (continued)**

**Tees (Figure 25)**

A tee is a busway fitting suitable for connection in three directions. The minimum leg lengths are shown in **Table 31** and **Table 32**.

**Table 31. Forward and rearward tees**

UL 857 ampere rating		Minimum leg dimensions in inches (mm)				
Cu	Al	X	A	Y	B	C
225	225	13.00 (330.2)	—	13.00 (330.2)	—	—
400	400	13.00 (330.2)	—	13.00 (330.2)	—	—
600	600	13.00 (330.2)	—	13.00 (330.2)	—	—
800	—	13.00 (330.2)	—	13.00 (330.2)	—	—
1000	—	13.00 (330.2)	—	13.00 (330.2)	—	—
1200	800	13.50 (342.9)	—	13.50 (342.9)	—	—
1350	1000	13.50 (342.9)	—	13.50 (342.9)	—	—
1600	1200	14.00 (355.6)	—	14.00 (355.6)	—	—
2000	1350	14.50 (368.3)	—	14.50 (368.3)	—	—
—	1600	15.00 (381.0)	—	15.00 (381.0)	—	—
2500	2000	16.00 (406.4)	—	16.00 (406.4)	—	—
3200	—	27.25 (692.2)	8.00 (203.2)	26.38 (670.1)	19.39 (492.5)	21.12 (536.4)
4000	2500	28.50 (723.9)	8.00 (203.2)	27.62 (701.6)	21.88 (555.8)	23.63 (600.2)
—	3200	29.25 (743.0)	8.00 (203.2)	28.38 (720.9)	23.41 (594.6)	25.12 (638.0)
5000	4000	31.00 (787.4)	8.00 (203.2)	30.12 (765.1)	26.94 (684.3)	28.63 (727.2)

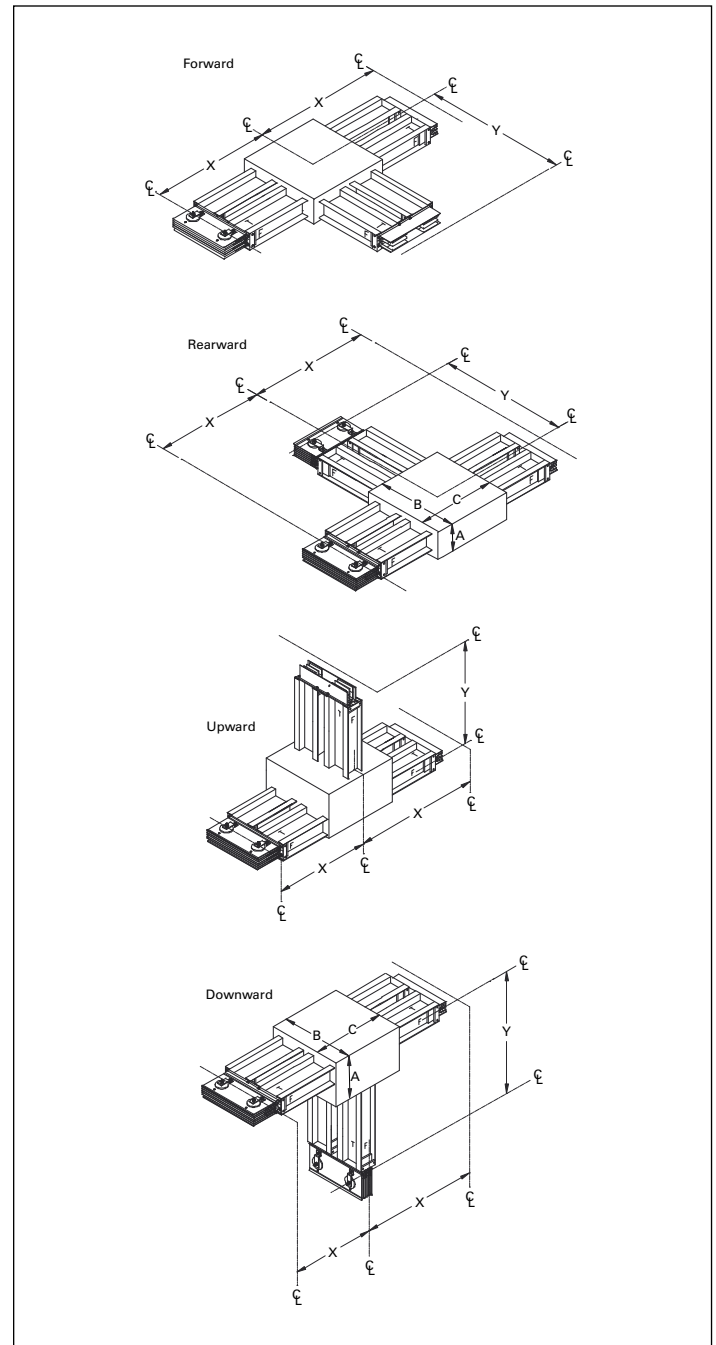
**Note:** All dimensions are to the centerline of the Pow-R-Bridge.

**Table 32. Upward and downward tees**

UL 857 ampere rating		Minimum leg dimensions in inches (mm)				
Cu	Al	X	A	Y	B	C
225	225	21.25 (539.8)	12.25 (311.2)	25.50 (647.7)	5.00 (127.0)	9.25 (235.0)
400	400	21.25 (539.8)	12.25 (311.2)	25.50 (647.7)	5.00 (127.0)	9.25 (235.0)
600	600	21.25 (539.8)	12.25 (311.2)	25.50 (647.7)	5.00 (127.0)	9.25 (235.0)
800	—	21.25 (539.8)	12.25 (311.2)	25.50 (647.7)	5.00 (127.0)	9.25 (235.0)
1000	—	21.88 (555.8)	12.25 (311.2)	25.50 (647.7)	5.62 (142.7)	10.50 (266.7)
1200	800	22.38 (568.5)	12.25 (311.2)	25.50 (647.7)	6.12 (155.4)	11.50 (292.1)
1350	1000	22.88 (581.2)	12.25 (311.2)	25.50 (647.7)	6.62 (168.1)	12.50 (317.5)
1600	1200	23.88 (606.6)	12.25 (311.2)	25.50 (647.7)	7.62 (193.5)	14.50 (368.3)
2000	1350	25.12 (638.1)	12.25 (311.2)	25.50 (647.7)	8.65 (219.7)	17.00 (431.8)
—	1600	25.88 (657.4)	12.25 (311.2)	25.50 (647.7)	9.65 (245.1)	18.50 (470.0)

**Table 32. Upward and downward tees (continued)**

UL 857 ampere rating		Minimum leg dimensions in inches (mm)				
Cu	Al	X	A	Y	B	C
2500	2000	27.62 (701.6)	12.25 (311.2)	25.50 (647.7)	11.42 (290.1)	22.00 (558.8)
3200	—	23.88 (606.6)	12.25 (311.2)	25.50 (647.7)	16.38 (416.1)	14.50 (368.3)
4000	2500	25.12 (638.1)	12.25 (311.2)	25.50 (647.7)	18.65 (473.7)	17.00 (431.8)
—	3200	25.88 (637.4)	12.25 (311.2)	25.50 (647.7)	20.41 (518.4)	18.50 (470.0)
5000	4000	27.62 (701.6)	12.25 (311.2)	25.50 (647.7)	23.94 (608.1)	22.00 (558.8)



**Figure 25. Tees**

**Physical data (continued)**

**Crosses (Figure 26)**

A cross is a busway fitting suitable for connection in four directions. It is applied when a bus run must branch off in three directions, all in the same plane.

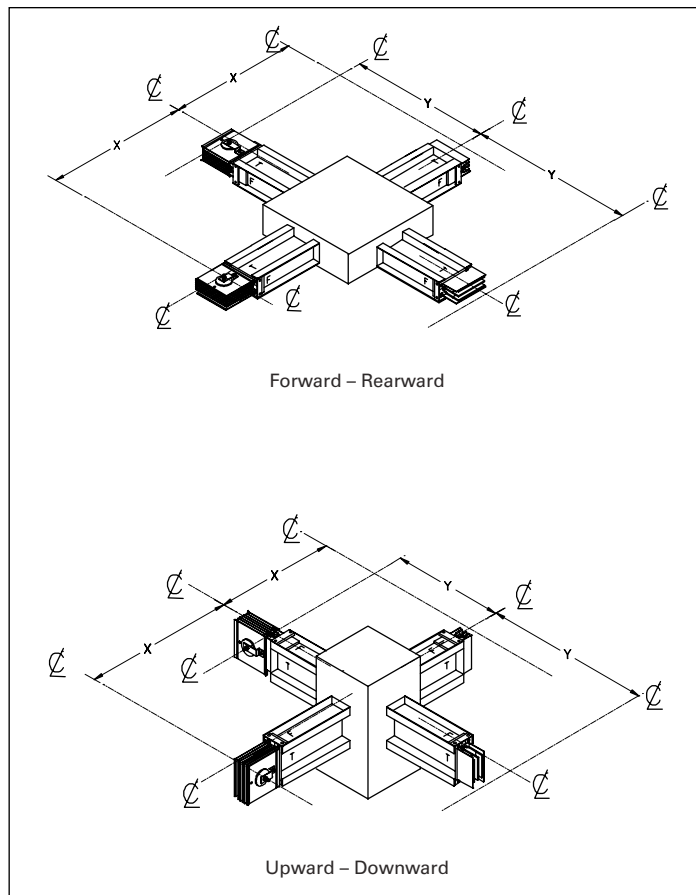
**Table 33. Forward and rearward crosses**

UL 857 ampere rating		Minimum leg dimensions in inches (mm)	
Cu	Al	X	Y
225	225	13.00 (330.2)	13.00 (330.2)
400	400	13.00 (330.2)	13.00 (330.2)
600	600	13.00 (330.2)	13.00 (330.2)
800	—	13.00 (330.2)	13.00 (330.2)
1000	—	13.00 (330.2)	13.00 (330.2)
1200	800	13.50 (342.9)	13.50 (342.9)
1350	1000	13.50 (342.9)	13.50 (342.9)
1600	1200	14.00 (355.6)	14.00 (355.6)
2000	1350	14.50 (368.3)	14.50 (368.3)
—	1600	15.00 (381.0)	15.00 (381.0)
2500	2000	16.00 (406.4)	16.00 (406.4)
3200	—	23.00 (584.2)	23.00 (584.2)
4000	2500	24.00 (609.6)	24.00 (609.6)
—	3200	25.00 (635.0)	25.00 (635.0)
5000	4000	26.00 (660.4)	26.00 (660.4)

**Note:** All dimensions are to the centerline of the Pow-R-Bridge. For 5000 A Cu and 4000 A Al, these are fixed leg length dimensions.

**Table 34. Upward and downward crosses**

UL 857 ampere rating		Minimum leg dimensions in inches (mm)	
Cu	Al	X	Y
225	225	21.25 (539.8)	25.50 (647.7)
400	400	21.25 (539.8)	25.50 (647.7)
600	600	21.25 (539.8)	25.50 (647.7)
800	—	21.25 (539.8)	25.50 (647.7)
1000	—	21.88 (555.8)	25.50 (647.7)
1200	800	22.38 (568.5)	25.50 (647.7)
1350	1000	22.88 (581.2)	25.50 (647.7)
1600	1200	23.88 (606.6)	25.50 (647.7)
2000	1350	25.12 (638.1)	25.50 (647.7)
—	1600	25.88 (657.4)	25.50 (647.7)
2500	2000	27.62 (701.6)	25.50 (647.7)
3200	—	23.88 (606.6)	25.50 (647.7)
4000	2500	25.12 (638.1)	25.50 (647.7)
—	3200	25.88 (637.4)	25.50 (647.7)
5000	4000	27.62 (701.6)	25.50 (647.7)



**Figure 26. Crosses**

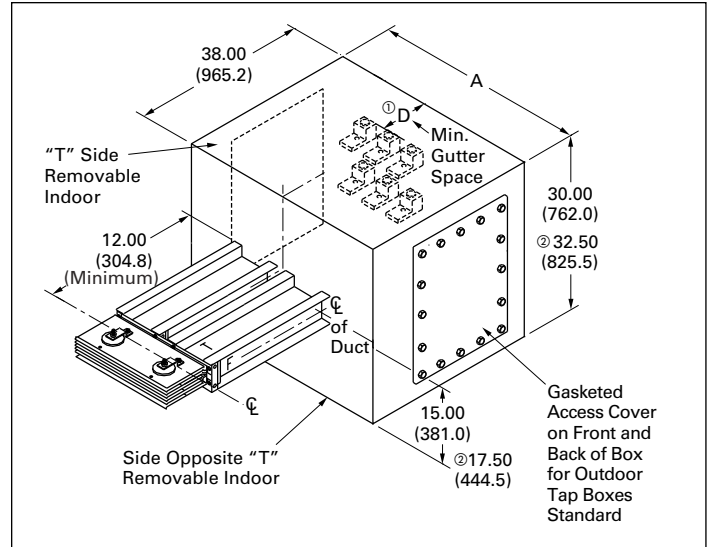


**Physical data (continued)**

**End cable tap box (Figure 27)**

End cable tap boxes are used to feed a run of busway with cable and conduit or where loads served by busway are connected without the need for overcurrent protection. For indoor applications, the “T” side, side opposite “T,” and the end panel are removable for access to the lugs. For outdoor applications, these panels are gasketed to prevent moisture from entering. In addition, the outdoor end cable tap boxes are provided with removable gasketed side access panels located on the “F” and side opposite “F” for more accessibility to the lugs. Removable side access panels are available on indoor cable tap boxes upon request.

**Note:** All dimensions are to the centerline of the Pow-R-Bridge.



**Figure 27. End cable tap box**

- ① Dimension D: For mechanical lugs = 21.34 inches (542.0 mm).  
For compression lugs = 19.44 inches (493.8 mm).
- ② 200% neutral.

**Table 35. End cable tap box dimension**

Copper		Aluminum		Quantity of mechanical terminals, range—one #4 (20 mm <sup>2</sup> )–600 kcmil (300 mm <sup>2</sup> ), two 1/0 (50 mm <sup>2</sup> )–250 kcmil (120 mm <sup>2</sup> ) ①					
UL 857 ampere rating	Dimension A in inches (mm) ②	UL 857 ampere rating	Dimension A in inches (mm) ②	Copper			Aluminum		
				G ③	P ④	N ⑤	G ③	P ④	N ⑤
225	12.00 (304.8)	225	12.00 (304.8)	1	2	4	1	2	4
400	12.00 (304.8)	400	12.00 (304.8)	1	2	4	1	2	4
600	12.00 (304.8)	600	12.00 (304.8)	1	2	4	—	—	—
800	12.00 (304.8)	—	12.00 (304.8)	2	3	5	1	2	4
1000	12.00 (304.8)	—	12.00 (304.8)	2	3	6	—	—	—
1200	12.00 (304.8)	800	12.00 (304.8)	2	4	8	2	3	5
1350	12.00 (304.8)	1000	12.00 (304.8)	2	4	8	2	3	6
1600	20.50 (520.7)	1200	12.00 (304.8)	3	5	9	2	4	8
2000	20.50 (520.7)	1350	20.50 (520.7)	3	6	12	2	—	8
—	—	1600	24.50 (622.3)	—	—	—	3	5	9
2500	24.50 (622.3)	2000	24.50 (622.3)	4	8	16	3	6	12
3200	30.50 (774.5)	—	—	5	9	18	—	—	—
4000	45.00 (1143.0)	2500	30.50 (774.5)	6	12	24	4	8	16
—	—	3200	30.50 (774.5)	—	—	—	5	9	18
5000	45.00 (1143.0)	4000	45.00 (1143.0)	7	15	30	6	12	24

- ① For compression lugs, factory provides provisions only.
- ② All dimensions shown in **Figure 27** remain constant regardless of system wiring configuration.
- ③ Denotes quantity of terminals per ground bus.
- ④ Denotes quantity of terminals per phase and 100% neutral bus.
- ⑤ Denotes quantity of terminals per 200% neutral bus option.

**Physical data (continued)**

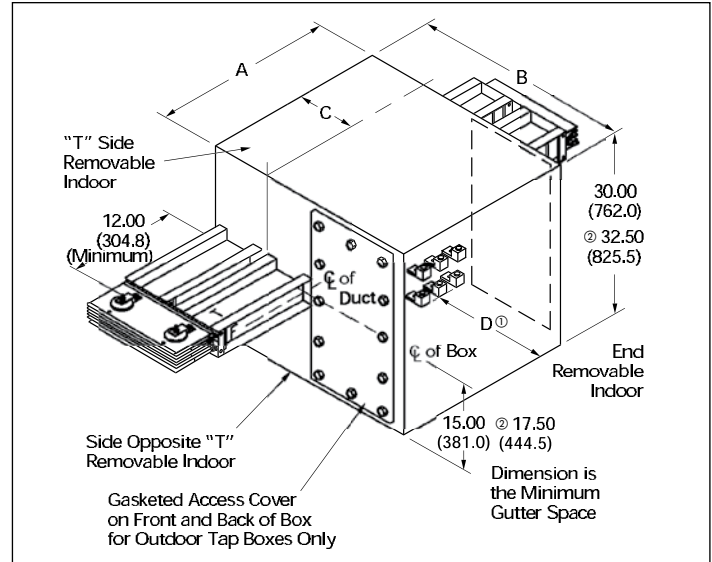
**Center cable tap box (Figure 28)**

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 for overcurrent protection. For indoor applications, the “T” side, side opposite “T,” and the end panel are removable for access to the lugs. For outdoor applications, these panels are gasketed to prevent moisture from entering. In addition, the outdoor center cable tap boxes are provided with removable gasketed access panels located on the front and back for more accessibility to the lugs.

**Note:** All dimensions are to the centerline of the Pow-R-Bridge.

**Table 36. Center tap box details—dimension C**

Dimension C in inches (mm)				
Copper				
225–1350 A	1600–2000 A	2500 A	3200 A	4000–5000 A
3.63 (92.2)	4.75 (120.7)	6.00 (152.4)	10.75 (273.1)	12.25 (311.2)
Aluminum				
225–1000 A	1200–1350 A	160–2000 A	2500–3200 A	4000 A
3.63 (92.2)	4.75 (120.7)	6.00 (152.4)	10.75 (273.1)	12.25 (311.2)



**Figure 28. Center cable tap box**

- ① Dimension D: For mechanical lugs = 21.34 inches (542.0 mm).  
For compression lugs = 19.25 inches (489.0 mm).
- ② 200% neutral.

**Table 37. Center tap box details—dimensions A and B**

Copper		Aluminum		Quantity of mechanical terminals, range—one #4 (20 mm <sup>2</sup> )—600 kcmil (300 mm <sup>2</sup> ), two 1/0 (50 mm <sup>2</sup> )—250 kcmil (120 mm <sup>2</sup> ) ①							
UL 857 ampere rating	Dimensions in inches (mm)		UL 857 ampere rating	Dimensions in inches (mm)		Copper			Aluminum		
	A ②	B ②		A ②	B ②	G ③	P ④	N ⑤	G ③	P ④	N ⑤
225	16.50 (419.1)	40.00 (1016.0)	225	16.50 (419.1)	40.00 (1016.0)	1	2	4	1	2	4
400	16.50 (419.1)	40.00 (1016.0)	400	16.50 (419.1)	40.00 (1016.0)	1	2	4	1	2	4
600	16.50 (419.1)	40.00 (1016.0)	600	16.50 (419.1)	40.00 (1016.0)	1	2	4	—	—	—
800	16.50 (419.1)	40.00 (1016.0)	—	16.50 (419.1)	40.00 (1016.0)	2	3	5	1	2	4
1000	16.50 (419.1)	40.00 (1016.0)	—	16.50 (419.1)	40.00 (1016.0)	2	3	6	—	—	—
1200	16.50 (419.1)	40.00 (1016.0)	800	16.50 (419.1)	40.00 (1016.0)	2	4	8	2	3	5
1350	16.50 (419.1)	40.00 (1016.0)	1000	16.50 (419.1)	40.00 (1016.0)	2	4	8	2	3	6
1600	20.50 (520.7)	42.50 (1079.5)	1200	20.50 (520.7)	42.50 (1079.5)	3	5	9	2	4	8
2000	20.50 (520.7)	42.50 (1079.5)	1350	20.50 (520.7)	42.50 (1079.5)	3	6	12	2	4	8
—	—	—	1600	24.50 (622.3)	45.00 (1143.0)	—	—	—	3	5	9
2500	24.50 (622.3)	45.00 (1143.0)	2000	24.50 (622.3)	45.00 (1143.0)	4	8	16	3	6	12
3200	30.38 (774.5)	58.00 (1473.2)	—	—	—	5	9	18	—	—	—
4000	45.00 (1143.0)	60.50 (1536.7)	2500	30.38 (771.7)	58.00 (1473.0)	6	12	24	4	8	16
—	—	—	3200	30.38 (771.7)	58.00 (1473.0)	—	—	—	5	9	18
5000	45.00 (1143.0)	60.50 (1536.7)	4000	45.00 (1143.0)	60.50 (1536.7)	7	15	30	6	12	24

- ① For compression lugs, factory provides provisions only.
- ② All dimensions shown in **Figure 28** remain constant regardless of system wiring configuration.
- ③ Denotes quantity of terminals per ground bus.
- ④ Denotes quantity of terminals per phase and 100% neutral bus.
- ⑤ Denotes quantity of terminals per 200% neutral bus option.

## Physical data (continued)

### Weatherheads (Figure 29)

Weatherheads are used for service entrance connections to busway. The side opposite of "T" is removable for access to the lugs.

**Note:** All dimensions are to the centerline of the Pow-R-Bridge.

**Table 38. Weatherhead details**

Copper		Aluminum		Quantity of mechanical terminals, range—one #4 (20 mm <sup>2</sup> )–600 kcmil (300 mm <sup>2</sup> ), two 1/0 (50 mm <sup>2</sup> )–250 kcmil (120 mm <sup>2</sup> ) ①					
UL 857 ampere rating	Minimum dimensions in inches (mm)	UL 857 ampere rating	Minimum dimensions in inches (mm)	Copper			Aluminum		
	A		A	G ③	P ④	N ⑤	G ③	P ④	N ⑤
225	16.50 (419.1)	225	16.50 (419.1)	1	2	4	1	2	4
400	16.50 (419.1)	400	16.50 (419.1)	1	2	4	1	2	4
600	16.50 (419.1)	600	16.50 (419.1)	1	2	4	—	—	—
800	16.50 (419.1)	—	—	2	3	5	1	2	4
1000	16.50 (419.1)	—	—	2	3	6	—	—	—
1200	16.50 (419.1)	800	16.50 (419.1)	2	4	8	2	3	5
1350	16.50 (419.1)	1000	16.50 (419.1)	2	4	8	2	3	6
1600	16.50 (419.1)	1200	16.50 (419.1)	3	5	9	2	4	8
2000	16.50 (419.1)	1350	16.50 (419.1)	3	6	12	2	4	8
—	—	1600	16.50 (419.1)	—	—	—	3	5	9
2500	30.00 (762.0)	2000	16.50 (419.1)	4	8	16	3	6	12
3200	30.00 (762.0)	—	—	5	9	18	—	—	—
4000	40.00 (1016.0)	2500	30.00 (762.0)	6	12	24	4	8	16
—	—	3200	30.00 (762.0)	—	—	—	5	9	18
5000	40.00 (1016.0)	4000	40.00 (1016.0)	7	15	30	6	12	24

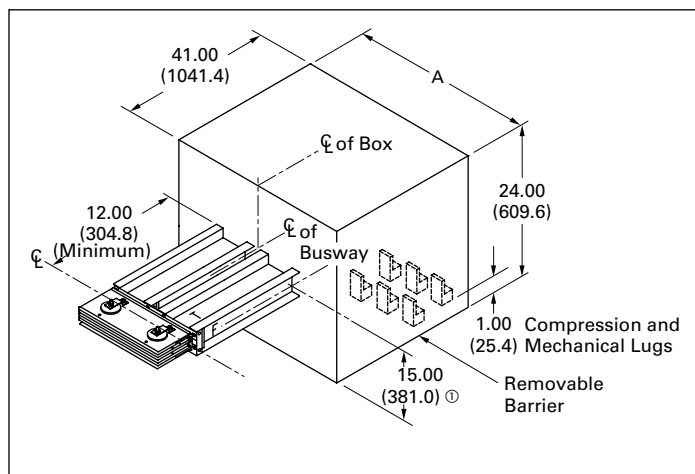
① For compression lugs, factory provides provisions only.

② 200% neutral.

③ Denotes quantity of terminals per ground bus.

④ Denotes quantity of terminals per phase and 100% neutral bus.

⑤ Denotes quantity of terminals per 200% neutral bus option.



**Figure 29. Weatherhead details**

① 17.50 (444.5)

## Physical data (continued)

### Expansion joints (Figure 30)

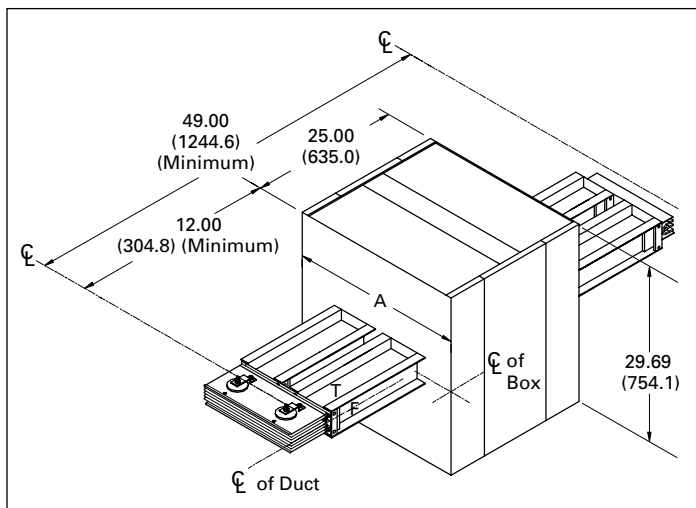
Expansion joints accommodate the expansion and contraction of bus bars with respect to the enclosure. They compensate for the difference in the coefficient of expansion of the aluminum housing and the copper or aluminum bus bars. Expansion joints must be used wherever a run of busway crosses an expansion joint of a building. They should also be installed in the center of extremely long straight runs of busway in which the run does not change planes either horizontally or vertically. One expansion joint is required every 300 ft (91 m) for copper or one every 225 ft (68 m) for aluminum. The use of expansion joints should be engineered for individual installations. Minimum dimensions are shown in **Table 39**.

**Note:** All dimensions are to the centerline of the Pow-R-Bridge.

**Table 39. Expansion joints**

UL 857 ampere rating		Dimensions in inches (mm)
Cu	Al	A ①
225	225	12.00 (304.8)
400	400	12.00 (304.8)
600	600	12.00 (304.8)
800	—	12.00 (304.8)
1000	—	12.00 (304.8)
1200	800	12.00 (304.8)
1350	1000	16.50 (419.1)
1600	1200	16.50 (419.1)
2000	1350	16.50 (419.1)
—	1600	16.50 (419.1)
2500	2000	20.50 (520.7)
3200	—	20.50 (520.7)
4000	2500	24.50 (622.3)
—	3200	24.50 (622.3)
5000	4000	30.25 (768.4)

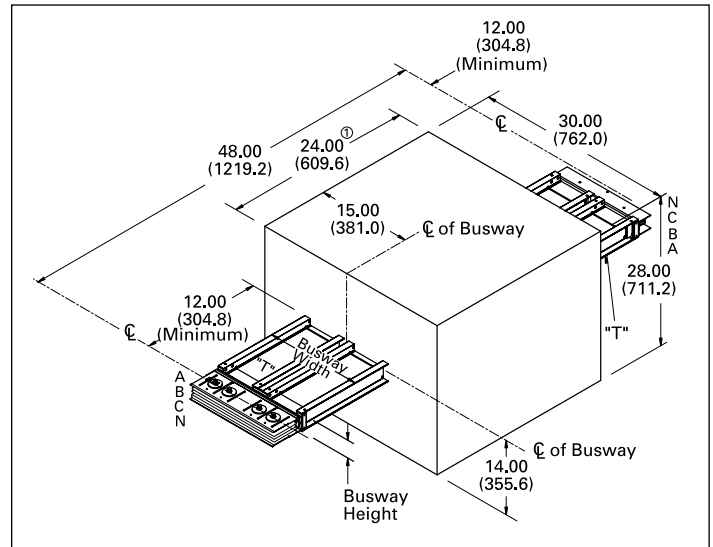
① Dimensions shown are for three-phase, three-wire and three-phase 100% neutral configurations. Please consult factory for 200% neutral sizes.



**Figure 30. Expansion joints**

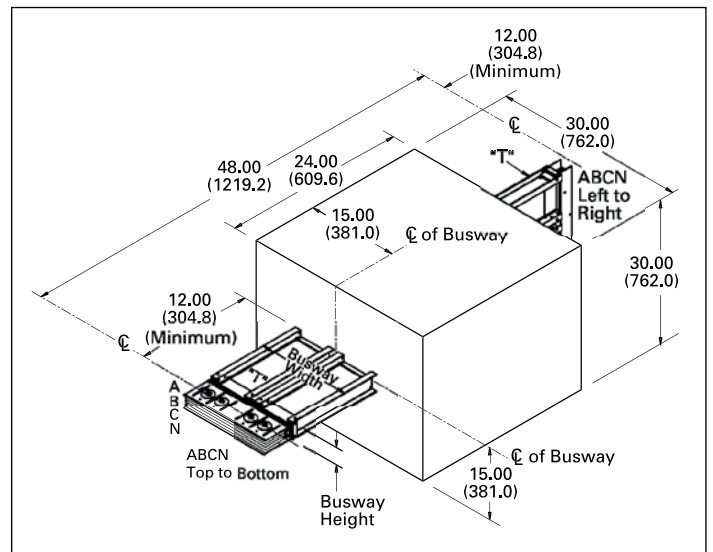
### Phase transpositions (Figure 31 and Figure 32)

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. Both 90° and 180° rotations are possible. In each case, all conductors are rotated.



**Figure 31. 180° transposition—dimensions in inches (mm)**

① For 5000 A Cu configuration, the box length will be 28.00 inches instead of 24.00 inches as shown.

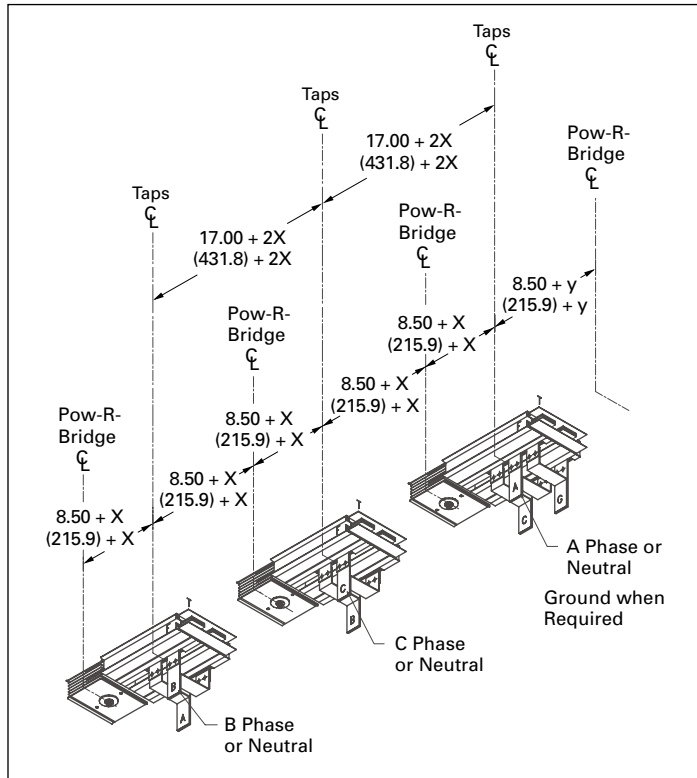


**Figure 32. 90° transposition—dimensions in inches (mm)**

**Physical data (continued)**

**Single-phase transformer taps (Figure 33)**

Single-phase transformer taps arrangements are used for connections to three single-phase transformers. The bus extensions do not include drilling or lugs (see **Figure 2** on **page 2** for wiring configuration designations).



**Figure 33. Three single-phase transformer taps**

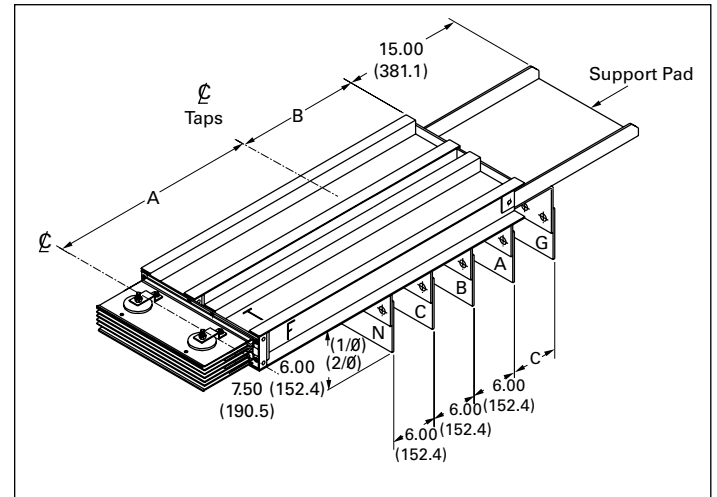
**Table 40. Single-phase transformer taps**

UL 857 ampere rating		Minimum dimensions in inches (mm)	
Cu	Al	X	Y ①
225	225	4.00 (101.6)	7.00 (177.8)
400	400	4.00 (101.6)	7.00 (177.8)
600	600	4.00 (101.6)	7.00 (177.8)
800	—	4.00 (101.6)	7.00 (177.8)
1000	—	4.50 (114.3)	9.75 (247.7)
1200	800	5.00 (127.0)	10.75 (273.1)
1350	1000	5.50 (139.7)	11.75 (298.5)
1600	1200	6.50 (165.1)	13.75 (349.3)
2000	1350	7.75 (196.9)	16.25 (412.8)
—	1600	8.50 (215.9)	17.50 (444.5)
2500	2000	10.25 (260.4)	21.25 (539.8)
3200	—	6.50 (165.1)	13.75 (349.3)
4000	2500	7.75 (196.9)	16.25 (412.8)
—	3200	8.50 (215.9)	17.50 (444.5)
5000	4000	10.25 (260.4)	21.25 (539.8)

① Includes ground tap.

**Three-phase transformer taps (Figure 34)**

Three-phase transformer taps are used when making connections to a three-phase transformer. The bus extensions do not include drilling or lugs.



**Figure 34. Three-phase transformer taps**

**Table 41. A minimum dimensions**

Wire designation	3W/3WH	3WG/3WHG/3WI	4W/4WH	4WG/4WHG/4WI/4WNG/4WNHG/4WNI
Inches	16.50	16.50	19.50	19.50
mm	419.1	419.1	495.3	495.3

**Table 42. B minimum dimensions**

Wire designation	3W/3WH	3WG/3WHG/3WI	4W/4WH	4WG/4WHG/4WI/4WNG/4WNHG/4WNI
Inches	6.25	12.12	9.25	15.12
mm	158.8	307.8	235.0	384.0

**Table 43. C minimum dimensions**

Wire designation	50% housing ground	50% integral ground and 100% ground
Inches	3.00	6.00
mm	76.2	152.4

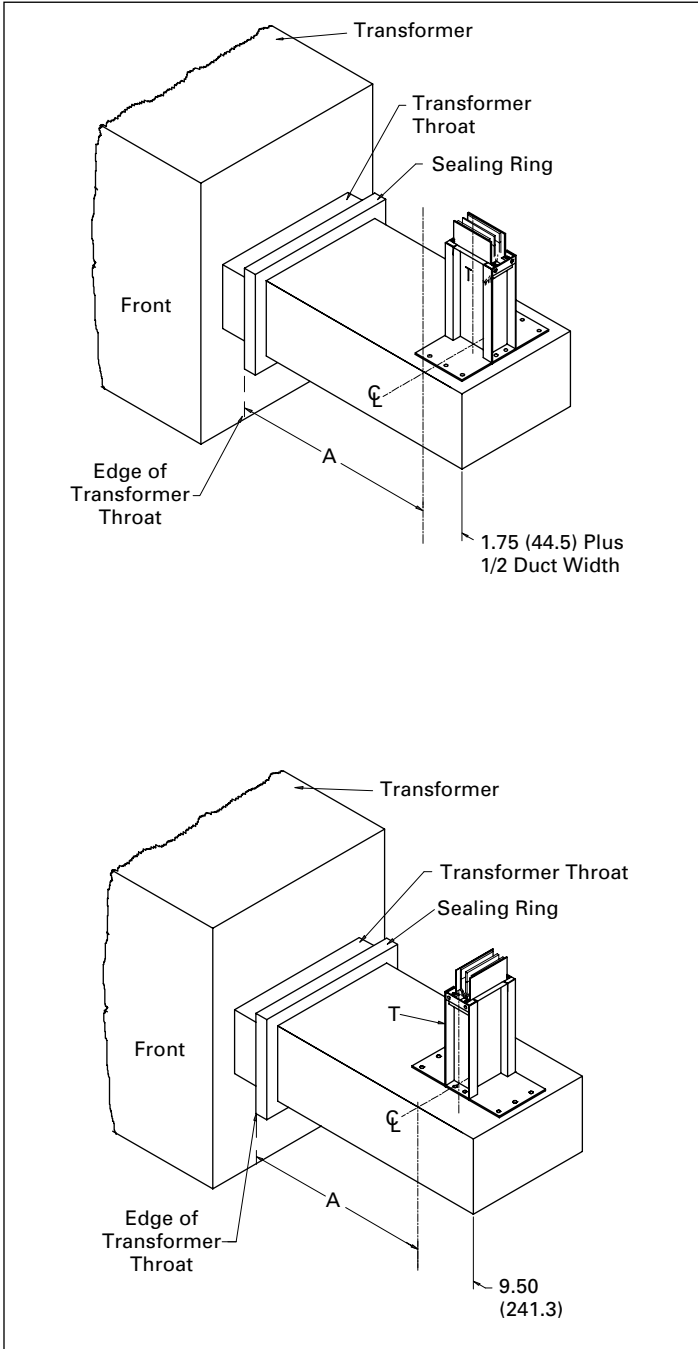
**Physical data (continued)**

**Transformer throat connections (Figure 35 and Figure 36)**

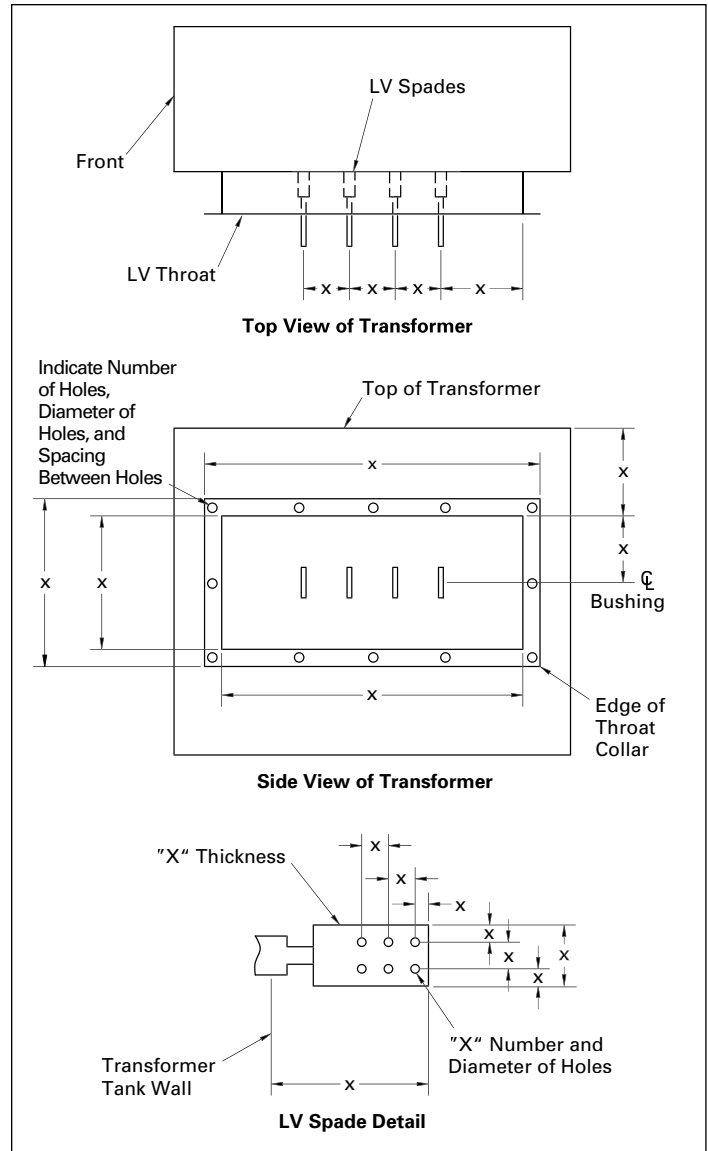
A transformer throat is used when making connections to a liquid-filled substation transformer. All transformer throat connections include flexible connectors between the transformer low-voltage spades and Pow-R-Way III bus bars. For transformers with drilled flanges, the busway will bolt to the transformer throat instead of using a sealing ring.

**Table 44. Transformer throat connections**

UL 857 ampere rating	Bars per phase	Minimum dimensions in inches (mm)	
		A	
<b>Aluminum</b>			
225–1350	1	26.00 (660.4)	
1600–2000	1	28.50 (723.9)	
2500–4000	2	31.50 (800.1)	
<b>Copper</b>			
225–2000	1	26.00 (660.4)	
2500	1	28.50 (723.9)	
3200–5000	2	31.50 (800.1)	



**Figure 35. Transformer throat**

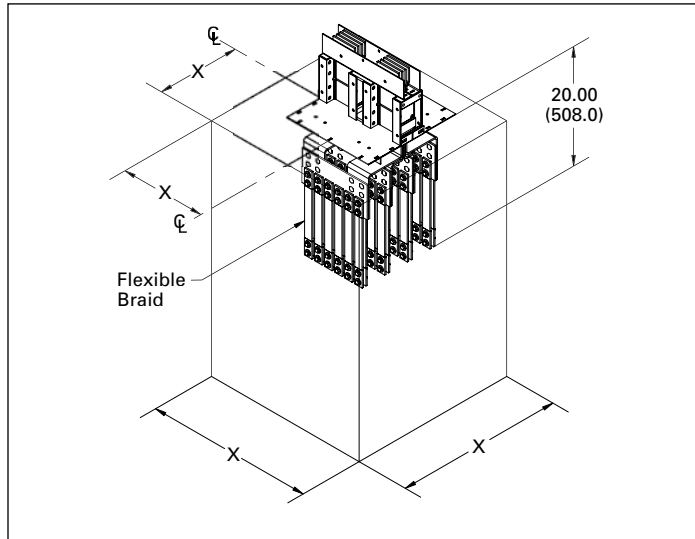


**Figure 36. Transformer throat connection detail**

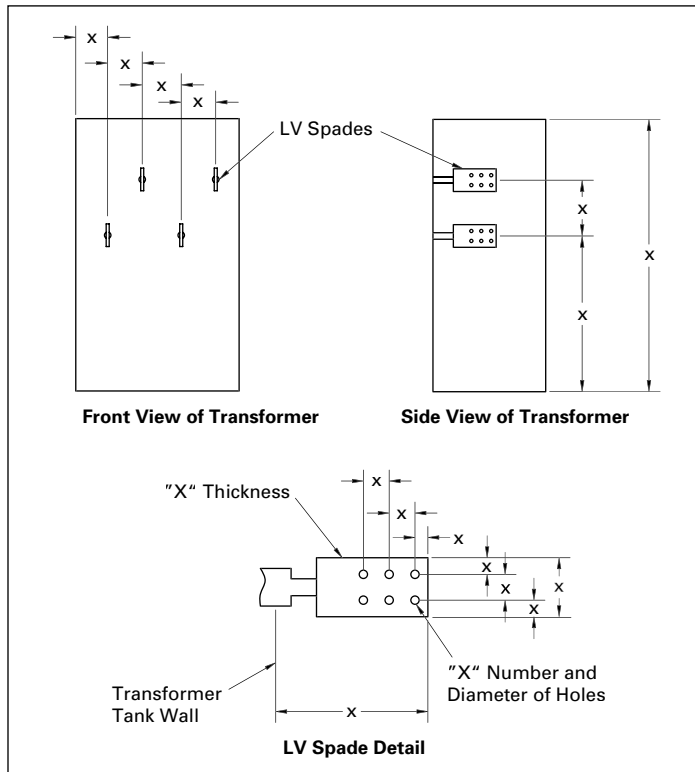
**Physical data (continued)**

**Transformer flange connections (Figure 37 and Figure 38)**

Transformer flange connections are used when making a connection to a dry-type substation transformer. Transformer flange connections include flexible connectors between the transformer low-voltage spades and the Pow-R-Way III flange bus bars. Hardware is supplied to bolt the flange plate to the transformer enclosure.



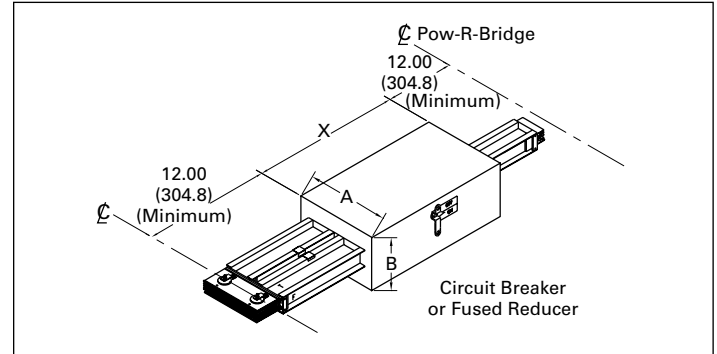
**Figure 37. Transformer flange connections**



**Figure 38. Transformer flange connection detail**

**Protected reducers (Figure 39)**

Protected reducers are used to reduce the ampacity of busway using either a circuit breaker or a fused, non-automatic circuit breaker overprotection device. Both serve as a disconnecting means. The line side of the cubicle is connected to the higher rated busway and the load side is connected to the lower (reduced) rated busway.



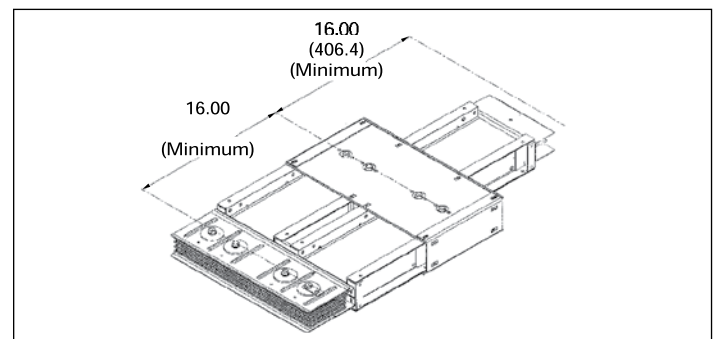
**Figure 39. Circuit breaker or fused reducer**

**Table 45. Circuit breaker and fused reducer dimensions**

Breaker amperes	Circuit breaker reducer			Fuse rating	Fusible switch reducer		
	Inches (mm)				Inches (mm)		
	A	B	X		A	B	X
225	18.25 (463.6)	18.00 (457.2)	34.00 (863.6)	200	18.25 (463.6)	18.00 (457.2)	42.25 (1073.2)
400	18.25 (463.6)	18.00 (457.2)	34.00 (863.6)	400	18.25 (463.6)	18.00 (457.2)	54.00 (1371.6)
600	18.25 (463.6)	18.00 (457.2)	34.00 (863.6)	600	18.25 (463.6)	18.00 (457.2)	60.00 (1524.0)
800	18.25 (463.6)	18.00 (457.2)	42.25 (1073.2)	800	18.25 (463.6)	18.00 (457.2)	60.00 (1524.0)
1000	18.25 (463.6)	18.00 (457.2)	42.25 (1073.2)	1000	18.25 (463.6)	18.00 (457.2)	60.00 (1524.0)
1200	18.25 (463.6)	18.00 (457.2)	42.25 (1073.2)	1200	18.25 (463.6)	18.00 (457.2)	60.00 (1524.0)
1600	26.25 (666.8)	20.00 (508.0)	48.00 (1219.2)	—	—	—	—
2000	26.25 (666.8)	20.00 (508.0)	48.00 (1219.2)	—	—	—	—
2500	26.25 (666.8)	20.00 (508.0)	48.00 (1219.2)	—	—	—	—

**Non-protected reducers (Figure 40)**

Non-protected reducers are used to reduce the ampacity of the busway without overcurrent devices. Per NEC Section 368.17, for industrial applications, no overcurrent protection is required where the busway is reduced in size, provided the length of the smaller busway does not extend more than 50 ft (15.2 m) and has a current rating of at least one-third of the first upstream overcurrent device.



**Figure 40. Non-fused reducer**

**Physical data (continued)**

**Meter center power takeoffs**

Meter center power takeoffs (PTO) are designed to tap power off the busway and feed tenant meter stacks in high-rise applications. There are two types of power takeoffs, bridge joint and in-line. Both devices are UL Listed.

**Bridge joint PTO**

The bridge joint PTO shown in **Figure 41** mounts to the right or left side of the busway at a joint between two sections of busway. The bridge joint PTO comes with a main circuit breaker or main fusible switch. Bridge joint PTOs should be ordered with the meter stacks through the Eaton Lincoln, IL, facility.

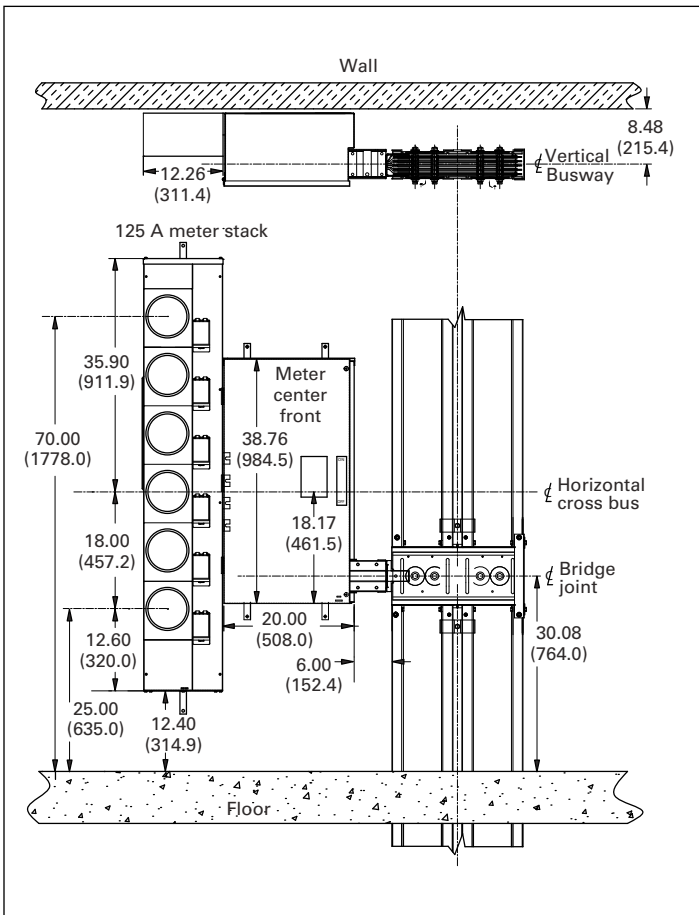
The height of the busway bridge joint must be coordinated to meet local utility/code requirements for minimum/maximum meter socket heights. All dimensions shown are for reference only showing a typical installation.

**In-line PTO**

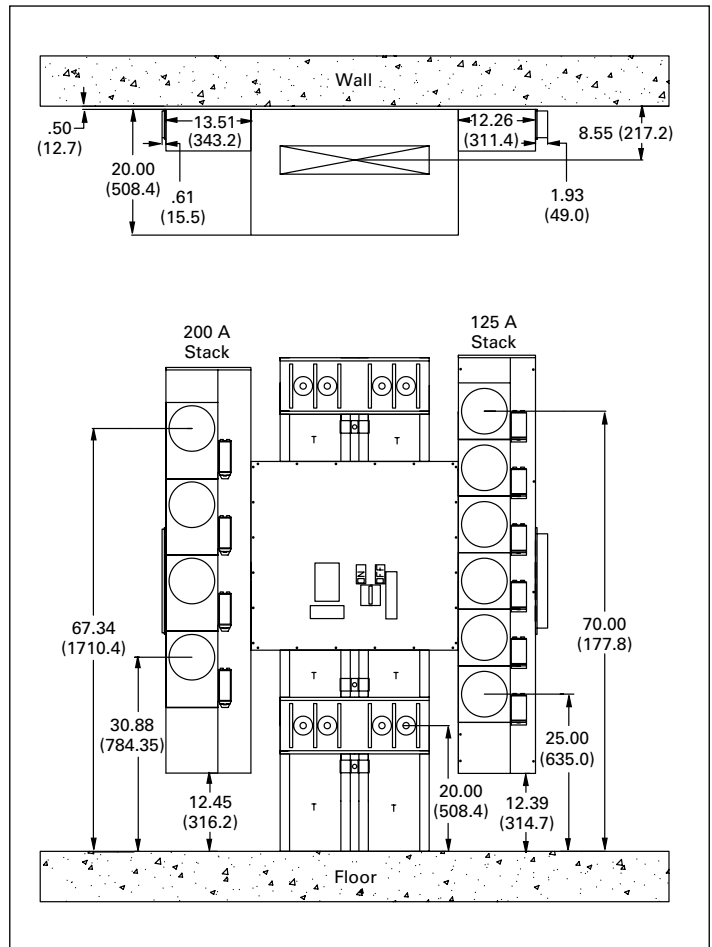
The in-line PTO shown in **Figure 42** is built integral with the busway, having the busway pass through the device. This space-saving design reduces the horizontal wall space by up to 24.00 inches (609.6 mm). With this device, there is no need to install a separate main device; saving installation time and money. This device is available with a main circuit breaker, main fusible switch, or no main device. In-line PTOs should be ordered with the busway through the Eaton Greenwood, SC, facility.

The height of the first busway joint up through the floor must be coordinated to meet local utility/code requirements for minimum/maximum meter socket heights. The minimum distance from the surface on which the vertical hanger assembly will be installed on (finished floor or preformed curb) to the first joint is 16.00 inches (406.4 mm). Meter stack may be placed to the left, right, or both sides of the main device. All dimensions shown are for reference only showing a typical installation.

**Note:** If 5-high 200 A meter stacks are used, it is recommended to increase the bridge joint height from 20.00 inches (508.0 mm) to 22.00–24.00 inches (558.8–609.6 mm). Attention must be given to the minimum/maximum heights of the meter sockets.



**Figure 41. Bridge joint PTO**



**Figure 42. In-line PTO**



**Physical data (continued)**

**In-line power takeoff**

**Main circuit breaker PTO**

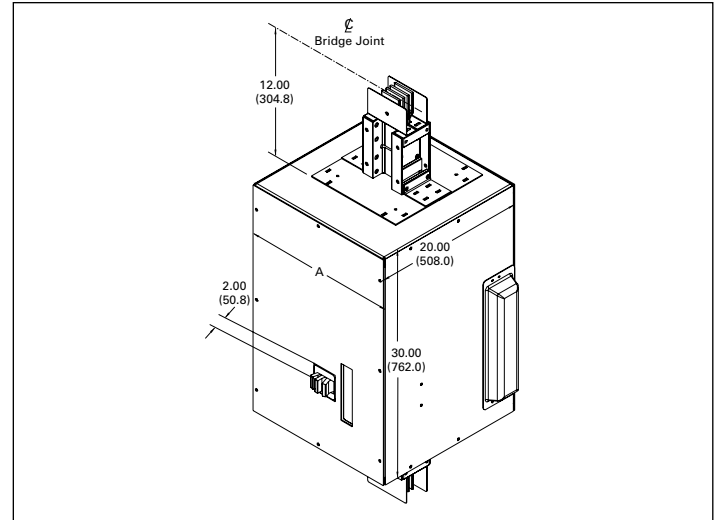
The in-line main circuit breaker PTO shown in **Figure 43** is available with trip ratings from 300 A to 1200 A; using L, M, and N frame circuit breakers. This device is indoor rated and may be weatherized upon request. See **Table 46** for dimensions and ratings.

**Main fusible switch PTO**

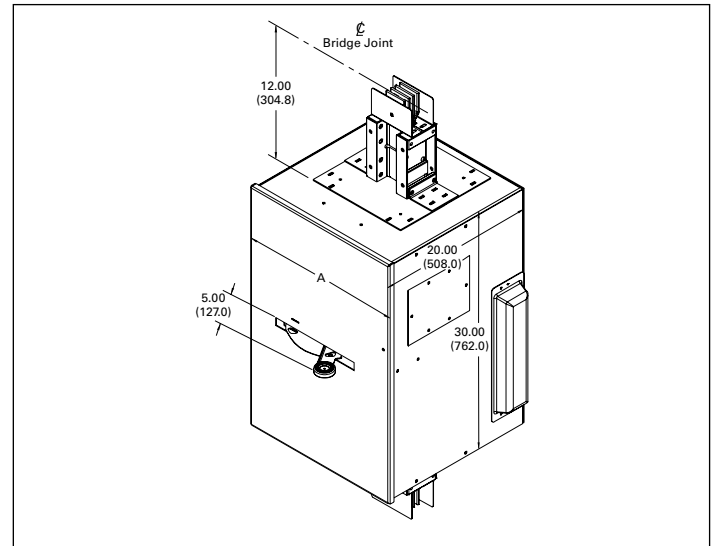
The in-line main fusible switch PTO shown in **Figure 44** is available with 400, 600, and 800 A switches; using Class “T” fuses. This device is indoor rated only. The switch handle is mounted in front, eliminating interference with the meter sockets and the need for spacers between the main device and meter stack. It comes with a hinged door, giving easy access to the fuses mounted below the main switch. See **Table 46** for dimensions and ratings.

**Unprotected PTO**

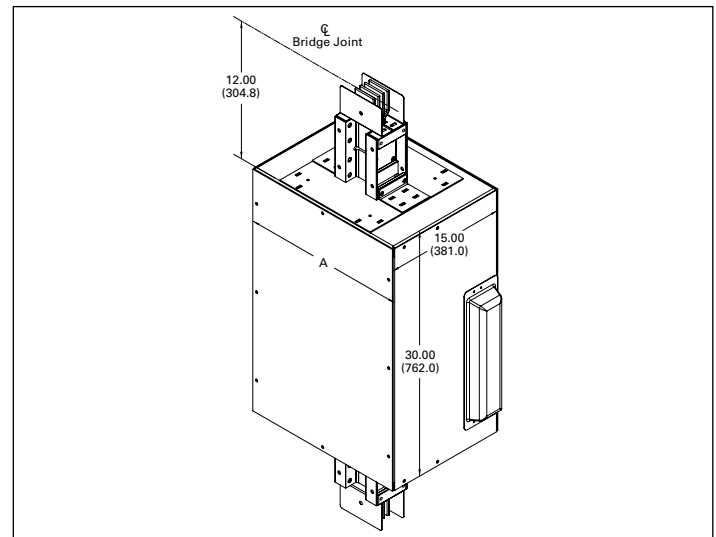
The in-line PTO with no main device shown in **Figure 45** comes with 1200 A horizontal cross bus as standard. This device is intended for use with six meter sockets or less or as local code permits. See **Table 46** for dimensions and ratings.



**Figure 43. Main breaker**



**Figure 44. Main fusible switch**



**Figure 45. Unprotected PTO**

**Table 46. In-line PTO dimensions and ratings**

Device	Short-circuit rating (kAIC)	A dimensions in inches (mm)	
		Single bar per phase	Two bar per phase
<b>Main circuit breaker</b>			
LD	65	20.00 (508.0)	33.00 (838.2)
HLD	100	20.00 (508.0)	33.00 (838.2)
MDL	65	20.00 (508.0)	33.00 (838.2)
HMDL	100	20.00 (508.0)	33.00 (838.2)
ND	65	20.00 (508.0)	33.00 (838.2)
HND	100	20.00 (508.0)	33.00 (838.2)
<b>Main fusible switch ①</b>			
400 A	200	20.00 (508.0)	33.00 (838.2)
600 A	200	20.00 (508.0)	33.00 (838.2)
800 A	200	20.00 (508.0)	33.00 (838.2)
<b>No main device</b>			
1200 A ②	100	20.00 (508.0)	33.00 (838.2)

① Class “T” fuses only.

② Rating of horizontal cross bus.

**Physical data (continued)**

**Busway-connected panelboards**

Pow-R-Way III busway-connected panelboards save space and installation time by eliminating the need to install a bus plug and cable over to a panelboard. This special enclosure plugs directly on to vertical busway and accepts Eaton PRL1a, PRL2a, and PRL3a main circuit breaker panelboard interiors. The enclosure also accepts 28.00 inch (711.2 mm) wide standard and EZ trims. The panels can be top or bottom fed and can mount on either side of the busway. Each panel is UL 857 Listed.

**Note:** These panels are not seismic rated.

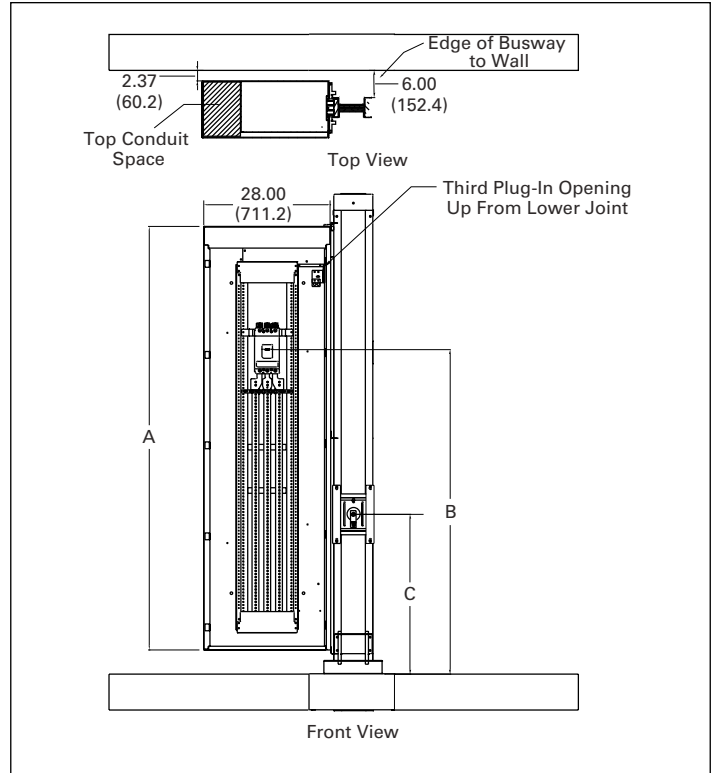
Busway-connected panelboards are sold and shipped through the Eaton regional satellite plants and coordinated with the Eaton busway plant in Greenwood, SC. See **Figure 46**.

**Panelboard spring hangers**

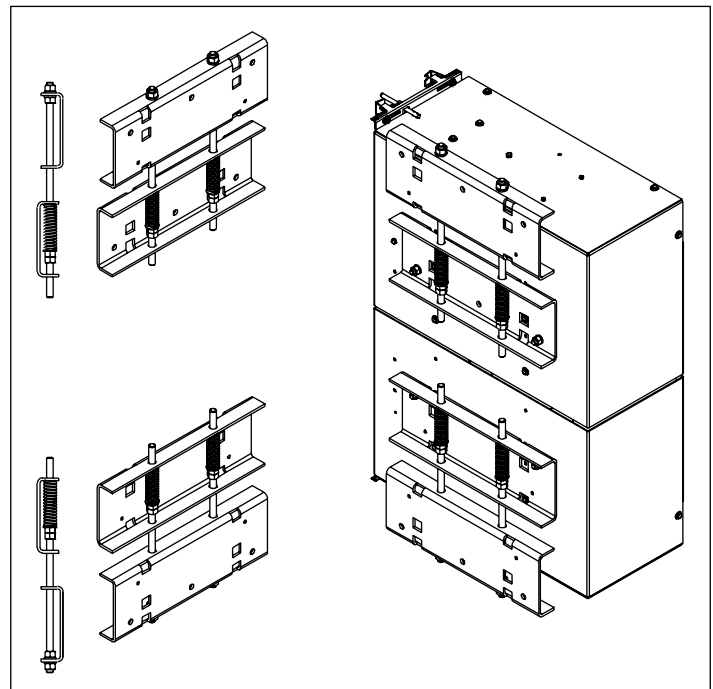
The specialized spring hanger shown in **Figure 47** allows the panel to be anchored and supported directly to a wall, and uniquely allows the panel to float with the riser busway. Panelboard spring hangers are sold separately as a busway accessory. Hardware is included to mount the spring hangers to the panelboard enclosure.

**Table 47. Panelboard enclosure detail**

MCB frame	Maximum box size	MCB height	Busway joint height	Box height off floor	Minimum floor-ceiling height
	Dimension in inches (mm)				
	A	B	C	D	
<b>PRL1a and 2a main circuit breaker</b>					
F	40.00 (1016.0)	72.00 (1828.8)	23.00 (584.2)	47.00 (1193.8)	103.00 (2616.2)
F	52.00 (1320.8)	72.00 (1828.8)	23.00 (584.2)	35.00 (889.0)	103.00 (2616.2)
F	64.00 (1625.6)	72.00 (1828.8)	23.00 (584.2)	23.00 (584.2)	103.00 (2616.2)
J	76.00 (1930.4)	72.00 (1828.8)	33.00 (838.2)	21.00 (533.4)	113.00 (2870.2)
K (500)	94.00 (2387.6)	74.00 (1879.6)	34.00 (863.6)	4.00 (101.6)	114.00 (2895.6)
K (750)	94.00 (2387.6)	72.00 (1828.8)	36.00 (914.4)	6.00 (152.4)	116.00 (2946.4)
<b>PRL3a main circuit breaker</b>					
F (4/0)	76.00 (1930.4)	72.00 (1828.8)	23.00 (584.2)	11.00 (279.4)	103.00 (2616.2)
FCL	76.00 (1930.4)	72.00 (1828.8)	23.00 (584.2)	11.00 (279.4)	103.00 (2616.2)
FB	76.00 (1930.4)	72.00 (1828.8)	23.00 (584.2)	11.00 (279.4)	103.00 (2616.2)
J	76.00 (1930.4)	72.00 (1828.8)	23.00 (584.2)	11.00 (279.4)	103.00 (2616.2)
K (500)	94.00 (2387.6)	74.00 (1879.6)	34.00 (863.6)	4.00 (101.6)	114.00 (2895.6)
K (750)	94.00 (2387.6)	72.00 (1828.8)	36.00 (914.4)	6.00 (152.4)	116.00 (2946.4)
L	94.00 (2387.6)	72.00 (1828.8)	34.00 (863.6)	4.00 (101.6)	114.00 (2895.6)
LCL	94.00 (2387.6)	72.00 (1828.8)	38.00 (965.2)	8.00 (203.2)	118.00 (2997.2)
LA	94.00 (2387.6)	72.00 (1828.8)	34.00 (863.6)	4.00 (101.6)	114.00 (2895.6)
LG	94.00 (2387.6)	72.00 (1828.8)	36.00 (914.4)	6.00 (152.4)	116.00 (2946.4)



**Figure 46. Busway-connected panelboard detail**



**Figure 47. Panelboard spring hangers**

**Physical data (continued)**

**Pow-R-Way III adapters (Figure 48 and Figure 49)**

A complete line of adapters are available to enable the user to add to existing old-line Westinghouse or obsolete Eaton's bus runs with the Pow-R-Way III design. The specific Westinghouse product lines are Low Impedance Busway, Current Limiting Busway, Pow-R-Way, and Pow-R-Way II. The obsolete Cutler-Hammer® designs are CP2, CP3, and CP4 Safetybus. See **Table 48**.

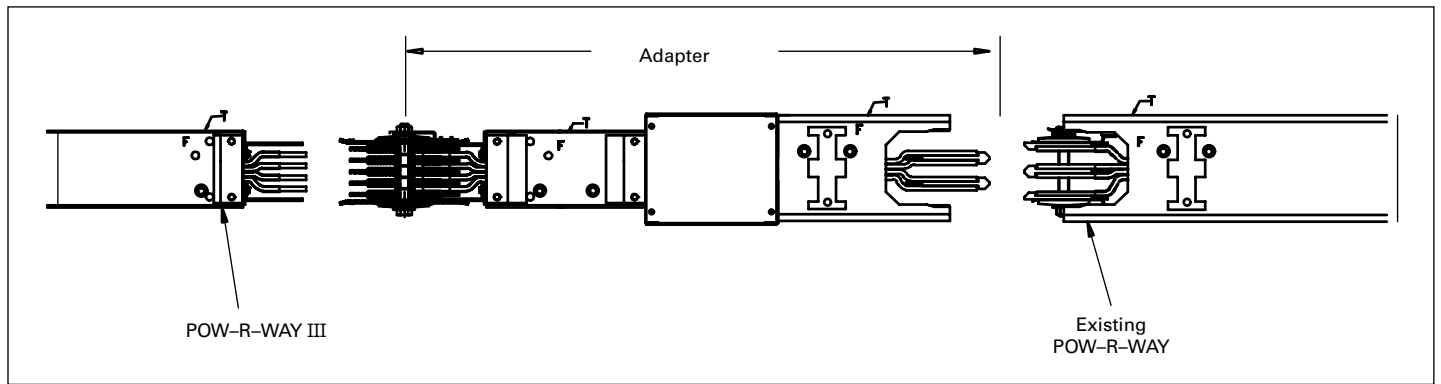
The adapters allow the incorporation of present day technologies, available in Pow-R-Way III plug-in units, into existing busway systems. State-of-the-art features such as energy monitoring, transient voltage surge suppression, and coordination/communication capabilities can all be added to existing distribution systems without having to upgrade and to replace entire runs of busway. See **Table 48**.

Special adapters to competitive busway products are also available. Please contact the Greenwood factory for information.

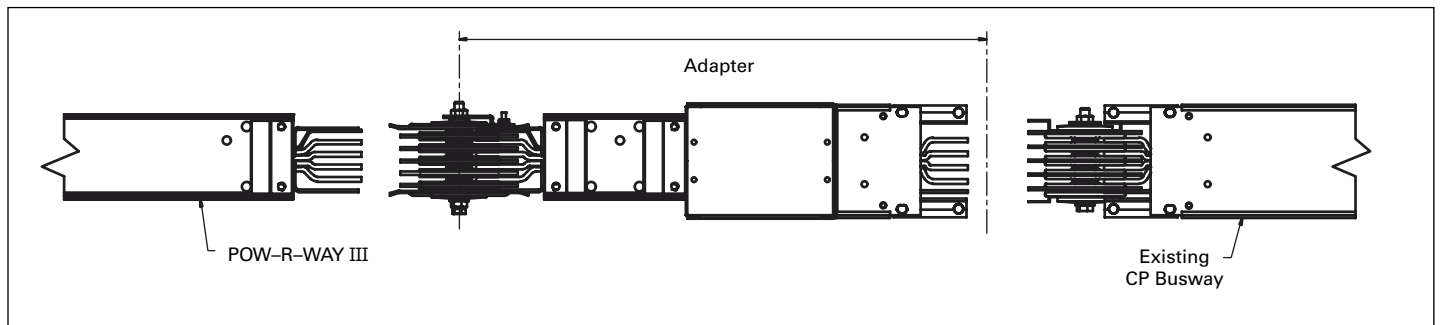
**Table 48. Available Pow-R-Way III adapters**

Busway types	Brand	Minimum adapter length in inches (mm)
Low impedance busway	Westinghouse	60.00 (1524.0)
Low impedance plug-in busway	Westinghouse	60.00 (1524.0)
Pow-R-Way busway (225 to 1600 A)	Westinghouse/Eaton	31.37 (796.8)
Pow-R-Way busway (2000 to 5000 A)	Westinghouse/Eaton	33.88 (860.6)
Pow-R-Way II busway	Westinghouse/Eaton	36.00 (914.4)
CP2 Safetybus	Eaton	36.00 (914.4)
CP3 Safetybus	Eaton	36.00 (914.4)
CP4 Safetybus	Eaton	36.00 (914.4)
Competitive busway	Contact factory	36.00 (914.4)

**Note:** Please contact product line regarding variation from standard dimension offerings.



**Figure 48. Pow-R-Way III to Pow-R-Way adapter**



**Figure 49. Pow-R-Way III to CP adapter**

**Physical data (continued)**

**Wall/floor flanges (Figure 50)**

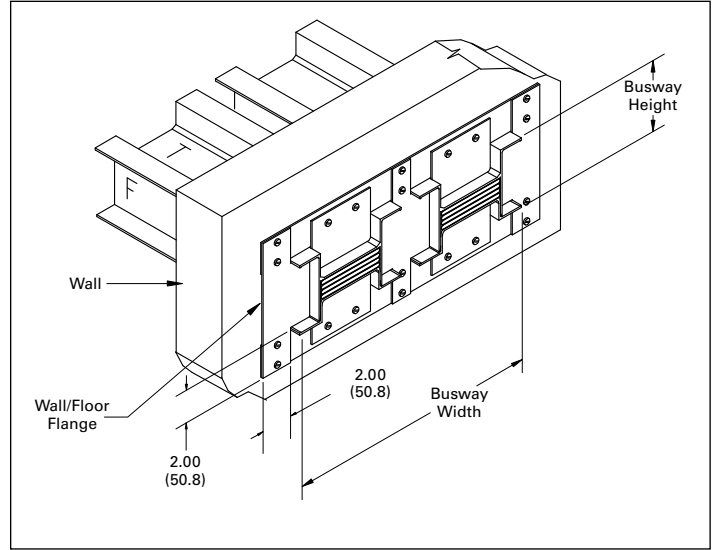
Wall and floor flanges are used to fit around the busway and close off the opening made to allow the bus run to pass through a floor or wall. Wall and floor flanges are for cosmetic purposes only and do not provide any type of vapor or fire barrier.

**Roof flange (Figure 51)**

A roof flange should always be used when outdoor busway penetrates a roof.

**End closures (Figure 52)**

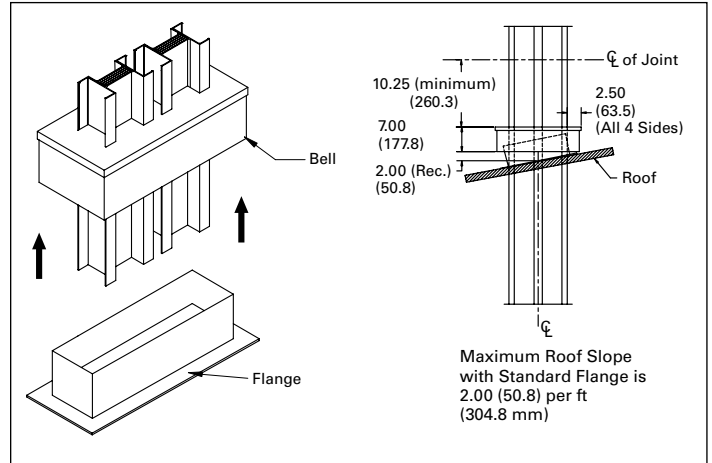
End closures terminate a bus run and can be used to close either the right or left end (see **Figure 2** on **page 2** for wiring conductor configurations).



**Figure 50. Wall/floor flange**

**Table 49. End closures**

UL 857 ampere rating		Dimensions in Inches (mm)
Cu	Al	A
225	225	5.13 (130.3)
400	400	5.13 (130.3)
600	600	5.13 (130.3)
800	—	5.13 (130.3)
1000	—	5.75 (146.1)
1200	800	6.25 (158.8)
1350	1000	6.75 (171.5)
1600	1200	7.77 (197.4)
2000	1350	9.02 (229.1)
—	1600	9.78 (248.4)
2500	2000	11.55 (293.4)
3200	—	16.52 (419.6)
4000	2500	19.02 (482.9)
—	3200	20.54 (521.7)
5000	4000	24.08 (611.6)

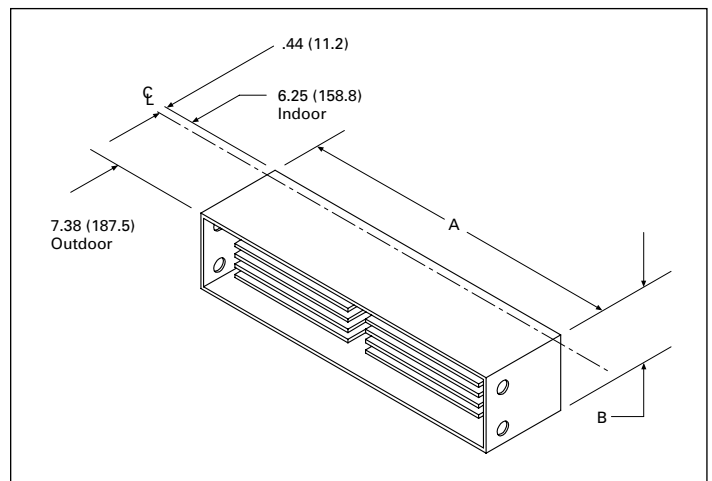


**Figure 51. Roof flange**

**Table 50. End closure dimensions**

Description	Dimensions in inches (mm)
	B
3WH, 3WG, 3WHG, 3WI, 4WH, 4WG, 4WHG, 4WI	5.00 (127.0)
4WNH, 4WNG, 4WNI, 4WNHG	5.50 (139.7)

**Note:** End closure extends 0.44 inches (11.2 mm) rating beyond the centerline of the removed Pow-R-Bridge.



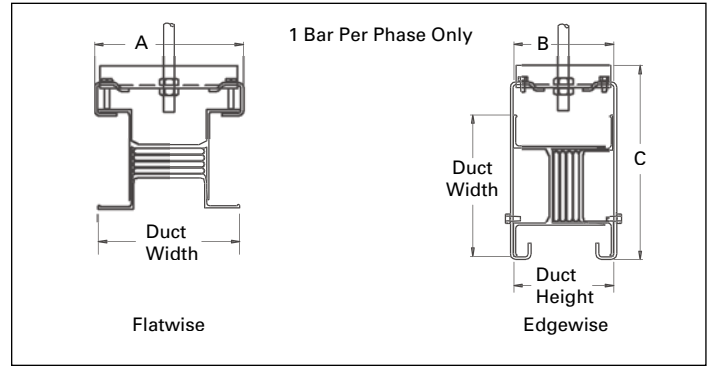
**Figure 52. End closure with Pow-R-Bridge removed**

**Physical data (continued)**

**Horizontal hangers**

One hanger is provided for every 10 ft (3 m) of horizontally mounted busway. The type of hanger supplied is determined by the specific mounting requirements of the busway. (For hook hangers and angle hangers, see **Figure 53** and **Figure 54**.)

Drop rods 0.50 inch (12.7 mm) diameter are not included and must be furnished by the installer. Drop rods 0.75 inch (19.1 mm) diameter are required for seismic applications.



**Figure 53. Hook hangers—non-seismic only**

**Table 51. Flatwise hook hanger**

UL 857 ampere rating		Dimensions in inches (mm)			
Cu	Al	Duct width	A	B	C
225	225	4.75 (120.7)	5.12 (130.0)	—	—
400	400	4.75 (120.7)	5.12 (130.0)	—	—
600	600	4.75 (120.7)	5.12 (130.0)	—	—
800	—	4.75 (120.7)	5.12 (130.0)	—	—
1000	—	5.38 (136.7)	5.75 (146.1)	—	—
1200	800	5.88 (149.4)	6.25 (158.8)	—	—
1350	1000	6.38 (162.1)	6.75 (171.5)	—	—
1600	1200	7.38 (187.5)	7.75 (196.9)	—	—
2000	1350	8.64 (219.5)	9.03 (229.4)	—	—
—	1600	9.40 (238.8)	9.78 (248.4)	—	—
2500	2000	11.17 (283.7)	11.58 (294.1)	—	—

**Table 52. Edgewise hook hanger**

Conductor configuration	Dimensions in inches (mm)			
	Duct height	Duct width	B	C
3WH/4WH/3WG/3WHG/4WG/4WHG	4.38–4.56 (111.2–115.8)	4.75–6.38 (120.7–162.1)	8.40 (213.3)	4.81 (122.2)
3WI/4WI	4.38–4.56 (111.2–115.8)	7.38–11.17 (187.4–283.7)	13.19 (335.0)	4.81 (122.2)
4WNH/4WNG	4.92–5.10 (125.0–129.5)	4.75–6.38 (120.7–162.1)	8.40 (213.3)	5.35 (135.9)
4WNHG/4WNI	4.92–5.10 (125.0–129.5)	7.38–11.17 (187.4–283.7)	13.19 (335.0)	5.35 (135.9)

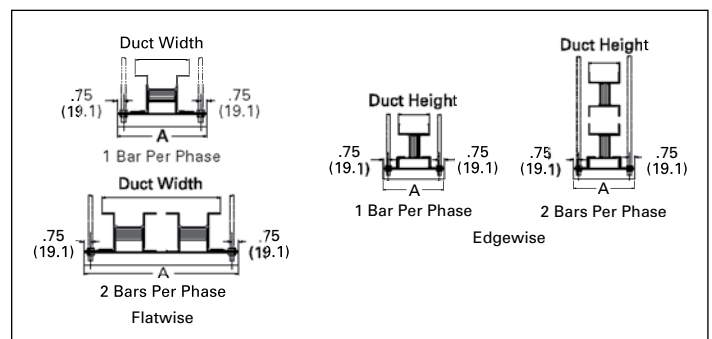
**Table 53. Flatwise angle hanger**

UL 857 ampere rating			Dimensions in inches (mm)	
Cu	Al	Conductor bars per phase	Busway width	A
225	225	1	4.75 (120.7)	9.00 (228.6)
400	400	1	4.75 (120.7)	9.00 (228.6)
600	600	1	4.75 (120.7)	9.00 (228.6)
800	—	1	4.75 (120.7)	9.00 (228.6)
1000	—	1	5.38 (136.7)	9.63 (244.6)
1200	800	1	5.88 (149.4)	10.12 (257.0)
1350	1000	1	6.38 (162.1)	10.63 (270.0)
1600	1200	1	7.38 (187.5)	11.63 (295.4)
2000	1350	1	8.64 (219.5)	12.88 (327.2)
—	1600	1	9.40 (238.8)	13.62 (345.9)
2500	2000	1	11.17 (283.7)	15.44 (392.2)
3200	—	2	16.14 (410.0)	20.39 (517.9)
4000	2500	2	18.64 (473.5)	22.88 (581.2)
—	3200	2	20.16 (512.1)	24.39 (619.5)
5000	4000	2	23.70 (602.0)	28.00 (711.2)

**Table 54. Edgewise angle hanger**

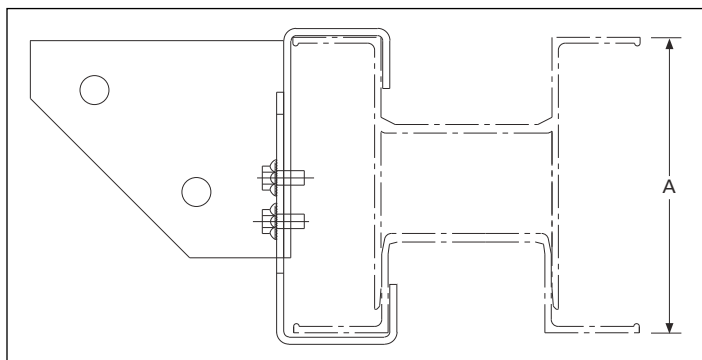
Conductor configuration	Dimensions in inches (mm)	
	Duct height	A
3WH/4WH/3WG/3WHG/4WG/4WHG/3WI/4WI	4.38–4.56 (111.2–115.8)	9.00 (228.6)
4WNH/4WNG/4WNHG/4WNI	4.92–5.10 (125.0–129.5)	9.36 (237.7)

**Note:** Angle hangers must be used for seismic applications.



**Figure 54. Angle hangers**

**Physical data (continued)**



**Figure 55. Sway brace**

**Sway brace**

Sway brace brackets provide a provision to brace the busway run at a 45-degree angle, restricting the suspended busway from swinging. Sway braces can be ordered as part number BVC1102G01 regardless of height of busway dimension "A."

**Vertical hangers (Figure 56 and Figure 57)**

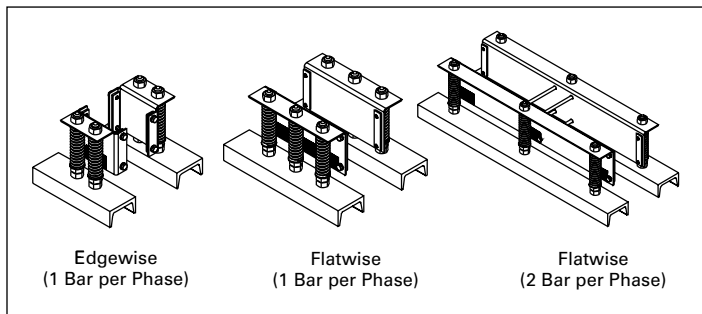
When busway is to be installed vertically, a spring suspension type vertical hanger should be used. Vertical hangers are not provided unless specified.

This unique hanger equalizes the weight of vertically mounted busway along all supports. A vertical hanger must be used on each floor and at the end of the bus run on the last floor.

The maximum span permitted by UL on vertical hangers is 16 ft (4.9 m). Intermediate hangers are required for floor heights exceeding 16 ft (4.9 m).

**Table 55. Edgewise vertical hangers (F and F-opposite sides)**

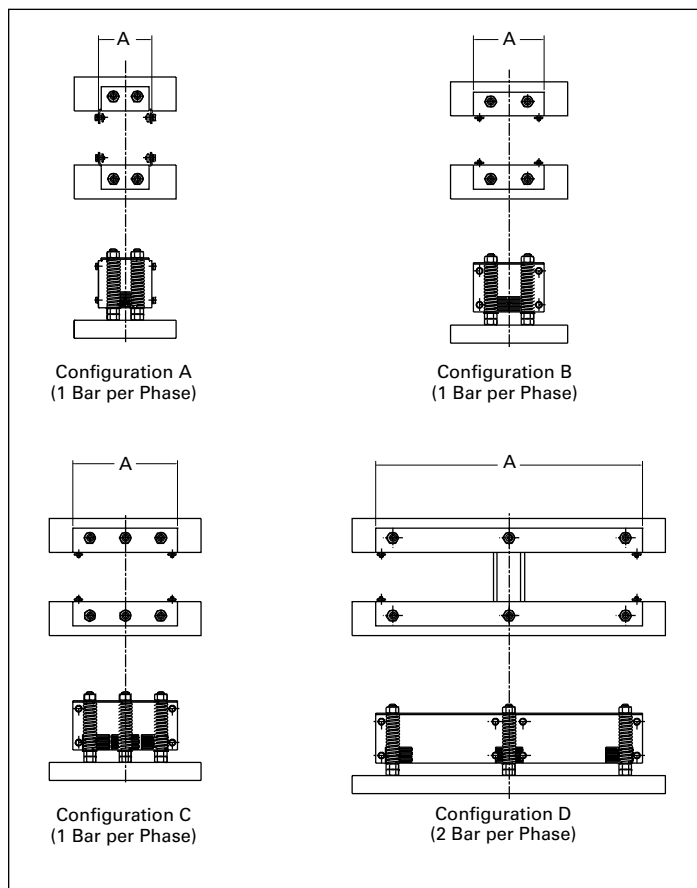
Conductor configuration	Busway Height	Hangers on "F" and "F" Opposite Sides	
	Inches (mm)	A inches (mm)	Figure 57 configuration
3WH/4WH	4.38 (111.3)	4.72 (119.9)	A
3WG/3WHG/4WG/4WHG	4.50 (114.3)	4.91 (124.7)	A
3WI/4WI	4.56 (115.8)	4.91 (124.7)	A
4WHN	4.92 (125.0)	5.25 (133.4)	A
4WNG/4WNHG	5.05 (128.3)	5.44 (138.2)	A



**Figure 56. Typical installation**

**Table 56. Flatwise vertical hangers (T and T-opposite sides)**

UL 857 ampere rating	Busway width	Hangers on "T" and "T" opposite sides		
		Cu	Al	Figure 57 configuration
225	225	4.75 (120.7)	4.62 (117.3)	B
400	400	4.75 (120.7)	4.62 (117.3)	B
600	600	4.75 (120.7)	4.62 (117.3)	B
800	—	4.75 (120.7)	4.62 (117.3)	B
1000	—	5.38 (136.7)	5.25 (133.4)	B
1200	800	5.88 (149.4)	5.75 (146.1)	B
1350	1000	6.38 (162.1)	6.25 (158.8)	B
1600	1200	7.38 (187.5)	7.25 (184.2)	B
2000	1350	8.64 (219.5)	8.50 (215.9)	B
—	1600	9.40 (238.8)	9.25 (235.0)	C
2500	2000	11.17 (283.7)	11.06 (280.9)	C
3200	—	16.14 (410.0)	16.00 (406.4)	D
4000	2500	18.64 (473.5)	18.50 (469.9)	D
—	3200	20.16 (512.1)	20.06 (510.0)	D
5000	4000	23.70 (602.0)	23.59 (600.0)	D



**Figure 57. Vertical hangers**

### Plug-in protective devices

All Pow-R-Way III plug-in units are designed with the safety of the installer and user as the key criteria. The following features are standard for both fusible and circuit breaker type plug-in units:

Pow-R-Way III bus plugs have extended ground and neutral bars, which bring the termination points down into the cable entry area making for a safer, easier connection.

A barrier is provided over the line side connections from the bus plug stab assembly to the fusible switch or circuit breaker.

The bus plug ground stab makes positive contact with the busway ground (integral or internal) before the phase or neutral stabs contact the bus bars.

A bus plug guide port is provided in the busway housing, to the right of each plug-in outlet. A polarizing alignment pin is located at the line side end of each bus plug enclosure. The alignment pin must be inserted into the guide port for proper installation. The plug-in unit and the busway are interlocked to ensure that the device is in the OFF position prior to installation or removal of the unit.

To ensure that the bus plug is seated onto the busway, the clamping mechanism will draw the unit tight onto the busway housing as the installer tightens the clamps.

Plug-in units have an interference bracket that prevents the cover from being opened while the device is in the ON position and to prevent accidental closing of the device while the cover is open.

There are two locations available for field positioning of the bus plug operating handle for all circuit breaker bus plugs and fusible plugs over 400 A and higher. On vertical bus run applications, the handle can be mounted on the side of the plug, and for horizontal runs, the handle can be mounted on the (line side) end of the unit. Bus plugs are shipped with the handle mounted on the end as standard. Mounting positions are illustrated in **Figure 60**.

When a plug-in unit is installed, the bus plug stab base assembly engages a seating ridge provided on the plug-in outlet. The stab base is drawn in to overlap the ridge and to form a tight seal against moisture and dust.

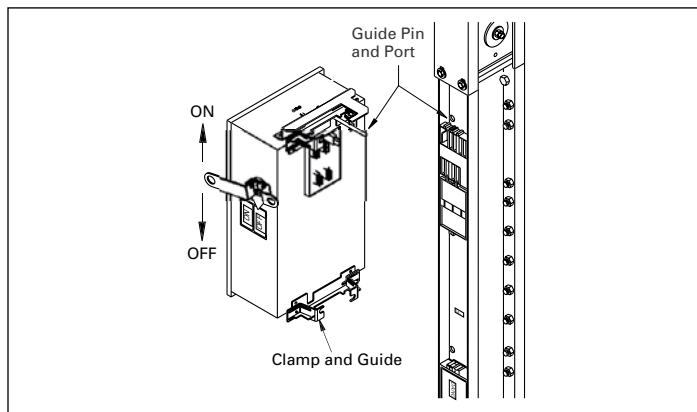


Figure 58. Plug-in stab details

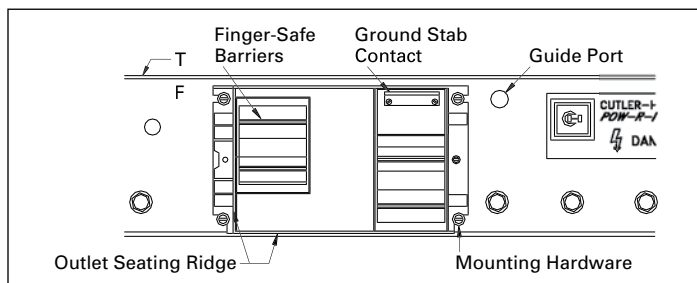


Figure 59. Plug-in outlet details

### Plug-in device mounting

The load end of a plug-in unit varies with the orientation of the busway as determined by the "F" and "T" markings (see **Figure 60** below).

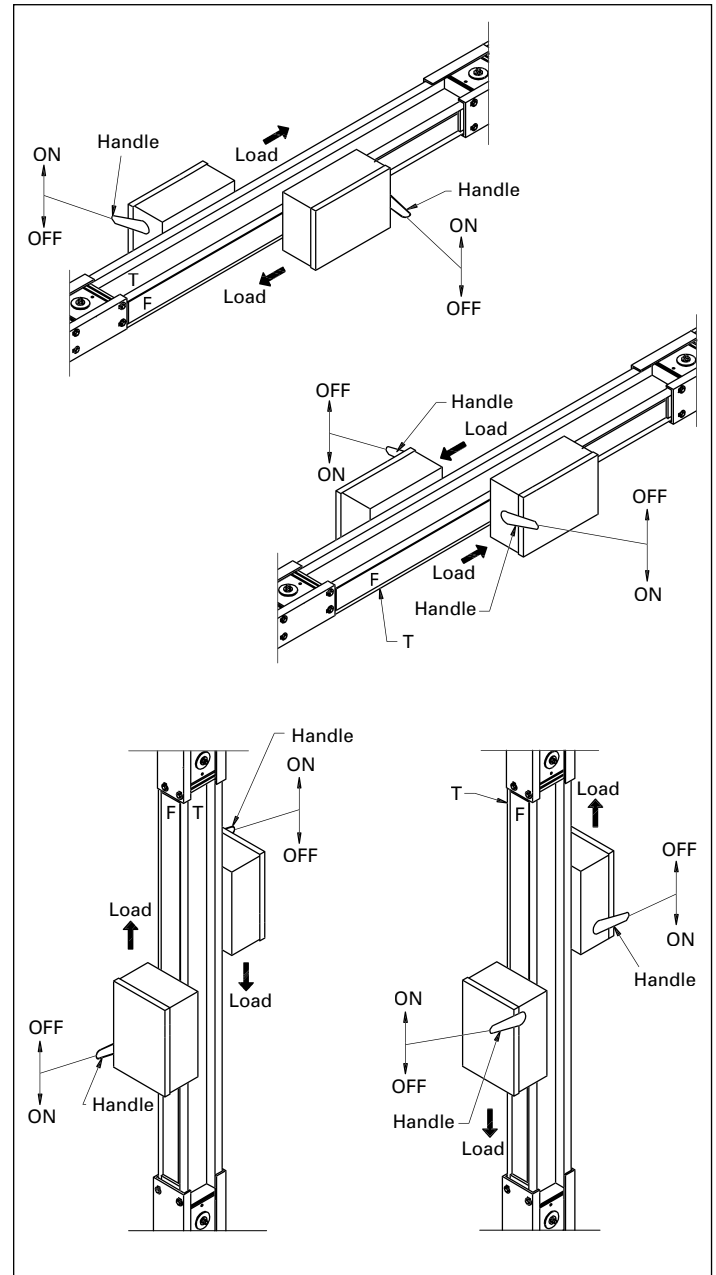
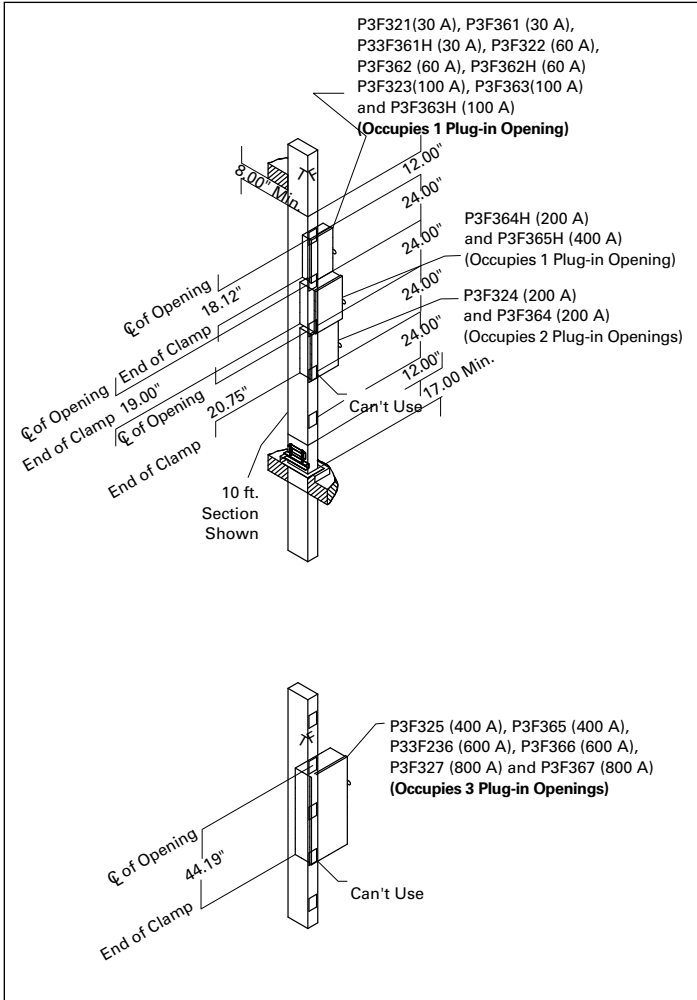


Figure 60. Plug-in device mounting

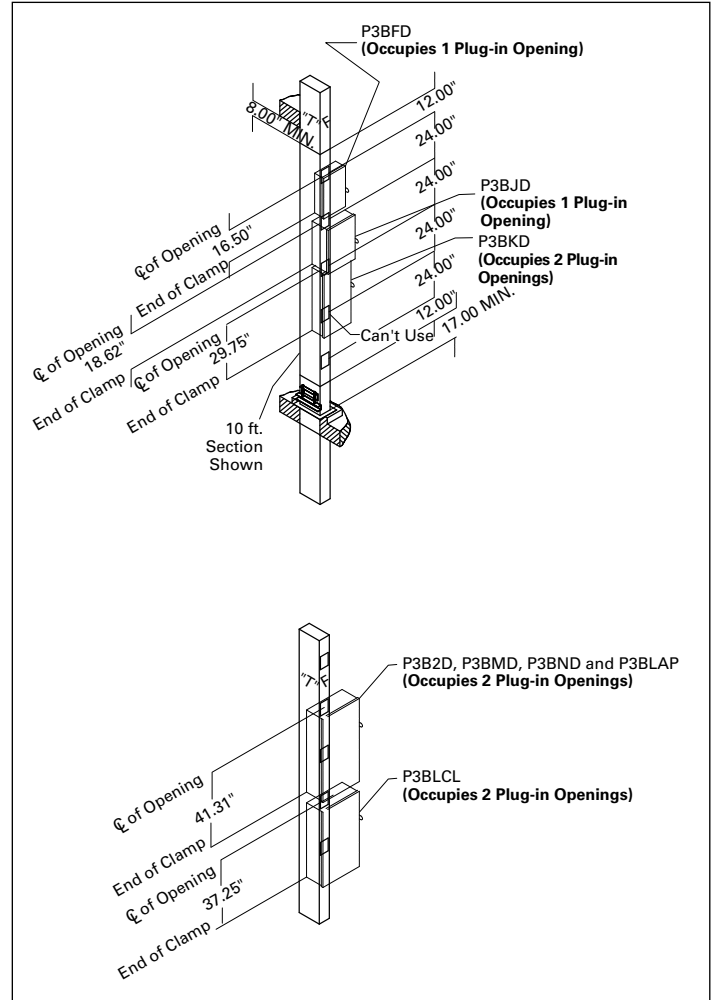
**Plug-in device mounting (continued)**

Plug-in openings are spaced every 24.00 inches (609.9 mm) starting 12.00 inches (304.8 mm) in from the centerline of each bridge joint with a maximum of five openings per side of an individual section of busway. **Figure 61** and **Figure 62** illustrate the number of plug-in openings taken up by each style/size bus plug.

Each plug-in unit uses only one plug-in opening; however, may cover up additional plug-in openings preventing use.



**Figure 61. Fusible plug-in device mounting**



**Figure 62. Breaker plug-in device mounting**



## SPD plug-in devices

### SPD Series (Figure 63)

The Pow-R-Way III plug-in device product offering includes a surge protective device (SPD), which is 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 family of products to ensure that quality power is supplied to commercial, industrial, medical, and institutional facilities.

The SPD not only protects against externally created impulse transients such as lightning, utility capacitor switching, and disturbances emitted by adjacent facilities, but it 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 ringwave, transients are imaging, equipment, variable frequency drives, lighting dimmers, arc welders, and the switching on and off of electrical distribution equipment. It is estimated that over 80% of surge disturbances are actually caused by internal transients.

The SPD also filters 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 metal oxide varistors (MOVs) that 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.

Not all SPD units on the market have filtering capabilities. The benefits of combining SPD and filtering are reduced MOV stress, resulting in a longer life cycle, lower let-through voltage, better noise attenuation levels, and increased reliability.

Without protection devices, electronic-based loads and microprocessors are not provided with the noise- and disturbance-free power that they require. Because microprocessors are now common in those facilities, specifiers must ensure that the AC power supply is properly filtered. Significant performance advantages are achieved by integrating SPD filters into busway systems.

Because the SPD unit is directly connected to the busway it is able to minimize let-through voltage and to isolate critical loads that are fed from a protected busway run. Due to the integrated design, the SPD bus plug saves the user-needed wall space and greatly reduces the installed project cost. The SPD bus plug is furnished with a breaker disconnect. For catalog numbers and selection criteria, see **Table 57** below.

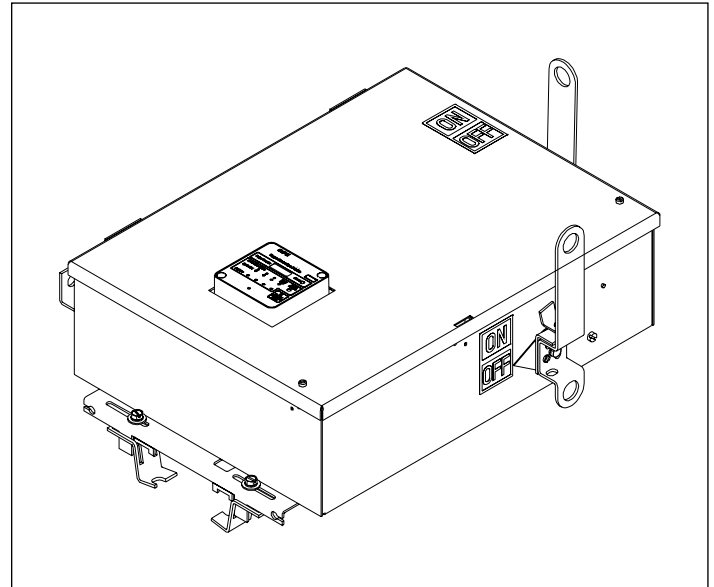


Figure 63. Surge protective device (SPD Series) bus plug

Table 57. SPD bus plugs catalog numbering system

Fixed—do not change		P3BSPD 250 480Y 2 C		Fixed—do not change
<b>Surge rating (kA/phase)</b>		<b>Voltage code</b>		<b>Diagnostics package</b>
50	200	208Y = 208Y/120 V (4W + G)	<p><b>1 = Basic</b>—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.</p> <p><b>2 = Standard</b>—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.</p> <p><b>3 = Standard + surge counter</b>—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.</p>	
80	250	400Y = 400Y/230 V (4W + G)		
100	300	480Y = 480Y/277 V (4W + G)		
120	400	600Y = 600Y/347 V (4W + G)		
160		240D = 240 delta (3W + G)		
		480D = 480 delta (3W + G)		
		600D = 600 delta (4W + G)		

**Note:** Available for Pow-R-Way III plugs. This information is required for all quotations. This information should also be included at order entry to ensure prompt processing of the order.

## Plug-in devices (continued)

### Ground detector/neutralizer bus plug (Figure 64)

In rare cases, bus bars in a busway system pick up static electricity. In order to discharge this potential, a neutralizer and ground detector bus plug is available. The unit has three 18,000 ohm resistors connected between the bus bars and the ground. Static electricity is discharged through these resistors. A neon lamp is wired in series with the bus bar and part of the resistor and burns continuously. If there is a ground anywhere on the system of a lower resistance than the path through the lamp, the lamp will go out, indicating that there is a short in the system.

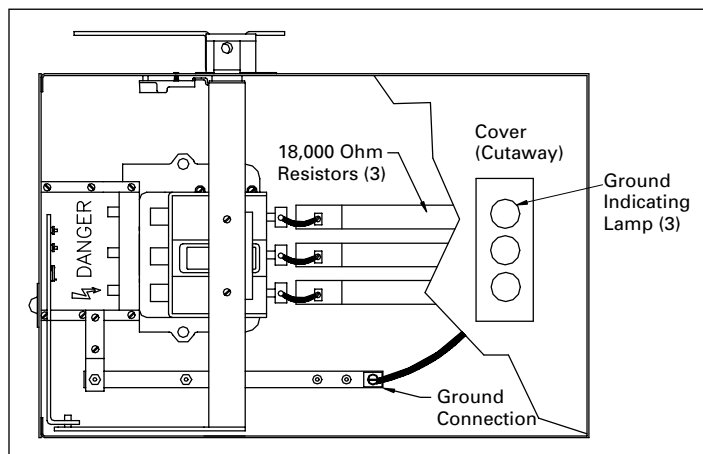


Figure 64. Ground detector/neutralizer bus plug

### Combination starter bus plugs (see Figure 65)

Eaton Freedom™ and Advantage™ motor starters are included in the Pow-R-Way III bus plug product offering. Freedom motor starters offer state-of-the-art features that ensure greater value, flexibility, and performance in the toughest commercial and industrial applications.

Advantage motor starters have features including a solid-state, heaterless overload relay with built-in ground fault protection. Advantage also features communication capabilities and an on-board microprocessor that controls the contactor magnet to eliminate burnout in low-voltage or varying control circuit conditions.

Plug-in combination starters or contactors are mounted in enclosures identical to the circuit breaker and fusible switch type bus plugs including the clamp and guides, safety interlocks, and guide pin. They are available from size 0 through 5 with a circuit breaker, motor circuit protector, or fusible disconnect. Contact Eaton for specific application and outline dimensions.

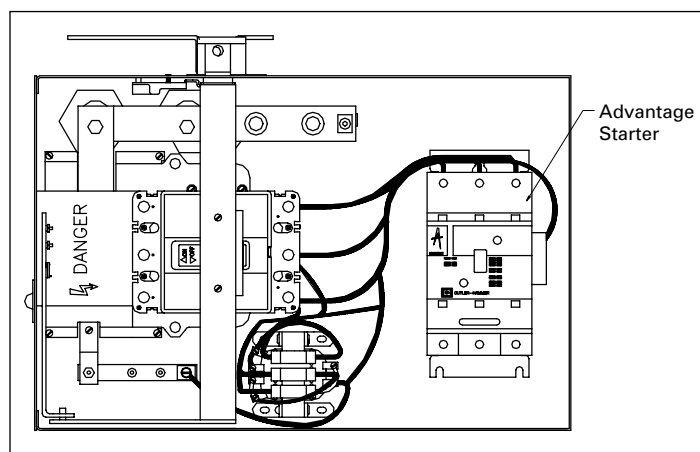


Figure 65. Freedom/Advantage bus plug

**Plug-in devices (continued)**

**Digitrip OPTIM bus plugs (Figure 66)**

Digitrip OPTIM™ is a programmable, communicating, micro-processor-based electronic trip unit system for Eaton Series C circuit breakers. OPTIM is available for Pow-R-Way III bus plugs on K-Frame (125–400 A), L-Frame (70–600 A), and N-Frame (400–1200 A) circuit breakers. Digitrip OPTIM provides an electrical distribution system with superior programmable protection, coordination, and a state-of-the-art advanced warning capability along with system diagnostics, monitoring, and communications. Digitrip OPTIM is available in two trip unit types: OPTIM 550 and OPTIM 1050.

Unique Digitrip OPTIM features can provide time current settings with more increments that permit the user to OPTIMIZE system protection and coordination; improved accuracy to give more selectivity and closer sensitivity in providing coordination; programmable short delay and/or instantaneous curve tripping options; and selectable thermal memory, as well as selectable sure start discriminator protection features. Increased system security is provided by the addition of a programmable password protection. For improved system coordination, 1<sup>st</sup> long delay time slope has been added to the traditional nine LSIG curve shaping options. Short delay and ground delay zone selective interlocking have also been added, down to a 70 A circuit breaker.

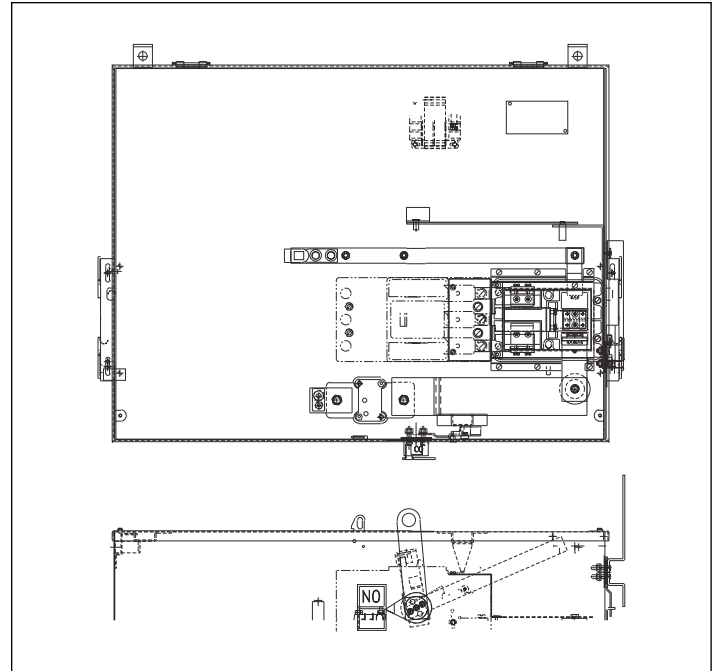
The following Advance Warning options are also available:

- A programmable high load phase and neutral alarm, adjustable between 50% and 100% of I<sub>r</sub> (LDPU setting), will signal an impending trip condition
- An adjustable ground fault alarm that will alert the user of a ground fault condition without the breaker
- Energy alarming can be performed (such as peak demand exceeded) to reduce energy costs with OPTIM 1050 via PowerNet
- Total Harmonic Distortion (THD) alarming detects changes in power quality with OPTIM 1050 via PowerNet

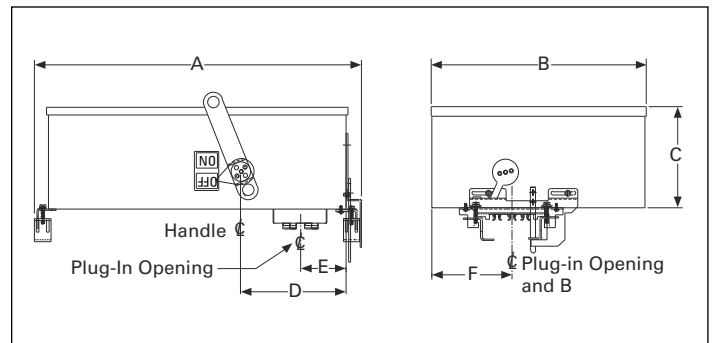
Digitrip OPTIM provides a complete selection of system diagnostic capabilities including four cause-of-trip LEDs mounted on the front of the trip unit to improve troubleshooting capabilities. They are complemented by trip event information that is stored in memory after a trip condition. Remote breaker status indication is provided by auxiliary and alarm switches. The Breaker Interface Module (BIM) provides trip indication information on the front of the unit or via relay contacts to a remote location.

Digitrip OPTIM has an extensive menu of monitoring capabilities including load monitoring, power factor (OPTIM 1050), power and energy (OPTIM 1050) power quality-current harmonics.

OPTIM trip units are PowerNet compatible and can be included in the unique Eaton tripping PowerNet communications system. Contact Eaton for specific applications and outline dimensions.



**Figure 66. OPTIM bus plug**



**Figure 67. Bus plugs**

**Table 58. OPTIM breaker plug-in unit dimensions**

OPTIM breaker frame	Maximum amperes	Maximum Vac	Dimensions in inches (mm)						Mechanical terminal	
			A	B	C	D	E	F	Wire range per phase	Approx. weight lb (kg)
K-Frame	400	600	34.40 (873.8)	19.30 (490.2)	11.46 (291.1)	12.42 (315.5)	3.77 (95.8)	7.86 (199.6)	350 A (1) 250–500 kcmil 400 A (2) 3/0–250 kcmil	59 (26.8)
L-Frame	600	600	41.90 (1064.3)	24.44 (620.8)	11.46 (291.1)	13.85 (351.8)	3.77 (95.8)	9.57 (243.1)	400 A (1) 4/0–600 kcmil 400 A (2) 400–500 kcmil	78 (35.4)
N-Frame	800	600	45.89 (1165.6)	29.65 (753.1)	11.46 (291.1)	17.46 (443.5)	3.77 (95.8)	9.66 (345.4)	700 A (2) 1–500 kcmil 800 A (3) 3/0–400 kcmil	141 (64.0)

### Power takeoff sections

Power takeoff sections are used to tap up to 1200 A of power off of the busway. A power takeoff section must be used when power in excess of the current-carrying capabilities of the plug-in stabs (800 A) is required. A bolt-on fusible switch or circuit breaker unit can then be bolted to the power takeoff.

#### Bridge joint power takeoff (Figure 68)

A bridge joint power takeoff is a special connection that allows for the attachment of a bolt-on unit at the bridge joint. The bridge joint power takeoff and a bolt-on unit can be used to tap off power where plug-in busway is not available. A bridge joint power takeoff can be rated up to 1000 A.

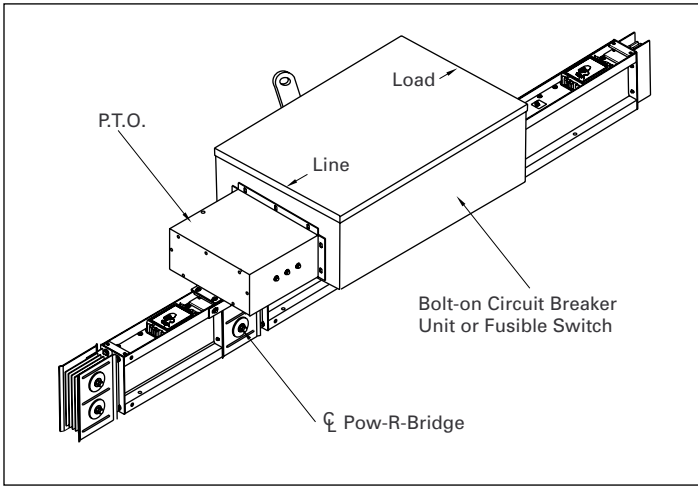


Figure 68. Bridge power takeoff

#### Built-in power takeoff (Figure 69)

A built-in power takeoff is a special piece of feeder busway that allows for the attachment of a bolt-on unit. Built-in power takeoffs are used where space restrictions dictate that the wide dimensions of the busway be flat against the wall, ceiling, or other obstruction. In this application, power takeoffs and bolt-on units are used instead of plug-in units. A built-in power takeoff can be rated up to 1200 A.

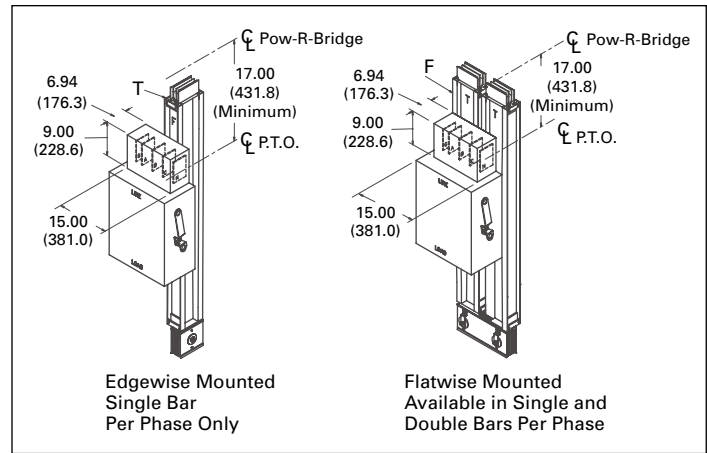


Figure 69. Built-in power takeoff

#### Plug-in cable tap boxes (Figure 70)

Plug-in cable tap boxes are used to feed the busway run, or where equipment served by the busway is connected without overcurrent protection. Plug-in cable tap boxes plug into any Pow-R-Way III busway (225–5000 A) plug in opening.

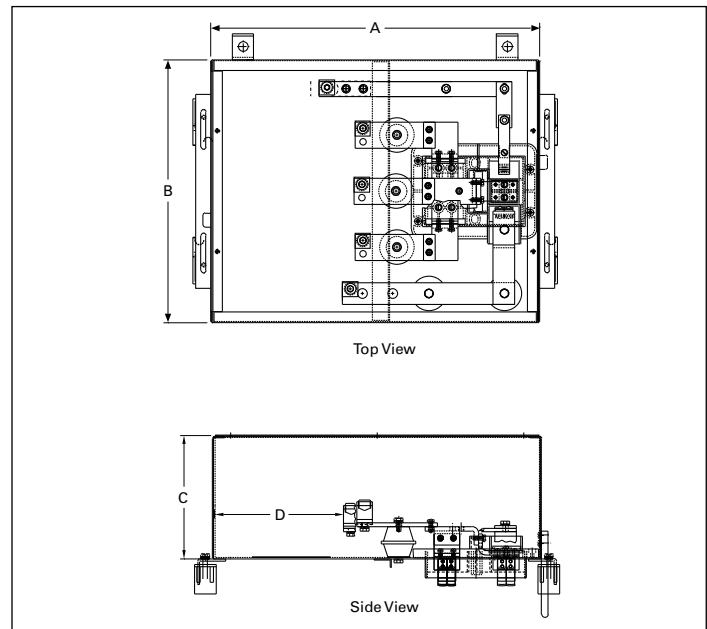


Figure 70. Plug-in cable tap box

Table 59. Plug-In cable tap box details

Ampere rating	Dimensions in inches (mm)				Compression conn./Phase and N		Mechanical lugs/phase and N		Catalog number
	A	B	C	D	English	Metric	English	Metric	
200	19.50 (495.3)	15.50 (393.7)	7.12 (180.8)	7.50 (190.5)	(1)	(1)	—	—	P3PTB200C
200	19.50 (495.3)	15.50 (393.7)	7.12 (180.8)	7.50 (190.5)	—	—	(1) #4–350 kcmil	(1) 21.2–177 mm <sup>2</sup>	P3PTB200M
400	26.25 (666.7)	21.00 (533.4)	10.00 (254.0)	7.50 (190.5)	(1)	(1)	—	—	P3PTB400C
400	26.25 (666.7)	21.00 (533.4)	10.00 (254.0)	7.50 (190.5)	—	—	(1) 250–750 kcmil or (2) 3/0–250 kcmil	(1) 127–380 mm <sup>2</sup> or (2) 85.0–127 mm <sup>2</sup>	P3PTB400M
600	30.00 (762.0)	24.75 (628.6)	10.50 (266.7)	12.80 (325.1)	(2)	(2)	—	—	P3PTB600C
600	30.00 (762.0)	24.75 (628.6)	10.50 (266.7)	12.80 (325.1)	—	—	(2) 250–750 kcmil or (4) 3/0–250 kcmil	(1) 127–380 mm <sup>2</sup> or (4) 85.0–127 mm <sup>2</sup>	P3PTB600M
800	30.00 (762.0)	24.75 (628.6)	10.50 (266.7)	12.80 (325.1)	(3)	(3)	—	—	P3PTB800C
800	30.00 (762.0)	24.75 (628.6)	10.50 (266.7)	12.80 (325.1)	—	—	(3) 250–750 kcmil or (6) 3/0–250 kcmil	(3) 127–380 mm <sup>2</sup> or (6) 85.0–127 mm <sup>2</sup>	P3PTB800M

## Receptacle plug-in units

Eaton's unique receptacle plug-in unit design makes them the most flexible receptacle units in the industry. Pow-R-Way III receptacle plug-in units come fully assembled and wired, reducing installation time, and are built to order. They are CSA® and UL 857 Listed and come in five different configurations.

### Single receptacle unit

The single receptacle plug-in unit, shown in **Figure 71**, is configured to order and uses Type FD single-pole or two-pole plug-in circuit breakers. One receptacle comes with each unit that can be straight blade or twist-lock, rated from 15 to 50 A. Each receptacle can also be fixed mounted to the front of the enclosure or cord mounted from the bottom of the enclosure (not as shown). Cord lengths are 1–15 ft in 1-ft increments. Consult NEC Sections 368, 400, and 645 for cord drop applications.

### Quad receptacle unit

The quad receptacle plug-in unit, shown in **Figure 72**, is configured to order and uses Type FD single-pole, two-pole, and three-pole plug-in circuit breakers. Each unit comes with 2–4 NEMA configured receptacles in any combination of straight blade and twist-lock and three-wire, four-wire, and five-wire, rated 15–50 A. Each receptacle is cord mounted from the bottom of the enclosure. Cord lengths are 1–15 ft in 1-ft increments. Consult NEC Sections 368, 400, and 645 for cord drop applications.

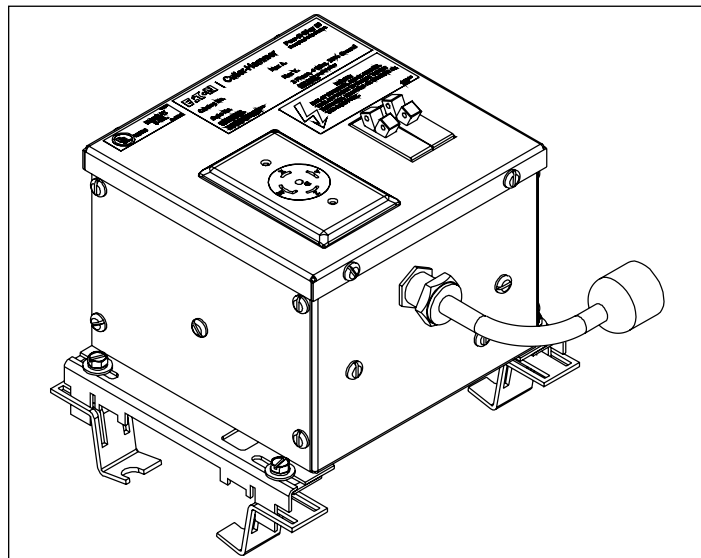


Figure 71. Single receptacle plug

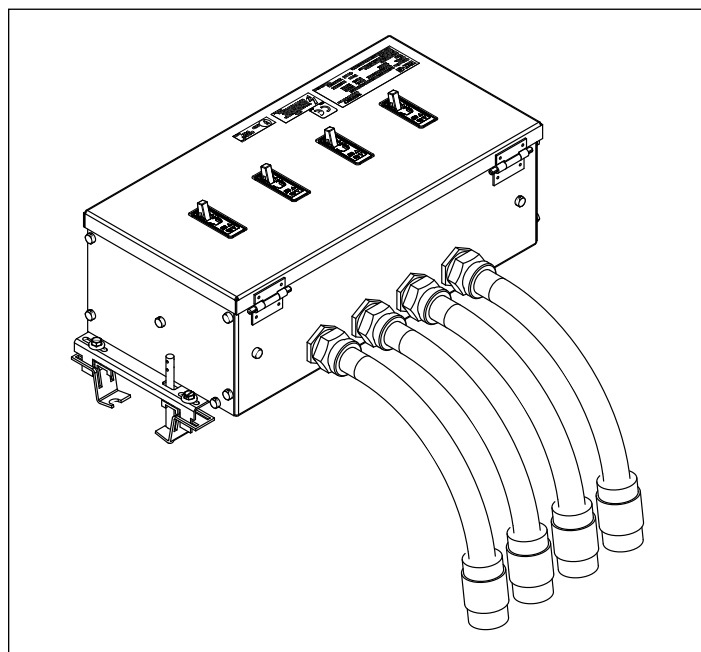


Figure 72. Quad receptacle plug

## Plug-in device electrical data

**Table 60. Circuit breakers**

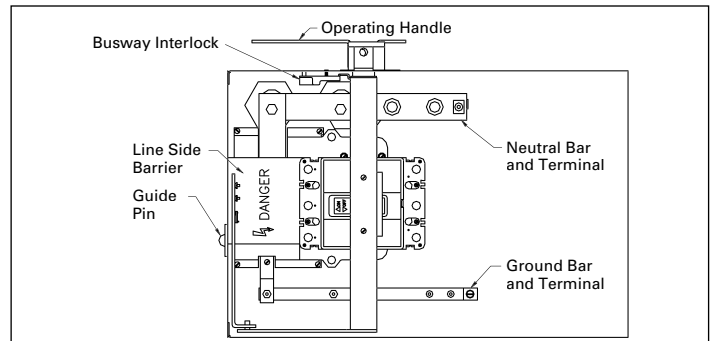
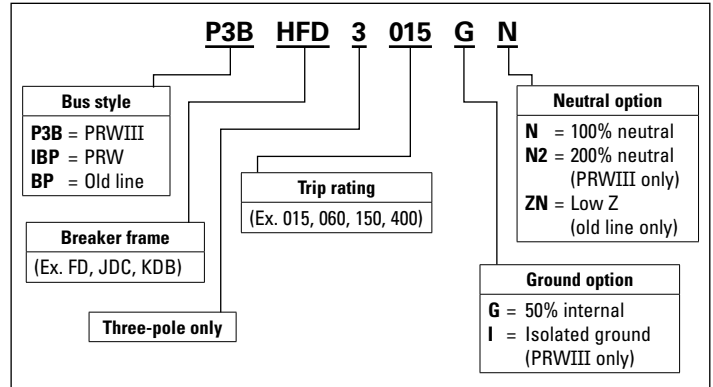
100% rated breakers are not available for use in bus plugs.  
Contact product line for guidance.

Ampere rating	Interrupting rating (kA symmetrical)			Breaker type
	240 Vac	480 Vac	600 Vac	
15-60	18	14	—	EHD
70-100	18	14	—	EHD
15-60	18	14	14	FDB
70-100	18	14	14	FDB
110-150	18	14	14	FDB
15-60	65	25	18	FD
70-100	65	25	18	FD
110-150	65	25	18	FD
175-225	65	25	18	FD
15-60	100	65	25	HFD
70-100	100	65	25	HFD
110-150	100	65	25	HFD
175-225	100	65	25	HFD
15-60	200	100	35	FDC
70-100	200	100	35	FDC
110-225	200	100	35	FDC
15-100	200	150	—	FCL
100-225	65	—	—	ED
100-225	100	—	—	EDH
100-225	200	—	—	EDC
70-225	65	35	18	JD, JDB
250	65	35	18	JD, JDB
70-225	100	65	25	HJD
250	100	65	25	HJD
70-225	200	100	35	JDC
250	200	100	35	JDC
125-250	200	200	—	LCL
250-400	65	—	—	DK
100-400	65	35	25	KD, KDB
100-400	100	65	35	HKD
100-400	200	100	50	KDC
200-400	200	200	—	LCL
300-600	65	35	25	LD, LDB
300-600	100	65	35	HLD
300-600	200	100	50	LDC
400-800	65	50	25	MDL
400-800	100	65	35	HMDL
400-800	65	50	25	ND
400-800	100	65	35	HND
400-800	200	100	50	NDC
600-1200	65	50	25	ND
600-1200	100	65	35	HND
600-1200	200	100	50	NDC

**Table 61. Integrally fused, current limiting circuit breaker**

Ampere rating	Interrupting rating (kA symmetrical)			Breaker type
	240 Vac	480 Vac	600 Vac	
15-100	200	200	200	FB-P
125-225	200	200	200	LA-P
250-400	200	200	200	LA-P
400-600	200	200	200	NB-P
700-800	200	200	200	NB-P

**Table 62. Breaker unit catalog numbering system**



**Figure 73. Typical circuit breaker plug-in unit**

**Note:** Please call Greenwood Low-voltage Busway department for help in assigning a catalog number for a specific application.

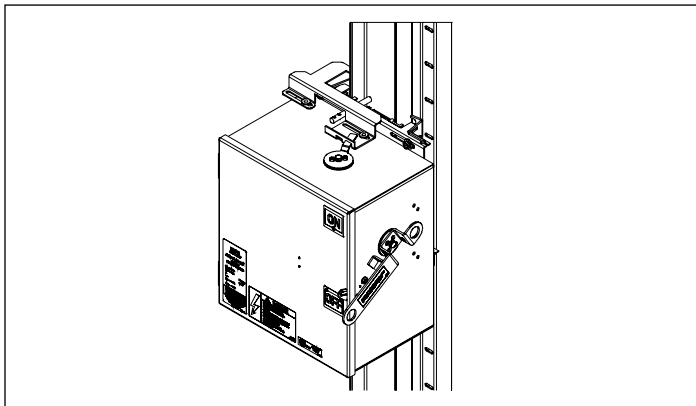
**Note:** Do not leave spaces between characters. Example: P3BFD3225N; IBPKD3400N.

**Note:** All plug-in units come fully assembled.

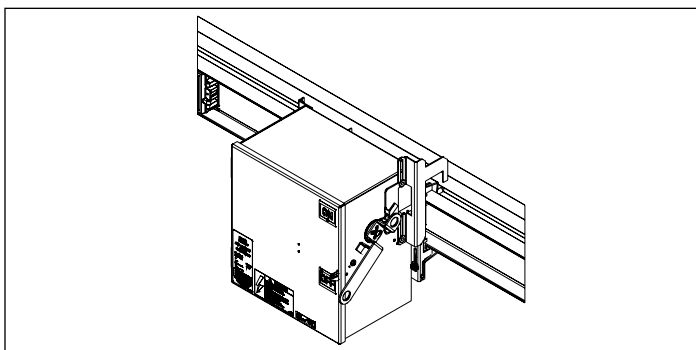
**Plug-in device electrical data (continued)**

**Table 63. Fusible switch horsepower and short-circuit rating (based on fuse class)**

Ampere rating	NEC standard	Maximum	Maximum symmetrical rms at fuse class
<b>240 V</b>			
30	3	7.5	200 kA-R
60	7.5	15	200 kA-R
100	15	30	200 kA-R
200	25	60	200 kA-R
400	50	125	200 kA-R
600	75	200	200 kA-R
800	100	250	200 kA-L
<b>480 V</b>			
30	5	15	200 kA-R
60	15	30	200 kA-R
100	25	60	200 kA-R
200	50	125	200 kA-R
400	100	250	200 kA-R
600	150	400	200 kA-J
800	200	500	200 kA-L
<b>600 V</b>			
30	7.5	20	200 kA-R
60	15	50	200 kA-R
100	30	75	200 kA-R
200	60	150	200 kA-R
400	125	350	200 kA-J
600	200	500	200 kA-J
800	250	500	200 kA-L

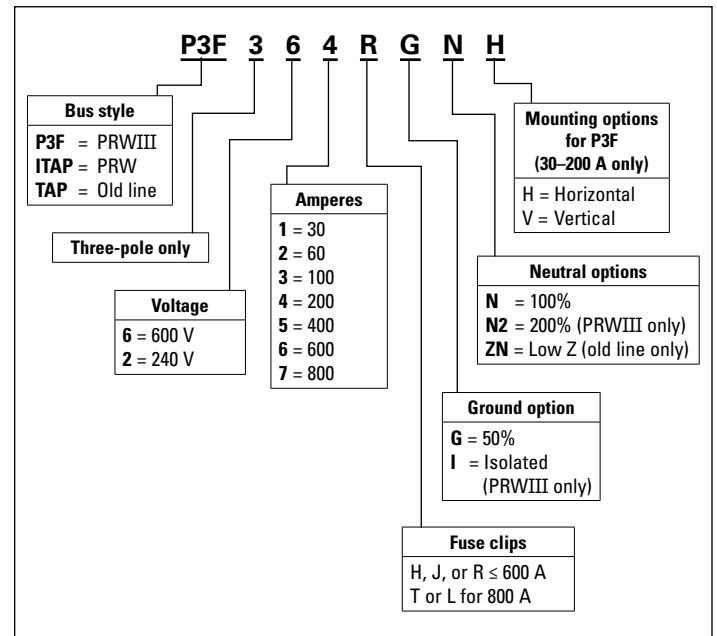


**Figure 74. Vertically mounted plug**

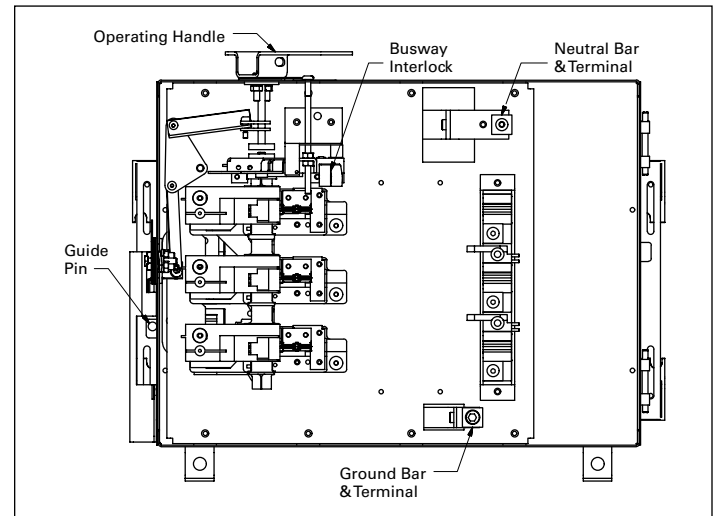


**Figure 75. Horizontally mounted plug**

**Table 64. Fusible unit catalog numbering system**



**Note:** Mounting option prefix used on 30 A, 60 A, 100 A, and 200 A plug-in units only.



**Figure 76. Typical fusible plug-in unit**

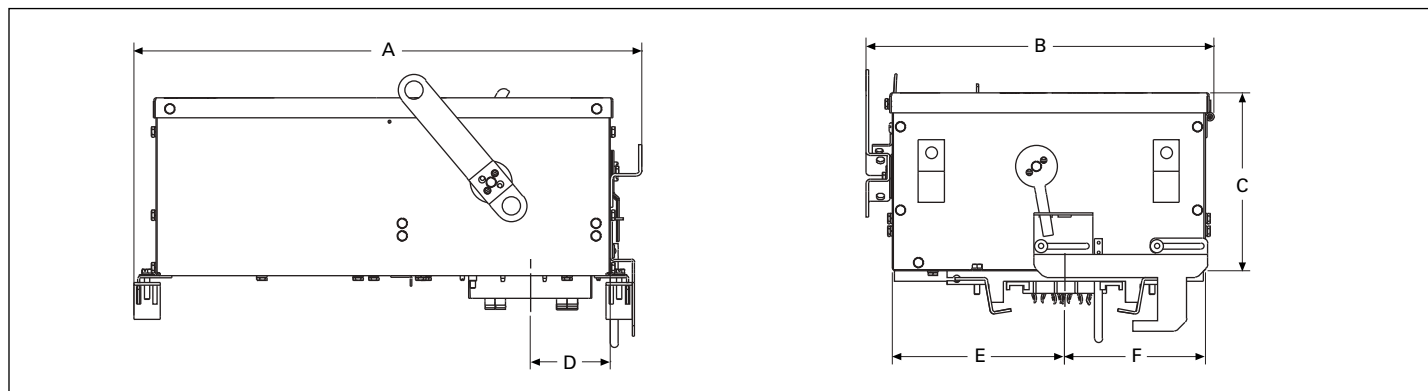
**Note:** "H" clips are standard for ITAP and TAP unless specified by adding "R" in catalog number. "R" clips are standard for P3F.

**Note:** Please call Greenwood Low-voltage Busway department for help in assigning a catalog number for a specific application.

**Note:** Do not leave spaces between characters. Example: P3F362RNV; ITAP361N.

**Note:** All plug-in units come fully assembled.

**Plug-in device physical data**



**Figure 77. Bus plugs**

**Table 65. Standard plug-in units**

Plug-in unit	Max. A	Max. Vac	Dimensions in inches (mm)						Standard mechanical terminal ①②			Approx. weight lb (kg)
			A	B	C	D	E	F	Wire range per phase (mm <sup>2</sup> )	Ground wire range	100% neutral wire range	
<b>Circuit breaker plug-in units ③</b>												
P3BFD (E- and F-frame breakers)	225	600	21.20 (538.5)	12.36 (314.0)	5.43 (138.0)	4.00 (101.6)	6.25 (158.8)	6.06 (153.7)	15–100 A (1) #14–1/0 (2.5–50) 110–225 A (1) #4–4/0 (25–95)	15–125 A #14–1/0 150–225 A 1/0–4/0	15–125 A #14–1/0 150–225 A 1/0–4/0	25 (11.3)
P3BJD (J-frame breakers)	250	600	23.26 (590.8)	12.36 (314.0)	6.97 (177.0)	4.00 (101.6)	10.44 (265.2)	6.06 (153.7)	250 A (1) #4–350 kcmil (35–185)	70–250 A #14–1/0	70–150 A #4–350 kcmil 175–250 A 1/0–4/0	47 (21.3)
P3BKD (K-frame breakers)	400	600	34.41 (874.0)	13.29 (337.6)	7.79 (197.9)	4.00 (101.6)	12.56 (319.0)	6.64 (168.7)	70–250 A (1) #3–350 kcmil (35–185) 300–350 A 250–500 kcmil (120–240) 400 A (2) 3/0–250 kcmil (95–120)	70–400 A #14–1/0	70–225 A #6–350 kcmil 250–400 A #4–600 kcmil	53 (24.0)
P3BLD (L-frame breakers)	600	600	41.91 (1064.5)	19.65 (499.1)	10.15 (257.8)	4.00 (101.6)	17.38 (441.5)	9.83 (249.7)	300–400 A (1) 4/0–600 kcmil (120–300) 450 A (2) #4–4/0 (25–95) 500 A (2) 3/0–350 kcmil (95–150) 600 A (2) 400–500 kcmil (185–240)	300–600 A #4–600 kcmil	300–600 A #4–600 kcmil 3/0–400 kcmil (OPTIM)	75 (34.0)
P3BMDL (MDL-frame breakers)	800	600	45.89 (1165.6)	19.65 (499.1)	10.15 (257.8)	4.00 (101.6)	17.38 (441.5)	9.83 (249.7)	300–600 A (2) #1–500 kcmil (50–240) 700–800 A (3) 3/0–400 kcmil (95–185)	300–800 A #4–600 kcmil	300–800 A #4–600 kcmil	136 (61.7)
P3BND (N-frame breakers)	800	600	45.98 (1167.9)	19.65 (499.1)	10.15 (257.8)	4.00 (101.6)	17.38 (441.5)	9.83 (249.7)	400–700 A (2) #1–500 kcmil (50–240) 800 A (3) 3/0–400 kcmil (120–240)	400–800 A #4–600 kcmil	400–800 A #4–600 kcmil	138 (62.6)
P3BLAP (TRI-PAC)	400	600	45.89 (1165.6)	19.65 (499.1)	10.15 (257.8)	4.00 (101.6)	13.80 (350.5)	9.83 (249.7)	225 A (1) #6–350 kcmil (16–185) 400 A (1) #4–250 kcmil (25–120) or (1) 3/0–600 kcmil (95–300)	70–400 A #4–600 kcmil	70–400 A #4–600 kcmil	96 (43.5)
P3BLCL	400	600	41.86 (1063.2)	19.65 (499.1)	10.15 (257.8)	4.00 (101.6)	13.80 (350.5)	9.83 (249.7)	(1) #4–250 kcmil (25–120) & (1) 3/0–600 kcmil (95–300)	400 A #4–600 kcmil	400 A #4–600 kcmil	88 (39.9)

① Standard wire size terminal connections are displayed for corresponding amperage ratings. Please consult molded-case circuit breaker tech data (breaker plug-in units), Bid Manager, or product line for other available options.

② Consult product line for: 200% neutral terminal wire size accommodations, to deviate from standard 100% neutral terminal offering, and/or for deviation from standard ground terminal offering.

③ All plugs are manufactured to UL 857 Standards. Enclosure dimensions are for standard offerings only. Contact product line regarding implications of non-standard plugs with motor operators, Kirk keys, neutral sensors, lighting contactors, metering, etc.



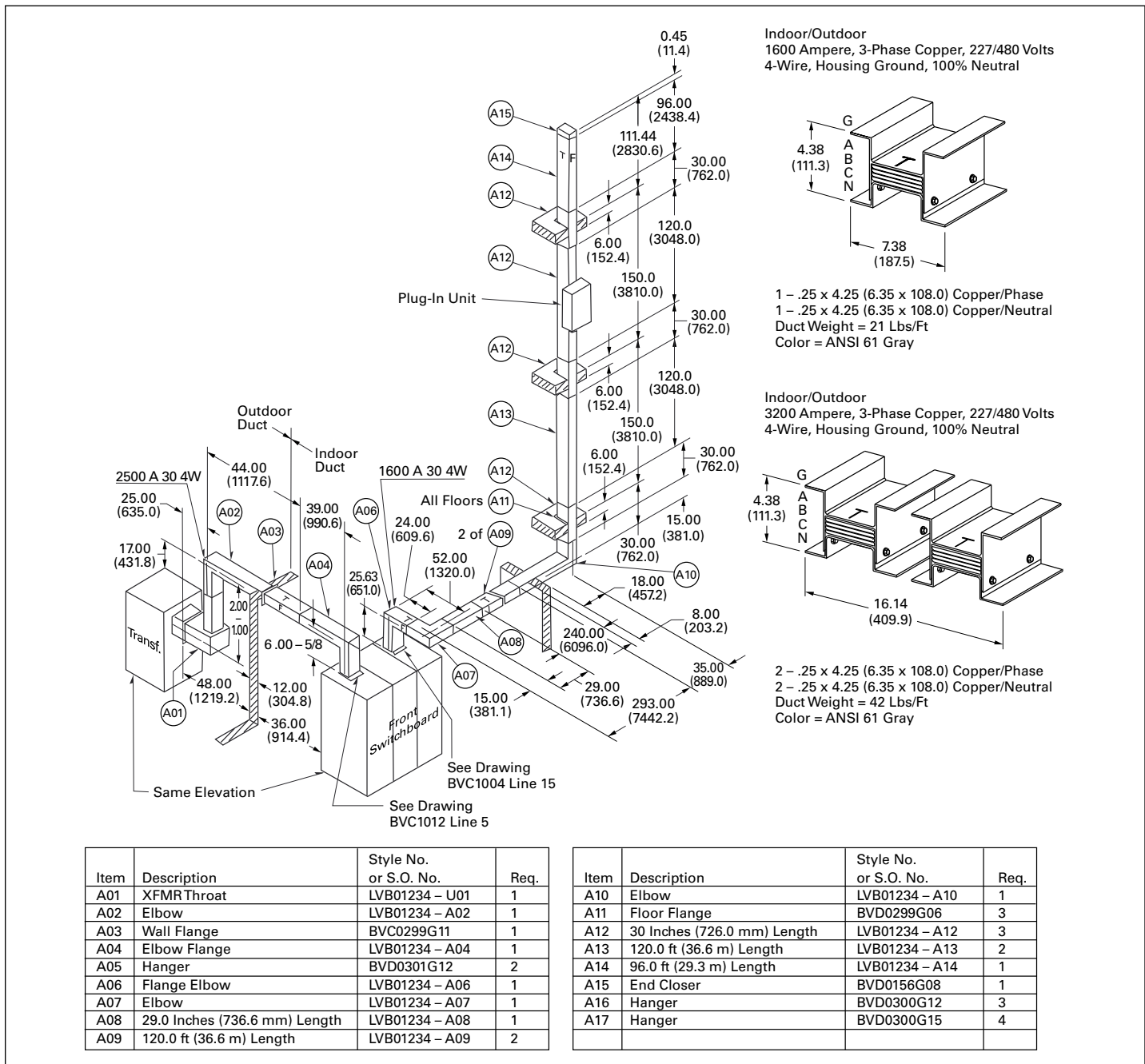
**Plug-in device physical data (continued)**

**Table 65. Standard plug-in units (continued)**

Plug-in unit	Max. A	Max. Vac	Dimensions in inches (mm)					Standard mechanical terminal ①②			Approx. weight lb (kg)	
			A	B	C	D	E	F	Wire range per phase (mm <sup>2</sup> )	Ground wire range		100% neutral wire range
<b>Fusible plug-in units ③④</b>												
P3F321RGH	240	30	14.72 (373.9)	13.92 (353.7)	8.46 (214.8)	3.85 (97.7)	7.95 (202.0)	5.66 (143.7)	(1) #14-#2 (2.5-35)	#14-1/0	#14-1/0	32 (14.5)
P3F321RGV			15.85 (402.5)	14.03 (356.3)	8.46 (214.8)	3.85 (97.7)	6.72 (170.6)	5.66 (143.7)				
P3F361RGH	600	30	14.72 (373.9)	13.92 (353.7)	8.46 (214.8)	3.85 (97.7)	7.95 (202.0)	5.66 (143.7)	(1) #14-#2 (2.5-35)	#14-1/0	#14-1/0	32 (14.5)
P3F361RGV			15.85 (402.5)	14.03 (356.3)	8.46 (214.8)	3.85 (97.7)	6.72 (170.6)	5.66 (143.7)				
P3F322RGH	240	60	14.88 (377.9)	17.92 (455.3)	8.37 (212.5)	3.85 (97.7)	11.95 (303.6)	5.66 (143.7)	(1) #14-#2 (2.5-35)	#6-3/0	#6-3/0	40 (18.1)
P3F322RGV			19.85 (504.1)	14.16 (359.6)	8.37 (212.5)	3.85 (97.7)	6.84 (173.8)	5.66 (143.7)				
P3F362RGH	600	60	14.88 (377.9)	17.92 (455.3)	8.37 (212.5)	3.85 (97.7)	11.95 (303.6)	5.66 (143.7)	(1) #14-#2 (2.5-35)	#6-3/0	#6-3/0	40 (18.1)
P3F362RGV			19.85 (504.1)	14.16 (359.6)	8.37 (212.5)	3.85 (97.7)	6.84 (173.8)	5.66 (143.7)				
P3F323RGH	240	100	14.88 (377.9)	17.92 (455.3)	8.37 (212.5)	3.85 (97.7)	11.95 (303.6)	5.66 (143.7)	(1) #14-1/0 (2.5-50)	#6-3/0	#6-3/0	40 (18.1)
P3F323RGV			19.85 (504.1)	14.16 (359.6)	8.37 (212.5)	3.85 (97.7)	6.84 (173.8)	5.66 (143.7)				
P3F363RGH	600	100	14.88 (377.9)	17.92 (455.3)	8.37 (212.5)	3.85 (97.7)	11.95 (303.6)	5.66 (143.7)	(1) #14-1/0 (2.5-50)	#6-3/0	#6-3/0	40 (18.1)
P3F363RGV			19.85 (504.1)	14.16 (359.6)	8.37 (212.5)	3.85 (97.7)	6.84 (173.8)	5.66 (143.7)				
P3F324RGH	240	200	17.42 (442.5)	21.98 (558.3)	8.52 (216.3)	3.85 (97.7)	15.44 (392.1)	6.80 (172.8)	(1) #4-300 kcmil (25-150)	#6-3/0	#6-3/0	56 (25.4)
P3F324RGV			23.80 (604.5)	16.64 (422.8)	8.52 (216.3)	3.85 (97.7)	8.26 (209.8)	6.80 (172.8)				
P3F364RGH	600	200	17.42 (442.5)	21.98 (558.3)	8.52 (216.3)	3.85 (97.7)	15.44 (392.1)	6.80 (172.8)	(1) #4-300 kcmil (25-150)	#6-3/0	#6-3/0	56 (25.4)
P3F364RGV			23.80 (604.5)	16.64 (422.8)	8.52 (216.3)	3.85 (97.7)	8.26 (209.8)	6.80 (172.8)				
P3F325R	240	400	48.85 (1242.1)	21.22 (539.0)	10.07 (255.8)	4.00 (101.6)	10.69 (271.5)	10.69 (271.5)	(1) 250 kcmil-750 kcmil (120-380)	#4-350 kcmil	#4-600 kcmil	77 (34.9)
P3F365R	600		(2) 3/0-250 kcmil (95-120)									
P3F365HR	600	600	23.59 (599.2)	21.22 (539.0)	21.00 (533.4)	4.00 (101.6)	10.69 (271.5)	10.69 (271.5)	(1) #4-600 kcmil (25-300) (2) 1/0-250 kcmil (50-120)	#4-600 kcmil	#4-600 kcmil	81 (36.7)
P3F326R	240		(2) #4-600 kcmil (25-300)									
P3F366R	600	600	48.90 (1242.1)	26.31 (668.3)	10.59 (270.0)	4.00 (101.6)	13.16 (334.3)	13.16 (334.3)	(2) #4-600 kcmil (25-300) (4) 1/0-250 kcmil (50-120)	#4-600 kcmil	#4-600 kcmil	82 (37.1)
P3F327R	240		(4) 1/0-250 kcmil (50-120)									
P3F367R	600	800	48.90 (1242.1)	26.31 (668.3)	10.59 (270.0)	4.00 (101.6)	13.16 (334.3)	13.16 (334.3)	(1) 250 kcmil-750 kcmil (120-380) (2) 3/0-250 kcmil (95-120)	#4-600 kcmil	#4-600 kcmil	108 (49.0)
P3F367R	600		(2) 3/0-250 kcmil (95-120)									

① Standard wire size terminal connections are displayed for corresponding amperage ratings. Please consult molded-case circuit breaker tech data (breaker plug-in units), Bid Manager, or product line for other available options.  
 ② Consult product line for: 200% neutral terminal wire size accommodations, to deviate from standard 100% neutral terminal offering, and/or for deviation from standard ground terminal offering.  
 ③ All plugs are manufactured to UL 857 Standards. Enclosure dimensions are for standard offerings only. Contact product line regarding implications of non-standard plugs with motor operators, Kirk keys, neutral sensors, lighting contactors, metering, etc.  
 ④ Alternative fuse options are available. Enclosure dimensions are not affected by fuse type.

**Construction drawing**



**Figure 78. Sample installation drawing**

After the approval process and prior to shipment of the busway from the factory, the installer will receive a set of construction drawings. A sample is illustrated in **Figure 78** above. The drawings will contain a complete layout of the entire installation and a bill of material that includes:

1. The item number of each section that can be correlated with the drawing.
2. A description of each section.
3. The style number or shop order number of each section.
4. The quantity of each section or style number required.
5. The height, width, and weight (per ft) of each ampere rating.
6. Location of the "T" and "F" markings on the busway.

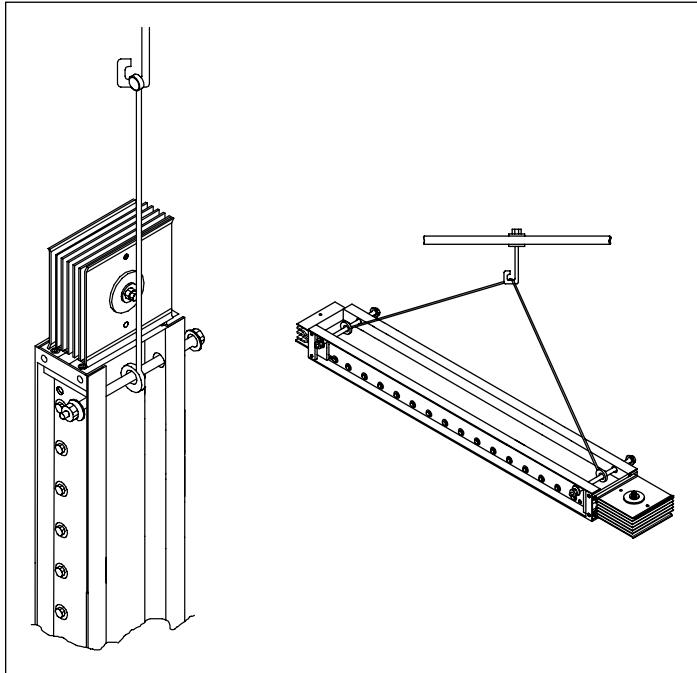
7. Flange reference drawings.
8. Switchgear locations and orientation.
9. Wall and floor locations.
10. The length of each section.
11. The location of any sections that have been designated as "Field Fit" pieces (see **page 52**).

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

## Installation data

### Hoisting and positioning busway

Pow-R-Way III is manufactured with two sets of lifting eyes at the ends of each piece to facilitate the hoisting and positioning of the busway during installation. Refer to **Figure 79** for location of lifting eyes.



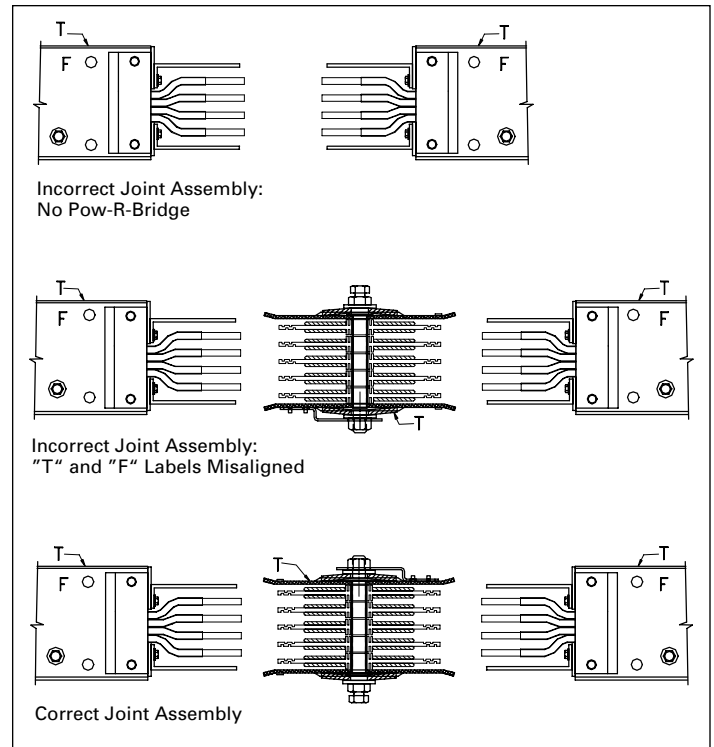
**Figure 79. Hoisting riser and horizontal busway**

### Busway joint assembly

When connecting sections of busway, the following guidelines must be followed:

1. Carefully read NEMA publication BUI.1 provided with the busway before installing equipment.
2. Contact surfaces must be kept clean and free of all contaminants.
3. Align the (factory installed) Pow-R-Bridge end of the piece being positioned with the non-bridge joint end of the adjacent section. Confirm that the "T" and "F" labels of both sections are in the same plane. Failure to do so will result in an improper installation with the phase bars of the connected sections out of sequence. Then, slide the two sections together until the bus bars of the non-bridge section contact the stopping lances of the bridge joint conductor bars of the section being positioned.

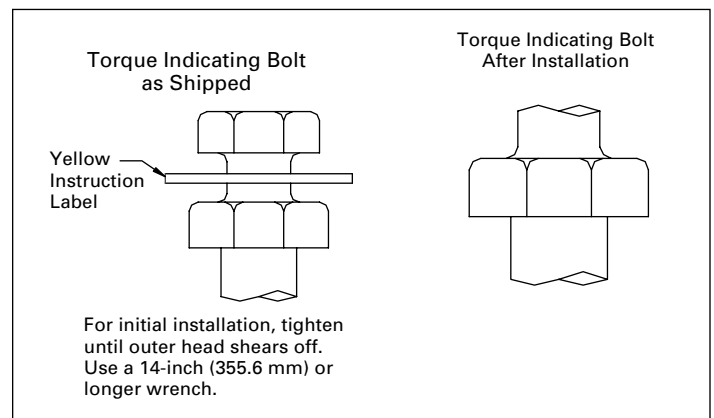
**Figure 80** illustrates examples of incorrect and correct connections. Obviously, the installation is incorrect if the bridge joint is missing, but the busway will also be improperly installed if the "T" label of the bridge joint is not in the same plane as the "T" label of the busway.



**Figure 80. Bridge joint installation**

### Torque indicating bolt (Figure 81)

The torque indicating bolt is a double-headed bolt designed to ensure that proper installation torque is achieved. Fall-away instruction labels are provided between the upper and lower bolt heads. A standard wrench with a (minimum) 14.00 inch (355.6 mm) handle should be used to complete the joint installation. Torque should be applied to the upper head only and as when the proper value is achieved. This bolt head will shear off allowing the tag to fall to the floor. Any joint that is improperly torqued will retain the highly visible tag and should be retightened. The lower bolt head remains intact for future maintenance and a label is provided on the bridge joint with the proper torque requirements.



**Figure 81. Torque indicating bolt**

**Note:** For maintenance or relocation torque from 55 to 65 ft-lb using a torque wrench.

## Final field fit program

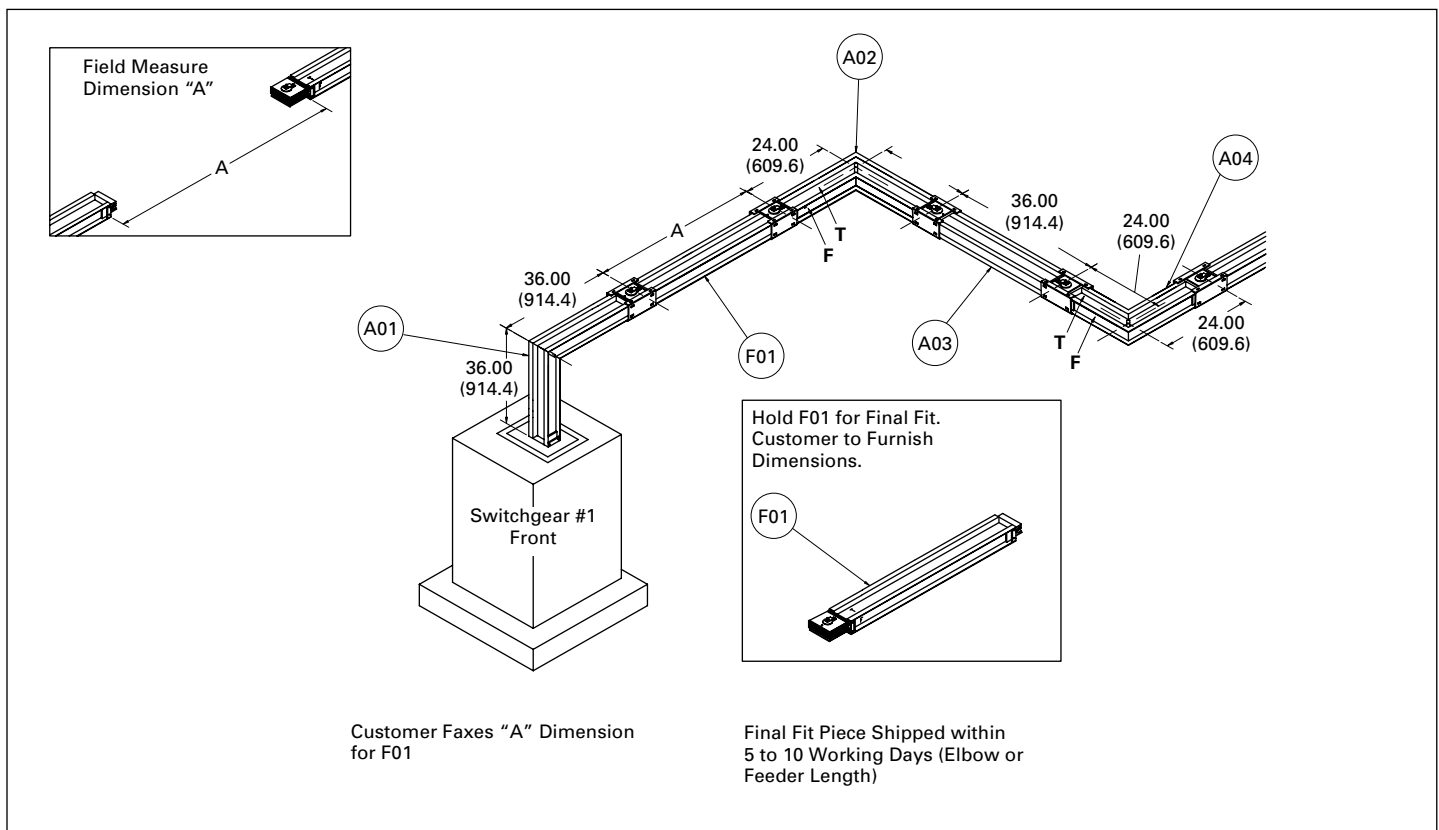
A field fit section of busway is typically an elbow or a short length of feeder that is intentionally left out of a run for later shipment. It is most often a mutually agreed upon section between the customer and the plant. The purpose of the program is to effectively manage the dimensional uncertainties that may be involved in a busway layout.

The example shown in **Figure 82** identifies the field fit piece as item F01, a straight length.

Upon release of the order, this item is kept on hold for field measurement. The contractor installs the busway (Items A01 through A04) and is then able to obtain an exact dimension for the final field fit piece, Item F01. The measurement should be made from the edge of the housing of A01 to the edge of the housing of A02.

The contractor can fax the dimensions directly to the factory on the Final Field Fit Fax Release form (see **page 53**), which is packed with the original shipment. The field fit section will ship within 5 to 10 working days from the receipt of the release fax. Offset fittings or more than four field fits released at the same time will ship within 15 working days. This program has been successful for many years and it provides the assurance of an exact fit the first time. It allows for busway runs to be released when certain dimensions are not yet determined. It also eliminates the costly delays that can occur when sections have to be remade and shipped due to last-minute job site changes. In turn, this allows for installations to begin early and projects can be completed on time.

The Final Field Fit Fax Release form is customized to each order and is shipped to the job site with the busway. The field fit items shown on the form will match the "F" items shown on the as-built drawings provided. The sheet is faxed from the job site directly to the product engineer at the factory.



**Figure 82. Final field fit program**

**Final Field Fit Program**

**Item Release!**

Email Directly to Greenwood busway factory

Ref. Drawing:

G.O.#:

Item #:

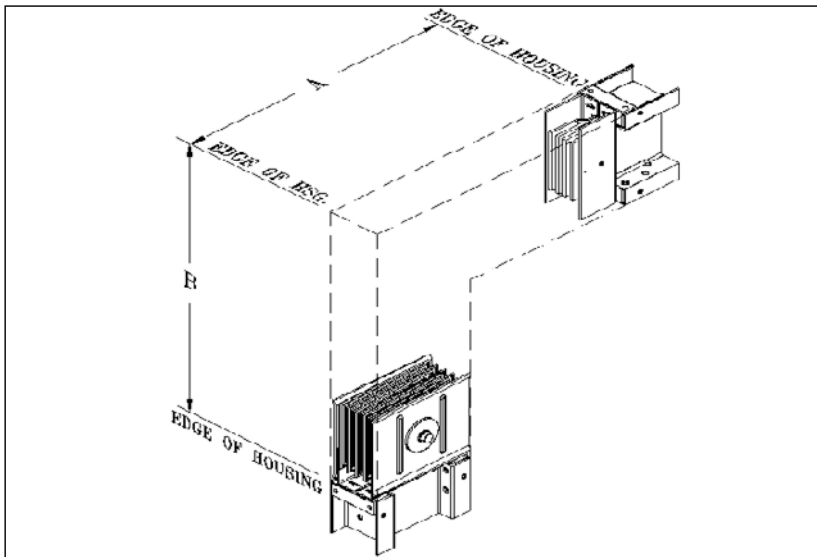
Phone #: **864-942-6310**

Email Address: [buswayfieldfit@eaton.com](mailto:buswayfieldfit@eaton.com)

Customer to provide dimensions indicated by letters on field fit section of busway. In order to help expedite your release please include the GO# and Item# listed above on this sheet in the subject line of your email message.

"A" Dimension = \_\_\_\_\_ (see chart for min.)

"B" Dimension = \_\_\_\_\_ (see chart for min.)



Minimum Dimensions		
Amp Rating	Hsg. to Hsg.	
CU.	AL.	(in.)
225	225	19.88
400	400	19.88
600	600	19.88
800	-	19.88
1000	-	20.19
1200	800	20.94
1350	1000	21.19
1600	1200	22.19
2000	1350	23.31
-	1600	24.19
2500	2000	26.12
3200	-	31.06
4000	2500	33.31
-	3200	35.12
5000	4000	38.88

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Phone#: \_\_\_\_\_ Email: \_\_\_\_\_  
 Date: \_\_\_\_\_

Lead times shown below are in working days from receipt of complete information.

Piece Type	1-5 pieces*	6-10 pieces*	11 or more pieces*
Straight Sections	5-10 working days	10-15 working days	consult factory for lead times
Standard 90 Elbows	5-10 working days	10-15 working days	consult factory for lead times
Offsets	10-15 working days	consult factory for lead times	consult factory for lead times
Specials/Other	consult factory for lead times	consult factory for lead times	consult factory for lead times

The number of pieces is calculated by adding all field fit pieces being released to be made at the same time together. This is not necessarily a number of like pieces. For example 3 elbows and 4 straight sections would equal 7 total pieces. The lead time for each item in this case would be found under the 6-10 piece column.

\*Denotes number of pieces per project not per run, and could be included on multiple order numbers.

Revised 4/14

Figure 83. Release form

## Specifications

### Part 1—General

#### 1.01 Scope

- A. The contractor shall furnish and install the busway system including all necessary fittings, hangers, and accessories as specified herein and as shown on the contract drawings.

#### 1.02 Related sections

#### 1.03 References

- A. The low-voltage busway and all components shall be designed, manufactured, and tested in accordance with the latest applicable standards of ANSI, CSA, NEMA, and IEC:
1. NEMA BU.1.
  2. ANSI/UL 857.
  3. CSA C22.2 No. 27.
  4. IEC 60439-1 and 2.

#### 1.04 Submittals for review/approval

- A. The following information shall be submitted to the engineer:
1. Master drawing index.
  2. Isometric drawing of each busway run.
  3. Busway ratings including:
    - a. Short-circuit rating
    - b. Voltage
    - c. Continuous current
  4. Major component ratings including:
    - a. Voltage
    - b. Continuous current
    - c. Interrupting ratings
  5. Cable terminal sizes.

#### 1.05 Submittals for information

- A. When requested by the Engineer, the following product information shall be submitted:
1. Descriptive bulletins.
  2. Product sheets.

#### 1.06 Submittals for close-out

- A. The following information shall be submitted for record purposes:
1. Final as-built drawings and information for items listed in Section 1.04.
  2. Installation information.
  3. Seismic certification and equipment anchorage details.

#### 1.07 Qualifications

- A. All components shall be of the same manufacturer as the busway.
- B. For the equipment specified herein, the manufacturer shall be ISO 9000, 9001, or 9002 certified.
- C. The manufacturer of this equipment shall have produced similar electrical equipment for a period of 10 years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

- D. The busway and related accessories shall be suitable for and certified to meet all applicable seismic requirements of the Uniform Building Code and the California Building Code for Zone 4 application.

#### 1.08 Delivery, storage, and handling

- A. Equipment shall be handled and stored in accordance with the manufacturer's instructions. One copy of these instructions shall be included with the equipment at time of shipment.

#### 1.09 Operation and maintenance manuals

- A. Ten copies of the equipment operation and maintenance manuals shall be provided.
- B. Operation and maintenance manuals shall include the following information:
1. Instruction books or leaflets.
  2. Recommended renewal parts list.
  3. Drawings and information required by Section 1.06.

### Part 2—Products

#### 2.01 Manufacturers

- A. Eaton

#### 2.02 Ratings

- A. The busway shall be Eaton type Pow-R-Way III and shall be:
1. Three-phase, three-wire with 50% integral housing ground.
  2. Three-phase, three-wire with 50% internal ground or 50% isolated, internal ground.
  3. Three-phase, three-wire with 100% ground.
  4. Three-phase, four-wire with 100% neutral.
  5. Three-phase, four-wire with 50% integral housing ground and 100% neutral.
  6. Three-phase, four-wire with 50% internal ground or 50% isolated, internal ground and 100% neutral.
  7. Three-phase, four-wire with 100% ground and 100% neutral.
  8. Three-phase, four-wire with 200% neutral.
  9. Three-phase, four-wire with 50% integral housing ground and 200% neutral.
  10. Three-phase, four-wire with 50% internal ground or 50% isolated, internal ground and 200% neutral.
  11. Three-phase, four-wire with 100% ground and 200% neutral as indicated on the Contract Drawings.

#### 2.03 Construction

The busway and associated fittings shall consist of copper (or) aluminum conductors totally enclosed in a two-piece extruded aluminum housing. Outdoor feeder, indoor feeder, and indoor plug-in shall be interchangeable at the same rating without the use of special adapters or splice plates. Where indicated on the contract drawings, provide indoor, sprinkler-proof, plug-in busway. Fittings shall be identical for use with both the plug-in and feeder types of busway. The busway shall be capable of being mounted in the flatwise, edgewise, or vertical positions without derating. The busway shall consist of standard 10 ft (3 m) sections with special sections and fittings manufactured to suit the installation. Horizontal runs shall be suitable for hanging on 10 ft (3 m) maximum centers. Vertical runs shall be suitable for mounting on 16 ft (5 m) maximum centers. Provide one hanger for every 10 ft (3 m) of horizontally mounted busway. On vertical runs, provide one spring, suspension type hanger per floor and at the end of the bus run on the last floor.

#### 2.04 Conductor bus bars

- A. Bus bars shall be fabricated from high strength, 57% conductivity aluminum or 99% conductivity copper and shall be suitably silver- (or) tin-plated at all electrical contact surfaces.
- B. Bus bars shall be insulated over their entire length, except at joint and contact surfaces, with Class B, 130 °C, epoxy insulation applied by the fluidized bed process. The epoxy insulation shall extend fully to the joint contact surface.
- C. The busway shall be capable of carrying rated current continuously without exceeding a temperature rise of 55 °C based on a 40 °C ambient.

#### 2.05 Bus joints

- A. Each busway section shall be furnished complete with joint hardware and covers. The busway joints shall be a single-bolt, non-rotating, removable bridge design. All bridge joints shall be furnished with [standard torque-indicating double head joint bolts and Belleville washers. The bridge joint shall utilize a captive nut retainer on the opposite side of the torque-indicating bolt. The bridge joint design shall ensure proper installation without the use of a torque wrench, and provide visual indication that the joint has been tightened to the proper torque value]. —OR— [an optional tension indicating SmartBolt and Belleville washer. The bridge joint shall utilize a captive nut retainer on the opposite side of the tension-indicating bolt. The bridge joint design shall ensure proper installation without the use of a torque wrench, and provide visual indication through a color changing window on the bolt head that the joint has been tightened to the proper internal tension value.] Each indoor busway joint shall allow for a minimum length adjustment of ±0.5 inches (12.7 mm). De-energization of busway shall not be required for safe testing of joint tightness. The bridge joint shall be the Eaton Pow-R-Bridge.

#### 2.06 Housing

- A. The busway housing shall be an all-aluminum construction. The housing shall be manufactured as a two-piece design only, and shall be fabricated from extruded aluminum. The two-piece housing shall be bolted along the bottom flange only, using Grade 5, 1/4 x 20 zinc-plated hardware on 3.00 inch (76.2 mm) centers for maximum mechanical strength. The busway enclosure finish shall be ANSI 61 gray baked epoxy powder paint applied by an electrostatic process.
- B. Outdoor feeder busway housing shall be identical to indoor feeder busway housings, and shall be UL listed for outdoor use. Busway shall be completely weatherized at the factory, and designed with a two-piece metal joint cover so that no caulking is required by the installer to achieve an IP66 rating suitable for outdoor use.
- C. The busway shall have a minimum short-circuit withstand rating of 85 kA rms symmetrical for ampere ratings through 800 A, 100 kA rms symmetrical through 1350 A, 125 kA rms symmetrical through 1600 A, 150 kA rms symmetrical through 2500 A, and 200 kA rms symmetrical for ratings through 5000 A.

#### 2.07 Plug-in busway

- A. Where required, busway shall be of the plug-in type. Plug-in busway shall be available in standard 24.00 inch (609.6 mm) incremental lengths not to exceed a maximum length of 10 ft (3 m). Plug-in outlets shall be provided on both sides of the busway on 24.00 inch (609.6 mm) centerlines. The design shall allow for 10 cover outlets per 10 ft (3 m) section. Covers for plug-in openings shall have a positive screw close feature and shall require the use of a tool to open. Plug-in outlet covers shall prohibit dirt and debris from entering the plug-in contact openings in the busway and shall have provisions for the installation of power company seals.

- B. The plug-in contact surfaces of the bus bars shall be constructed of conductor tabs, welded to the side edges of the bars. The tabs shall be of the same (full) thickness, rating, and material as the bus bars. The contact surfaces shall receive the same plating process as the joint contact surfaces.
- C. Plug-in and feeder busway of the same ampere rating shall have identical short-circuit withstand ratings.
- D. Positive mechanical guides for plug-in units shall be provided at each plug-in outlet to facilitate unit alignment and to prevent improper installation.
- E. The plug-in busway shall maintain the same sandwich bus design as the feeder busway. Plug-in busway with bus bars that are separated or flared at the plug-in opening shall be unacceptable.
- F. Plug-in outlets shall be furnished with barriers across the plug-in openings to prevent accidental contact with a live part by an operator or installer.
- G. Where required, indoor sprinkler-proof plug-in busway shall be provided with housing identical to the standard plug-in bus. Sprinkler-proof busway shall carry an ingress protection rating of IP55 with the plug-in openings closed.
- H. Where required, plug-in units of the types and ratings indicated on the contract drawings shall be supplied. Plug-in units shall be mechanically interlocked with the busway housing to prevent their installation or removal while the switch is in the ON position. The ground stab of any plug-in unit shall make a positive connection with a busway ground (housing or internal) contact, inside the plug-in outlet, before the phase and neutral stabs make contact with the contact surfaces of the bus bars. All plug-in units shall be equipped with a defeatable interlock to prevent the cover from being opened while the switch is in the ON position and to prevent the accidental closing of the switch while the cover is open. The operating mechanism and handle shall remain in control of the disconnect device at all times, permitting easy operation from the floor by means of a hookstick or chain. For safety reasons, no projections shall extend into the busway housing other than the plug-in stabs. All plug-in units shall be interchangeable without alteration or modification to the busway.
- I. Fusible-type bus-plugs shall have a quick-make, quick-break disconnect switch and positive pressure fuse clips.
- J. Circuit breaker type bus plugs shall have an interrupting rating as indicated on the contract drawings and shall meet all the requirements of UL Standard 489. It shall be possible to increase the interrupting rating of a breaker plug-in device having ampere ratings through 400 A up to 100 kAIC at 480 Vac and 200 kAIC at 240 Vac by changing out the circuit breaker only and leaving the enclosure intact. All circuit breaker plug-in devices shall be Eaton type Series C.
- K. Current limiting circuit breaker type plug-in devices shall be units that provide integral time delay/thermal trip protection and current-limiting protection in one assembly. These breakers shall be UL rated at 200 kAIC at 240 Vac and 150 kAIC at 480 Vac, and shall be series-rated to protect all molded-case breakers downstream as shown on the contract drawings.
- L. Where indicated on the contract drawings, provide bus plugs with Surge Protective Device (SPD). SPD units shall incorporate Metal Oxide Varistors (MOVs) for suppression of AC transients and filtering capacitors to eliminate electrical line noise and ringing transients. Ratings of SPD bus plugs shall be as indicated on the contract drawings. SPD units shall be Eaton's Clipper Power System.
- M. Where indicated on the contract drawings, provide circuit breaker bus plugs with programmable microprocessor-based trip units that have coordination, communication, monitoring, and advanced warning capabilities. Programmable breaker bus plugs shall be Eaton's Digitrip OPTIM.

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