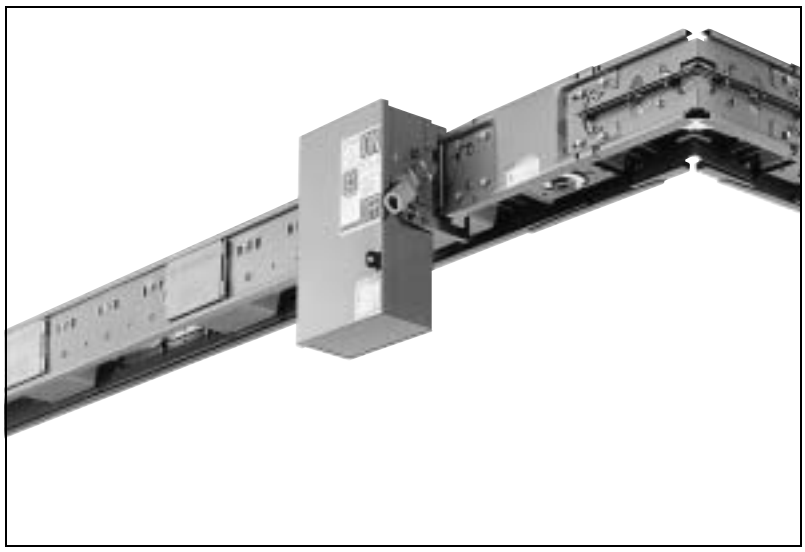
Busway Systems

Class 5600



CONTENTS

Merlin Gerin
Modicon
Square D
Telemecanique
Schneider Electric Brands

SQUARE D
Schneider Electric

General

I-LINE® Busway manufactured by Square D offers a complete line of compatible, sandwich-type feeder and plug-in busway lengths and fittings. It allows maximum flexibility, ease of installation, and offers electrical efficiency in the distribution of low voltage power for both commercial and industrial applications.

I-LINE busway has been used to supply power in thousands of installations throughout the world for more than three decades. Our broad range of I-LINE busway products include: I-LINE Plug-In style from 225 A–600 A with aluminum or copper conductors; I-LINE® II Plug-in and Feeder styles from 800 A to 4000 A with aluminum conductors, and to 5000 A with copper conductors. I-LINE and I-LINE II busways are constructed in three-pole and four-pole full neutral configurations for system voltages to 600 Volts and are rated to allow 100% of the current to flow continuously.

Busway installation is quick and easy. The compact, totally enclosed design is lightweight and easy to handle. Labor studies have shown that a 75% savings in installation time is not uncommon when comparing I-LINE busway with cable and conduit installations. This significant reduction in installation time can result in total installed cost for busway being significantly lower than other distribution methods.

In addition, a wide variety of busway components and plug-in units are available from stock for fast delivery.

When you need busway, select the best—I-LINE busway. Our design and construction has been time-tested in many years of use throughout the world. No matter how you compare, I-LINE busway is your solid first choice!

Sandwich Construction

I-LINE feeder and plug-in busway both utilize sandwich-type construction to provide superior voltage drop characteristics, even at low power factors.

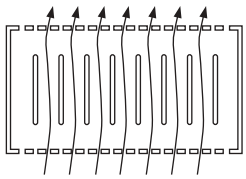
Steel housing sides and aluminum tops and bottoms have been carefully designed to reduce component weight and minimize the hysteresis and eddy current losses that are common in all steel housings.

Plug-in busway ratings that utilize two or three bus bars per phase have a phase paralleling feature at the joint assembly of each straight length. This helps equalize bus bar loading when plugs are mounted on one side only.

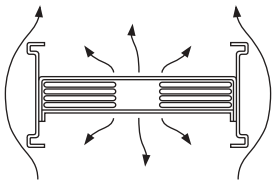
The plug-in housing has notches along the top rail for easy alignment and installation of plug-in units.

Within the same ampere rating, all I-LINE II busway lengths and fittings are fully compatible between feeder and plug-In styles using standard universal tie channels (housing “splice plates”) supplied with each component.

Totally Enclosed Housing



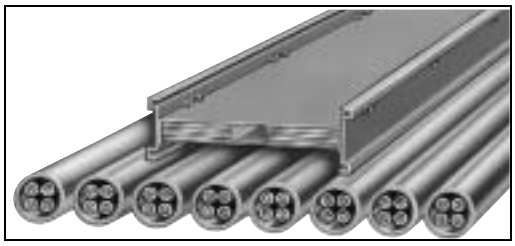
Ventilated busway depends on free air movement through a perforated housing to cool the bus bars. Unless mounted in its preferred position (maximum bus bar cooling), ventilated busway must be derated. Ventilated housing also permits dirt accumulation and offers limited protection of bus bars due to open ventilating slots in the housing.



I-LINE busway has a modern “totally enclosed” housing design requiring no derating regardless of mounting position. Because the housing has no ventilating holes, the entry of dirt and possibility of accidental contact with bus bars is greatly reduced.

Compact Size

I-LINE II busway is compact. The small size means it may be used in locations where feeder circuits would not otherwise be possible. Efficient use of light-weight raw materials is an additional factor in I-LINE busway’s compact design.



Finish

I-LINE busway housing appearance has been further enhanced by the addition of a multi-million dollar cationic electro-deposition paint system to our production facility. I-LINE busway users get a tough, durable uniform “E-Coat” epoxy paint finish, making their busway installations functional and attractive for years to come.

Insulation

All bus bars are insulated using Class B rated (130 °C (266 °F) vendor certified) materials to prolong insulation life. I-LINE busway insulation consists of two layers of heat-formed polyester film surrounding each bus bar. On plug-in busway lengths, all insulation is notched at the openings to allow plug-in unit mounting.

I-LINE II busway uses the same two layers of polyester film to insulate the bus bars in indoor busway while outdoor busway utilizes powder-coated epoxy insulation for the bus bars. Both types of insulation offer high quality dielectric strength and long life expectancy.

Plating

Bus bars for I-LINE and I-LINE II busway are plated to ensure low surface-to-surface contact resistance and to minimize surface corrosion. Aluminum bus bars are electroplated with a coat of tin after preparation with the ALSTAN 70 process. Copper bus bars are plated with a layer of silver that is flashed onto the surface of the bus bar.

Dielectric Testing

UL® and CSA require a one-time dielectric test for all new busway designs prior to certification. This test, at two times rated voltage plus 1000 Vac (2200 Vac), is intended to confirm the integrity of the insulation system. I-LINE busway passes this test.

Every length and fitting of our busway must also pass a 7500 Vdc “hi-pot” test before shipment from the factory. This additional test helps ensure the highest quality busway possible for our customers.

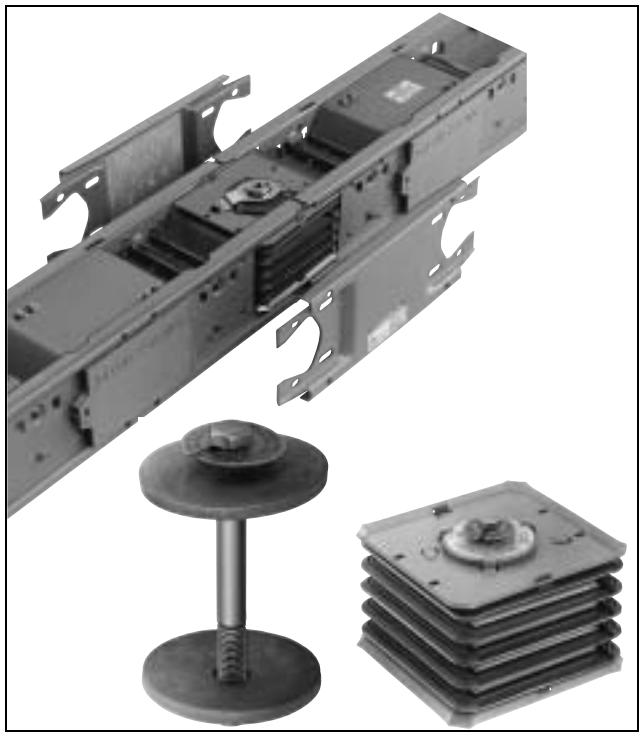
VISI-TITE® One Bolt Joint

I-LINE busway incorporates the “one bolt” joint principle. This joint design uses a high-strength (Grade 5) VISI-TITE® bolt to provide a clamping force of over 4000 pounds. The force is distributed over the contact area by a pair of large diameter, spring steel cupped conical washers. On higher ampere ratings (2000 A or above) two or three joint bolts are used-one for each set of bus bars. Our “one bolt” principle replaces older designs which required up to 32 nuts, bolts, and washers for each set of bus bars. The VISI-TITE torque indicating joint bolt is standard on all busway joints. Insulated and at ground potential, the bolt and nut are both captive to reduce installation time.

Fast, accurate torquing is a snap with VISI-TITE double- headed bolts. There’s no need for a torque wrench. Use any long handled wrench to tighten the outer bolt head until it twists off and releases a red plastic warning disc. Any disc remaining during inspection indicates an improperly torqued joint. For maintenance of the joint or when busway is relocated, the VISI-TITE bolt should be tightened to 70 lb-ft +/- 10 lb-ft (94.92 N•m +/- 13.56 N•m) with a torque wrench.

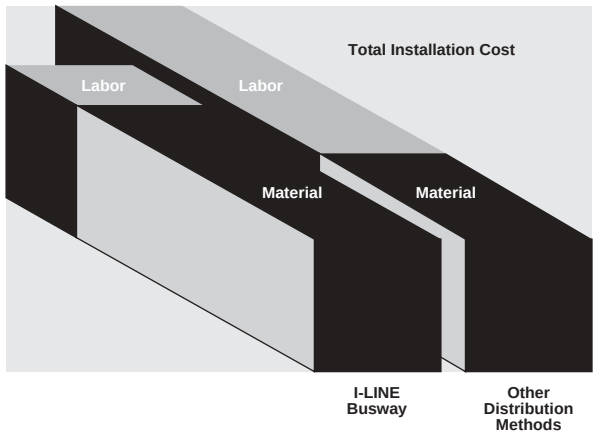
EZ JOINT PAK™ Connector Assembly

I-LINE II busway offers an improved single bolt joint package which can be removed and replaced with an isolation joint pak to electrically isolate busway sections for load shifting and maintenance. It can also be relocated to the opposite end of a length to take care of last minute job changes. The EZ JOINT PAK™ Connector Assembly is shipped pre-assembled with each I-LINE II busway length or fitting, providing minimum job-site installation labor. And the VISI-TITE bolt is a standard feature on all assemblies.



Labor Savings

I-LINE II busway installs quickly compared to other forms of low voltage power distribution. While material costs may be slightly higher, the labor required to install I-LINE II busway is often much lower. This results in an overall reduction in total installation cost.



Tie Channels

I-LINE II busway uses one set of universal tie channels for all ampere ratings of busway–both feeder and plug-in. This helps speed up busway installation.

Internal Smoke/Gas Barriers

Continuous air spaces inside I-LINE II busway housing are closed off with special barriers to help prevent the spread of smoke and gases in the event of a fire in the area of the busway installation. This standard internal barrier allows busway to extend through walls or floors without creating open space for a “chimney effect” fire path.

I-LINE busway from 225 A–600 A requires installation of a special internal barrier for wall or floor penetrations.

Short Circuit Strength

I-LINE busway housing construction gives high short circuit ratings. On some feeder busway, additional short circuit strength is gained by wrapping the bus bar sandwich with epoxy saturated fiberglass tape. This results in ratings of up to 200,000 RMS symmetrical for 4000 A and 5000 A feeder busway.

On plug-in busway, molded plug-in opening insulators (or optional high strength insulators) provide additional short circuit strength. Full short circuit bracing extends across the plug-in opening to protect the plug-in connections.

Our busway has been tested under actual short circuit conditions at the Square D High Power Laboratory in Cedar Rapids. These tests confirm I-LINE busway can withstand extremely high short circuit levels. Some ratings actually stand up to tests at 200,000 RMS symmetrical amperes!

Voltage Drop

Because of its extremely low reactance, I-LINE busway voltage drop is low. This efficient design allows power to be delivered in an installation with the highest efficiency possible. This makes I-LINE busway ideal for efficient power distribution in commercial or industrial facilities.

Outdoor Busway

Outdoor feeder busway is furnished with a housing construction employing a special gasketed design to prevent the entry of rain. Unique engineering and design features allow field installation in any mounting position while still maintaining outdoor integrity. This product symmetry provides for proper installation in all instances. The VISI-TITE bolt is also standard on outdoor busway.

Universal Fittings

I-LINE II busway fittings are designed for use with feeder and plug-in busway straight lengths as well as for continuations of service entrance busway runs. The compact universal fittings allow maximum layout flexibility without the need for special built-to-order combination fittings.

Quality

All I-LINE busway products are manufactured in a Square D facility which has been registered by Underwriter’s Laboratories, Inc. to ISO 9001:2000.

Integral Ground Bus

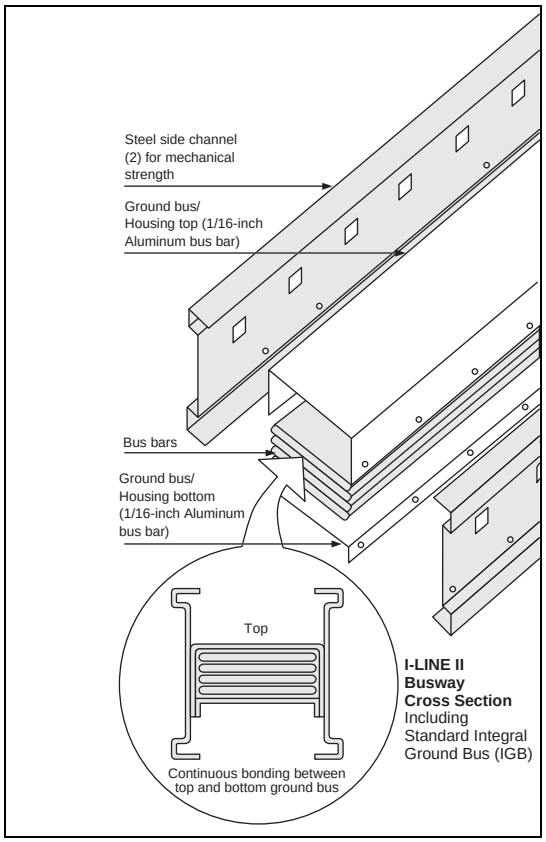
I-LINE II busway (800 A–5000 A) is built with an innovative Integral Ground Bus (IGB) system, proven by many years of use on original I-LINE busway installations.

In simple terms, IGB utilizes two 1/16-inch thick ground bus bars to form the housing top and bottom. This provides an integral 50% continuous current capacity ground path. Equally important, the two ground bus bars completely encircle the phase conductors and provide a very effective high level ground path for ground faults. Copper integral ground is available as an option.

We believe a properly designed ground should be included on all distribution systems. I-LINE II busway includes IGB as a standard feature on every rating from 800 A to 5000 A.

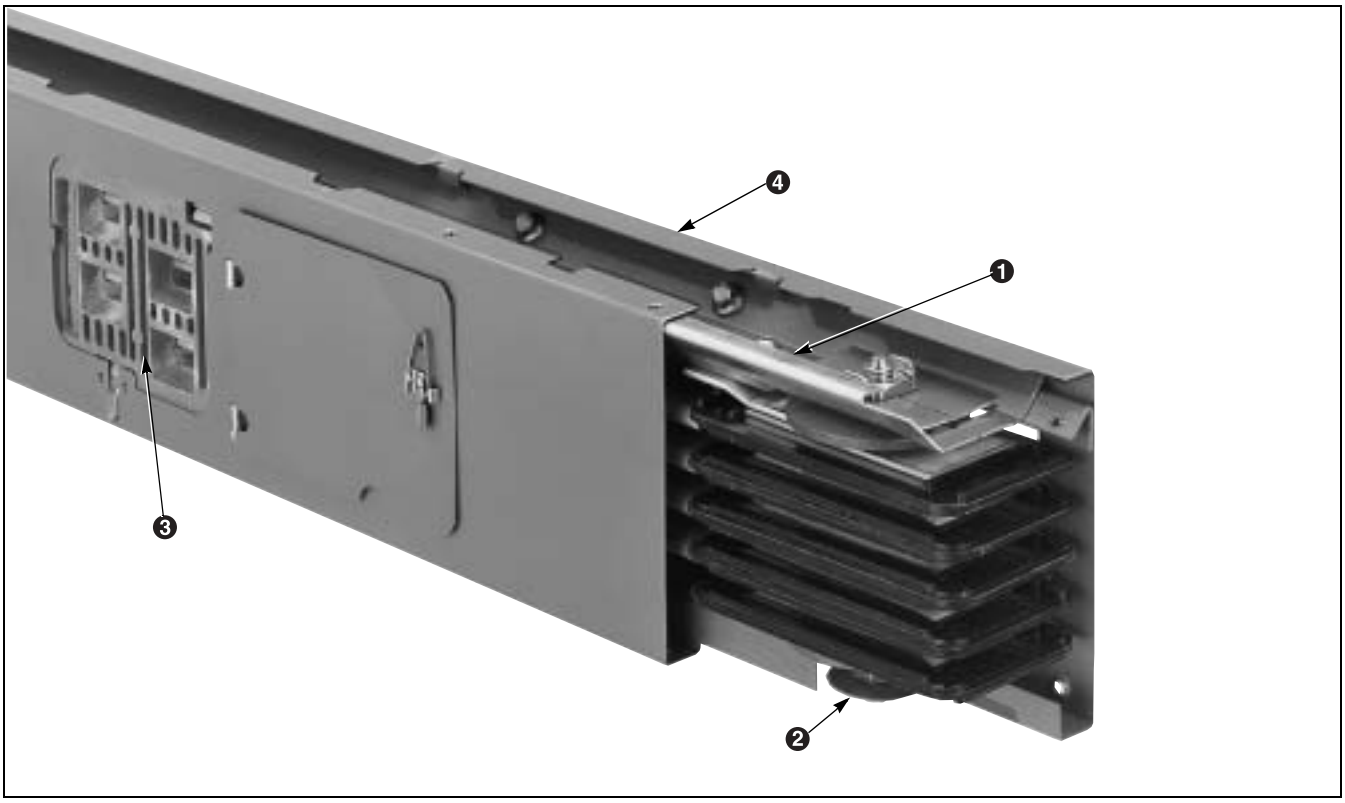
(Integral ground bus is available as an option on 225 A–600 A busways.)

We offer many products and services to fulfill the need for complete and reliable grounding throughout your electrical system. Consult your local sales office for assistance in this very important aspect of proper electrical design.



I-LINE II Busway Cross Section Including Standard Integral Ground Bus (IGB)

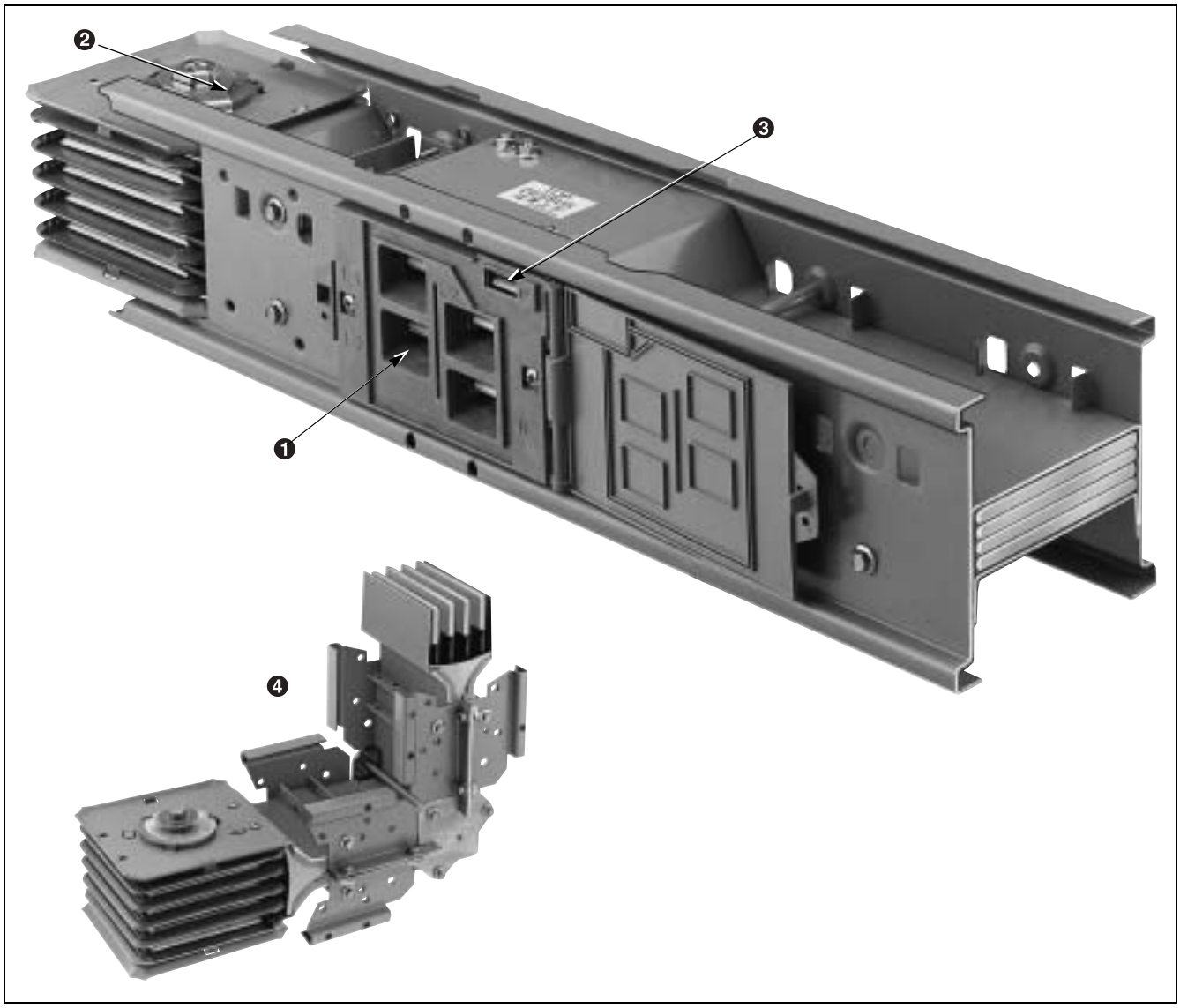
Plug-in Busway 225 A–600 A



1. Integral Ground Bus (IGB)—Is furnished as an optional feature for I-LINE busway and rated at 50% capacity of the nameplate Amperage rating of the busway. The conductor is aluminum and is the top part of the housing itself.
2. VISI-TITE Bolt—Is a double-headed bolt furnished for all joint connectors to ensure proper torque for each connection. A cupped conical washer is also included to ensure equal distribution of pressure across the full joint surface area.
3. Plug-in Openings—Is furnished standard with plug-in openings on 2 ft (61 cm) centers on both sides of I-LINE busway. The openings include a hinged door that covers the opening when it is not in use. A 600 A maximum capability is at each plug-in opening. Hangers for the busway fit without blocking access to the plug-in opening.
4. The Enclosure—Is a three-piece formed housing with plug-in openings supported by molded rigid insulators.

NOTE: Insulation for I-LINE busway is two full-length layers of Class B rated (130 °C (266 °F) vendor certified) polyester film.

Plug-in Busway 800 A–5000 A



1. Molded plug-in opening insulator—Adds insulation and support at plug-in contact area.
2. EZ JOINT PAK connector assembly—Includes like-phase connector on higher ampere ratings with more than one conductor per phase (plug-in bus only).
3. Ground jaw for plug-in unit—Has a “blow-on” design similar to phase jaw connection.
4. Fittings—Includes elbows, tees, and flanged ends that are easily removed and refitted with the use of our EZ JOINT PAK assembly without disturbing adjacent lengths.

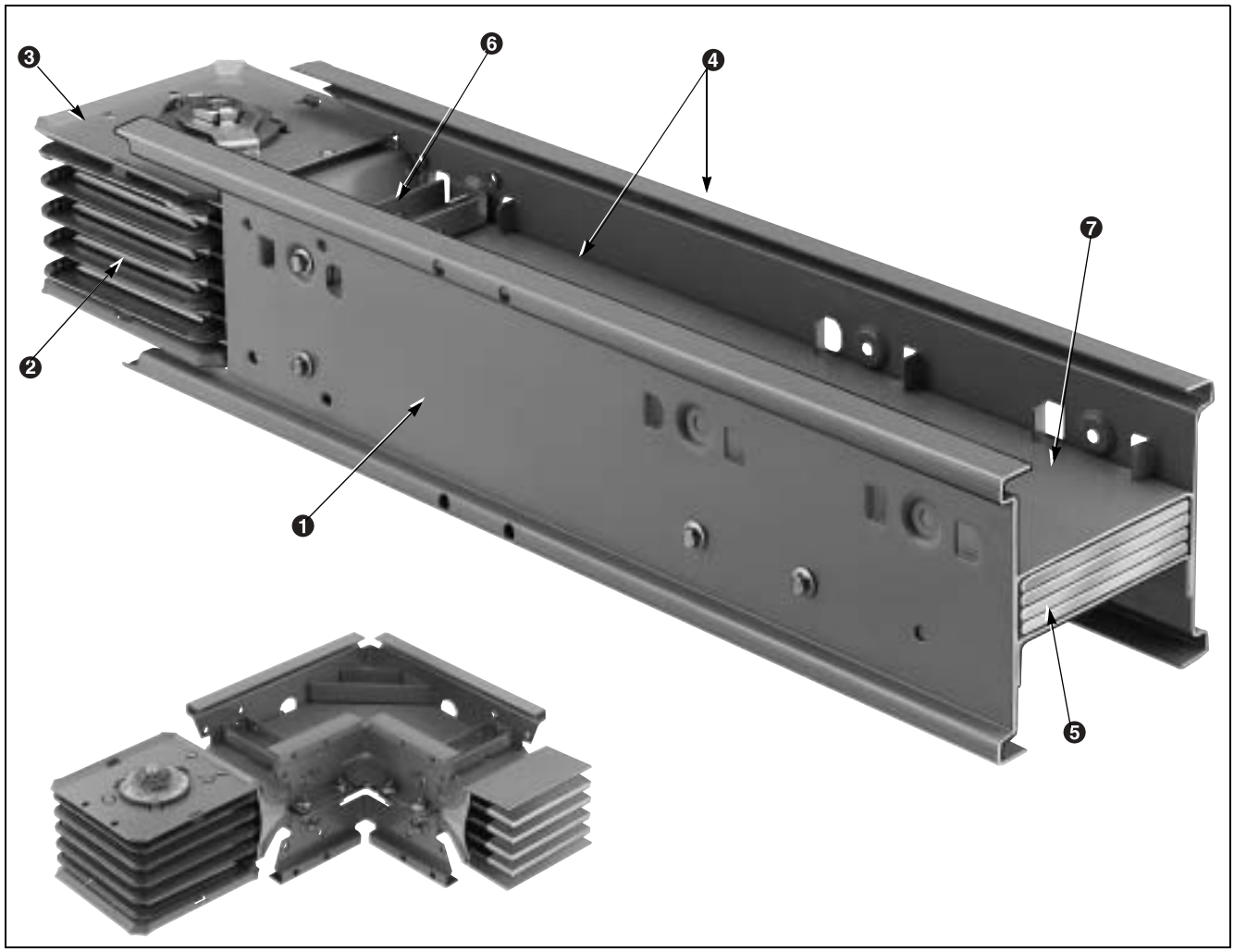
NOTE: Internal barriers are standard on both feeder and plug-in busway. All interior spaces are barriered to stop hot gases.

NOTE: Hangers fit both feeder and plug-in busway without blocking access to openings.

NOTE: I-LINE plug-in units (15 A–1600 A) fit both original and I-LINE II busway.

NOTE: I-LINE II plug-in busway with sandwich construction also includes features depicted for feeder style on page 14.

Indoor Feeder Busway 800 A–5000 A



1. Steel housing channels—Provides mechanical strength.
2. Molded extra-strength glass fiber interphase barriers.
3. EZ JOINT PAK connector assembly—Removable for isolation or maintenance. Includes VISI-TITE bolt.
4. Steel/aluminum housing—Reduces hysteresis and eddy current losses on feeder and plug-in busway.
5. Plated aluminum or copper bus bars.
6. Surge clamps for added short circuit strength.
7. Integral Ground Bus (IGB) —Two, 1/16-inch thick aluminum bus bar. Also serves as top and bottom housing.

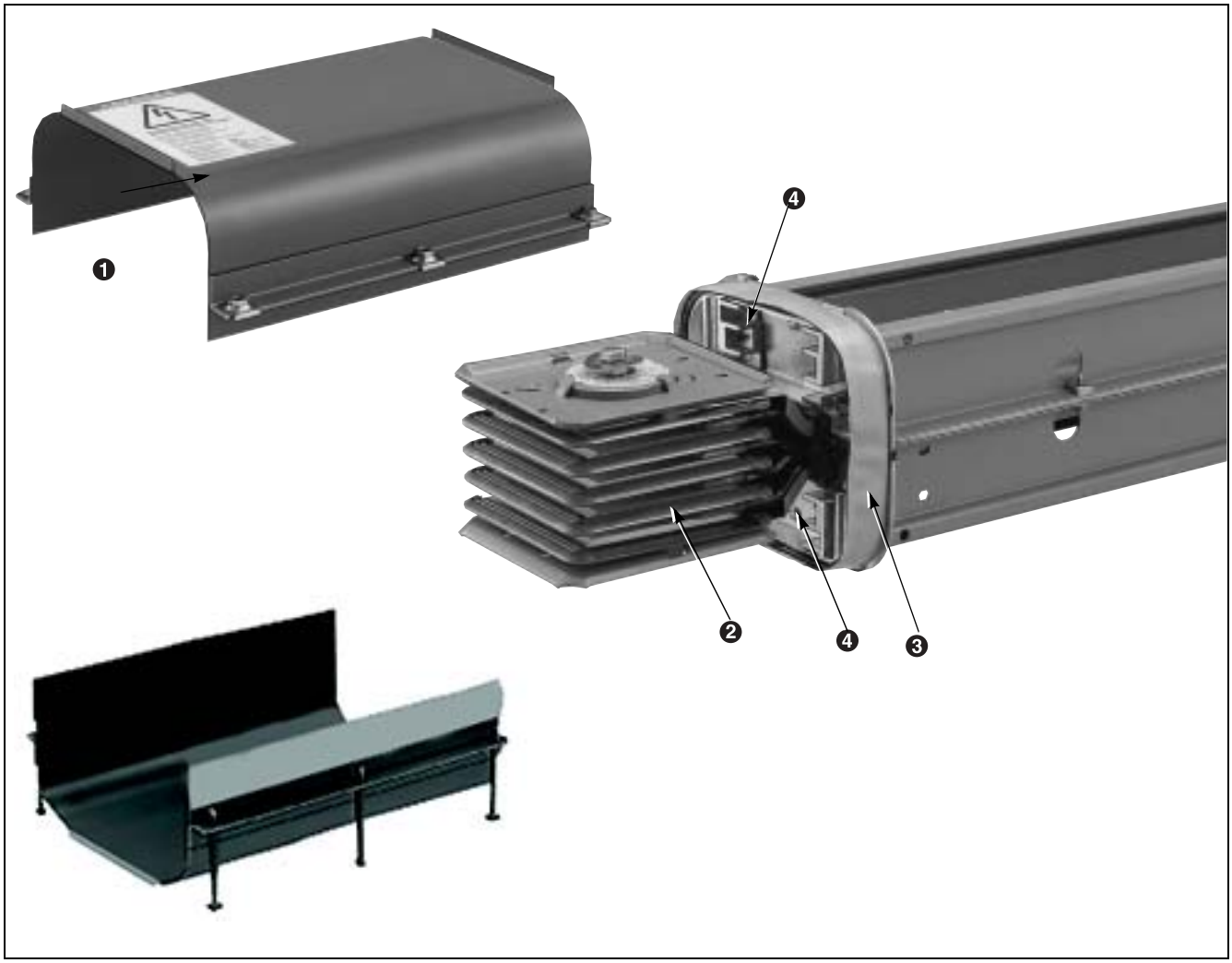
★ Electrodeposition paint process—Provides lasting uniform appearance.

★ Housing sizes—Are the same for I-LINE II feeder and plug-in busway. Same accessories fit both.

★ Insulation— Is Class B rated (130 °C (266 °F) vendor certified) insulation.

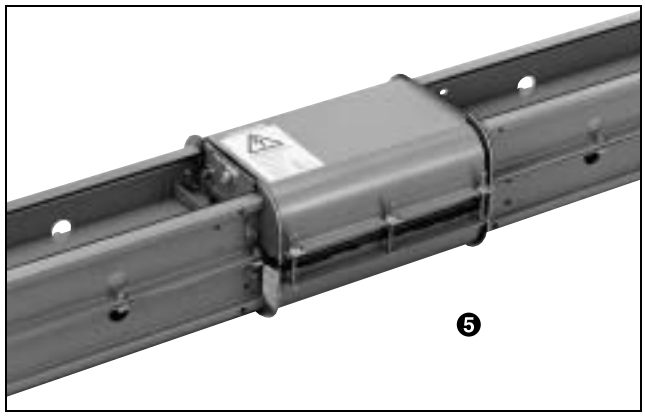
★ Optional Fiberglass tape and epoxy resin—Improves short circuit strength (Type AFH2/CFH2).

Outdoor Feeder Busway 800A–5000 A



1. Joint Covers— Two-piece joint cover with quick-fasten nut for speedy installation of the busway.
2. EZ JOINT PAK—The same joint pack used on our indoor I-LINE II busway is continued in our Outdoor Feeder design.
3. Flanged Collar—Simple installation of the joint covers is assisted by a smooth flange surface with the joint sealant strip factory installed. Removal of the sealant's protective paper covering and installation of the joint covers with the quick fasten nut, seal the joint from contamination by water.
4. Removable Drain Plug—The outdoor feeder design includes removable drain plugs to allow condensation to escape from the joints. These drain plugs should be removed only as described in the installation instructions for outdoor feeder busway.
5. Completed Joint—The assembled joint with all installation activities complete.

NOTE: Supports are required on 5 ft (152 cm) centers for vertical or horizontal mounting. Normally, the support for outdoor busway is in the form of a T-stand type device, which is customer supplied. However, hangers are available from Square D when drop rods can be utilized.



Listed below are the four basic types of busway applications:

- Service Entrance Run
- Plug-In Type Horizontal Run
- Plug-In Type Vertical Run
- Feeder Type Tie Run

In addition to the information that is electronically entered into the Product Selectors, the information needed by Oxford to engineer a busway run is listed below. **A busway run may consist of more than one type of application.**

Type of Application				
1	2	3	4	**Busway Order Entry Checklist** Order Number: _____ Completed by: _____ Field Office: _____ Date: _____ (✓) = Required Information
SERVICE	HORIZONTAL	VERTICAL	TIE	
✓	✓	✓	✓	A. Layout sketch of busway run
✓	✓	✓	✓	B. All necessary dimensions
✓	✓	✓	✓	C. Positions of equipment (fronts or rears)
✓	✓	✓	✓	D. Phasing of existing equipment or equipment by others
✓	✓		✓	E. Location of walls (if applicable)
		✓		F. Location of floors (floor to floor dimensions)
✓	✓		✓	G. Wall thickness (if applicable)
		✓		H. Floor thickness
✓			✓	I. Location of roof (if applicable)
✓			✓	J. Roof thickness (if applicable)
✓	✓	✓	✓	K. Special requirements noted on busway sketch (e.g., special lugs, critical dimensions)
✓				L. Indicate appropriate service device (e.g., tap box, service head, x'fmer. tap, bussed)
✓	✓	✓	✓	M. Equipment details if connecting busway to other than Square D equipment
	✓	✓		N. Indicate location of plug-In busway on sketch
		✓		O. Indicate the side of the busway that the plug-in units are to be mounted
		✓		P. Indicate if there are any curbs where busway passes through floors
		✓		Q. Curb thickness (in addition to the floor thickness)
		✓		R. Indicate type of vertical hangers (spring or fixed)
✓	✓	✓	✓	S. If connecting to existing I-LINE® I, indicate bolt or slot connection
✓	✓	✓	✓	T. If connecting to other than Square D busway, send a piece of that busway to Oxford
✓	✓	✓	✓	U. Switchboard identification markings noted on busway sketch

Notes: (1) For detailed illustrations refer to pages 17–27.

(2) Lack of all required information causes delays in order processing and can affect the delivery schedule.

(3) If additional assistance is required, contact Square D at 1-888-SQUARE D (1-888-778-2733).

The Four Types of Busway Runs

There are four major types of busway applications. Figures 1– 4 illustrate the basic systems.

Service Entrance Run

Figure 1 is a typical service entrance run from a utility transformer to a switchboard. Cables connect directly to the busway. (Generally a combination outdoor-indoor application.)

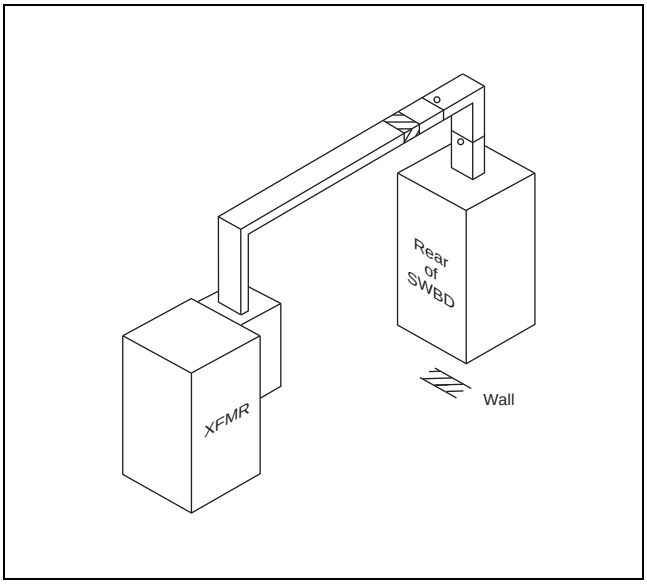


Figure 1

Plug-In Type Horizontal Run

Figure 2 is a simple plug-in run fed by a switchboard through a tee. (Always an indoor application.)

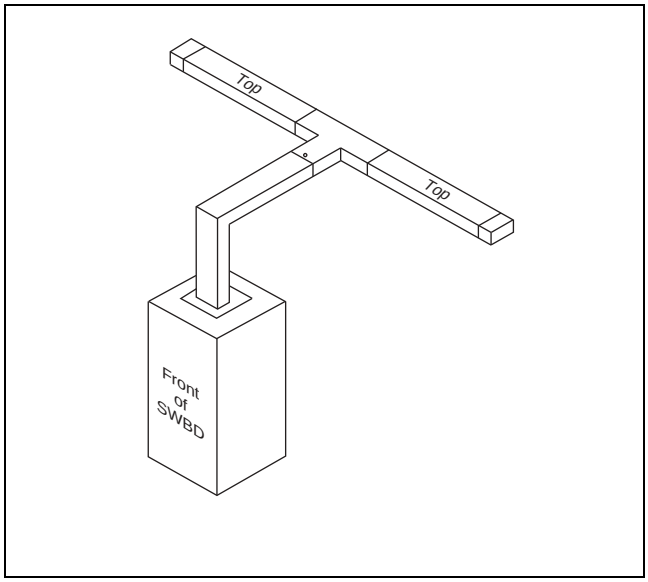


Figure 2

Plug-In Type Vertical Riser

Figure 3 is a simple plug-in riser fed by a switchboard. (Always an indoor application.)

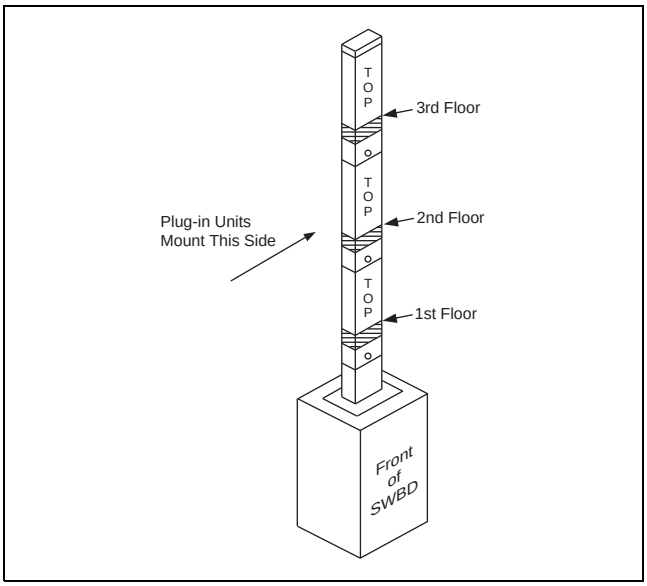


Figure 3

Feeder Type Tie Run

Figure 4 is a typical feeder run between two switchboards. (Generally an indoor application.)

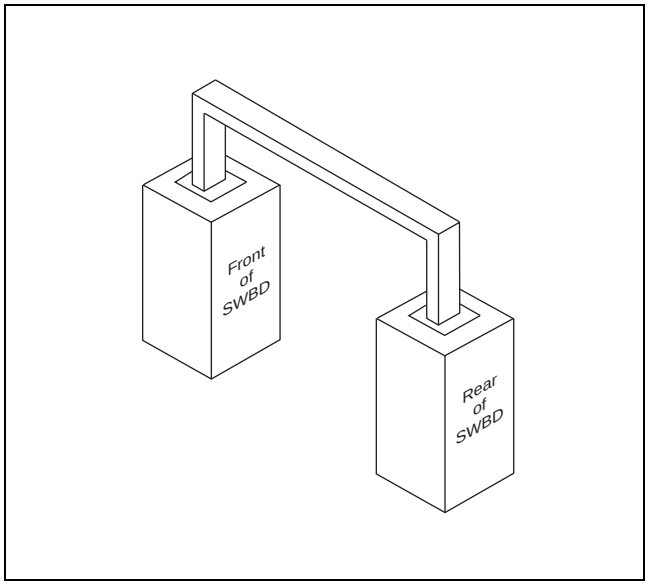


Figure 4

Service Entrance Runs

I-LINE II busway can be used as a service entrance conductor to bring power from a utility transformer into a distribution switchboard. Cable or solid bussing is used to connect to the transformer.

When the transformer is connected to the busway using cables, the governing electrical code may specify height clearance requirements for the cables.

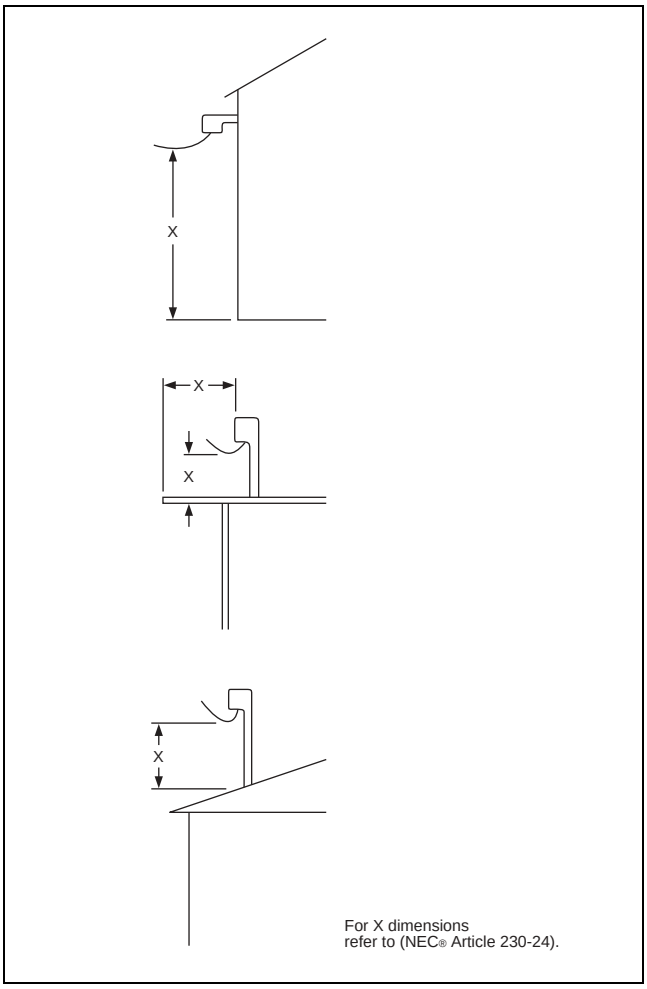


Figure 5: Typical connection of transformer to busway using cables

Figure 5 illustrates the dimensions to be considered when planning this type of run.

Service Heads

If the busway specifications or local utility require that for the service entrance cable-to-busway termination be enclosed in a weatherproof box, then a service head should be ordered.

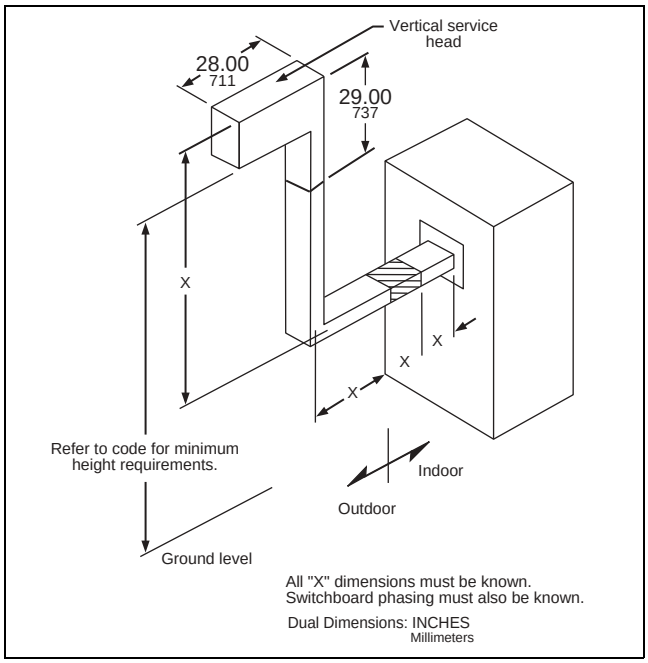


Figure 6: Typical vertical service head application

If the flatwise busway elevation is too low to allow a cable connection that would comply with the electrical code, another solution is the Vertical Service Head (29SV). The vertical service head can be attached to busway that exits the rear of the switchboard (see Figure 6) and is turned upward, or can be attached to busway that exits the top of a switchboard and penetrates the roof utilizing a drip flange and roof collar (see Figure 7 on page 19).

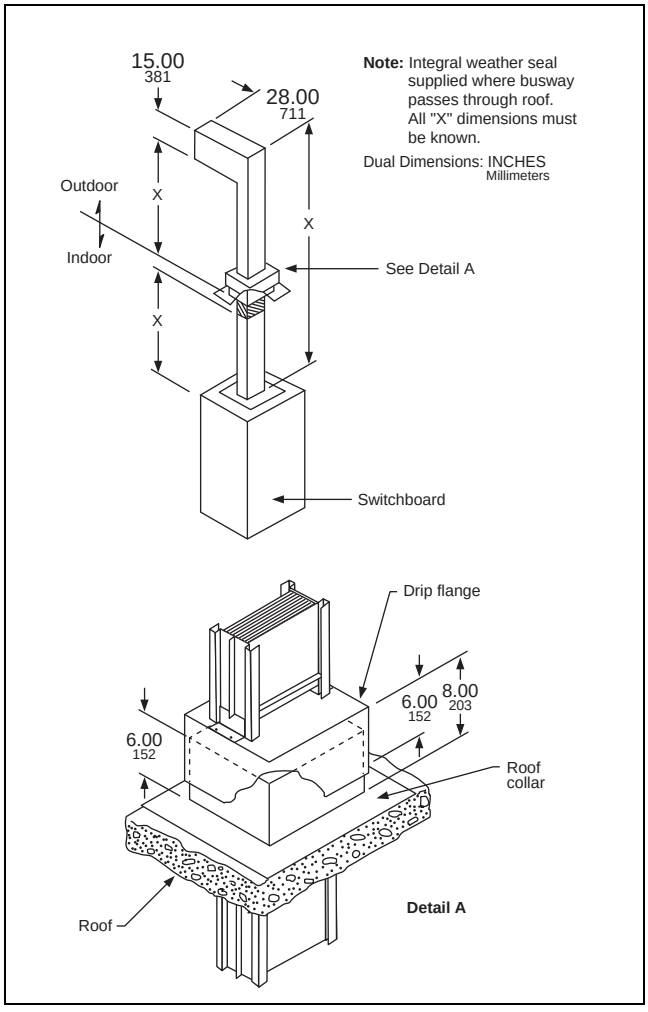


Figure 7: Vertical service head penetrating a roof

If a vertical service head extends through a roof, the roof must be sealed around the busway. To do this, a fixed collar must be factory assembled onto the section of busway that penetrates the roof. The contractor can then flash from the collar to the roof. A roof flange kit can be ordered from the factory to make the flashing job easier. The kit consists of a drip flange and a roof collar. When installed, the roof collar must be sealed to ensure that no moisture gets indoors. The roof flange kit will accommodate a roof slope up to one inch per foot. See Detail A in Figure 7.

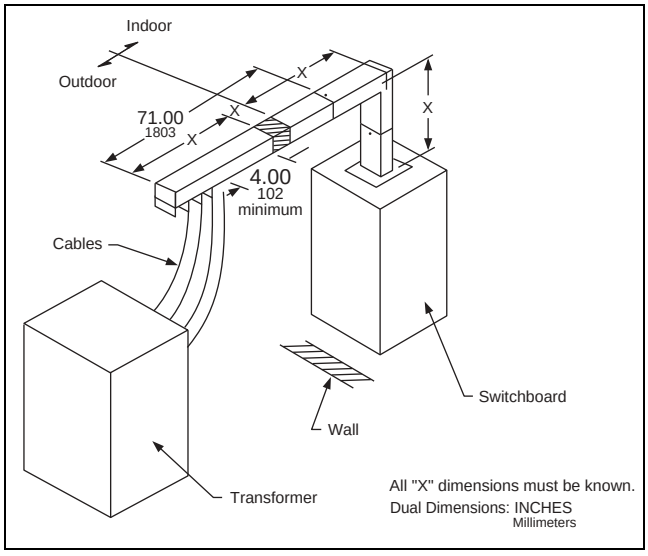


Figure 8: Transformer tap for one three-phase transformer

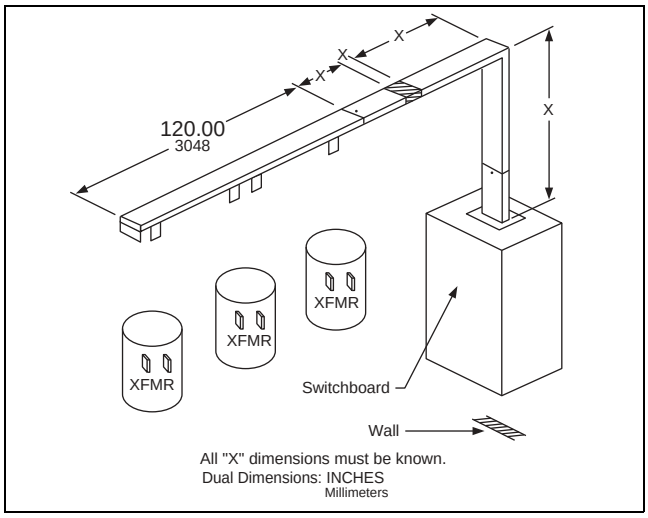


Figure 9: Transformer tap for three single-phase transformer

Transformer Taps

A transformer tap performs the same function as a service head, except that the lugs and bussing to which the service entrance cables are connected are not enclosed in a weather-proof enclosure.

A Flatwise Service Head (71SB) with the box removed is therefore a Transformer Tap (71SF). A (71SF) is a transformer tap for one three-phase transformer. Figure 8 illustrates a typical 71SF service entrance run.

If three single-phase transformers are supplied by the utility to deliver power to the customer, a separate transformer tap has been designed for this application. This transformer tap is known as a “TTF” and is shown in Figure 9.

Bussed Transformer Connections

If required, the factory can provide a bussed transformer connection. **This type of connection will include flexible connectors from the low voltage spades of the transformer to the busway connectors.** These flexible connectors are used to allow for busway expansion and contraction on the low voltage spades. Positioning of these flexible connectors is critical for proper alignment between the busway and transformer.

Bussed transformer connections are usually made to two types of transformers. One type has a low voltage throat as shown in Figure 10, and the other is a padmount type with a low voltage compartment shown in Figure 11 on page 21.

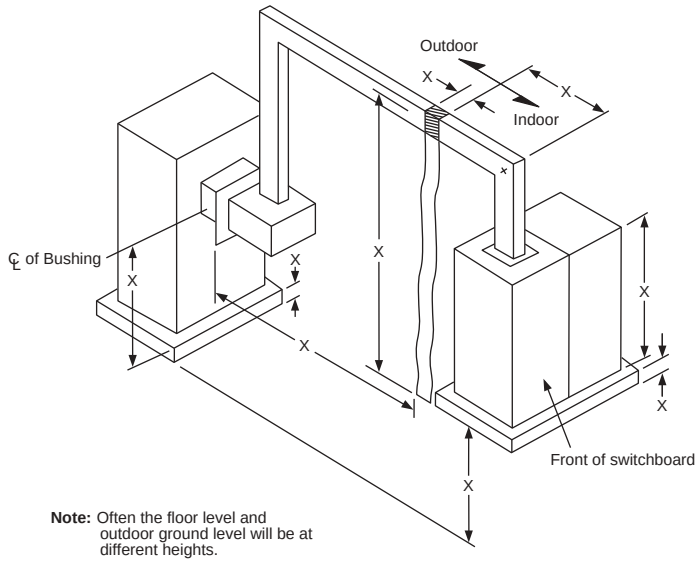
Phasing

When a bussed transformer connection is to be used, it is essential that the phasing of the transformer and of the switchboard it supplies be properly coordinated. It is sometimes best to let the manufacturer coordinate the phasing. Simply supply the name of the transformer manufacturer and phasing details of the low voltage side.

Other Service Entrance Connections

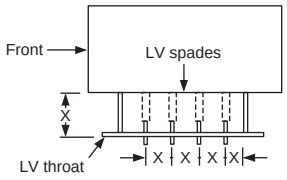
Occasionally, the customer or local utility will require a service entrance connection that differs from our standards. In this case, be sure to inform the factory of any special dimensions, such as required height of service head from ground or floor, spacing between phase bars, number and type of lugs, distance from lugs to wall, phasing, etc.

Information Needed for Transformer Connection

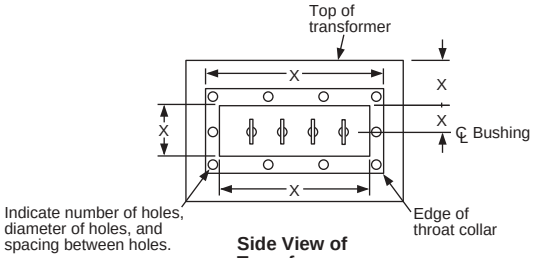


Note: Often the floor level and outdoor ground level will be at different heights.

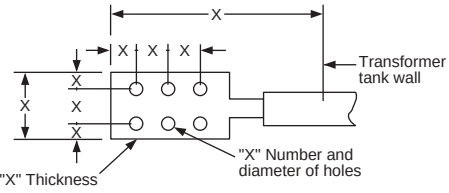
All "X" dimensions must be known.



Top View of Transformer



Side View of Transformer



LV Spade Detail

Figure 10: Measurements needed for bussed transformer connection (throat type)

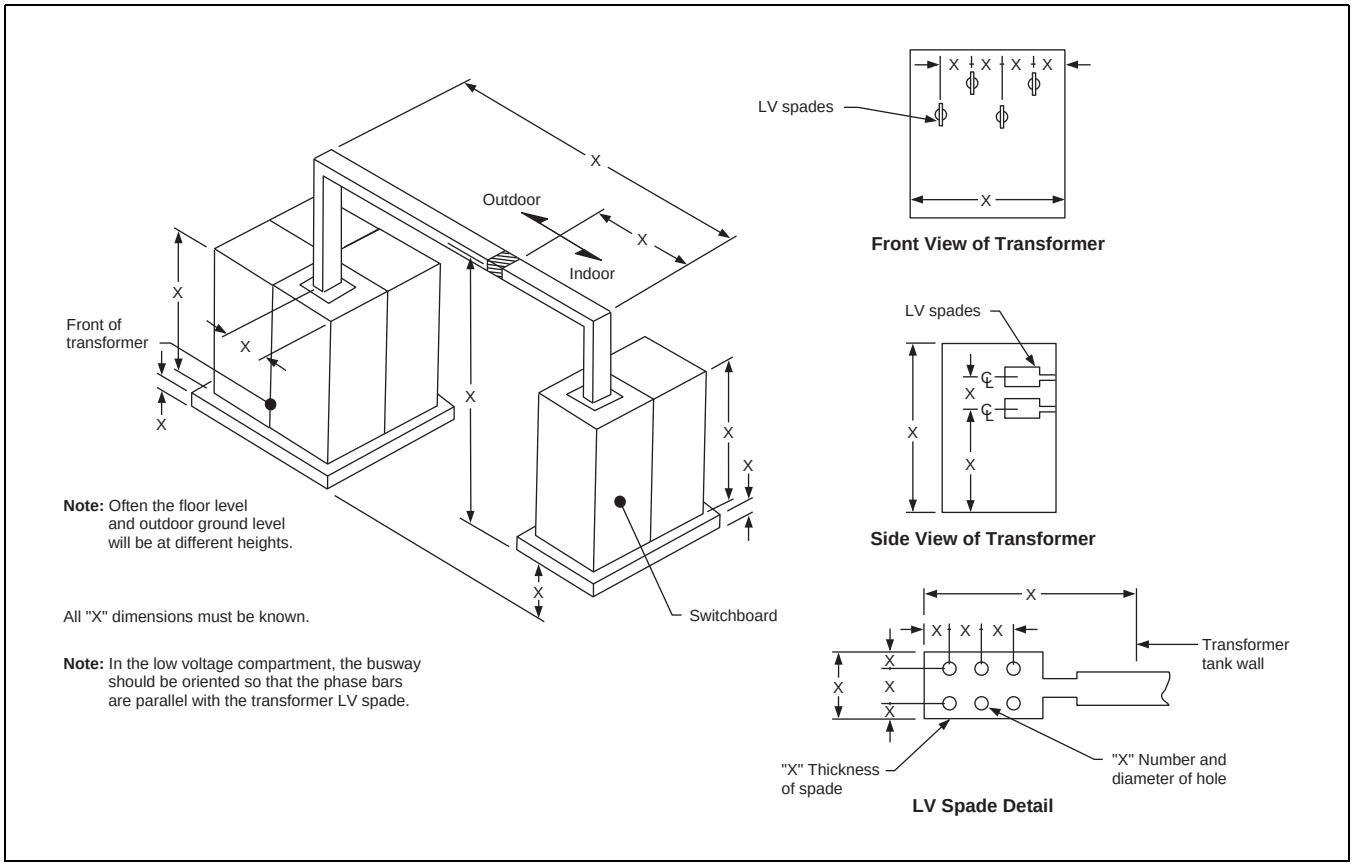


Figure 11: Measurements needed for bussed transformer connection (pad mount type)

Plug-in Busway Horizontal Run

Plug-in busway is used as a means of bringing power from a distribution switchboard to multiple loads throughout a building or manufacturing facility.

Phasing

A typical I-LINE II plug-in run is shown in Figure 12. The phasing shown on the plug-in busway is “GABCN” top to bottom, with the top located as shown for a horizontal run. This phasing arrangement must always be followed so that proper phasing of the plug-in units will be ensured (see Detail A). Because this busway phasing must be followed, it is the busway that will determine the phasing of the switchboard.

NOTE: Plug-in busway has the integral ground bus plug-in jaw on the top side only.

Identification

When submitting busway run sketches for review, ensure that the plug-in busway sections are marked (P).

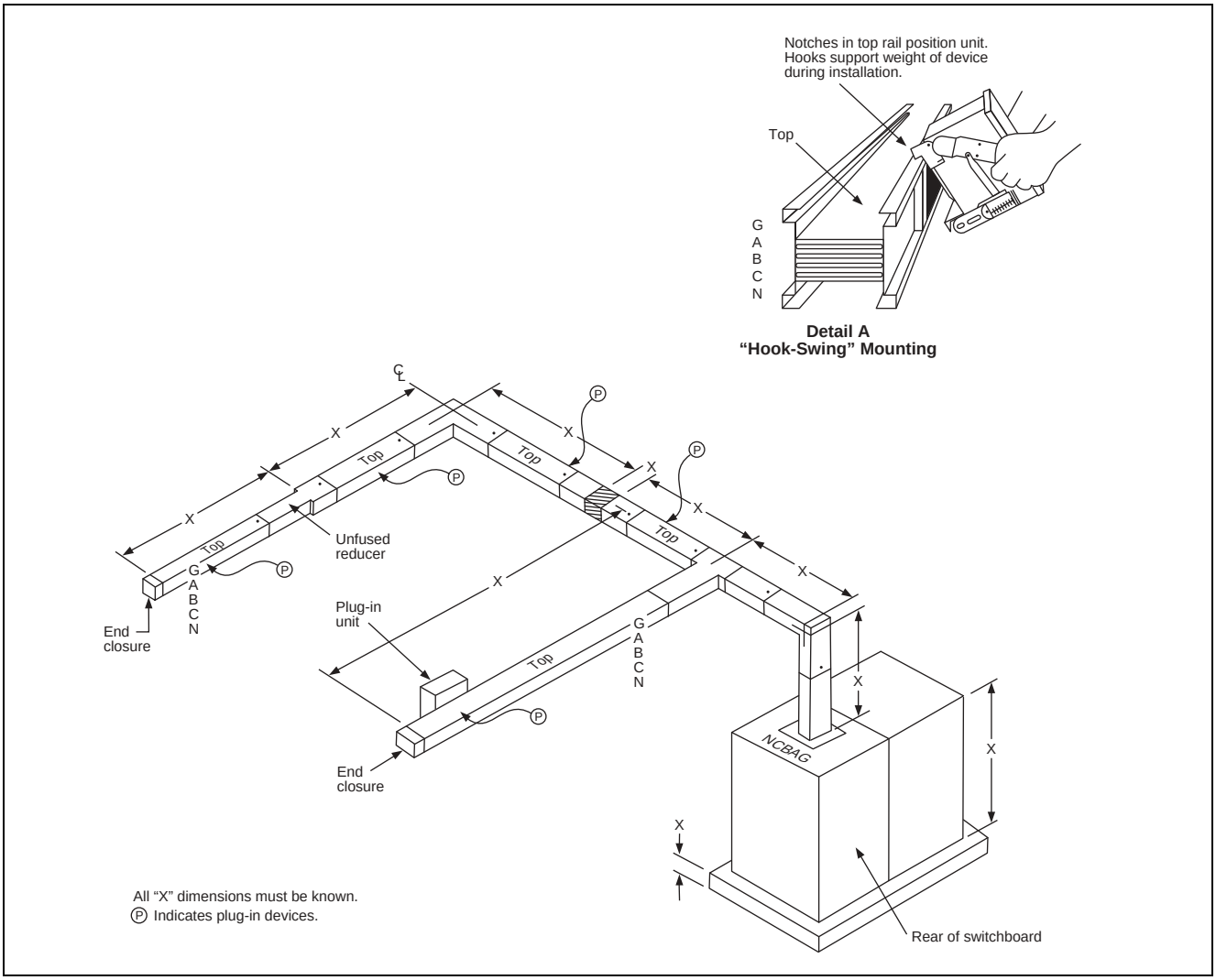


Figure 12: Measurements needed for a typical plug-in type run

Plug-in Risers

I-LINE II plug-in busway can be utilized for the entire vertical riser. There is no need to use feeder busway to penetrate the floors. This feature enables the use of more plug-in openings per floor of the riser. (Plug-in risers under 800 A require internal barriers where the busway passes through a floor.)

Dimensions

The riser in Figure 13 has been fully dimensioned. Note that feeder style busway has been used out of the switchboard and the two 120-inch (3048 mm) sections of plug-in style busway on the second and third floor do not have a joint located in or near the floor. Refer to page 25 for a discussion and detail of joint accessibility requirements.

Figure 14 shows typical dimensions that should be known to ensure an accurate installation: floor-to-floor height, floor thickness, exact layout of multiple run riser, closet dimensions, the type and quantity of plug-in tap units per floor, which side of the busway the units should mount on, and (if necessary) the desired height of the units from the floor.

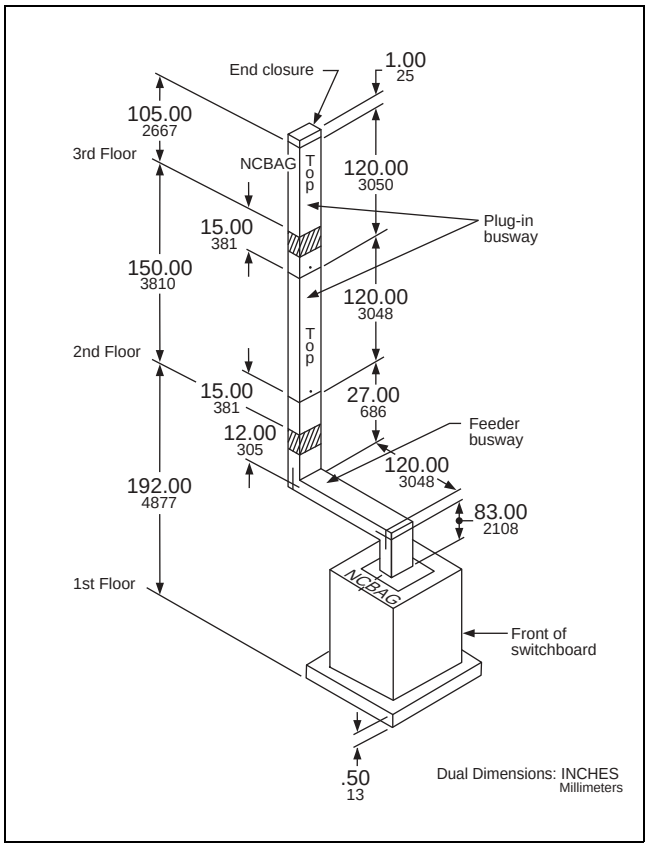


Figure 13: Typical layout 800 A riser

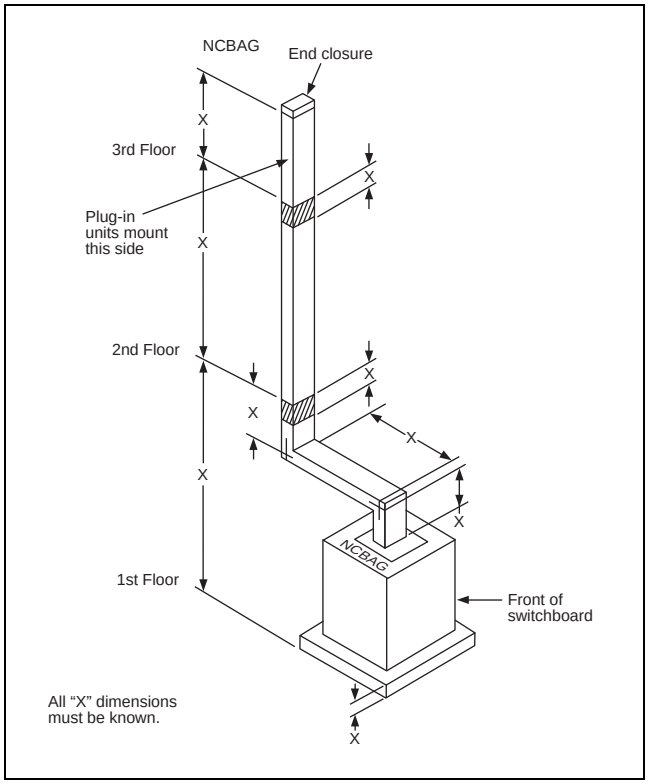


Figure 14: Typical information needed for riser

Riser Installation and Phasing

Circuit breaker type and the 30 A, 60 A, and 100 A fusible type plug-in units can be mounted on either side of the busway in riser installations.

When fusible type plug-in units are being supplied, the location of the plug-in unit determines the phasing of the busway. NEC Article 380-6 and CEC Article 14.502 state: *"Single throw knife switches shall be mounted so that gravity will not tend to close them".* It is essential that the busway be oriented with the correct side available for the insertion of the units.

To determine the correct busway orientation (based on where the plug-in units mount for your installation), please contact your local representative for assistance and coordination.

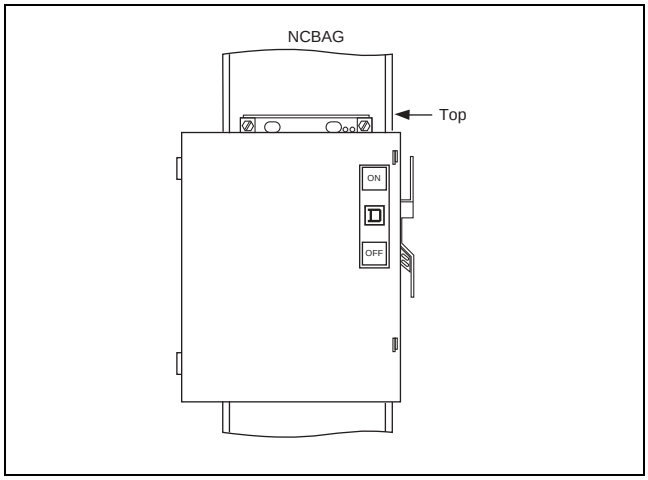


Figure 15: Correct orientation of riser busway

Figure 15 shows the correct mounting and phasing of the riser busway and plug-in unit. It is IMPERATIVE that the face labelled “TOP” be installed as shown on the installation drawings provided with your project.

Special Manufacturer’s Recommendation

NEC requires a waterproof curb to be installed at each floor opening where busway passes through (see Figure 16). An unprotected floor opening can act as a funnel for plumbing leaks, sprinkler system leaks, fluid spills, and other types of contamination.

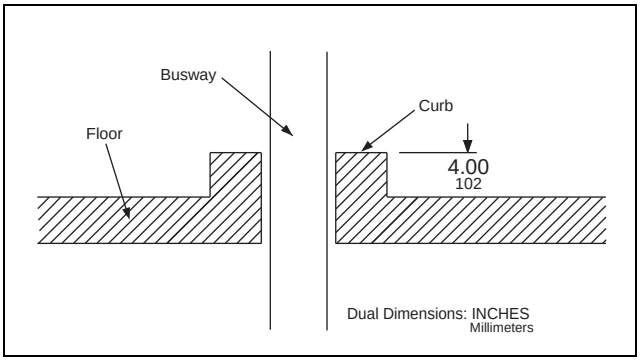


Figure 16: Waterproof curb recommended at floor opening

The cost of removing and replacing a contaminated busway length far exceeds the cost for including a waterproof curb when the floors are poured.

Once busway is installed through a floor opening, the remaining unused area should be filled to prevent smoke from passing floor-to-floor (chimney effect) in case of fire in the building. Some recommended materials available are fire rated foam and caulk. Grouting is also acceptable, but must be applied in a very dry form to prevent water and contaminants from entering the busway once the grouting cures and the water leeches out. Check with your local inspector to determine the appropriate materials to be used in filling the void around the busway.

Plug-In Units

When entering an order, the factory must know not only which side of the busway the plugs will mount on, but also the type and quantity of plugs to be used on each floor. Also, notify the factory if the plugs need to be mounted at a certain height from the floor.

Hangers

Spring hangers are recommended for riser applications. When properly installed and maintained, spring hangers compensate for expansion and contraction of the busway, as well as shrinkage of the building. In riser applications, support for busway must be provided at intervals not exceeding 16 ft (488 cm).

Feeder Runs

Feeder type runs are normally used for distributing power to loads that are concentrated in one area. Typical connections are switchboard-to-switchboard tie runs (see Figure 17), or a switchboard feeding a remote motor control center (MCC).

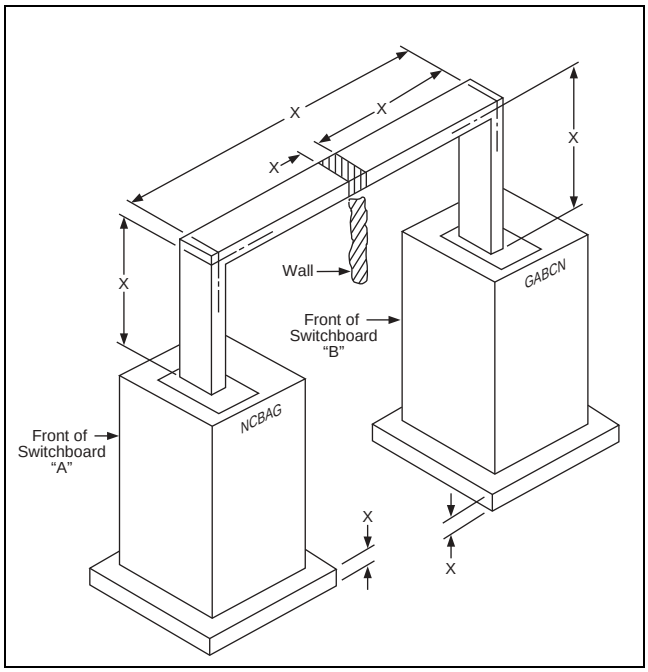


Figure 17: Measurements needed for feeder type run

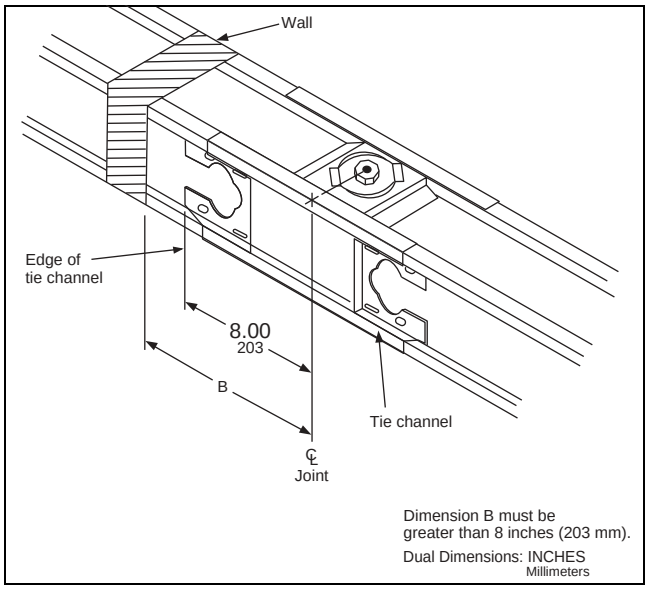


Figure 18: Joint accessibility requirements

Busway Through Walls and Floors

When 800 A–5000 A busway extends through a wall or floor, feeder or plug-in busway can be used. For runs under 800 A, plug-in busway will be used throughout. In all cases, wall or floor location must be specified.

According to CEC Article (12.2006) and NEC Article (364-4), busway must be installed so that supports and joints are accessible for maintenance purposes after installation. This implies that no part of the tie channel can be inside the wall. Therefore, the distance from the center line of the joint to the wall must be greater than the distance from the center to the edge of the tie channel (see Figure 18). If the dimensions of the tie channel cannot easily be determined, it is best to keep the joint at least 12 inches (305 mm) from wall. This will ensure proper joint clearance for any type of busway passing through a wall or floor.

Layout And Measurement of Busway Installations

Laying out and measuring a busway job does not require specialized tools or skills. The following list of tools will generally be sufficient:

- 100 ft (3048 cm) tape measure
- Plumb bob/chalk line
- 25 ft x 1 in. (762 cm x 25 mm) tape measure
- Felt tip marker or crayon
- 6 ft (183 cm) wood rule

Let's assume you want to feed a new motor control center (MCC) with busway from a new distribution switchboard. Using illustrations, we'll go step by step through the layout process to determine the busway orientation and dimensions. When completed, we will have a single line isometric drawing showing the proposed busway layout.

Known Information

From the bid documents, specifications, and/or factory drawings, the following information is known:

- Busway is to be 1600 A, 3Ø4W 50% GND aluminum feeder busway. (Width is determined to be 8.84 in. (225 mm).
- Switchboard is 7 ft x 7 1/2 in. (213 cm x 191 mm) high, 3 ft (91 cm) wide, and 2 ft (61 cm) deep. Busway connection to be in top center.
- Motor control center is 7 ft x 7 1/2 in. (213 cm x 191 mm) high with a 1 ft (30 cm) additional height pull box for busway connection; 20 in. (508 mm) wide; 20 in. (508 mm) deep. Busway connection is in top center.
- Bottom of busway (B.O.B.) to be installed 16 ft (488 cm) above finished floor (A.F.F.) unless obstructed.

1. Determine the physical size of the busway housing.

   This information lets you know how far to stay away from obstructions. In our example Figure 19, the busway is 8.84 in. (225 mm) wide and 5.88 in. (149 mm) high (9 in. x 6 in. (229 mm x 152 mm) nominal).

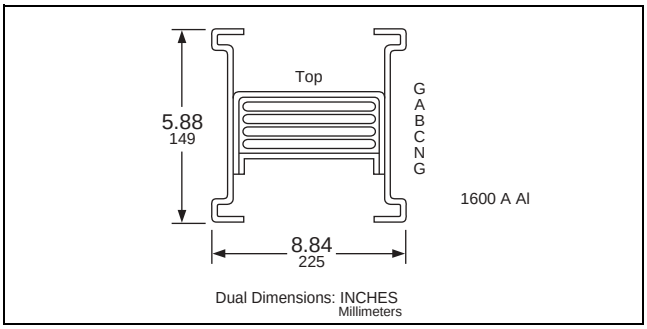


Figure 19

2. Review the area where the busway could be installed (if not already specified).

   Note special conditions such as building expansion joints, steel changes, HVAC equipment, and plumbing lines.

3. Measure all dimensions from fixed points.

   Measure dimensions such as columns, walls, or other building structures. Try to leave at least 4 in. (102 mm) between the busway and any obstructions. Figure 20 on page 27 shows the switchboard and MCC locations, the obstructions, and the dimensions to fixed points.

4. Start dimensional layout from the fixed end.

   Sketch the proposed busway routing, noting elevations and obstructions (see Figure 21 on page 27).

5. Route the busway above the bottom chord of the building steel, unless specified.

   For industrial applications, this protects the busway from damage by forklifts, cranes, etc. The busway must be supported by drop rods or from below. Do not route busway where it cannot be adequately supported.

6. When selecting the elevation for plug-in busway, remember that overcurrent devices (plug-in units) may require different mounting clearances.

   Referring to the sample busway layout, (see Figure 21), enough information is known to tabulate the amount of busway footage needed and the required fittings (e.g., flanged ends, elbows). A copy of the figure could help your local sales representative with pricing your job, and also could be forwarded to the factory to aid in preparation of approval or record drawings.

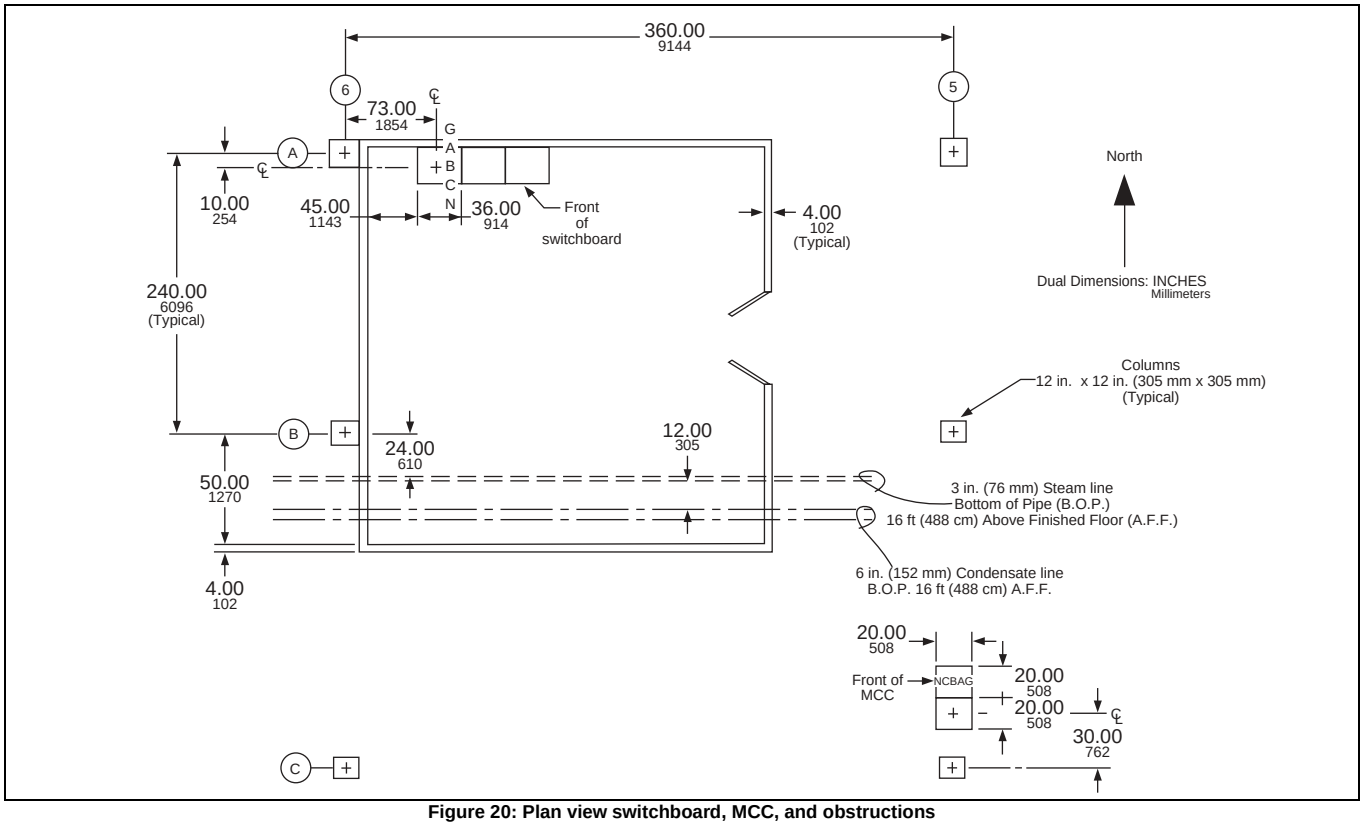


Figure 20: Plan view switchboard, MCC, and obstructions

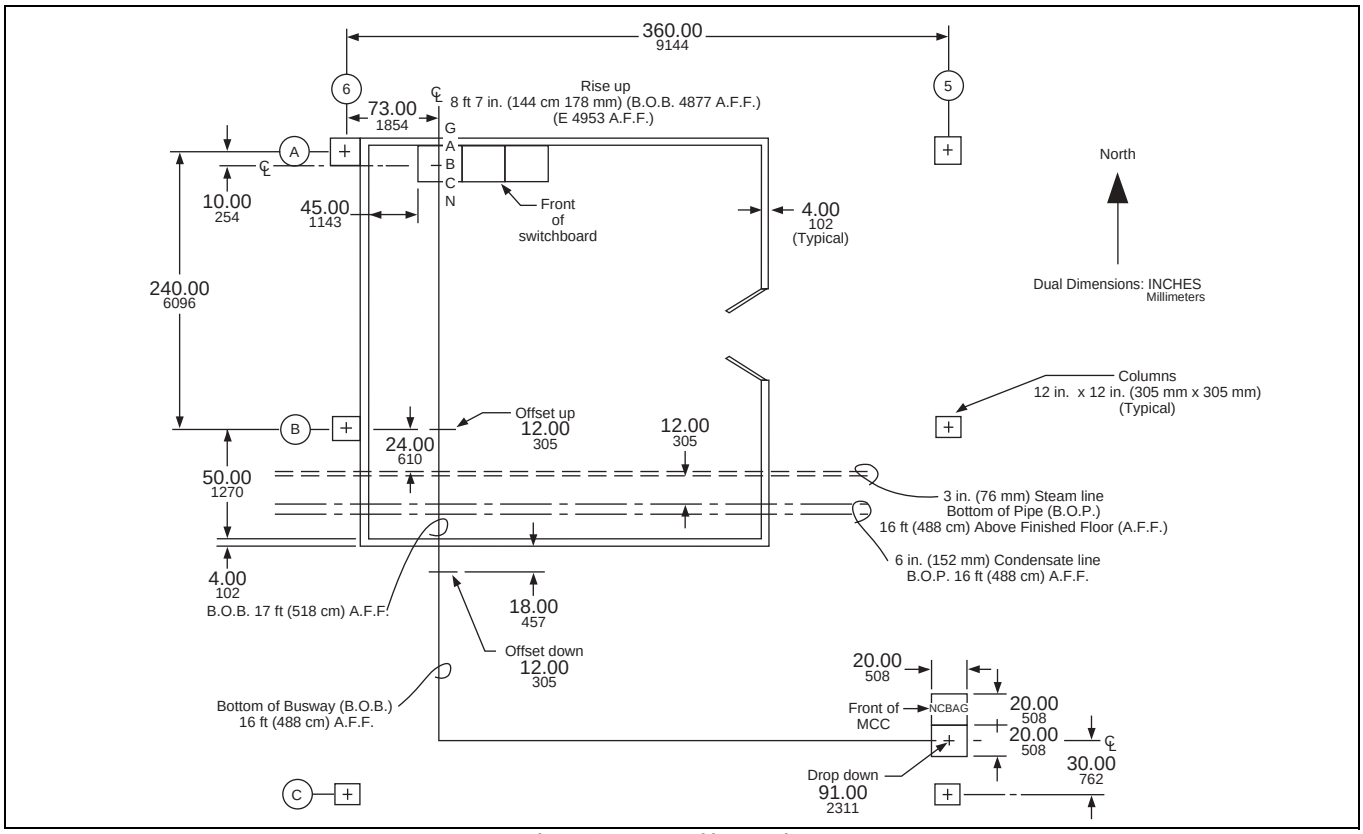


Figure 21: Proposed busway layout

Installation Recommendations

To make the busway installation proceed as quickly and efficiently as possible, a few preliminary steps should be taken.

1. Familiarize yourself with the busway routing. If record drawings were supplied by the factory, have a copy accessible to the installers.
2. Inspect busway for damage when received. Store busway in a clean, dry location.
3. Have the following recommended tools available for the busway installation:

- 1/2-in. (13 mm) nut driver or socket and rachet
- Straight blade screwdriver
- torque wrench or breaker bar with 5/8-inch (16 mm) head
- 3/4-in. (19 mm) socket for torque wrench or breaker bar
- busway assembly tool (AT-2) for 800 A–5000 A (provided by Square D)
- A level
- Tape measure or 6 ft (488 cm) wood rule
- Busway insulation tester (“megger,” 1000 V recommended)

4. Carefully read the installation instructions for all devices and NEMA Publication BU1.1-2000 provided with the busway before installing any of the equipment. This will help ensure proper installation and operation procedures are followed for the busway system being installed. Note the instructions call for the busway to be “meggered” before and after installation.
5. Install busway hangers and supports. The most common method of supporting the busway hangers is threaded drop rods (or all thread) which the installer must supply.
6. Anticipate the weight of the objects being installed so the necessary lifting devices and manpower are available.
7. If any problems are encountered or questions arise, contact your local representative.
8. Once the installation of the busway is complete, the NEMA Publication BU1.1-2000 should be delivered to the facility owner for his or her use in operating and maintaining the busway system.

Painting Installed Busway Systems

A busway system, which includes plug-in units, may be painted after installation. All precautions, however, must be taken to prevent the paint from coming in contact with conductors and insulation, and all nameplates and labels (safety labels, serial number labels, UL Labels, etc.) remain visible and legible.

Hanger Spacing

Maximum support intervals include:

- Vertical mounting
  - — indoor–16 ft (488 cm)
  - — outdoor–5 ft (152 cm)
- Horizontal mounting
  - – indoor–10 ft (305 cm)
  - – outdoor–5 ft (152 cm)

Maintenance Recommendations

⚠DANGER

HAZARD OF ELECTRIC SHOCK, BURN OR EXPLOSION

- Electrical equipment should be serviced only by qualified electrical maintenance personnel, and this instruction bulletin should not be viewed as sufficient instruction for those who are not otherwise qualified to operate, service, or maintain the equipment discussed. Although reasonable care has been taken to provide accurate and authoritative information in this bulletin, no responsibility is assumed by Square D for any consequences arising out of the use of this material.
- The successful operation of busway depends upon proper handling, storage, installation, operation, and maintenance. Neglecting fundamental installation and maintenance requirements may lead to personal injury as well as damage to electrical equipment or other property.
- Follow safety related work practices, as described in NFPA 70E, part II, at all times.
- Hazardous voltages in electrical equipment can cause severe personal injury or death. Energizing busway for the first time after initial installation or maintenance is potentially dangerous. Unless otherwise specified, inspect and perform preventive maintenance only on busway and equipment to which power has been turned off, disconnected, and electrically isolated so that no accidental contact can be made with energized parts.

Failure to follow these instructions will result in death, severe personal injury, or equipment damage.

NEMA Publication BU1.1-2000 is provided with each busway project as a guide for proper installation, operation and maintenance of busway products. This publication addresses such areas as inspection of all electrical joints and terminals for tightness, prevention of entry of water and contaminants into the busway, instructions for what to do if water and contaminants do enter the busway, and other maintenance topics. This publication is also available upon request by contacting your local representative.

Other publications we recommend to help ensure the highest quality of product performance are as follows:

NFPA 70–National Electrical Code (U.S.)

NFPA 70B–Maintenance of Electrical Equipment

NEMA BU1–Busway Standard published by the National Electrical Manufacturers Association

CSA C22.1–Canadian Electrical Code, Part 1

Special Busway Construction

This section outlines requirements for busways with features other than our standard.

Special Paint

I-LINE busway can be provided in colors other than ANSI 49 gray for a price add-on. The special color requested should be specified by an ANSI color code at the time of order entry. With typically lengthened lead times for special color parts, it is imperative to provide this information as early as possible in the order process so delivery commitments can be met.

Low Current Density Busway

Some customers require a lower current density busway than our standard for rigorous duty in their installation. We have developed a range of busway for the most commonly requested current density of 1000 A per square inch for copper busway. If you require this current density for your installation, specify it, and we can meet your need. If you have requests for another specific current density, contact your local representative.

Riser Plug-in Busway

We also offer an I-LINE II plug-in busway specifically designed for installation in riser closets of high-rise buildings. This plug-in busway has a plug-in door on the front side that faces out into the room. The back of the busway, facing the wall is blanked off with a feeder bus side rail.

This design provides a plug-in busway ideally suited for riser cabinets and gives the customer only the necessary plug-in openings. The catalog number for this device is the same as our plug-in busway, except an R is substituted for the P. (Example: if the standard plug-in busway prefix is AP2512G, the riser busway prefix is AR2512G).

Drip Resistant to IP-54

Some busway is located in indoor locations that are subject to occasional water, such as roof leaks or sprinklers. While this application does not require the full protection of outdoor busway, additional protection is needed for the indoor busway. This is where the Drip Resistant feature could be used. This added feature to the busway is tested to the International IEC-529 standard and is rated as IP-54. This rating specifies protection from dust (“limited ingress permitted with no harmful deposits”) and water (“splashed from all directions with limited ingress permitted”).

This product is available as an option with indoor plug-in and feeder busway. It is identified by the addition of “M54” at the end of the standard catalog number.

Services

We pride ourselves in providing excellent service to our customers the world over. We offer a wide range of services to make the use of I-LINE busway as simple and easy as possible. A summary of these services follows:

Busway Measuring and Layout Service

We can provide full site measuring and coordination of a busway installation. This service is ideal for large complicated projects requiring close coordination with other services. This service must be requested at the time of specification and order entry. Refer requests for this service to your local representative.

Emergency Service

Trained and qualified busway personnel are on call 24 hours daily to assist in your emergency busway needs. Call 1-888-SQUARE D (1-888-778-2733) any time.

"Missing Link" Program

The "Missing Link" program is designed specifically to help a customer correct last minute changes to a project using busway. Those changes could include an unplanned obstruction requiring the busway to be rerouted, incorrect measurement of the busway run, or the need to order additional pieces to supplement busway previously ordered. The program applies to the United States, Canada, and Mexico, and guarantees shipment of factory-built busway in five to seven working days or we pay for the premium freight.

The program applies to I-LINE II (800 A–5000 A) indoor and outdoor feeder busway straight lengths and elbows (90°, offset, and double). Plug-in busway is not included in the program. Straight lengths are available in one-inch increments from 16–120 in. (406–3048 mm). The program is limited to a maximum of four pieces of busway per run and twenty pieces per order. For complete details of the program, contact Square D at 1-888-SQUARE D (1-888-778-2733).

Busway "Quick Ship" Service

An extensive selection of busway is available for direct shipment from the Oxford Distribution Center. This service will allow you to order your busway today and have the order shipped within two days. There is no need to wait for standard busway devices. The following categories of busway devices are included in the quick ship program.

- 800 A–2000 A copper I-LINE II indoor feeder and plug-in busway
- 800 A–3000 A aluminum I-LINE II indoor feeder and plug-in busway
- 225 A–600 A copper and aluminum I-LINE plug-in busway. All of the above in both:
  - — three-phase, three-wire
  - — three-phase, four-wire

How To Properly Measure Your Missing Link(s)

All Missing Link dimensions should be measured to the nearest whole inch from centerline of joint to centerline of joint, or centerline of joint to centerline of busway.

As shown in Figure 22 Diagram A, the centerline of the joint is located at the joint bolt on the end with a joint-pak installed. If the joint-pak is not installed, the centerline of the joint is one inch (25 mm) from the end of the bus bars.

If it is necessary to measure an elbow, the dimensions X and Y (shown in Figure 22 Diagram B) are all that's needed. Be sure to measure from centerline of joint (as described above) to centerline of busway housing. You must also specify whether an edgewise or flatwise elbow is required. The table on page 49 lists the standard minimum elbow dimensions for each amperage.

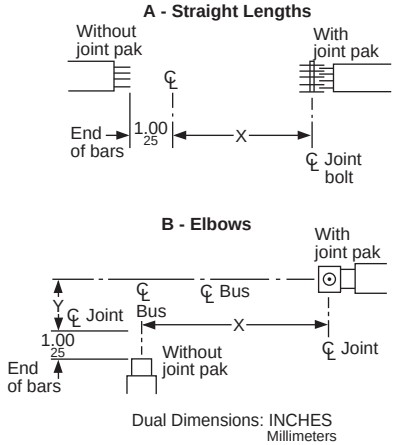


Figure 22

Electrical Data

- **Standards:** UL857 (File Number E22182); CSA C22.2 No. 27-1973 (File Number LL-61778); IEC 439 Parts 1 and 2
- **Systems:** ac–3Ø3W, 3Ø4W, 1Ø2W, 1Ø3W. All neutrals are 100% capacity dc–2-pole
- **Voltage:** 600 Volts ac/dc, 50 Hz and 60 Hz
- **Ground:** 50% capacity as standard for 800 A–5000 A, as an option on 225 A–600 A
- **Enclosure:** Indoor and outdoor

Short Circuit Ratings: UL Three-cycle Test (KA, RMS Symmetrical)

Ampere Rating	Aluminum				Copper			
	AOF2 AF2	AOFH2 AFH2	AP AP2	APH APH2	COF2 CF2	COFH2 CFH2	CP CP2	CPH CPH2
225	. . .	. . .	22	. . .	. . .	. . .	22	. . .
400	. . .	. . .	22	42	. . .	. . .	22	42
600	. . .	. . .	22	42	. . .	. . .	22	42
800	50	85	50	75	50	85	50	75
1000	50	100	50	100	50	85	50	75
1200	50	100	50	100	50	100	50	100
1350	50	100	50	100	50	100	50	100
1600	50	100	50	100	50	100	50	100
2000	100	150	125	150	50	100	65	100
2500	100	150	125	150	100	150	125	150
3000	100	150	125	150	100	150	125	150
4000	150	200★	200	. . .	150	200★	200	. . .
5000	. . .	. . .	. . .	. . .	150	200★	200	. . .

★ Certain fittings are UL Rated at 150 KA RMS Symmetrical.

Short Circuit Ratings: (KA, RMS Symmetrical) (Series Connected with a Fuse)

Ampere Rating	Aluminum				Copper			
	AF2	AFH2	AP AP2	APH APH2	CF2	CFH2	CP CP2	CPH CPH2
225	. . .	. . .	200	. . .	. . .	. . .	200	. . .
400	. . .	. . .	100	200	. . .	. . .	100	200
600	. . .	. . .	50	200	. . .	. . .	50	200
800	100	200	200	200	100	200	200	200
1000	100■	200■	100■	200■	100■	200■	200■	200■
1200	100	200	100	200	100	200	100	200
1350	100♦	200♦	100♦	200♦	100♦	200♦	100♦	200♦
1600	100	200	100	200	100	200	100	200
2000	. . .	200	200	200	. . .	200	100	200
2500	. . .	. . .	200	200	. . .	200	200	200
3000	. . .	. . .	200	200	. . .	. . .	200	200
4000	200	. . .	. . .	. . .	200	. . .	. . .	. . .
5000	. . .	. . .	. . .	. . .	200	. . .	. . .	. . .

■ A 1200 A Fuse is used in series.
♦ A 1600 A Fuse is used in series.

NOTE: 225 A–600 A busway are connected in series with a Class J or T fuse; 800 A–5000 A are connected in series with a Class L fuse. All ratings are tested in compliance with UL/CSA standards. All ratings apply for three-pole and four-pole busway.

Impedance Values

Line-to-Neutral (Milliohms Per 100 Feet)

Ampere Rating	Aluminum Busway			Copper Busway		
	R	$X_{60\ Hz}$	$X_{50\ Hz}$	R	$X_{60\ Hz}$	$X_{50\ Hz}$
225	7.30	3.42	2.85	4.06	3.75	3.12
400	3.71	2.60	2.17	2.13	2.30	1.92
600	2.04	1.59	1.32	2.13	2.30	1.92
800	2.67	.91	.76	1.86	1.10	.92
1000	2.15	.74	.62	1.63	.96	.80
1200	1.62	.60	.50	1.17	.76	.63
1350	1.36	.53	.44	1.05	.70	.58
1600	1.05	.45	.37	.88	.61	.51
2000	.88	.37	.30	.78	.51	.42
2500	.71	.30	.25	.54	.38	.32
3000	.53	.23	.19	.48	.34	.28
4000	.41	.14	.12	.35	.21	.17
5000	. . .	. . .	. . .	.25	.17	.14

Impedance values are for busway operating at 80 °C (176 °F) temperature.

Resistance Values for Aluminum Integral Ground Bus

Ampere Rating 3Ø3W and 3Ø4W	DC Resistance (Milliohms per 100 Feet)	
	Aluminum Phase Conductors	Copper Phase Conductors
225	8.1	8.1
400	6.4	6.4
600	5.3	6.4
800	4.0	4.4
1000	3.5	4.0
1200	3.2	3.5
1350	3.0	3.4
1600	2.8	3.0
2000	2.2	3.0
2500	2.0	2.2
3000	1.8	2.0
4000	1.7	1.7
5000	. . .	1.7

Resistance values for the integral ground bus are at 80 °C (176 °F) operating temperature.

Voltage Drop Sample Calculations (60 Hz)

Sample No. 1

1000 A aluminum busway at 50% power factor–60 Hz

Voltage Drop

= $\sqrt{3}$ I (R cos Ø **+** X sin Ø)

= $\sqrt{3}$ X 1000 (.00215 X .50 **+** .00074 X .866)

= 2.97 Volts/100 ft **-** concentrated load

Sample No. 2

1000 ampere copper busway at 50% power factor–60 Hz

Voltage Drop

= $\sqrt{3}$ I (R cos Ø **+** X sin Ø)

= $\sqrt{3}$ X 1000 (.00163 X .50 **+** .00096 X .866)

= 2.85 Volts/100 ft **-** concentrated load

= $\frac{2.85}{2}$ = 1.43 Volts/100 ft **-** distributed load

Voltage Drop Data (60 Hz At Rated Load)

The values expressed below are based on a single concentrated load at the end of the busway run. For distributed loading, divide the values shown by two (2).

Average Phase Line-To-Line Voltage Drop in Volts Per 100 ft (3048 cm)

Ampere Rating	Power Factor – Aluminum Busway							Power Factor – Copper Busway						
	100	90	80	70	50	30	20	100	90	80	70	50	30	20
225	2.845	3.141	3.076	2.943	2.577	2.125	1.875	1.582	2.061	2.143	2.151	2.057	1.869	1.748
400	2.570	3.099	3.137	3.086	2.845	2.489	2.279	1.476	2.023	2.137	2.171	2.118	1.963	1.856
600	2.120	2.628	2.687	2.664	2.491	2.212	2.043	2.214	3.034	3.205	3.256	3.177	2.944	2.785

Average Phase Line-to-Line Voltage Drop in Volts Per 100 ft (3048 cm)

Ampere Rating	Aluminum Busway – Power Factor %											
	100	95	90	85	80	75	70	60	50	40	30	20
800	3.700	3.908	3.879	3.809	3.716	3.609	3.490	3.229	2.942	2.636	2.313	1.975
1000	3.724	3.938	3.910	3.841	3.748	3.641	3.522	3.260	2.972	2.664	2.340	2.001
1200	3.367	3.588	3.574	3.519	3.442	3.350	3.248	3.018	2.764	2.490	2.200	1.895
1350	3.180	3.408	3.402	3.356	3.288	3.205	3.111	2.899	2.663	2.408	2.136	1.850
1600	2.910	3.154	3.162	3.130	3.076	3.007	2.927	2.744	2.535	2.307	2.063	1.804
2000	3.048	3.296	3.302	3.266	3.208	3.134	3.049	2.854	2.634	2.394	2.137	1.866
2500	3.074	3.326	3.333	3.298	3.239	3.165	3.080	2.884	2.662	2.420	2.162	1.888
3000	2.754	2.989	3.000	2.970	2.920	2.856	2.781	2.608	2.412	2.197	1.966	1.722
4000	2.841	3.001	2.979	2.925	2.854	2.772	2.681	2.480	2.260	2.025	1.777	1.518

Average Phase Line-to-Line Voltage Drop in Volts Per 100 ft (3048 cm)

Ampere Rating	Copper Busway – Power Factor %											
	100	95	90	85	80	75	70	60	50	40	30	20
800	2.577	2.924	2.984	2.994	2.976	2.941	2.893	2.766	2.609	2.428	2.227	2.009
1000	2.823	3.201	3.266	3.276	3.256	3.217	3.164	3.024	2.852	2.653	2.433	2.194
1200	2.432	2.803	2.877	2.899	2.893	2.869	2.830	2.723	2.584	2.420	2.236	2.034
1350	2.455	2.844	2.923	2.949	2.946	2.924	2.888	2.783	2.645	2.482	2.298	2.095
1600	2.439	2.845	2.932	2.963	2.965	2.947	2.914	2.816	2.683	2.525	2.344	2.144
2000	2.702	3.119	3.202	3.227	3.222	3.195	3.153	3.035	2.881	2.700	2.496	2.271
2500	2.338	2.735	2.822	2.854	2.858	2.842	2.812	2.719	2.594	2.443	2.271	2.080
3000	2.494	2.921	3.015	3.051	3.055	3.039	3.008	2.910	2.777	2.617	2.434	2.230
4000	2.425	2.758	2.817	2.828	2.813	2.781	2.736	2.619	2.472	2.303	2.115	1.911
5000	2.165	2.517	2.590	2.616	2.615	2.598	2.567	2.477	2.358	2.215	2.054	1.876

Notes:

- For balanced 3-phase line-to-line voltage drop 4-wire busway, use values from tables.
- For balanced 3-phase line-to-neutral voltage drop, multiply values from tables by .577.
- For single-phase voltage drop, multiply values from tables by 1.15.
- For other than rated current, multiply values from tables by

$$\frac{\text{Actual Current}}{\text{Rated Current}}$$

For different lengths, multiply values from 60 Hz tables by

$$\frac{\text{Actual Footage}}{100 \text{ ft}}$$

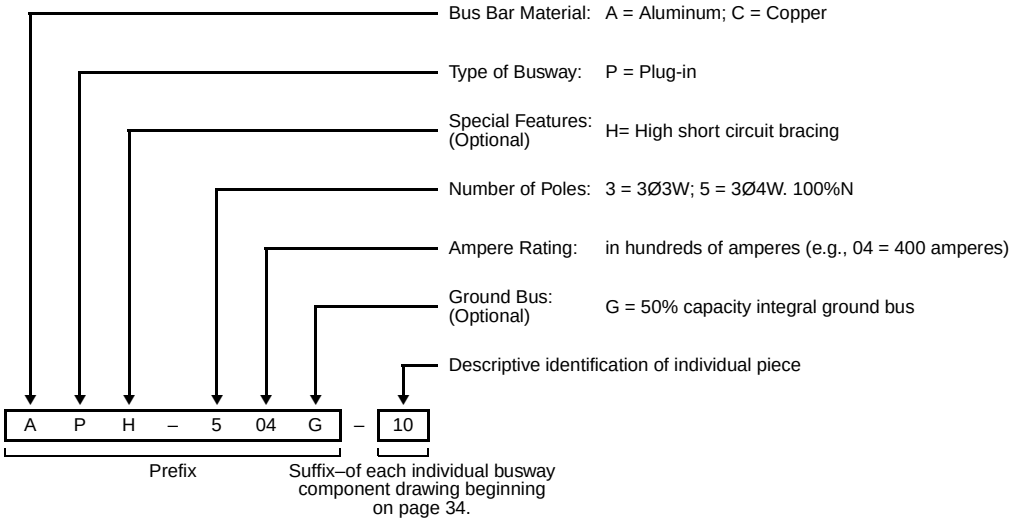
- Voltage drop calculations for 50 Hz can be made by substituting the appropriate “x” value from page 31 into samples No.1 and 2 above.
- For other frequency values (e.g., 400 Hz), contact your local Square D representative for assistance.

I-LINE® Busway Catalog Numbering System

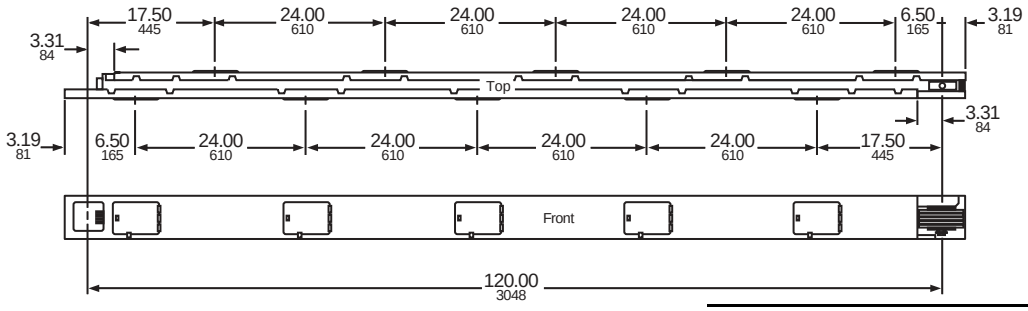
Catalog numbers are composed of two basic parts—the PREFIX (as below), plus the SUFFIX of each individual busway component on pages 34–37.

The PREFIX contains necessary busway information except individual component descriptive details that are defined as the SUFFIX. The catalog number PREFIX will generally remain unchanged throughout a busway run while the SUFFIX will vary with each individual length or fitting selected.

A few devices, such as hangers, wall flanges, etc., do not follow the exact pattern described above. For these exceptions, a complete listing of device catalog numbers is shown with the individual device drawing(s) on pages 38–40.



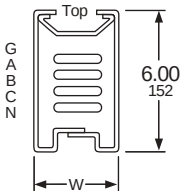
Straight Lengths



Dual Dimensions: INCHES
Millimeters

Catalog Number Suffix	-10	-6
Standard Length –Feet	10	6
Standard Length –Meters	3.05	1.83
Number of Plug-in Openings	10	6

Cross Section



Dual Dimensions: INCHES
Millimeters

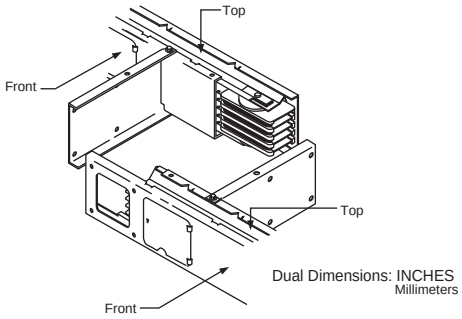
Aluminum Content and Weight

Aluminum Ampere Rating	Width		Bus Bars Per Phase		Weights			
					3-Pole		4-Pole	
	IN	mm	IN	mm	Lb/Ft	kg/m	Lb/Ft	kg/m
225	2.25	57	(1) .25x0.94	(1) 6x24	6.1	9.1	6.4	9.5
400	3.38	86	(1) .25x2.00	(1) 6x51	7.5	11.2	7.9	11.8
600	4.75	121	(1) .25x3.38	(1) 6x86	9.4	14.0	10.6	15.8

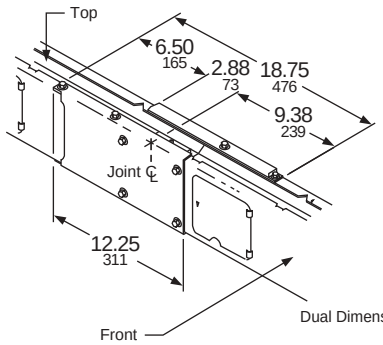
Copper Content and Weight

Copper Ampere Rating	Width		Bus Bars Per Phase		Weights			
					3-Pole		4-Pole	
	IN	mm	IN	mm	Lb/Ft	kg/m	Lb/Ft	kg/m
225	2.25	57	(1) .25x0.94	(1) 6x24	8.3	9.8	9.3	10.4
400	3.38	86	(1) .25x2.00	(1) 6x51	12.1	18.0	13.9	20.7
600	3.38	86	(1) .25x2.00	(1) 6x51	12.1	18.0	13.9	20.7

Joint Detail

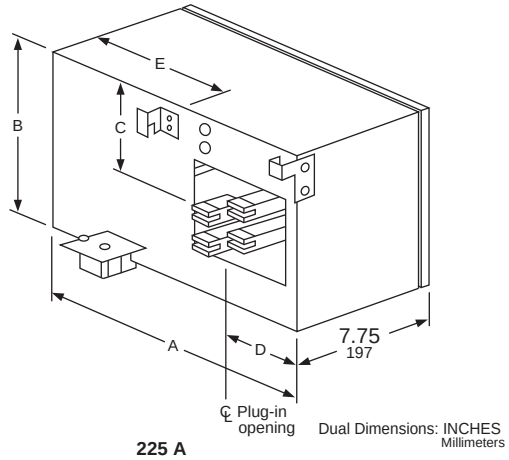


Dual Dimensions: INCHES
Millimeters

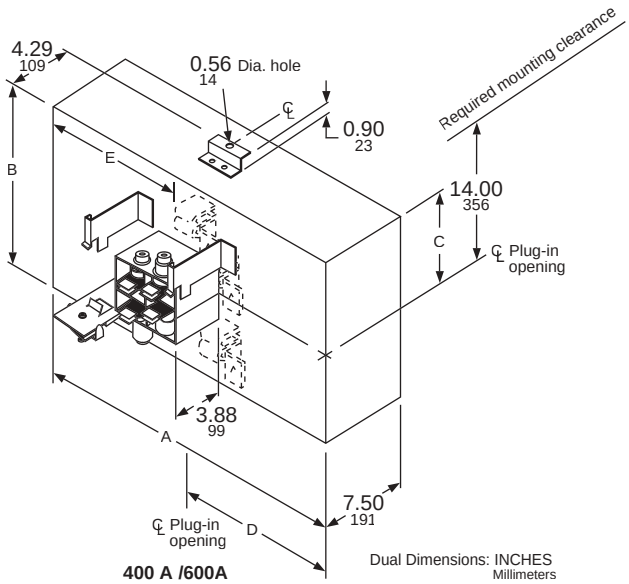


Dual Dimensions: INCHES
Millimeters

Cable Tap Boxes



225 A

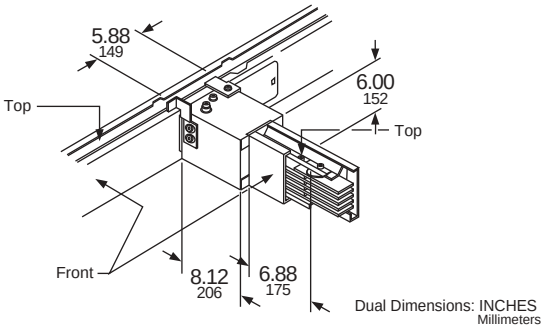


400 A /600A

Ampere Rating	A		B		C		D		E‡		Lugs Per Phase and Neutral	Ground Lug	Catalog Number (With Ground Bus)			
	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm			3-Pole	Weight	3Ø4W 100%N	Weight
225	16.38	416	8.42	216	3.90	100	3.30	83	9.45	267	1-300 kcmil	1 – #6-2/0	PTB-302G	18.25 lb	PTB-502G	19.00 lb
400	25.95	659	18.44	468	9.76	248	7.50	191	14.00	356	2-500 kcmil	1 – #6-2/0-300 kcmil	PBTB-306G	60.00 lb	PBTB-506G	62.00 lb
600	25.95	659	18.44	468	9.76	248	7.50	191	14.00	356	2-500 kcmil	1 – #6-2/0-300 kcmil	PBTB-306G	60.00 lb	PBTB-506G	62.00 lb

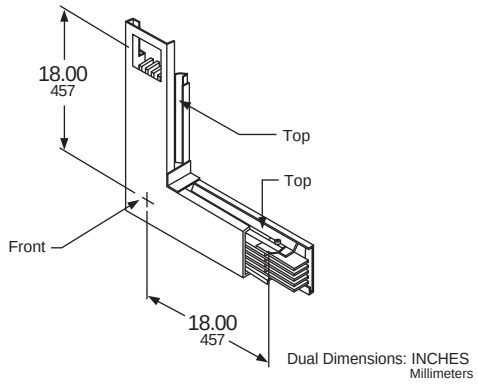
‡ Lugs in plug-in tap boxes can be reversed in field so that end of lugs point in opposite direction from that shown on drawing. (400 A and 600 A only.)

Tees

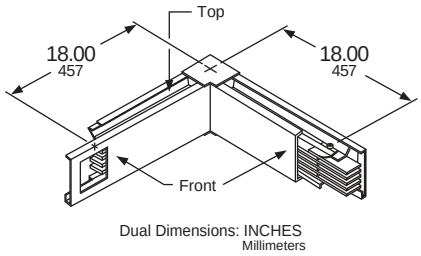


Ampere Rating (Tee Leg)		Catalog Number (Without Ground Bus)		Catalog Number (With Ground Bus)	
Aluminum	Copper	3-Pole	3Ø4W 100% N	3-Pole	3Ø4W 100% N
225	225	PTT-2-3W	PTT-2-4W	PTT-2-3WG	PTT-2-4WG
400	400	PTT-3-3WG	PTT-3-4WG	PTT-3-3WG	PTT-3-4WG
. . .	600	PTT-3-3WG	PTT-3-4WG	PTT-3-3WG	PTT-3-4WG
600	. . .	PTT-4-3WG	PTT-4-4WG	PTT-4-3WG	PTT-4-4WG

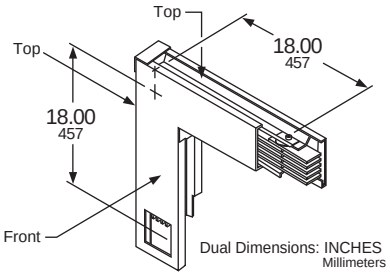
Elbows



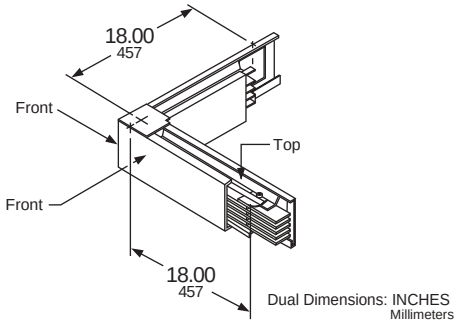
Top Inside Elbow: Catalog Number Suffix–LTI



Front Inside Elbow: Catalog Number Suffix–LFI

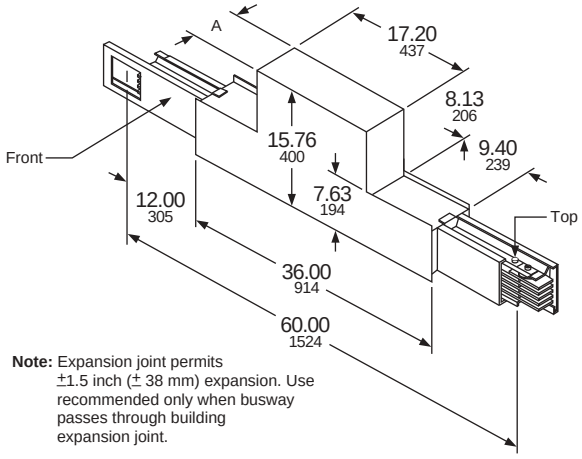


Top Outside Elbow: Catalog Number Suffix–LTO



Front Outside Elbow: Catalog Number Suffix–LFO

Expansion Fitting



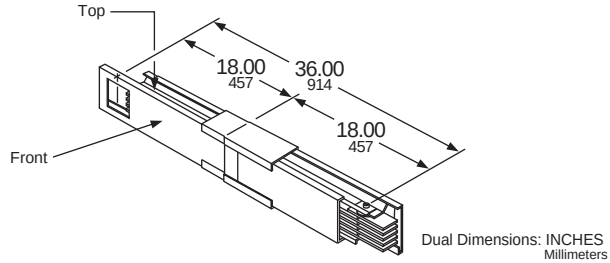
Note: Expansion joint permits ±1.5 inch (± 38 mm) expansion. Use recommended only when busway passes through building expansion joint.

Dual Dimensions: INCHES
Millimeters

Ampere Rating		A	
Aluminum	Copper	IN	mm
225	225	4.51	114
400	400	5.57	141
. . .	600	5.57	141
600	. . .	6.95	176

Catalog Number Suffix–EJ

Unfused Reducer

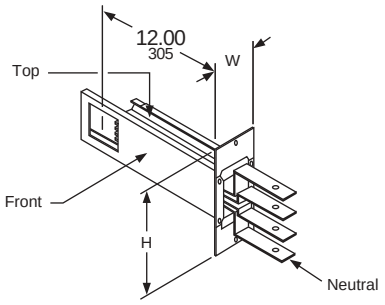


Bolt End Ampere Rating	Catalog Number Suffix		
	Slot End Ampere Rating		
	225	400	600
225	. . .	. . .	. . .
400	-R02	. . .	. . .
600	-R02	▲-R04	. . .

▲ Aluminum busway only.

NOTE: The National Electrical Code (Article 364-11) states that overcurrent protection is required where busways are reduced in ampacity except for certain industrial applications.

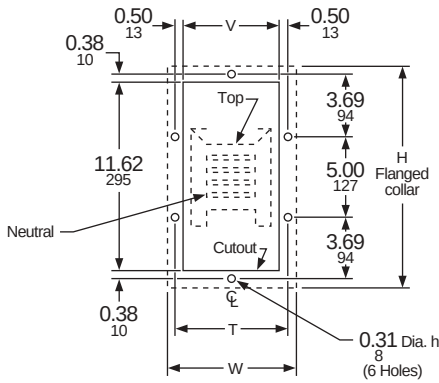
Flanged End Cutout And Drilling Template



Flanged End Dual Dimensions: INCHES
Millimeters

Catalog Number Suffix–FES 12 (Slot End) /FEB 12 (Bolt End)

Ampere Rating		H		W		V		T	
Aluminum	Copper	IN	mm	IN	mm	IN	mm	IN	mm
225	225	13.38	340	4.44	113	2.44	62	3.44	87
400	400	13.38	340	5.50	140	3.50	89	4.50	114
. . .	600	13.38	340	5.50	140	3.50	89	4.50	114
600	. . .	13.38	340	6.88	175	4.88	124	5.88	149



Flanged Collar Dual Dimensions: INCHES
Millimeters

Flanged End Details

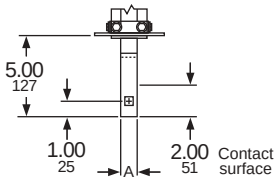


Figure 1

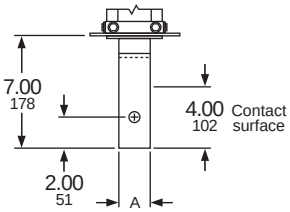
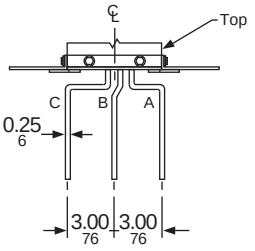
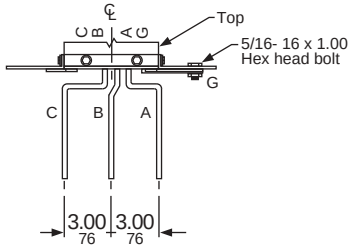


Figure 2

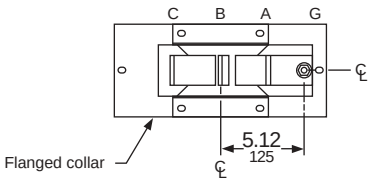
Ampere Rating		Fig.	A	
Aluminum	Copper		IN	mm
225	225	1	0.94	24
400	400	2	2.00	51
. . .	600	2	2.00	51
600	. . .	2	3.38	86



3-Pole

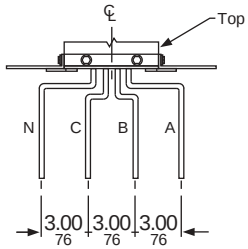


3-Pole with Ground Bus

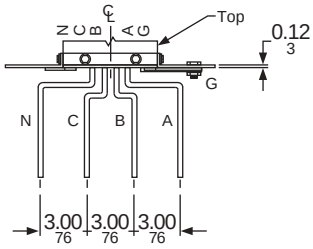


3-Pole with Ground Bus
(Bottom View)

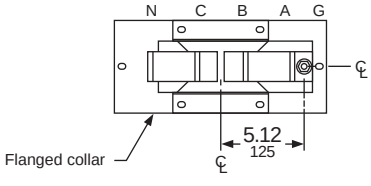
Dual Dimensions: INCHES
Millimeters



4-Pole

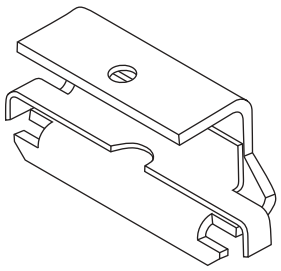


4-Pole with Ground Bus

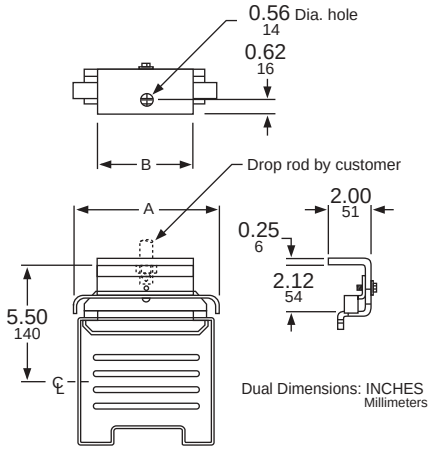


4-Pole with Ground Bus
(Bottom View)

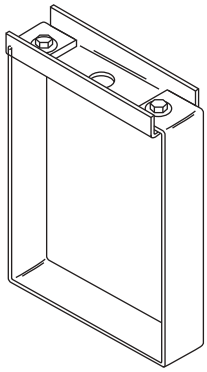
Flatwise Hanger



Ampere Rating		A		B		Catalog Number
Aluminum	Copper	IN	mm	IN	mm	
225	225	2.65	67	1.06	27	HP-2-F
400	400	3.71	94	1.44	36	HP-3-F
. . .	600	3.71	94	1.44	36	HP-3-F
600	. . .	5.09	129	2.82	72	HP-5-F

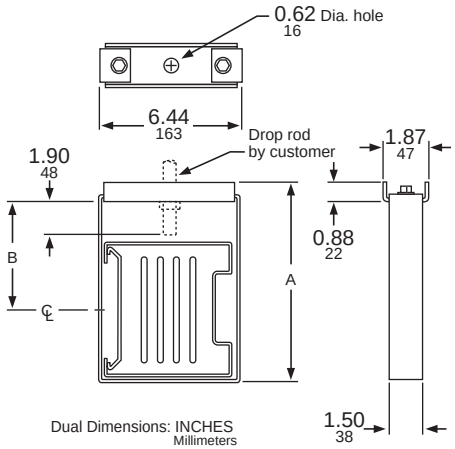


Edgewise Hanger

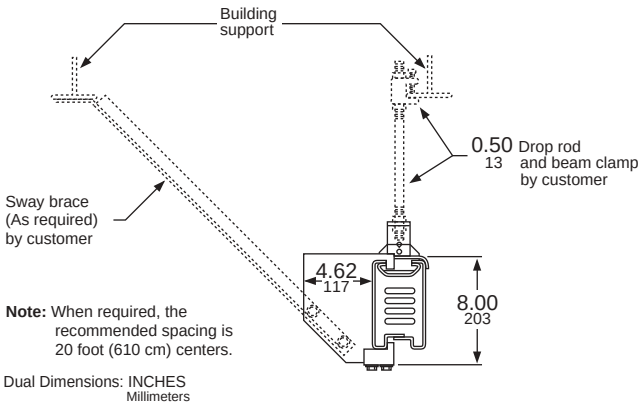


Ampere Rating		A		B		Catalog Number
Aluminum	Copper	IN	mm	IN	mm	
225★	225★	6.29	160	3.57	91	HP-3-E
400	400	6.29	160	3.57	91	HP-3-E
. . .	600	6.29	160	3.57	91	HP-3-E
600	. . .	7.67	195	4.26	108	HP-5-E

★Hanger spacing on 5 foot centers maximum when mounted edgewise.



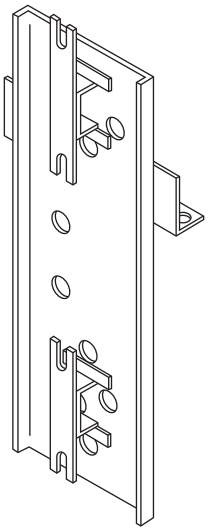
Sway Brace Collar

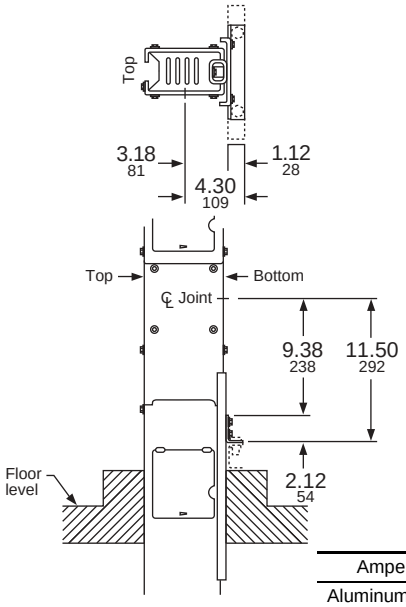


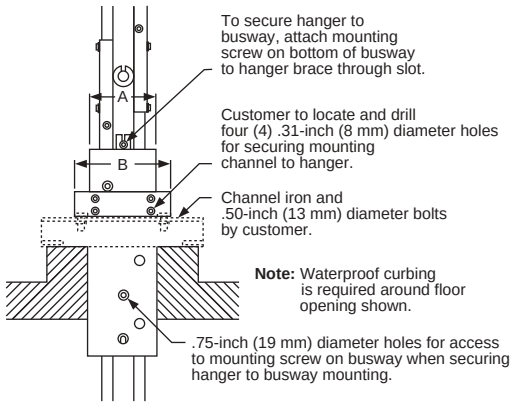
Sway braces are used when only one side of the busway is heavily loaded with tap-off units or when other factors could cause possible swaying of the busway.

Catalog Number HP-1-SBC

Vertical Hanger





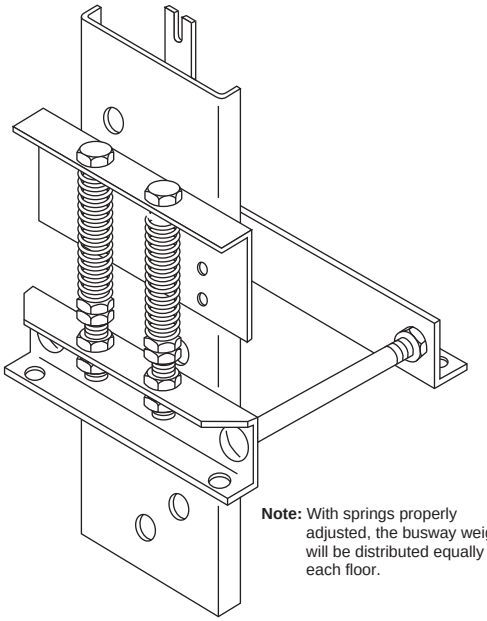


Dual Dimensions: INCHES
Millimeters

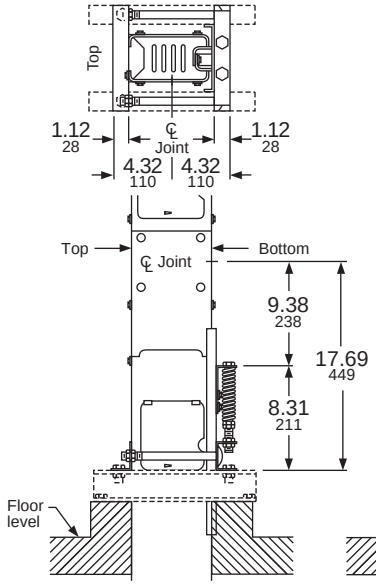
Ampere Rating		A		B		Catalog Number
Aluminum	Copper	IN	mm	IN	mm	
225	225	4.28	109	6.54	166	HP-2-V
400	400	5.32	135	7.58	192	HP-3-V
. . .	600	5.32	135	7.58	192	HP-3-V
600	. . .	6.70	170	8.96	228	HP-4-V

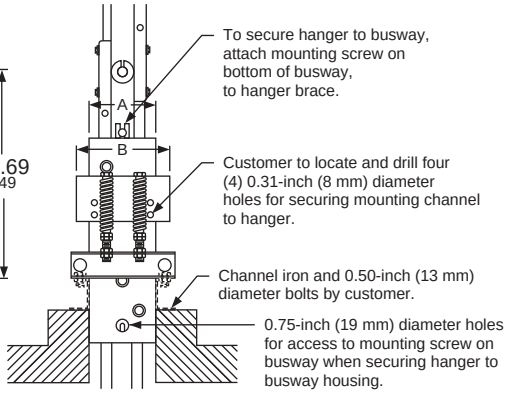
Note: Dimensions shown apply for 6 ft (183 cm) and 10 ft (305 cm) straight lengths only. Consult your local Square D sales office for dimensions that apply for fractional straight lengths.

Vertical Spring Hanger



Note: With springs properly adjusted, the busway weight will be distributed equally on each floor.



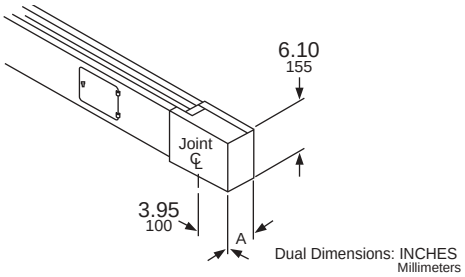


Ampere Rating		A		B		Catalog Number
Aluminum	Copper	IN	mm	IN	mm	
225	225	4.28	109	6.54	166	HP-2-VS
400	400	5.32	135	7.58	192	HP-3-VS
. . .	600	5.32	135	7.58	192	HP-3-VS
600	. . .	6.70	170	8.96	228	HP-4-VS

Note: Dimensions shown apply for 6 ft (183 cm) and 10 ft (305 cm) straight lengths only. Consult your local Square D sales office for dimensions that apply for other straight lengths.

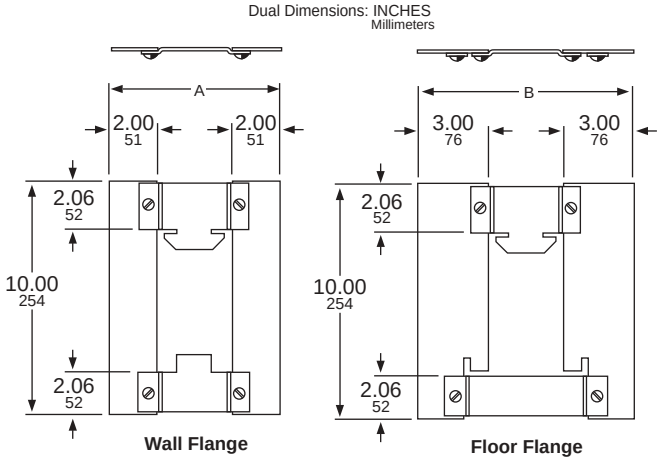
Busway Systems
225 A–600 A Catalog Numbering System/Physical Data

End Closure



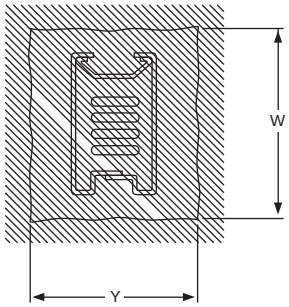
Ampere Rating		A		Catalog Number
Aluminum	Copper	IN	mm	
225	225	2.66	68	ACP-2-EC
400	400	3.52	89	ACP-3-EC
. . .	600	3.52	89	ACP-3-EC
600	. . .	4.90	124	ACP-4-EC

Wall And Floor Flange



Ampere Rating		A		B		Catalog Number	
Aluminum	Copper	IN	mm	IN	mm	Wall Flange	Floor Flange
225	225	6.28	160	8.34	212	ACP-2-WF	ACP-2-FF
400	400	7.34	186	9.40	239	ACP-3-WF	ACP-3-FF
. . .	600	7.34	186	9.40	239	ACP-3-WF	ACP-3-FF
600	. . .	8.72	221	10.78	274	ACP-4WF	ACP-4-FF

Required Wall Openings



Ampere Rating		Straight Length		Flanged Ends		Flatwise Elbow							Edgewise Elbow						
							Wall Thickness							Wall Thickness					
Aluminum	Copper	Y★	W	Y★	W	W	4 IN 102 mm	8 IN 203 mm	12 IN 305 mm	16 IN 406 mm	20 IN 508 mm	24 IN 610 mm	Y★	4 IN 102 mm	8 IN 203 mm	12 IN 305 mm	16 IN 406 mm	20 IN 508 mm	24 IN 610 mm
							Y★							W					
225	225	6 IN 152 mm	8 IN 203 mm	6 IN 152 mm	15 IN 381 mm	8 IN 203 mm	8 IN 203 mm	10 IN 254 mm	12 IN 305 mm	14 IN 356 mm	16 IN 406 mm	18 IN 457 mm	6 IN 152 mm	13 IN 330 mm	15 IN 381 mm	17 IN 432 mm	19 IN 483 mm	21 IN 533 mm	23 IN 584 mm
400	400	7 IN 178 mm		7 IN 178 mm			9 IN 229 mm	11 IN 279 mm	13 IN 330 mm	15 IN 381 mm	17 IN 432 mm	19 IN 483 mm	7 IN 178 mm						
—	600	7 IN 178 mm		7 IN 178 mm			9 IN 229 mm	11 IN 279 mm	13 IN 330 mm	15 IN 381 mm	17 IN 432 mm	19 IN 483 mm	7 IN 178 mm						
600	—	8 IN 203 mm		8 IN 203 mm			11 IN 279 mm	13 IN 330 mm	15 IN 381 mm	17 IN 432 mm	19 IN 483 mm	21 IN 533 mm	8 IN 203 mm						

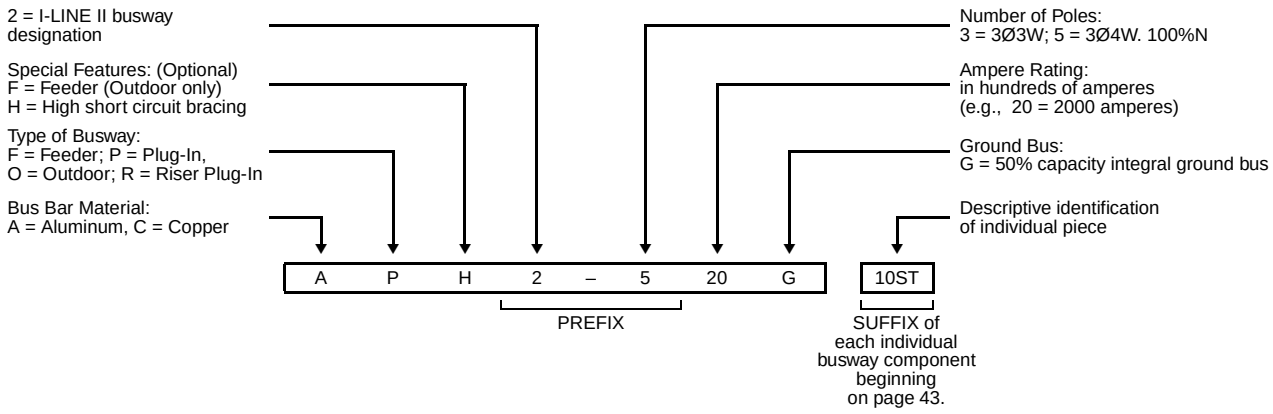
★ Dimension allows clearance for vertical hanger. Subtract one inch (25 mm) for horizontal mounted busway.

Busway Catalog Numbering System

Catalog numbers are composed of two basic parts—the PREFIX (as below), plus the SUFFIX of each individual busway component on pages 43–55.

The PREFIX contains necessary busway information except individual component descriptive details that are defined as the SUFFIX. The catalog number PREFIX will generally remain unchanged throughout a busway run while the SUFFIX will vary with each individual length or fitting selected.

A few devices, such as hangers, wall flanges, etc., do not follow the exact pattern described above. For these exceptions, a complete listing of device catalog numbers is shown with the individual device drawing(s) on pages 56–57.



Cross Sections—Plug-In and Indoor Feeder Lengths

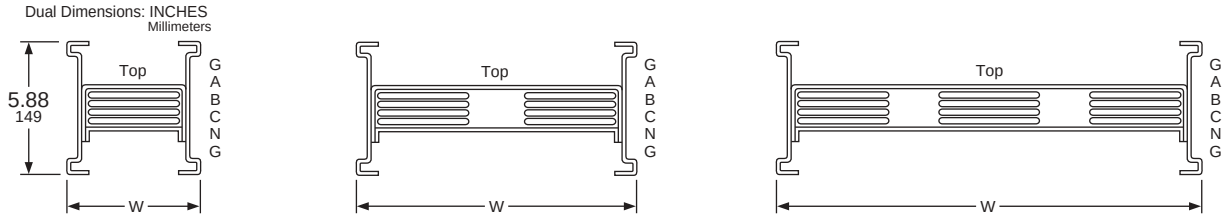


Figure A **Figure B** **Figure C**

Cross Sections—Fittings and All Outdoor Feeder

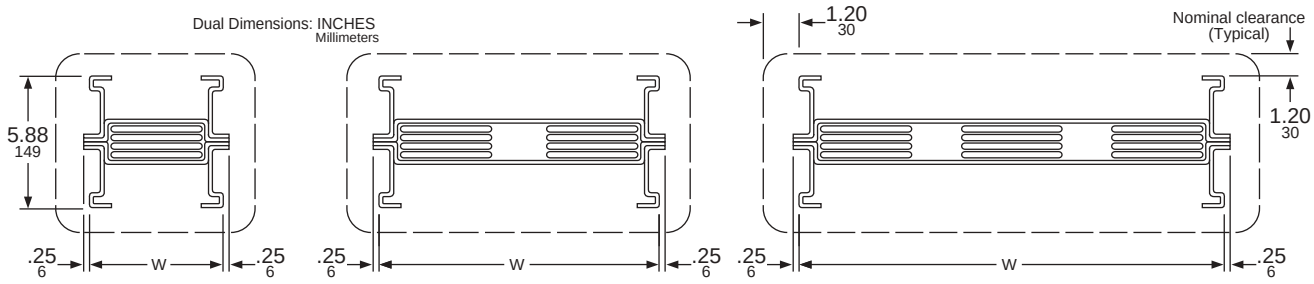


Figure A **Figure B** **Figure C**

Note: Dotted line indicates the profile of the joint covers for Outdoor Feeder busway. The profile for indoor fittings is the same as the busway itself.

Aluminum Content and Weight

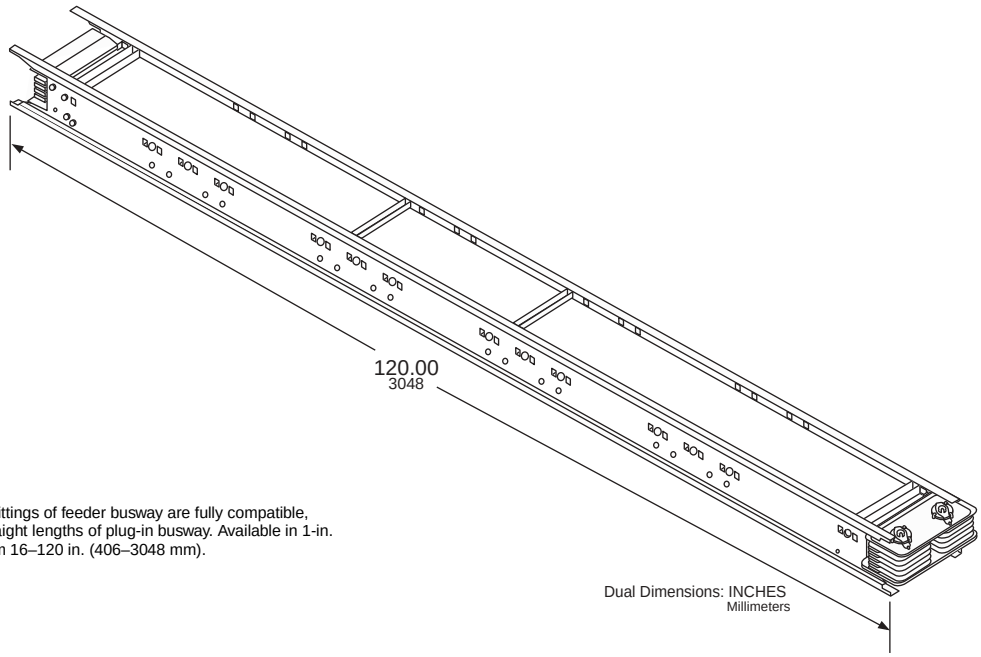
Ampere Rating	W		Fig.	Bus Bars Per Phase		Weights—Feeder				Weights—Plug-In			
						3-Pole		4-Pole		3-Pole		4-Pole	
	IN	mm		IN	mm	Lb/Ft	Kg/M	Lb/Ft	Kg/M	Lb/Ft	Kg/M	Lb/Ft	Kg/M
800	4.34	110	A	One – .25 x 3.00	One – 6 x 76	9.1	13.5	10.0	14.9	11.2	16.7	12.1	18.0
1000	5.34	136	A	One – .25 x 4.00	One – 6 x 102	10.1	15.0	11.3	16.8	12.2	18.2	13.4	19.9
1200	6.34	161	A	One – .25 x 5.00	One – 6 x 127	11.1	16.5	12.5	18.6	13.2	19.6	14.6	21.7
1350	7.34	186	A	One – .25 x 6.00	One – 6 x 152	12.1	18.0	13.8	20.5	14.2	21.1	15.9	23.7
1600	8.84	225	A	One – .25 x 7.50	One – 6 x 191	13.8	20.5	15.8	23.5	15.9	23.7	17.9	26.6
2000	12.72	323	B	Two – .25 x 4.50	Two – 6 x 114	19.1	28.4	22.5	33.5	21.2	31.5	24.6	36.6
2500	16.22	412	B	Two – .25 x 6.00	Two – 6 x 152	22.1	32.9	26.7	39.7	24.2	36.0	26.8	39.9
3000	18.72	475	B	Two – .25 x 7.50	Two – 6 x 191	25.1	37.3	30.6	45.5	27.2	40.5	32.7	48.7
4000	25.60	650	C	Three – .25 x 6.50	Three – 6 x 165	33.9	50.4	40.4	60.1	36.0	53.6	42.5	63.2

Copper Content and Weight

Ampere Rating	W		Fig.	Bus Bars Per Phase		Weights—Feeder				Weights–Plug-In			
						3-Pole		4-Pole		3-Pole		4-Pole	
	IN	mm		IN	mm	Lb/Ft	Kg/M	Lb/Ft	Kg/M	Lb/Ft	Kg/M	Lb/Ft	Kg/M
800	3.84	98	A	One – .25 x 2.50	One – 6 x 64	12.1	18.0	14.6	21.7	14.2	21.1	16.7	24.8
1000	4.34	110	A	One – .25 x 3.00	One – 6 x 76	13.8	20.5	16.7	24.9	15.9	23.7	18.8	28.0
1200	5.34	136	A	One – .25 x 4.00	One – 6 x 102	16.8	25.0	20.8	31.0	18.9	28.1	22.9	34.1
1350	5.84	148	A	One – .25 x 4.50	One – 6 x 114	18.3	27.2	22.8	33.9	20.4	30.4	24.9	37.1
1600	6.74	171	A	One – .25 x 5.40	One – 6 x 137	21.1	31.4	27.5	40.9	23.2	34.5	29.6	44.0
2000	7.84	199	A	One – .25 x 6.50	One – 6 x 165	24.3	36.2	30.8	45.8	26.4	39.3	32.9	49.0
2500	12.72	323	B	Two – .25 x 4.50	Two – 6 x 114	38.7	57.6	47.7	71.0	40.8	60.7	49.8	74.1
3000	15.22	387	B	Two – .25 x 5.00	Two – 6 x 127	42.7	63.5	51.7	76.9	44.8	65.2	53.8	80.1
4000	23.60	599	C	Three – .25 x 4.50	Three – 6 x 114	59.1	87.9	72.6	108.0	61.2	91.1	74.7	111.2
5000	25.10	638	C	Three – .25 x 6.00	Three – 6 x 152	72.6	108.0	90.6	134.8	74.7	111.2	92.7	137.9

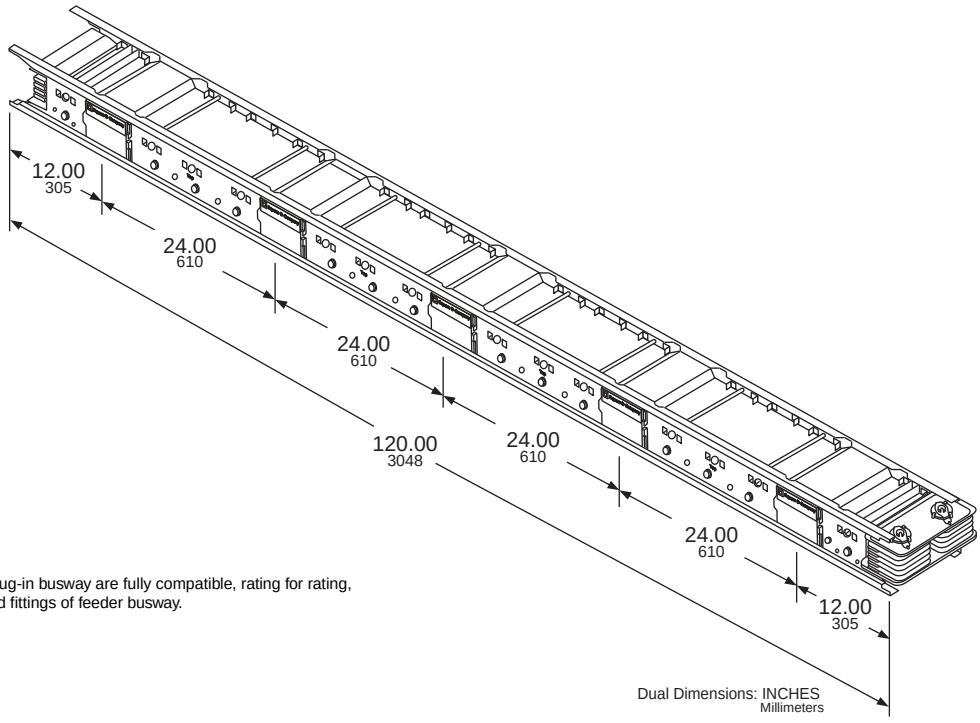
Note: For required wall and floor openings, refer to page 40.

Straight Lengths—Feeder



Note: All straight lengths and fittings of feeder busway are fully compatible, rating for rating, with straight lengths of plug-in busway. Available in 1-in. (25 mm) increments from 16–120 in. (406–3048 mm).

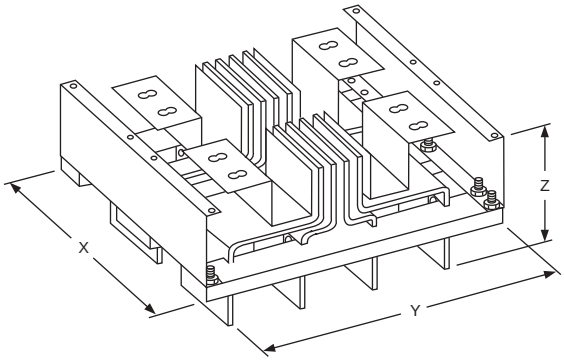
Straight Lengths—Plug-in (Indoor Only)

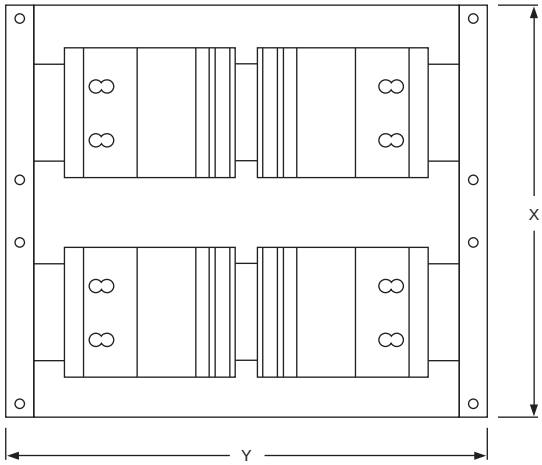


Note: All straight lengths of plug-in busway are fully compatible, rating for rating, with straight lengths and fittings of feeder busway.

Catalog Number Suffix	-10ST	-8ST	-6ST	-4ST
Standard Lengths–Feet	10 ft	8 ft	6 ft	4 ft
Standard Lengths–Meters	3.05 m	2.44 m	1.83 m	1.219 m
Number of Plug-in Openings	10	8	6	4

Qwik Flange (Indoor Only)





Catalog Number Suffix –QF

Amperage Ratings		X				Y		Z	
Aluminum	Copper	3-Pole		4-Pole					
		IN	mm	IN	mm	IN	mm	IN	mm
. . .	800	10.50	207	10.50	207	16.26	413	7.50	190
800	1000	10.50	207	10.50	207	16.26	413	7.50	190
1000	1200	10.50	207	10.50	207	16.26	413	7.50	190
. . .	1350	10.50	207	10.50	207	16.26	413	7.50	190
1200	. . .	10.50	207	10.50	207	16.26	413	7.50	190
. . .	1600	10.50	207	10.50	207	16.26	413	7.50	190
1350	. . .	10.50	207	10.50	207	16.26	413	7.50	190
. . .	2000	10.50	207	10.50	207	16.26	413	7.50	190
1600	. . .	10.50	207	10.50	207	16.26	413	7.50	190
2000	2500	14.34	364	14.34	364	16.26	413	7.50	190
2500	. . .	17.84	453	17.84	453	16.26	413	7.50	190
. . .	3000	16.84	428	16.84	428	16.26	413	7.50	190
3000	. . .	20.34	517	20.34	517	16.26	413	7.50	190
. . .	4000	25.22	641	25.22	641	16.26	413	7.50	190
4000	. . .	27.22	691	27.22	691	16.26	413	7.50	190
. . .	5000	26.72	679	26.72	679	16.26	413	7.50	190

Qwik Flange (Indoor Only)

Dual Dimensions: INCHES
Millimeters

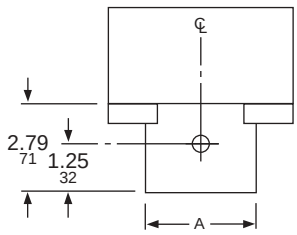


Figure 1

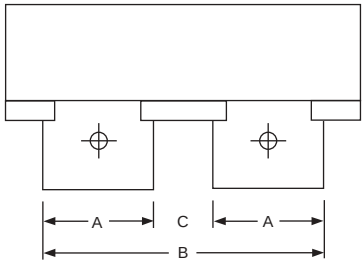


Figure 2

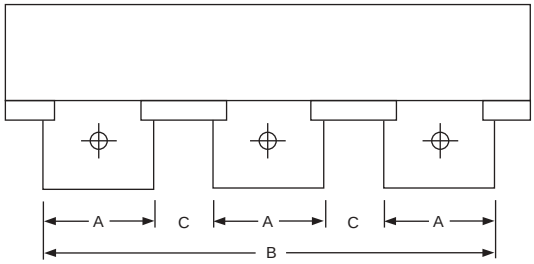
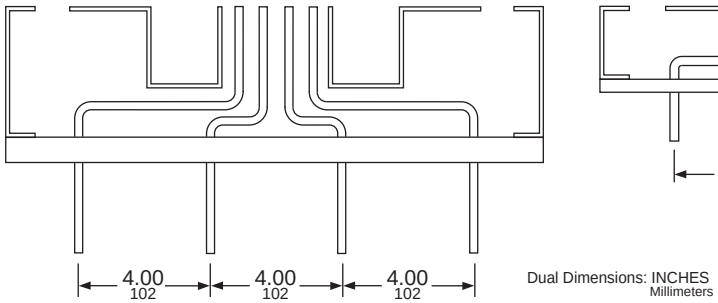
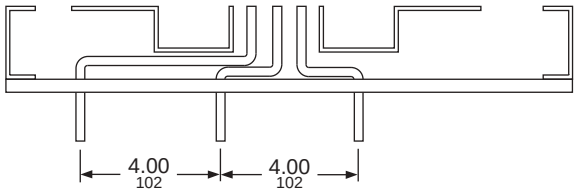


Figure 3

Aluminum Ampere Rating	Fig.	A		B		C	
		IN	mm	IN	mm	IN	mm
800	1	3.00	76	. . .	. . .	. . .	. . .
1000	1	4.00	102	. . .	. . .	. . .	. . .
1200	1	5.00	127	. . .	. . .	. . .	. . .
1350	1	6.00	152	. . .	. . .	. . .	. . .
1600	1	7.50	191	. . .	. . .	. . .	. . .
2000	2	4.50	114	11.38	289	2.38	60
2500	2	6.00	152	14.88	378	2.88	73
3000	2	7.50	191	17.38	441	2.38	60
4000	3	6.50	165	24.26	616	2.38	60

Copper Ampere Rating	Fig.	A		B		C	
		IN	mm	IN	mm	IN	mm
800	1	2.50	64	. . .	. . .	. . .	. . .
1000	1	3.00	76	. . .	. . .	. . .	. . .
1200	1	4.00	102	. . .	. . .	. . .	. . .
1350	1	4.50	114	. . .	. . .	. . .	. . .
1600	1	5.40	137	. . .	. . .	. . .	. . .
2000	1	6.50	165	. . .	. . .	. . .	. . .
2500	2	4.50	114	11.38	289	2.38	60
3000	2	5.00	127	13.88	353	3.88	86
4000	3	4.50	114	22.26	565	4.38	111
5000	3	6.00	152	23.76	604	2.88	73

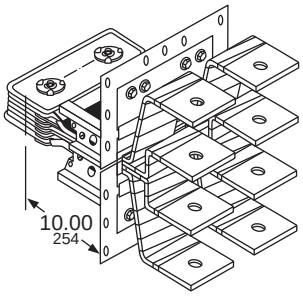




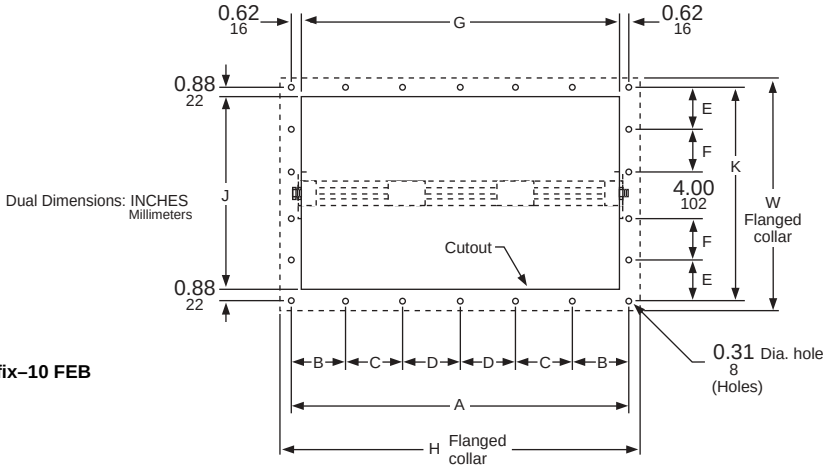
Dual Dimensions: INCHES
Millimeters

NOTE: Refer to “Detail of Phase Bussing Connections in a Switchboard” on page 48.

Flanged End



Flanged End: Catalog Number Suffix–10 FEB



Flanged Collar and Cutout Dimensions

Ampere Rating		L		H		W				G		J	
						3-Pole		4-Pole					
Aluminum	Copper	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm
. . .	800	10.00	254	7.38	187	12.82	326	13.18	335	5.12	130	10.00	254
800	1000	10.00	254	7.38	187	12.82	326	13.18	335	5.12	130	10.00	254
. . .	1200	10.00	254	8.00	203	12.82	326	13.18	335	5.76	145	10.00	254
1000	1350	10.00	254	9.00	229	12.82	326	13.18	335	6.75	171	10.00	254
1200	. . .	10.00	254	10.00	254	12.82	326	13.18	335	7.76	196	10.00	254
1350	1600	10.00	254	11.00	279	12.82	326	13.18	335	8.75	222	10.00	254
1600	2000	10.00	254	13.88	352	18.82	478	19.18	487	11.63	295	16.00	406
2000	2500	10.00	254	15.88	403	18.82	478	19.18	487	13.63	346	16.00	406
2500	3000	10.00	254	19.88	505	18.82	478	19.18	487	17.63	448	16.00	406
3000	. . .	10.00	254	22.75	578	18.82	478	19.18	487	20.50	521	16.00	406
4000	4000	10.00	254	28.75	730	18.82	478	19.18	487	26.50	673	16.00	406
. . .	5000	10.00	254	28.75	730	18.82	478	19.18	487	26.50	673	16.00	406

Flanged Collar Hole Location and Spacing

Ampere Rating		N Holes	Hole Location and Spacing													
			A		B		C		D		K		E		F	
Aluminum	Copper		IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm
. . .	800	10	6.38	162	3.19	81	. . .	. . .	. . .	. . .	11.75	296	3.88	98	. . .	. . .
800	1000	10	6.38	162	3.19	81	. . .	. . .	. . .	. . .	11.75	296	3.88	98	. . .	. . .
. . .	1200	10	7.00	178	3.50	89	. . .	. . .	. . .	. . .	11.75	296	3.88	98	. . .	. . .
1000	1350	10	8.00	203	4.00	102	. . .	. . .	. . .	. . .	11.75	296	3.88	98	. . .	. . .
1200	. . .	10	9.00	229	4.50	114	. . .	. . .	. . .	. . .	11.75	296	3.88	98	. . .	. . .
1350	1600	10	10.00	254	5.00	127	. . .	. . .	. . .	. . .	11.75	296	3.88	98	. . .	. . .
1600	2000	16	12.88	327	4.25	108	. . .	. . .	. . .	. . .	17.75	451	3.46	88	3.42	87
2000	2500	16	14.88	378	5.00	127	. . .	. . .	. . .	. . .	17.75	451	3.46	88	3.42	87
2500	3000	18	18.88	480	4.75	121	4.69	119	. . .	. . .	17.75	451	3.46	88	3.42	87
3000	. . .	20	21.75	552	4.38	111	4.37	111	. . .	. . .	17.75	451	3.46	88	3.42	87
4000	4000	22	27.75	705	4.62	117	4.63	118	4.63	118	17.75	451	3.46	88	3.42	87
. . .	5000	22	27.75	705	4.62	117	4.63	118	4.63	118	17.75	451	3.46	88	3.42	87

Flanged End

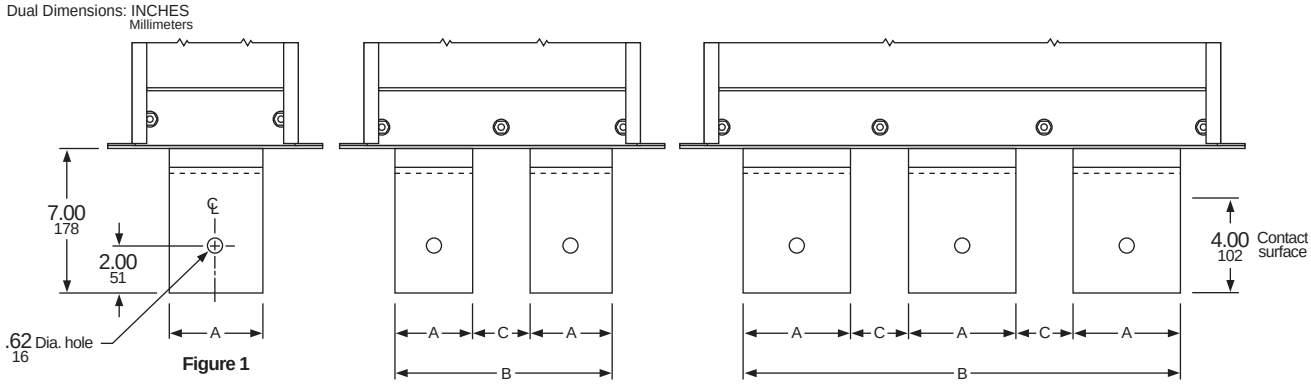


Figure 1

Figure 2

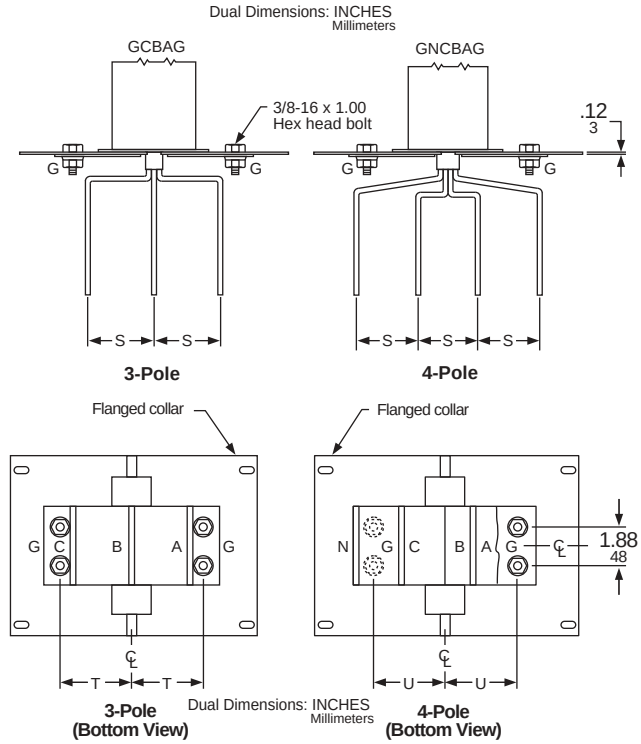
Figure 3

Aluminum Ampere Rating	Fig.	A		B		C	
		IN	mm	IN	mm	IN	mm
800	1	3.00	76	. . .	. . .	. . .	. . .
1000	1	4.00	102	. . .	. . .	. . .	. . .
1200	1	5.00	127	. . .	. . .	. . .	. . .
1350	1	6.00	152	. . .	. . .	. . .	. . .
1600	1	7.50	191	. . .	. . .	. . .	. . .
2000	2	4.50	114	11.38	289	2.38	60
2500	2	6.00	152	14.88	378	2.88	73
3000	2	7.50	191	17.38	441	2.38	60
4000	3	6.50	165	24.26	616	2.38	60

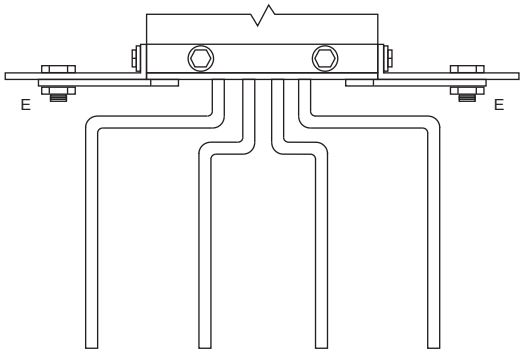
Ampere Rating		S		T		U	
Aluminum	Copper	IN	mm	IN	mm	IN	mm
. . .	800	3.00	76	3.62	92	3.81	97
800	1000	3.00	76	3.62	92	3.81	97
. . .	1200	3.00	76	3.62	92	3.81	97
1000	1350	3.00	76	3.62	92	3.81	97
1200	. . .	3.00	76	3.62	92	3.81	97
1350	1600	3.00	76	3.62	92	3.81	97
1600	2000	3.00	76	6.62	169	6.81	173
2000	2500	5.00	127	6.62	169	6.81	173
2500	3000	5.00	127	6.62	169	6.81	173
3000	. . .	5.00	127	6.62	169	6.81	173
4000	4000	5.00	127	6.62	169	6.81	173
. . .	5000	5.00	127	6.62	169	6.81	173

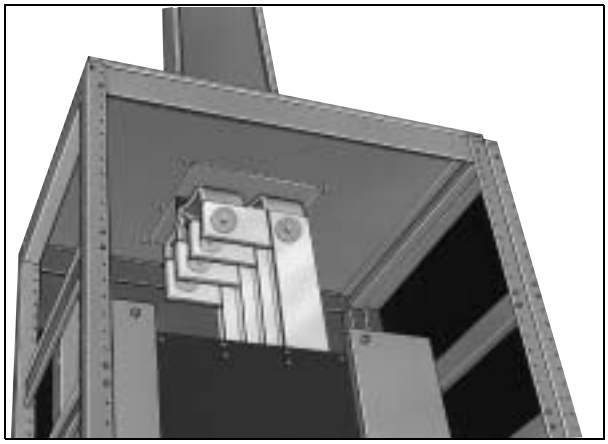
NOTE: Refer to “Detail of Phase Bussing Connections in a Switchboard” on page 48.

Copper Ampere Rating	Fig.	A		B		C	
		IN	mm	IN	mm	IN	mm
800	1	2.50	64	. . .	. . .	. . .	. . .
1000	1	3.00	76	. . .	. . .	. . .	. . .
1200	1	4.00	102	. . .	. . .	. . .	. . .
1350	1	4.50	114	. . .	. . .	. . .	. . .
1600	1	5.40	137	. . .	. . .	. . .	. . .
2000	1	6.50	165	. . .	. . .	. . .	. . .
2500	2	4.50	114	11.38	289	2.38	60
3000	2	5.00	127	13.88	353	3.88	99
4000	3	4.50	114	22.26	565	4.38	111
5000	3	6.00	152	23.76	604	2.88	73



Qwik Flange And Flanged End Termination Details





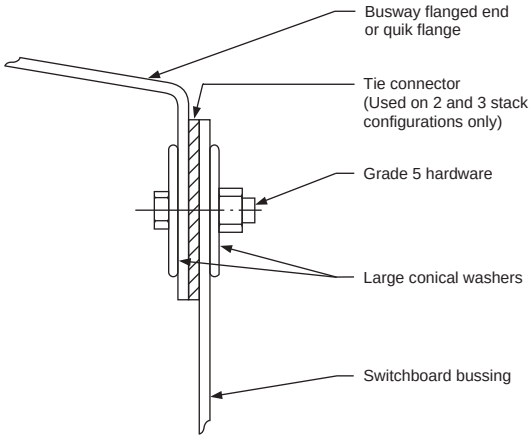
CAUTION

HAZARD OF EQUIPMENT DAMAGE

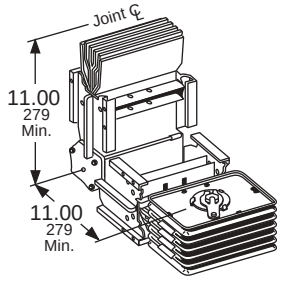
Improper contact pressure can cause overheating and equipment failure. Use 3-inch (76 mm) conical washers and Grade 5 hardware to ensure proper contact pressure.

Failure to follow this instruction can result in equipment damage.

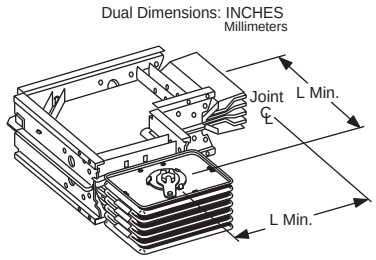
Detail of Phase Bussing Connections in a Switchboard



Elbows



Edgewise: Catalog Number Suffix–LEM11



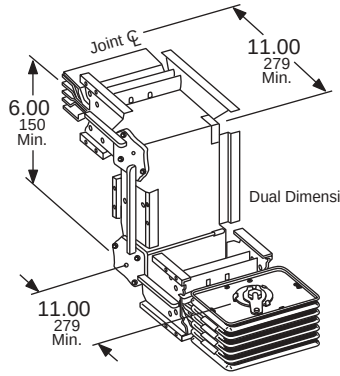
Flatwise

Flatwise: Catalog Number Suffix–LFM

Flatwise Elbows

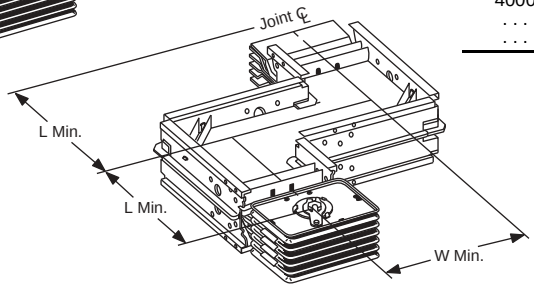
Ampere Rating		L		Catalog Number Suffux
Aluminum	Copper	IN	mm	
. . .	800	11.00	279	-LFM11
800	1000	11.00	279	-LFM11
1000	1200	12.00	305	-LFM12
1200	1350	12.00	305	-LFM12
. . .	1600	12.00	305	-LFM12
1350	2000	13.00	330	-LFM13
1600	. . .	13.00	330	-LFM13
2000	2500	15.00	381	-LFM15
. . .	3000	16.00	406	-LFM16
2500	. . .	17.00	432	-LFM17
3000	. . .	18.00	457	-LFM18
. . .	4000	21.00	533	-LFM21
. . .	5000	21.00	533	-LFM21
4000	. . .	22.00	559	-LFM22

Offset Elbows



Dual Dimensions: INCHES
Millimeters

Edgewise: Catalog Number Suffix–OE

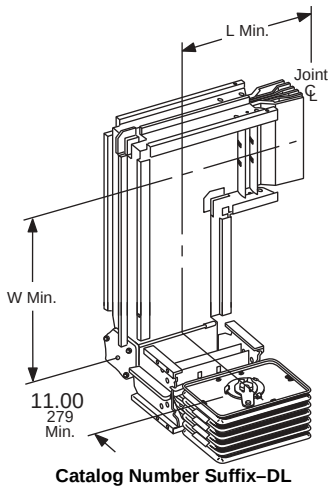


Flatwise: Catalog Number Suffix–OF

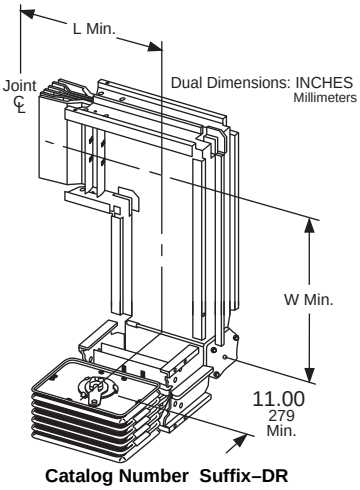
Flatwise Offset

Ampere Rating		L		W	
Aluminum	Copper	IN	mm	IN	mm
800	800/1000	11.00	279	4.00	100
1000	1200	12.00	305	4.00	100
. . .	1350	12.00	305	4.00	100
1200	1600	12.00	305	6.00	150
1350	. . .	13.00	330	9.00	229
. . .	2000	13.00	330	9.00	229
1600	. . .	13.00	330	10.00	254
2000	2500	15.00	381	14.00	356
2500	. . .	17.00	432	16.00	406
. . .	3000	16.00	406	16.00	406
3000	. . .	18.00	457	18.00	457
4000	. . .	22.00	559	25.00	635
. . .	4000	21.00	533	23.00	635
. . .	5000	21.00	533	25.00	635

Double Elbows



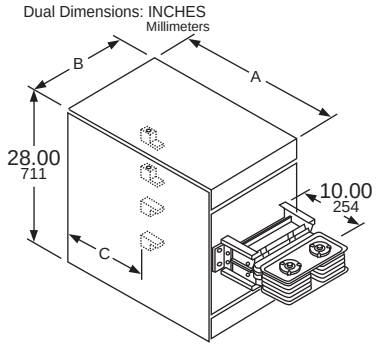
Catalog Number Suffix–DL



Catalog Number Suffix–DR

Ampere Rating		L		W	
Aluminum	Copper	IN	mm	IN	mm
800	800/1000	11.00	279	7.00	178
1000	1200	12.00	305	8.00	203
. . .	1350	12.00	305	8.00	203
1200	1600	12.00	305	8.00	203
1350	. . .	13.00	330	9.00	229
. . .	2000	13.00	330	9.00	229
1600	. . .	13.00	330	9.00	229
2000	2500	15.00	381	12.00	305
2500	. . .	17.00	432	14.00	356
. . .	3000	16.00	406	13.00	330
3000	. . .	18.00	457	15.00	381
4000	. . .	22.00	559	19.00	635
. . .	4000	21.00	533	18.00	457
. . .	5000	21.00	533	19.00	635

Cable Tap Box–End

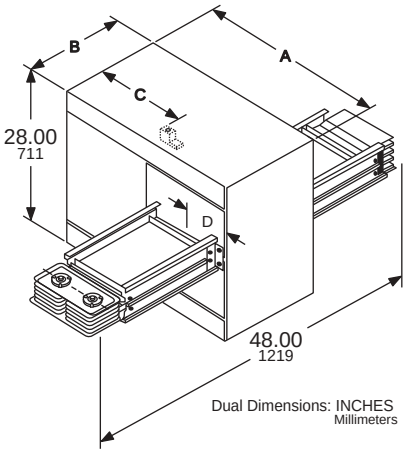


Catalog Number Suffix–ETBMB

Ampere Rating		A		B★		C		Lugs Per Phase and Neutral 2/0-500 kcmil	Ground Lugs	
Aluminum	Copper	IN	mm	IN	mm	IN	mm		#6-300 kcmil	500 kcmil
800	800	29.14	740	11.00	279	16.00	406	3	3	. . .
1000	1000	29.14	740	11.00	279	16.00	406	4	4	. . .
1200	1200	29.14	740	11.00	279	16.00	406	4	4	. . .
1350	1350	29.14	740	14.88	378	16.00	406	5	5	. . .
1600	1600	29.14	740	14.88	378	16.00	406	6	6	. . .
. . .	2000	29.14	740	14.88	378	16.00	406	7	7	. . .
2000	. . .	29.14	740	16.88	429	16.00	406	7	7	. . .
2500	2500	39.38	1000	20.88	530	26.00	660	9	. . .	9
. . .	3000	39.38	1000	20.88	530	26.00	660	10	. . .	10
3000	. . .	39.38	1000	23.76	604	26.00	660	10	. . .	10
4000	4000	39.38	1000	29.76	756	26.00	660	14	. . .	14
. . .	5000	39.38	1000	29.76	756	26.00	660	17	. . .	17

★ This dimension increases by 7 inches (178 mm) for outdoor end tap boxes.

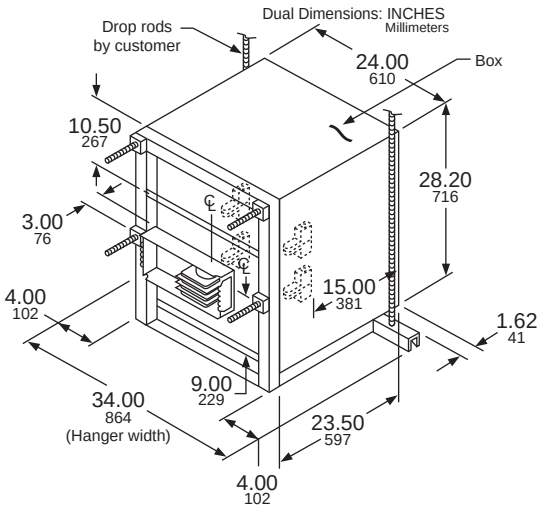
Cable Tap Box–Center



Catalog Number Suffix–CTB

Ampere Rating		A		B		C		D		Lugs Per Phase and Neutral 2/0-500 kcmil	Ground Lugs	
Aluminum	Copper	IN	mm	IN	mm	IN	mm	IN	mm		#6-300 kcmil	500 kcmil
800	800	35.00	889	14.00	356	16.00	406	7.27	185	3	3	. . .
1000	1000	35.00	889	14.00	356	16.00	406	7.27	185	4	4	. . .
1200	1200	35.00	889	14.00	356	16.00	406	7.27	185	4	4	. . .
1350	1350	35.00	889	14.00	356	16.00	406	7.27	185	5	5	. . .
1600	1600	35.00	889	14.00	356	16.00	406	7.27	185	6	6	. . .
. . .	2000	35.00	889	14.00	356	16.00	406	7.27	185	7	7	. . .
2000	. . .	41.70	1059	20.00	508	17.60	447	10.28	261	7	7	. . .
. . .	2500	41.70	1059	20.00	508	17.60	447	12.56	319	9	. . .	9
2500	. . .	41.70	1059	20.00	508	17.60	447	12.56	319	9	. . .	9
3000	3000	60.00	1524	22.00	559	26.00	660	16.00	406	10	. . .	10
4000	4000	63.00	1600	32.00	813	26.00	660	19.00	483	14	. . .	14
. . .	5000	63.00	1600	32.00	813	26.00	660	19.00	483	17	. . .	17

Cable Tap Box–Bolt On



Ampere Rating	Lugs Per Phase and Neutral	Ground Lugs	Catalog Number	
			3Ø3W▲	3Ø4W▲
800 1000 1200 1350 1600	6-500 kcmil	2-500 kcmil	PTB316G__†	PTB516G__†

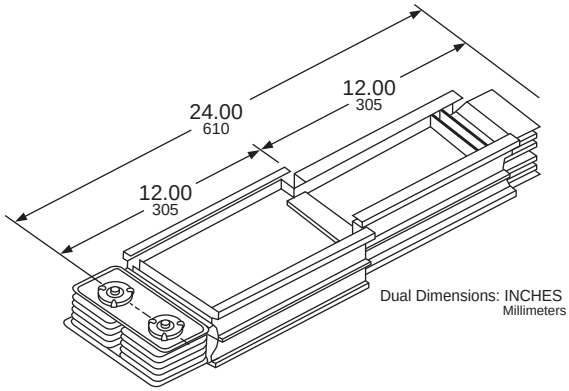
Box–can be moved to opposite end in field. 20.2-inch (513 mm) clearance required from ℄ of busway, for mounting bolt-on tap boxes when box is on top; and 10.0-inch (254 mm) required mounting clearance when box is on the bottom.

▲ May be used only on plug-in busway with the same number of poles.(e.g., do not use 3-pole units on 3Ø4W busway or 3Ø4W units on 3-pole busway.) Cannot be mounted in the last opening on either side of a busway run.

† **Cannot be used on 800 A Copper I-LINE II busway.**

Note: Add "H" on the end of the catalog number for units that will be mounted horizontally and "V" for units that will be mounted vertically. These mounting frames are NOT interchangeable.

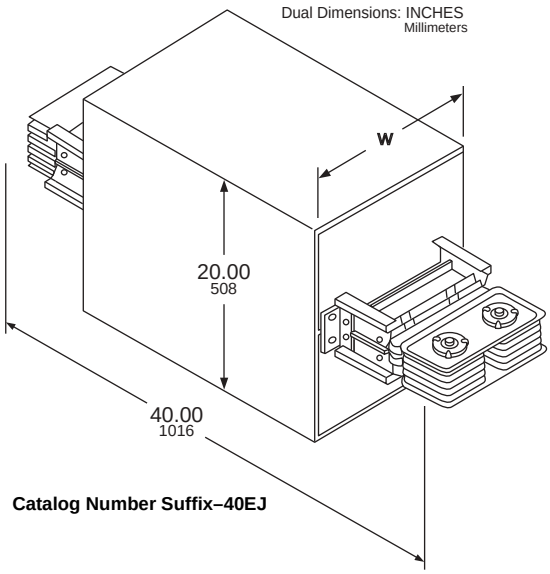
Unfused Reducer (Indoor Only)



Bolt End Ampere Rating	Catalog Number Suffix									
	Slot End Ampere Rating									
	400	600	800	1000	1200	1350	1600	2000	2500	3000
800	-R04	-R06	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
1000	-R04	-R06	-R08	. . .	. . .	. . .	. . .	. . .	. . .	. . .
1200	-R04	-R06	-R08	-R10	. . .	. . .	. . .	. . .	. . .	. . .
1350	. . .	-R06	-R08	-R10	-R12	. . .	. . .	. . .	. . .	. . .
1600	. . .	-R06	-R08	-R10	-R12	-R13	. . .	. . .	. . .	. . .
2000	. . .	. . .	-R08	-R10	-R12	-R13	-R16	. . .	. . .	. . .
2500	. . .	. . .	. . .	-R10	-R12	-R13	-R16	-R20	. . .	. . .
3000	. . .	. . .	. . .	-R10	-R12	-R13	-R16	-R20	-R25	. . .
4000	. . .	. . .	. . .	. . .	. . .	. . .	-R16	-R20	-R25	-R30
5000	. . .	. . .	. . .	. . .	. . .	. . .	. . .	-R20	-R25	-R30

Note: The National Electrical Code (Article 364-11) states that overcurrent protection is required where busways are reduced in ampacity except for certain industrial applications.

Expansion Fitting (Indoor Only)



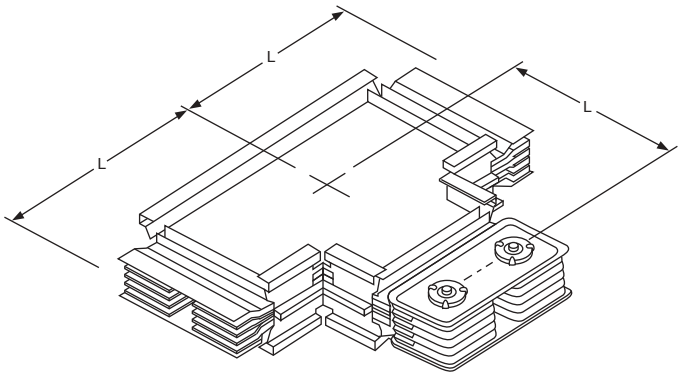
Catalog Number Suffix–40EJ

Aluminum	Copper	W	
		IN	mm
800	800	13.50	343
1000	1000	13.50	343
1200	1200	13.50	343
1350	1350	17.38	441
1600	1600	17.38	441
. . .	2000	17.38	441
2000	2500	19.38	492
2500	3000	23.38	594
3000	. . .	26.25	667
4000	4000	32.25	819
. . .	5000	32.25	819

Note: Expansion joint permits 1.50 inches (38 mm) of expansion or contraction.

Note: An expansion fitting should be used under the following conditions: whenever a busway run crosses a building expansion. When a long straight run of busway does not contain any elbows, or both ends of the run are fixed.

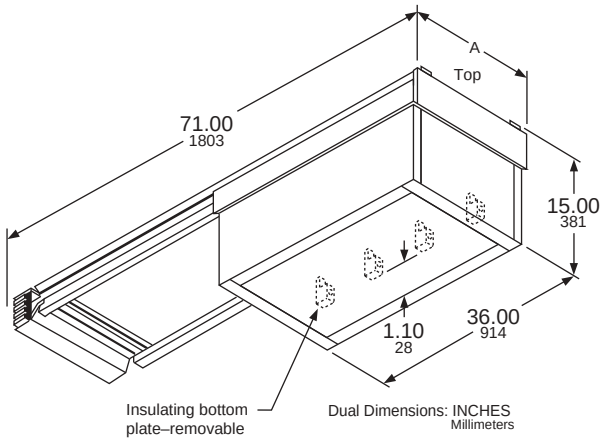
Tees



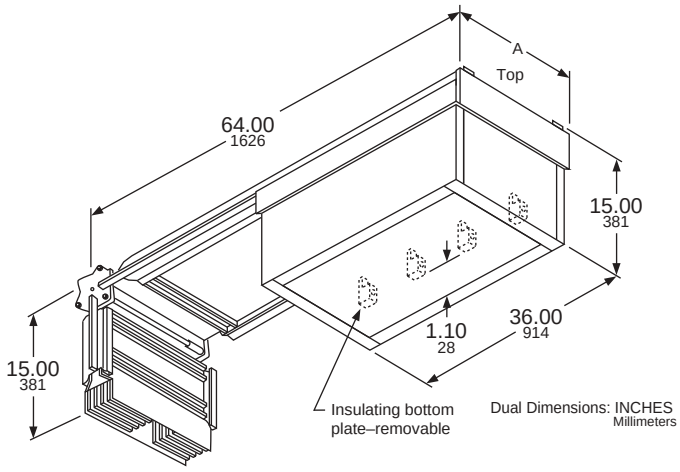
Ampere Rating		L		Catalog Number Suffix
Aluminum	Copper	IN	mm	
. . .	800	11.00	279	-33TFS11B11S11
800	1000	11.00	279	-33TFS11B11S11
1000	1200	12.00	305	-36TFS12B12S12
1200	1350	12.00	305	-36TFS12B12S12
. . .	1600	12.00	305	-36TFS12B12S12
1350	2000	13.00	330	-39TFS13B13S13
1600	. . .	13.00	330	-39TFS13B13S13
2000	2500	15.00▲	381▲	-45TFS15B15S15
. . .	3000	16.00▲	406▲	-48TFS16B16S16
2500	. . .	17.00▲	432▲	-51TFS17B17S17
3000	. . .	18.00▲	457▲	-54TFS18B18S18
. . .	4000	21.00▲	533▲	-63TFS21B21S21
. . .	5000	21.00▲	533▲	-63TFS21B21S21
4000	. . .	22.00▲	559▲	-66TFS22B22S22

▲ Add 1 inch (25 mm) for L Dimensions of outdoor tees.

Service Head Flatwise



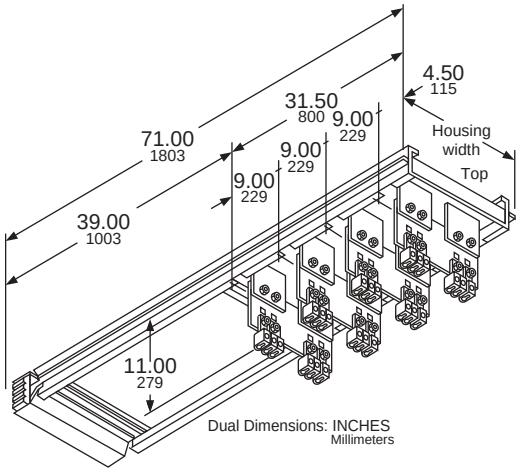
Catalog Number Suffix–71 SB



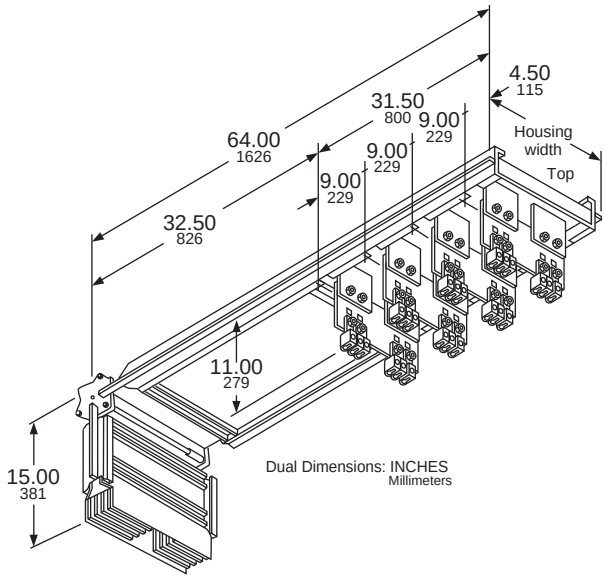
Catalog Number Suffix–79 LESBS15T64

Ampere Rating	A	Lugs Per Phase and Neutral 2/0-500 kcmil	Ground Lugs #6-300 kcmil
800	Housing Width Plus 2.23 57	2	2
1000		3	3
1200		4	3
1350		4	3
1600		4	4
2000		5	5
2500		7	6
3000		8	7
4000		10	9
5000		13	11

Transformer Tap (One 3Ø Transformer)



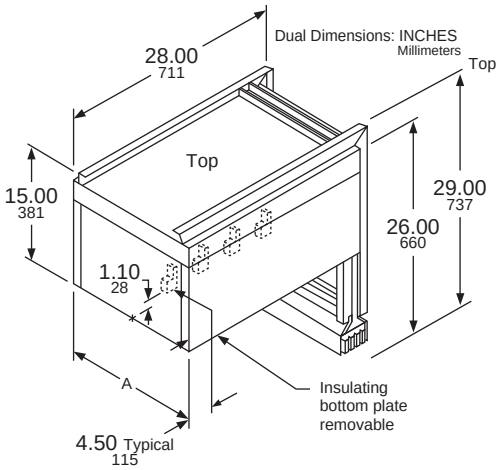
Catalog Number Suffix–71 SF



Catalog Number Suffix–79 LESFS15T64

Service Entrance devices may be ordered with an indoor type joint connection for those applications where the service head is outdoors and penetrates a wall such that the first joint is indoors. Service Entrance devices come standard with an outdoor type joint connection.

Service Head Vertical

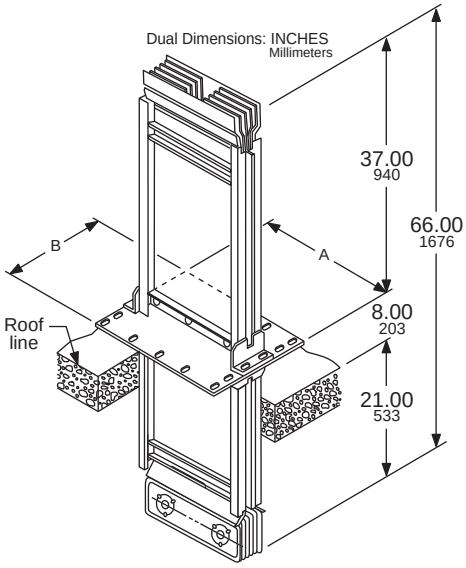


Catalog Number Suffix–29 SV

Ampere Rating	A	Lugs Per Phase and Neutral 2/0-500 kcmil	Ground Lugs #6-300 kcmil
800	Housing Width Plus 2.23 / 57	2	2
1000		3	3
1200		4	3
1350		4	3
1600		4	4
2000		5	5
2500		7	6
3000		8	7
4000		10	9
5000		13	11

Notes:
1. Vertical service heads must be braced or supported near top, to withstand weight of cables, ice, wind, etc.
2. Refer to NEC Article 230-24 for required clearance of service drops over roof overhang or the ground.

Straight Length With Flanged Collar

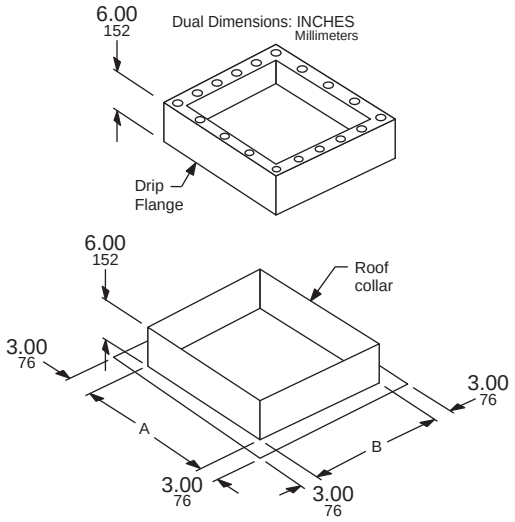


Catalog Number Suffix–66 FCS37

Ampere Rating		A		B★	
Aluminum	Copper	IN	mm	IN	mm
. . .	800	9.38	238	13.18	335
800	1000	9.38	238	13.18	335
. . .	1200	11.00	279	13.18	335
1000	1350	11.00	279	13.18	335
1200	. . .	12.00	305	13.18	335
1350	1600	13.00	330	13.18	335
1600	2000	15.88	403	19.18	487
2000	2500	17.88	454	19.18	487
2500	3000	21.88	556	19.18	487
3000	. . .	24.75	629	19.18	487
4000	4000	30.75	781	19.18	487
. . .	5000	30.75	781	19.18	487

★ 4-Pole dimensions. For 3-Pole dimensions subtract .25/6.

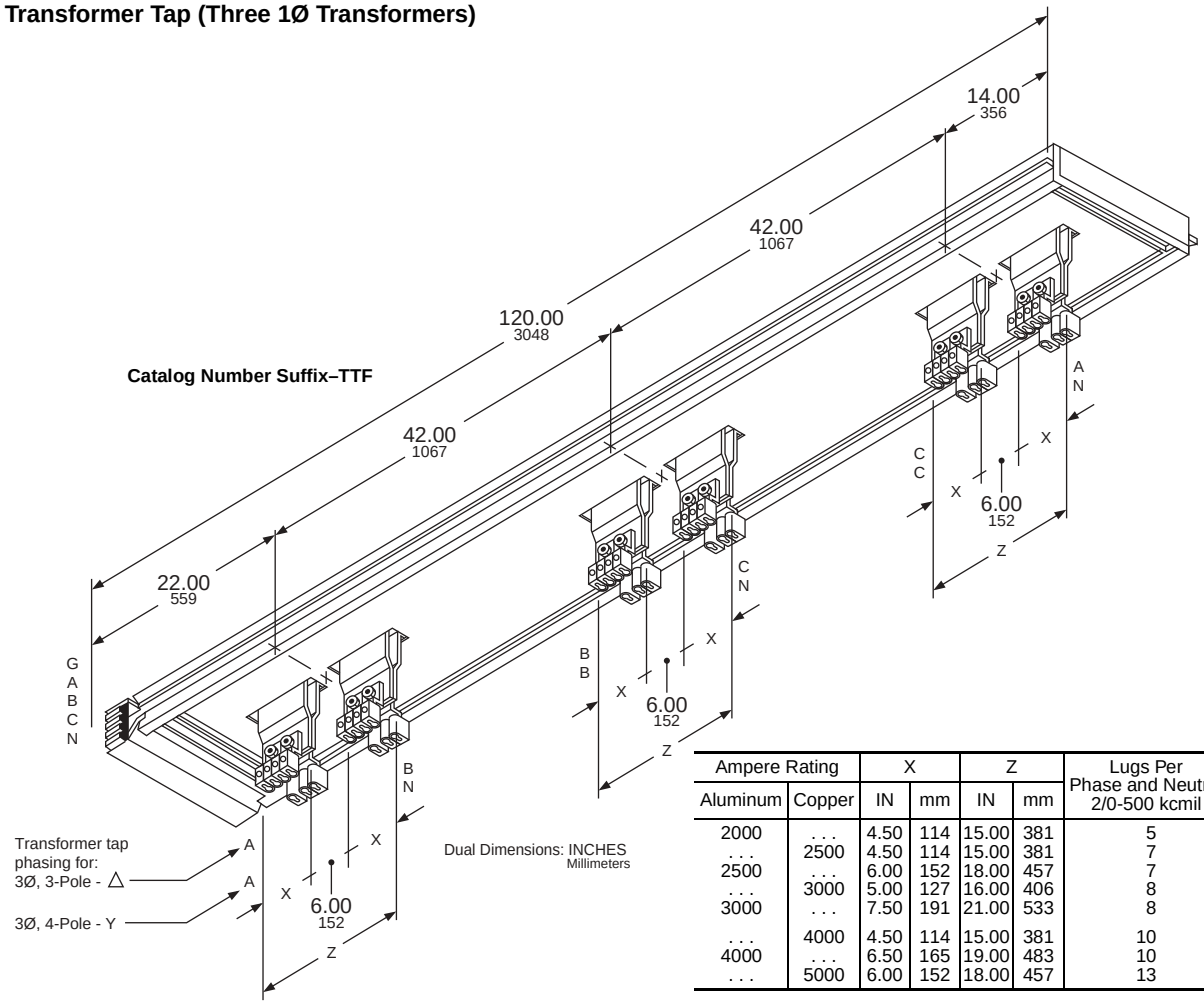
Roof Flange Kit



Ampere Ratings		Catalog Number
Aluminum	Copper	
. . .	800	ACF-38-RF
800	1000	ACF-38-RF
. . .	1200	ACF-53-RF
1000	1350	ACF-53-RF
1200	. . .	ACF-63-RF
1350	1600	ACF-67-RF
1600	2000	ACF-78-RF
2000	2500	ACF-13-RF
2500	3000	ACF-15-RF
3000	. . .	ACF-19-RF
4000	4000	ACF-24-RF
. . .	5000	ACF-24-RF

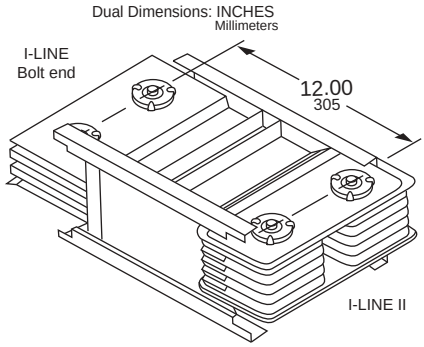
Note: Roof flange kit will accommodate roof slope up to one inch per foot. The roof flange kit consists of one drip flange and one roof collar and must be ordered separately from the straight length with flange collar (66FCS37). For "A" & "B" dimensions, refer to table above in section "straight length with flanged collar."

Transformer Tap (Three 1Ø Transformers)

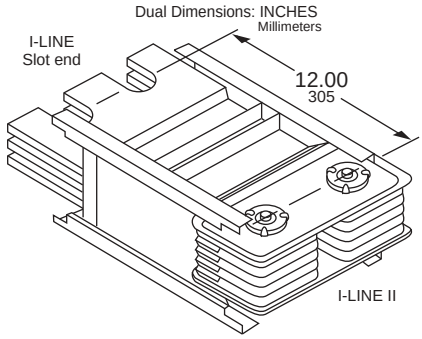


Ampere Rating		X		Z		Lugs Per Phase and Neutral 2/0-500 kcmil	Ground Lugs #6-300 kcmil
Aluminum	Copper	IN	mm	IN	mm		
2000	. . .	4.50	114	15.00	381	5	5
. . .	2500	4.50	114	15.00	381	7	6
2500	. . .	6.00	152	18.00	457	7	6
. . .	3000	5.00	127	16.00	406	8	7
3000	. . .	7.50	191	21.00	533	8	7
. . .	4000	4.50	114	15.00	381	10	9
4000	. . .	6.50	165	19.00	483	10	9
. . .	5000	6.00	152	18.00	457	13	11

Adapter (Indoor Only)



Catalog Number Suffix–12B



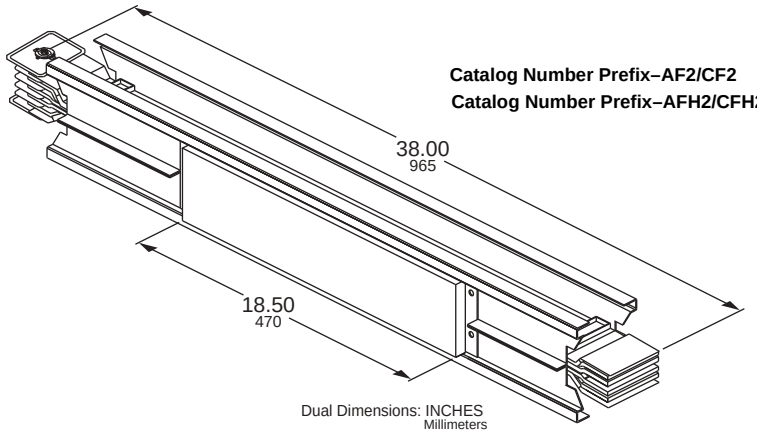
Catalog Number Suffix–12S

Note: Contact the factory if connecting to Series I I-LINE busway before ordering for coordination of joint and adapter details.

Phase Transition (Indoor Only)

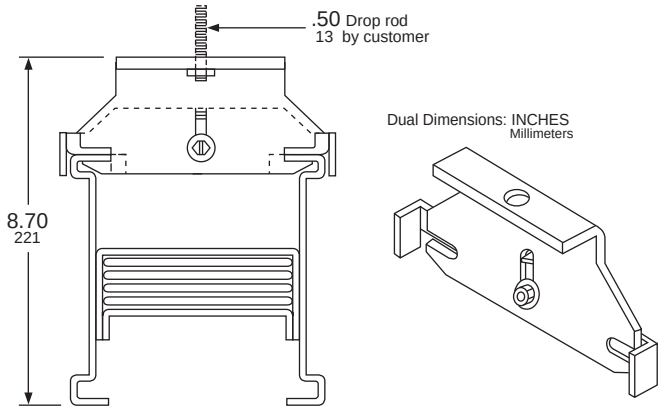
3-Pole	Catalog # Suffix
180˚ Transition	
A C B B C A	38 PT

4-Pole	Catalog # Suffix
180˚ Transition A N B C C B N A	38 PT
180˚ Neutral Transition A N B A C B N C	38 PTN
A and C Phase Transition A C B B C A N N	38 PTAC



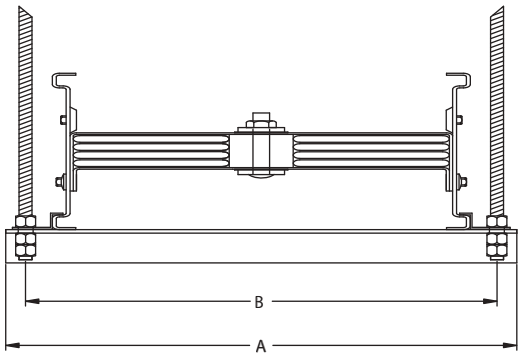
Catalog Number Prefix–AF2/CF2
Catalog Number Prefix–AFH2/CFH2

Hanger–Horizontal Flatwise

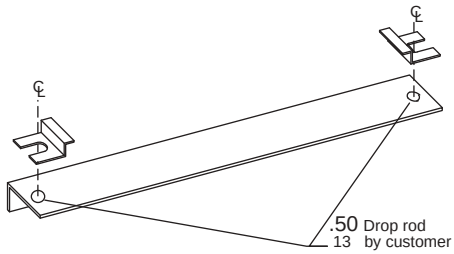


Ampere Rating		Catalog Number
Aluminum	Copper	
. . .	800	HF-38-F
800	1000	HF-43-F
1000	1200	HF-53-F
. . .	1350	HF-58-F
1200	. . .	HF-63-F
. . .	1600	HF-67-F
1350	. . .	HF-73-F
. . .	2000	HF-78-F
1600	. . .	HF-88-F

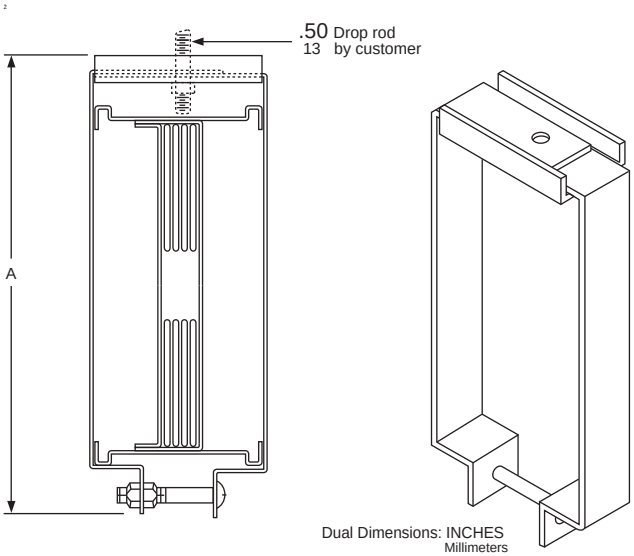
Hanger–Horizontal Flatwise



Ampere Rating		Catalog Number	A		B	
Aluminum	Copper		IN	mm	IN	mm
2000	2500	HF-13-F	16.22	412	14.72	374
. . .	3000	HF-15-F	18.72	475	17.22	437
2500	. . .	HF-16-F	19.72	501	18.22	463
3000	. . .	HF-19-F	22.22	564	20.72	526
. . .	4000	HF-24-F	27.10	688	25.60	650
. . .	5000	HF-25-F	28.60	726	27.10	688
4000	. . .	HF-26-F	29.10	739	27.60	701

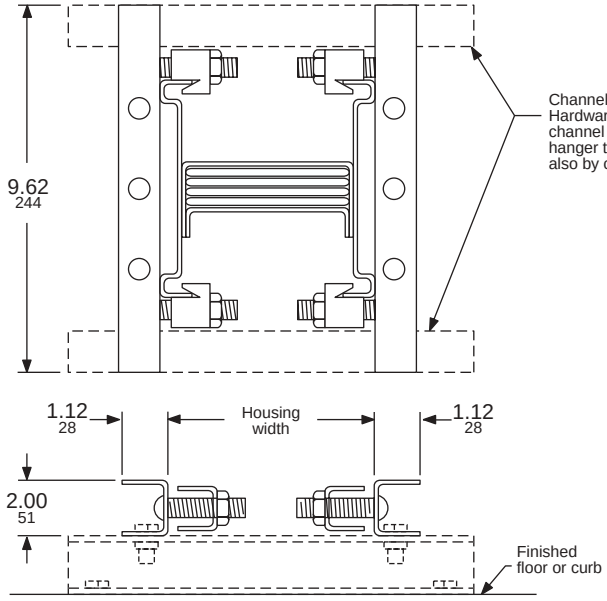


Hanger – Horizontal Edgewise

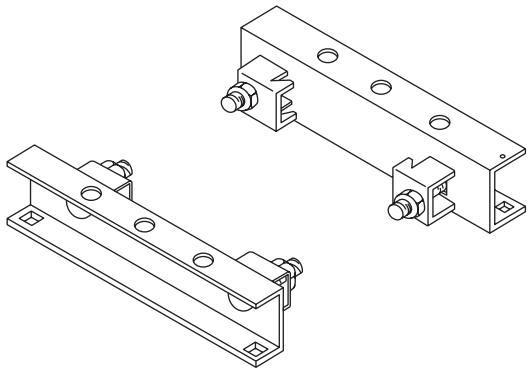


Ampere Rating		A		Catalog Number
Aluminum	Copper	IN	mm	
800	800	8.36	212	HF-43-E
. . .	1000	8.36	212	HF-43-E
1000	1200	9.86	250	HF-58-E
. . .	1350	9.86	250	HF-58-E
1200	1600	10.86	276	HF-67-E
1350	2000	11.86	301	HF-78-E
1600	. . .	13.86	339	HF-88-E
2000	2500	17.24	438	HF-13-E
. . .	3000	19.74	501	HF-15-E
2500	. . .	20.74	527	HF-16-E
3000	. . .	24.12	613	HF-19-E
. . .	4000	28.12	714	HF-24-E
4000	5000	29.62	752	HF-26-E

Hanger–Vertical Fixed



Hanger–Vertical Fixed

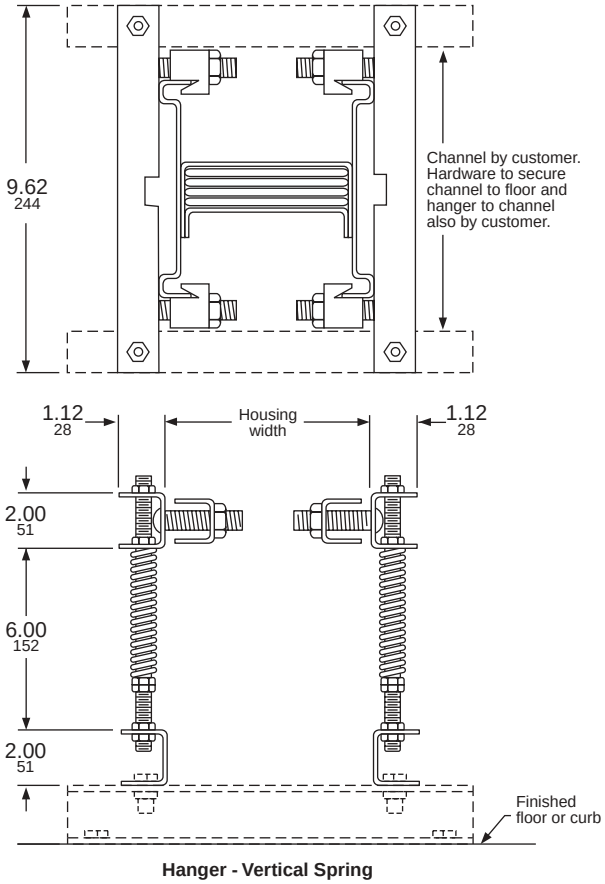


Catalog Number HF-V

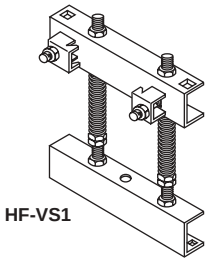
Note: Allow 13.25 inches (337 mm) above curb or floor to ℄ of joint for proper installation of tie channel cover.

Dual Dimensions: INCHES
Millimeters

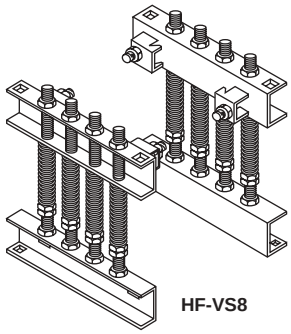
Hanger–Vertical Spring



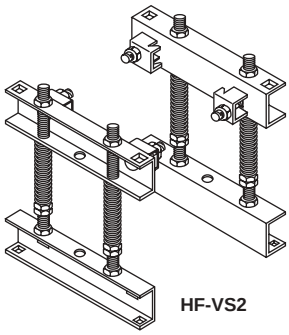
Hanger - Vertical Spring



HF-VS1



HF-VS8



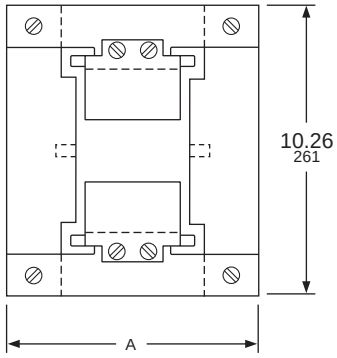
HF-VS2

Note: Allow 21 inches (533 mm) above cur to ℄ of joint for proper installation of tie channel cover.

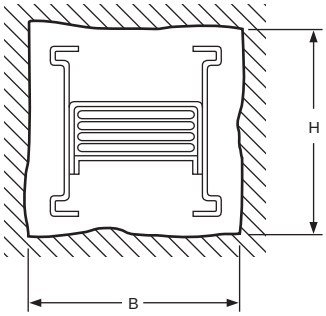
Dual Dimensions: INCHES
Millimeters

Ampere Rating		Catalog Number
Aluminum	Copper	
800	800	HF-VS1
1000	1000	HF-VS1
1200	1200	HF-VS1
1350	. . .	HF-VS1
1600	. . .	HF-VS1
. . .	1350	HF-VS2
. . .	1600	HF-VS2
2000	2000	HF-VS2
2500	. . .	HF-VS2
. . .	2500	HF-VS8
3000	3000	HF-VS8
4000	4000	HF-VS8
. . .	5000	HF-VS8

Wall and Floor Flange



Ampere Rating		A		Catalog Number
Aluminum	Copper	IN	mm	
. . .	800	8.32	211	ACF-38-WF
800	1000	8.82	224	ACF-43-WF
1000	1200	9.82	249	ACF-53-WF
. . .	1350	10.32	262	ACF-58-WF
1200	. . .	10.82	275	ACF-63-WF
. . .	1600	11.22	285	ACF-67-WF
1350	. . .	11.82	300	ACF-73-WF
. . .	2000	12.32	313	ACF-78-WF
1600	. . .	13.32	338	ACF-88-WF
2000	2500	17.20	437	ACF-13-WF
. . .	3000	19.70	500	ACF-15-WF
2500	. . .	20.70	526	ACF-17-WF
3000	. . .	23.20	589	ACF-19-WF
. . .	4000	28.08	713	ACF-24-WF
. . .	5000	29.58	751	ACF-25-WF
4000	. . .	30.08	764	ACF-26-WF

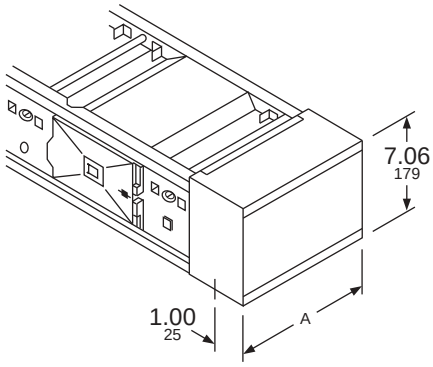


Dual Dimensions: INCHES
Millimeters

Ampere Rating		Indoor Str. Lnth.		Outdoor Str. Lnth.		Fl. End		Flatwise Elbow★							Edgewise Elbow★						
								H	Wall Thickness						B	Wall Thickness					
Aluminum	Copper	B	H	B	H	B	H		4	8	12	16	20	24		4	8	12	16	20	24
. . .	800	6	9	8	9	10	15	8	9	11	13	15	17	19	6	12	14	16	18	20	22
800	1000	6	9	9	9	10	15	8	10	12	14	16	18	20	6	12	14	16	18	20	22
1000	1200	7	9	10	9	11	15	8	12	14	16	18	20	22	7	12	14	16	18	20	22
. . .	1350	8	9	10	9	12	15	8	12	14	16	18	20	22	8	12	14	16	18	20	22
1200	. . .	8	9	11	9	13	15	8	13	15	17	19	21	23	8	12	14	16	18	20	22
1350	1600	9	9	12	9	14	15	8	14	16	18	20	22	24	9	12	14	16	18	20	22
. . .	2000	10	8	12	9	17	21	8	15	17	19	21	23	25	10	12	14	16	18	20	22
1600	. . .	11	9	13	9	17	21	8	17	19	21	23	25	27	11	12	14	16	18	20	22
2000	2500	15	9	17	9	19	21	8	22	24	26	28	30	32	15	12	14	16	18	20	22
. . .	3000	17	9	20	9	23	21	8	26	28	30	32	34	36	17	12	14	16	18	20	22
2500	. . .	18	9	21	9	23	21	8	27	29	31	33	35	37	18	12	14	16	18	20	22
3000	. . .	21	9	23	9	26	21	8	31	33	35	37	39	41	21	12	14	16	18	20	22
. . .	4000	26	9	28	9	32	21	8	37	39	41	43	45	47	26	12	14	16	18	20	22
. . .	5000	27	9	30	9	32	21	8	40	42	44	46	48	50	27	12	14	16	18	20	22
4000	. . .	28	9	30	9	32	21	8	40	42	44	46	48	50	28	12	14	16	18	20	22

★ Wall thickness is in inches. To convert to millimeters, multiply the thickness in inches by 25.4.

End Closure (Indoor Only)

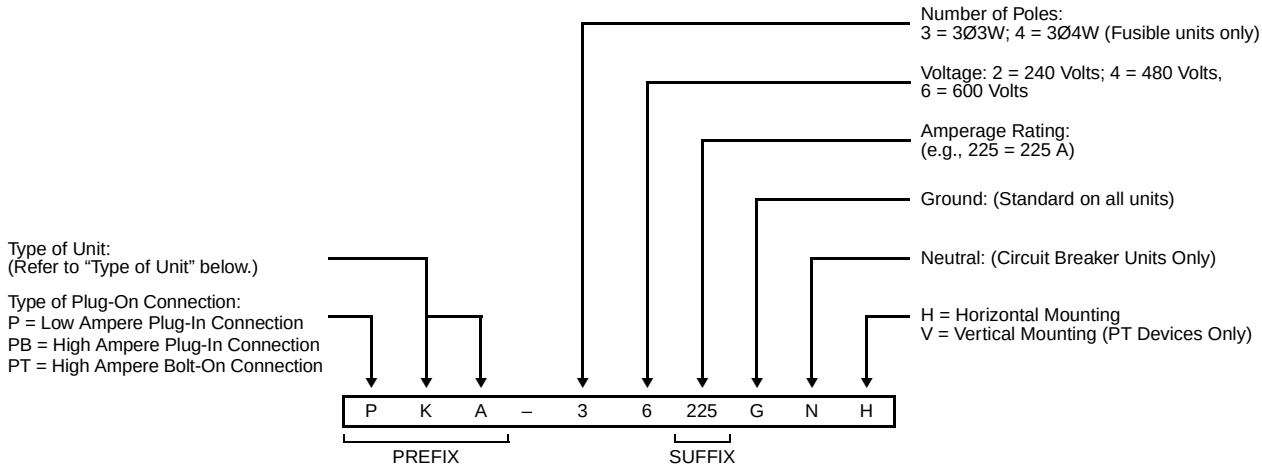


Dual Dimensions: INCHES
Millimeters

Ampere Rating		A		Catalog Number
Aluminum	Copper	IN	mm	
. . .	800	4.34	110	ACF-38-EC
800	1000	4.84	123	ACF-43-EC
1000	1200	5.84	148	ACF-53-EC
. . .	1350	6.34	161	ACF-58-EC
1200	. . .	6.84	174	ACF-63-EC
. . .	1600	7.24	184	ACF-67-EC
1350	. . .	7.84	199	ACF-73-EC
. . .	2000	8.34	212	ACF-78-EC
1600	. . .	9.34	237	ACF-88-EC
2000	2500	13.22	336	ACF-13-EC
. . .	3000	15.72	399	ACF-15-EC
2500	. . .	16.72	425	ACF-17-EC
3000	. . .	19.22	488	ACF-19-EC
. . .	4000	24.10	612	ACF-24-EC
. . .	5000	25.60	650	ACF-25-EC
4000	. . .	26.10	663	ACF-26-EC

Plug-In Catalog Numbering System

Catalog numbers are composed of two basic parts—the PREFIX, plus the SUFFIX. The PREFIX contains the general descriptive details of the plug-in unit, and outline on pages 60–71. The SUFFIX defines the exact device type.



Type of Unit

- Q–Fusible Unit; 1600 A Maximum
- S–Fusible Vertical Riser Unit; 200 A Only
- FA–FA Frame Circuit Breaker Unit; 100 A Maximum
- FC–FC Frame Circuit Breaker Unit; 100 A Maximum
- FH–FH Frame Circuit Breaker Unit; 100 A Maximum
- FI–FI Frame Circuit Breaker Unit; 100 A Maximum
- KA–KA Frame Circuit Breaker Unit; 250 A Maximum
- KC–KC Frame Circuit Breaker Unit; 250 A Maximum
- KH–FH Frame Circuit Breaker Unit; 250 A Maximum
- KI–KI Frame Circuit Breaker Unit; 250 A Maximum
- LA–LA Frame Circuit Breaker Unit; 400 A Maximum
- LC–LC Frame Circuit Breaker Unit; 600 A Maximum
- LH–LH Frame Circuit Breaker Unit; 400 A Maximum
- LI–FI Frame Circuit Breaker Unit; 600 A Maximum
- MA–MA Frame Circuit Breaker Unit; 1000 A Maximum
- MH–MH Frame Circuit Breaker Unit; 1000 A Maximum
- MX–MX Frame Circuit Breaker Unit; 800 A Maximum
- PA–PA Frame Circuit Breaker Unit; 1600 A Maximum
- PH–PH Frame Circuit Breaker Unit; 1600 A Maximum
- PX–PX Frame Circuit Breaker Unit; 1600 A Maximum

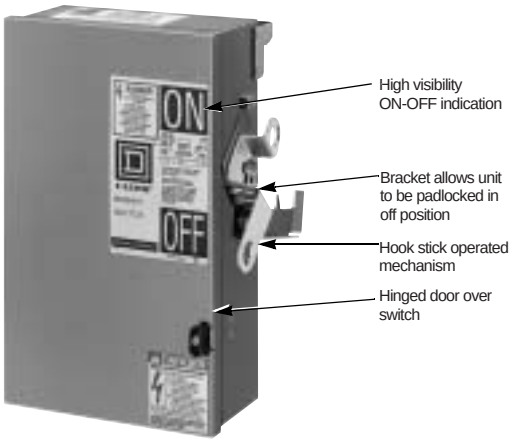
Note: Special purpose plug-in devices are not defined by this catalog numbering system. Consult the factory for cataloging details of these devices.

Compatibility

All plug-in units listed in this catalog may be used on original I-LINE as well as I-LINE II busway. There is no need to stock two different types of units.

Fusible

Plug-in switches that are 30, 60, 100, 200, 400 and 600 A contain a heavy duty safety switch mechanism. Switches that are 800 A–1600 A contain a circuit breaker and fuses.



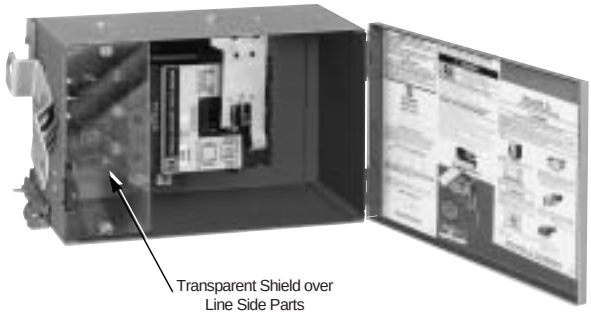
Circuit Breakers

Molded case circuit breaker plug-in devices are available in frame sizes of 100 A (FA)–1600 A (PA) with standard, high-interrupting, current-limiting and solid-state trip circuit breakers.

The operating handle gives visual tripped indication on all devices, as well as floor operable reset on all devices.

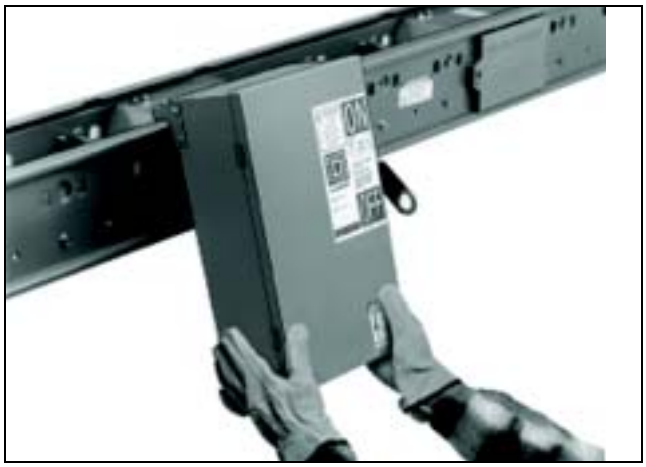
The FA frame circuit breaker unit is a high-interrupting capacity breaker that would fit into the same enclosure as the standard molded case breaker pictured below. Mounting and the interlock are identical to the fusible unit above.

The short circuit ratings for circuit breaker devices are listed on page 61.



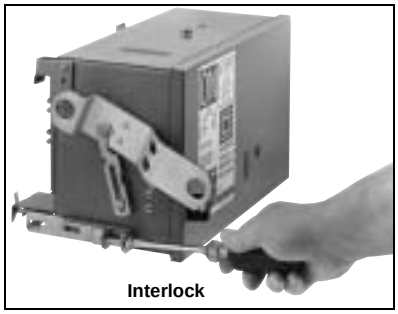
Plug-In Device Mounting

Plug-in units are positioned along the busway length by notches in the busway housing top that accept the mounting hooks of the plug-in unit. This aligns the plug-in unit connectors with the plug-in opening. After the unit is positioned on the busway it is allowed to swing down into the plug-in opening where the connectors make contact with the bus bars. This is accomplished in a “hook-swing” sequence of motions.



Interlock

Plug-in devices that are 30 A–250 A are interlocked with the busway housing to prevent installation or removal of the unit when the disconnect is turned ON. All devices incorporate an interlock to prevent the door over the disconnect from being opened when the unit is ON. This door interlock can be defeated from outside the unit.



Interlock

Grounding Spring

Grounding

All plug-in units come with standard grounding means. A grounding spring cuts through the busway paint and forms an electrical ground continuity. An equipment ground is established, before the phase jaws make contact with the bus bars by means of a grounding stab that makes contact with two ground jaws on the busway. A ground lug on the inside of the plug-in unit is provided for the purpose of attaching a ground wire.

Special Purpose Plug-In Devices

- Combination motor starter from NEMA Size 0–Size 2. Fusible or circuit breaker primary disconnect.
- Lighting contactor. 30 A, 60 A, 100 A. Fusible disconnect.
- Magnetic contactor. NEMA Size 0–Size 2. Fusible or circuit breaker primary disconnect.
- Ground detector and neutralizer. Used to provide means for indicating grounds on an ungrounded 3-phase system and to create a discharge path for static electricity. Consult the factory for dimensional details.
- Capacitor banks. 2.5 kVAR–30 kVAR auxiliary devices. Mount directly on busway prewired for use with separate fusible or circuit breaker disconnect. Consult the factory for dimensional details.
- Single-phase transformer plug-in devices from 1 kVA–10 kVA auxiliary devices. Mount directly on busway prewired for use with separate fusible or circuit breaker disconnect. Consult the factory for dimensional details.

Horsepower Ratings

UL Horse Power Ratings		Motor–3-Phase Horsepower Ratings	
	Plug-In Unit Ampere Rating	Fusible Switch	
		Standard	Maximum
240 Vac	30	3	7.5
	60	7.5	15
	100	15	30
	200	25	60
	400	. . .	. . .
	600	. . .	. . .
480 Vac	30	5	15
	60	15	30
	100	25	30
	200	50	125
	400	. . .	. . .
	600	. . .	. . .
600 Vac	30	7.5	20
	60	15	50
	100	30	60
	200	60	150
	400	125	350
	600	250	500

Type PQ Fusible Switch
Low Ampere Plug-In Connection

Type PBLA Circuit Breaker
High Ampere Plug-In Connection

Type PTMA Circuit Breaker
High Ampere Bolt-on Connection

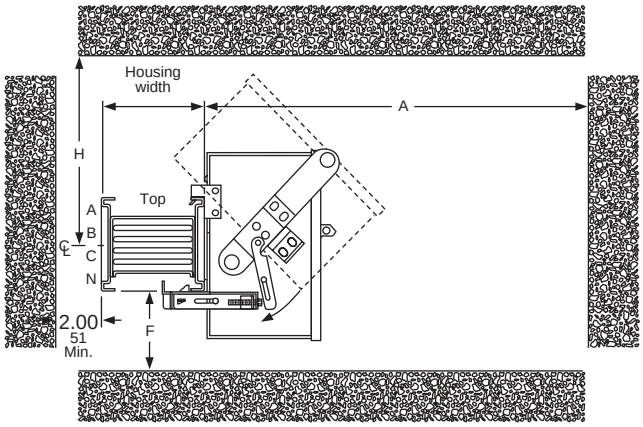
Interrupting Capacity of Fusible Switch Plug-In Units

Catalog Number Prefix	Current Rating	Fuse Class (Includes 240 V, 480 V, and 600 V)		
		K or H	J	R
PQ	30	10000	200000	200000
PQ	60	10000	200000	200000
PQ	100	10000	200000	200000
PQ & PS	200	10000	200000	200000
PBQ	400	10000	100000	100000
PBQA	400	. . .	100000	100000
PBQ	600	10000	100000	100000

Interrupting Capacity of Circuit Breaker Plug-In Units

Catalog Number Prefix	Trip Range (Amperes)	Interrupting Rating – RMS Symmetrical Amperes		
		240 Vac	480 Vac	600 Vac
With Molded Case Circuit Breakers—Standard Interrupting Capacity				
PFA	15-100	10000	18000	14000
PKA	125-250	42000	25000	22000
PBLA	250-400	42000	30000	22000
PTMA	500-1000	42000	30000	22000
PTPA	1200-1600	65000	50000	42000
With Molded Case Circuit Breakers— High Interrupting Capacity and Solid State Trip				
PFH	15-100	65000	25000	18000
PKH	125-250	65000	35000	25000
PBLH	250-400	65000	35000	25000
PTME, PTMH	500-1000	65000	65000	25000
PTPE, PTPH	1200-1600	125000	100000	65000
With Molded Case Circuit Breaker—Extra High Interrupting Capacity				
PFC	15-100	100000	65000	. . .
PKC	125-250	100000	65000	. . .
PBLC	300-600	100000	65000	35000
With Molded Case I-LIMITER® Current Limiting Circuit Breakers				
PFI	15-100	100000	100000	. . .
PKI	125-250	100000	100000	. . .
PBLI	300-600	200000	200000	100000
With Electronic Trip Circuit Breakers				
PBLX	100-600	100000	65000	35000
PTMX	450-800	65000	65000	25000
PTPX	600-2500	125000	100000	65000

Required Clearances for Plug-In Unit Mounting (Check These Dimensions Carefully Before Installing Busway Lengths)



NOTE: For required working clearances, consult the National Electrical Code/Canadian Electrical Code.

Fusible Switch		A		F		H	
Cat. No. Prefix	Ampere Rating	IN	mm	IN	mm	IN	mm
PQ	30	15.22	387	7.98	203	8.00	203
	60	15.22	387	7.98	203	8.00	203
	100	15.22	387	11.98	304	8.00	203
	200	27.50	699	15.00	381	15.00	381
PS	200	27.50	699	9.00	229	12.00	305
PBQ	400	60.00	1524	7.25	184	18.00	457
	600	60.00	1524	7.25	184	18.00	457
PTQ	800	53.90	1369	8.75	222	9.50	241
	1000	53.90	1369	8.75	222	9.50	241
	1200	57.00	1448	10.25	260	13.75	349
	1600	57.00	1448	10.25	260	13.75	349

Circuit Breaker		A		F		H	
Cat. No. Prefix	Ampere Rating	IN	mm	IN	mm	IN	mm
PFA, PFH	15-100	20.87	530	2.12	54	10.00	254
PFC, PFI	15-100	25.63	651	2.38	60	11.00	279
PKA, PKH	125-250	25.63	651	2.38	60	11.00	279
PKC, PKI	125-250	25.63	651	2.38	60	11.00	279
PBLA, PBLH	250-400	35.69	906	5.62	142	15.00	381
PBLX, PBLC, PBLI	300-600	35.00	889	8.00	203	20.00	508
PTMX, PTME, PTMA, PTMH	500-1000	35.20	894	6.25	159	7.75	197
PTPX, PTPE, PTPA, PTPH	1000-1600	57.00	1448	10.25	260	13.75	349

Vertical Mounting

Fusible Units

Fusible switch plug-in units (30 A–100 A) mount on either side of the vertical busway and comply with NEC Article 380-6 and CEC Article 14-502 concerning gravity tending to close a switch blade. With unit mounted on one side of the busway, the operating handle is on top and when mounted on the opposite side; the handle is on the bottom. The 200 A fusible unit (“PS”) mounts only on the front of the busway. (“TOP” sticker on the busway is on the right). The operating handle is on the right side of the mounted unit.

The 400 A–1600 A fusible units mount only on the front of the busway. The handle is on the cover.

IMPORTANT: Orientation of the busway is essential for proper mounting of plug-in units. The busway must be positioned so that the top marking is to the right and the neutral position is to the left.

Circuit Breaker Units

Circuit breaker plug-in units may be installed on both sides of a riser. The restriction is that when the handle of the plug-in unit is operated vertically rather than rotationally or horizontally, the up position of the handle shall be the ON position.

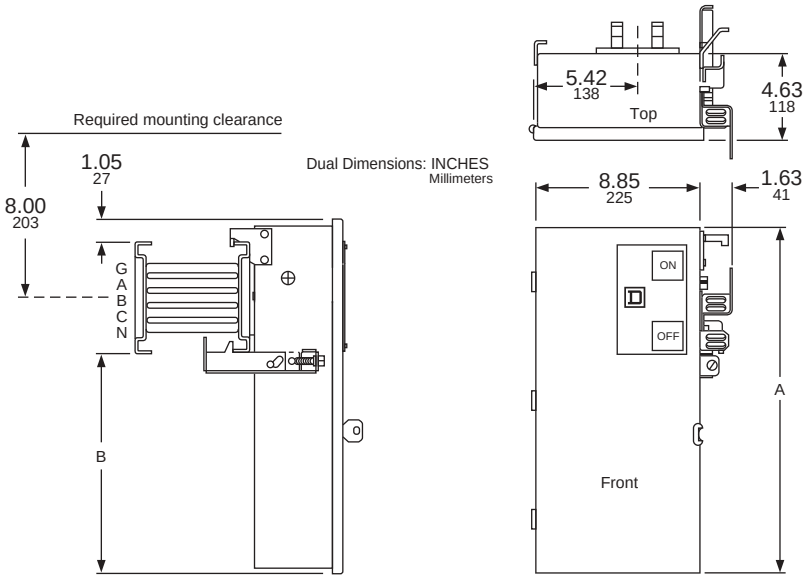
Fusible Switch Lighting Contactor		A		F		H	
Cat. No. Prefix	Contactor and Switch Rating	IN	mm	IN	mm	IN	mm
PSL	30 A†	29.58	751	3.38	86	10.00	254
	30★ – 60 – 100 A	33.42	849	9.38	238	12.00	305

★ 30 A unit with mechanically held contactor.
† 30 A unit with electrically held contactor.

Fusible Switch Starter and Contactor			A		F		H	
Cat. No. Prefix	Starter or Contactor Size	Switch Rating	IN	mm	IN	mm	IN	mm
PSS, PSC	0 – 1	30-60 A	27.40	696	2.13	54	10.00	254
	2	60 A	29.58	751	3.38	86	10.00	254
	2	100 A	33.42	849	9.38	238	12.00	305

Circuit Breaker Starter and Contactor			A		F		H	
Cat. No. Prefix	Starter or Contactor Size	Switch Rating	IN	mm	IN	mm	IN	mm
PBS, PBC	0, 1, 2	15-90 A	27.86	708	3.75	95	10.00	254

Fusible Switch Plug-In Units—30 A–100 A (Type “PQ”)

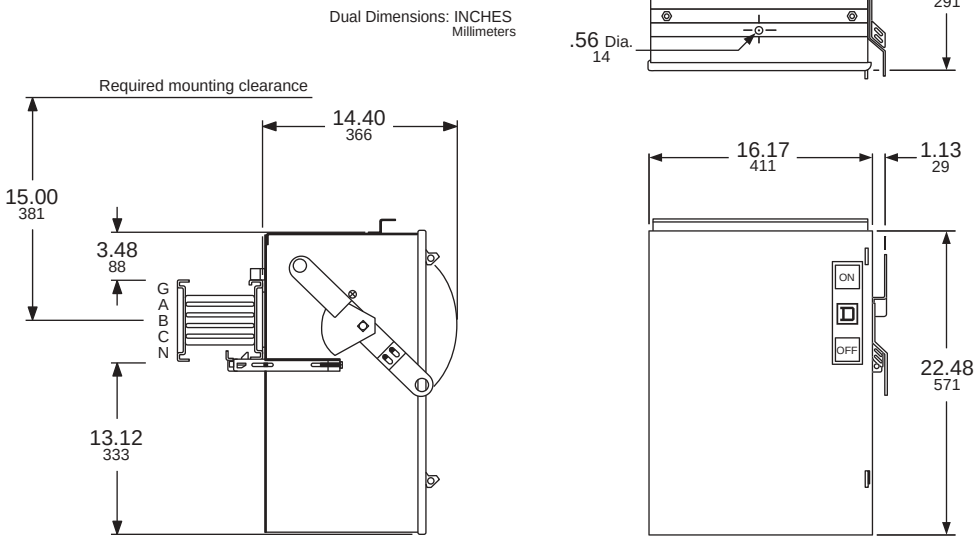


Fusible Switch		Weight		Lugs Per Phase		Lugs Per Neutral		Ground Lugs		A		B	
Cat. No. Prefix	Ampere Rating	Lb	Kg	Qty.	Size	Qty.	Size	Qty.	Size	IN	mm	IN	mm
PQ	30	15.0	33.0	1	#12 – #2	1	#12 – #1/0	1	#10 – #2	14.95	379	7.98	203
	60	15.0	33.0	1	#12 – #2	1	#12 – #1/0	1	#10 – #2	14.95	379	7.98	203
	100	17.0	37.5	1	#12 – #1/0	1	#12 – #1/0	1	#10 – #2	18.97	480	11.98	304

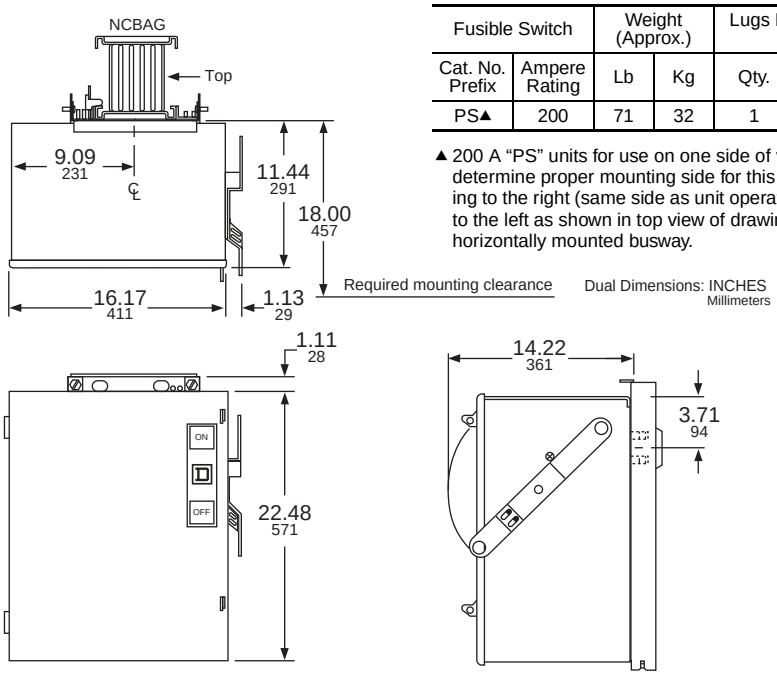
Fusible Switch Plug-In Unit–200 A (Type “PQ”)

Fusible Switch		Weight (Approx.)		Lugs Per Phase and Neutral		Ground Lugs	
Cat. No. Prefix	Ampere Rating	Lb	Kg	Qty.	Size	Qty.	Size
PQ▲	200	71	32	1	#6-300 kcmil	1	#10-2/0

▲ 200 A “PQ” units are for use primarily on horizontally mounted busway. Refer to “PS” units for use primarily on vertically mounted busway.



Fusible Switch Plug–In Unit 200 A (Type “PS”)



Fusible Switch		Weight (Approx.)		Lugs Per Phase and Neutral		Ground Lugs	
Cat. No. Prefix	Ampere Rating	Lb	Kg	Qty.	Size	Qty.	Size
PS▲	200	71	32	1	#6-300 kcmil	1	#10-2/0

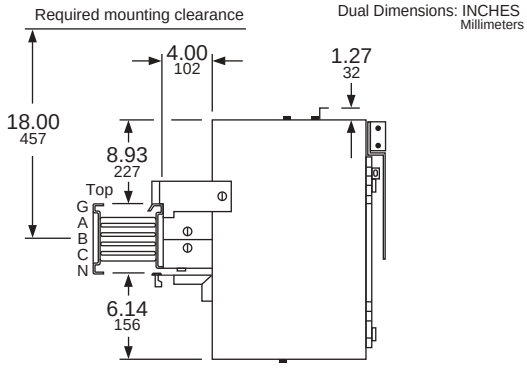
▲ 200 A “PS” units for use on one side of vertically mounted busway only. To determine proper mounting side for this unit, position busway “TOP” marking to the right (same side as unit operating handle) and the neutral bus bar to the left as shown in top view of drawing. Refer to “PQ” units for use on horizontally mounted busway.

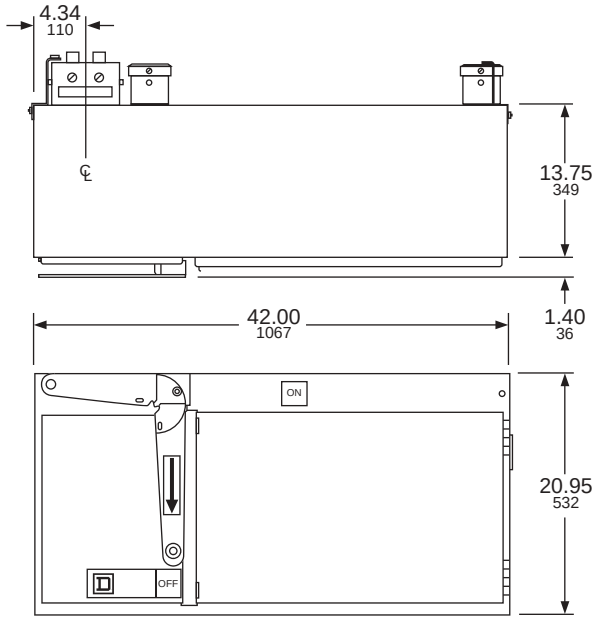
Fusible Switch Plug–In Unit 400 A (Type “PBQ”)

Fusible Switch		Weight (Approx.)		Lugs Per Phase and Neutral		Ground Lugs	
Cat. No. Prefix	Ampere Rating	Lb	Kg	Qty.	Size	Qty.	Size
PBQ♦	400	195	89	2	#4-600 kcmil	1	#3/0-600 kcmil

♦ 400 A “PBQ” unit plugs into one opening, but requires space equal to two plug-in openings.

Note: For vertical riser applications for I-LINE II busway, order auxiliary kit catalog number PBQ-4060-RMK. This kit is not suitable for installation on I-LINE busway from 225 A–600 A in a vertical riser mounting.



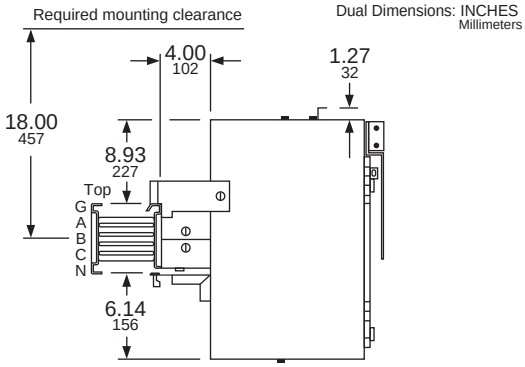


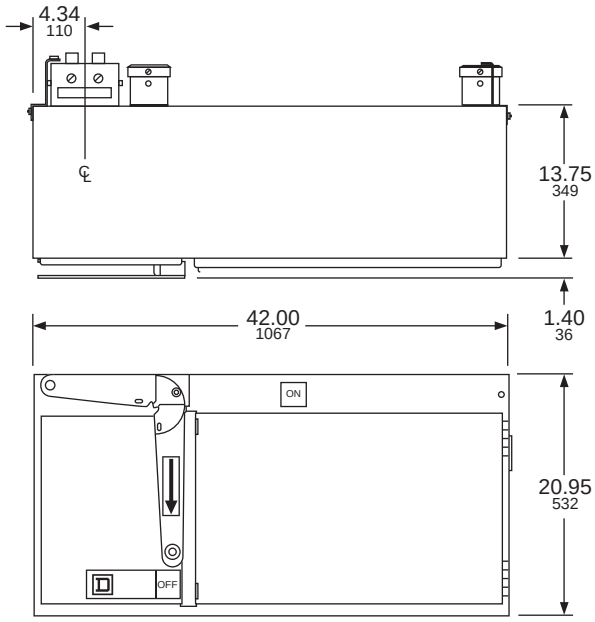
Fusible Switch Plug-In Unit— 600 A (Type “PBQ”)

Fusible Switch		Weight (Approx.)		Lugs Per Phase and Neutral		Ground Lugs	
Cat. No. Prefix	Ampere Rating	Lb	Kg	Qty.	Size	Qty.	Size
PBQ♦	600	195	89	2	#4-600 kcmil	1	#3/0-600 kcmil

♦ 600 A “PBQ” unit plugs into one opening but requires space equal to two plug-in openings.

Note: For vertical riser applications for I-LINE II busway, order auxiliary kit catalog number PBQ-4060-RMK. This kit is not suitable for installation on I-LINE busway from 225 A–600 A in a vertical riser mounting.



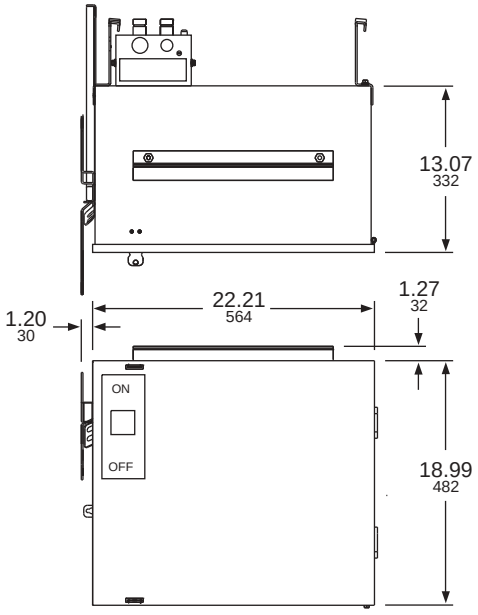


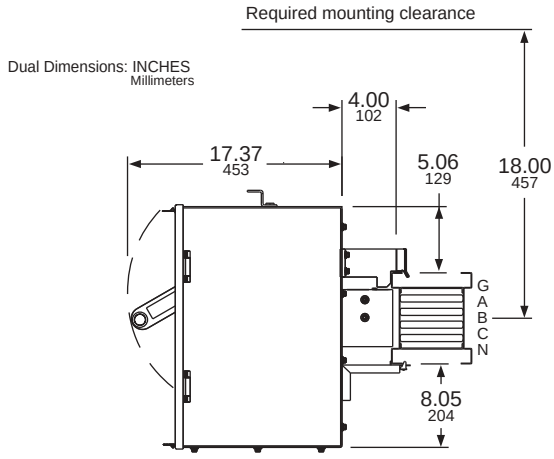
Fusible Switch Plug-In Unit— 400 A (Type “PBQA”)

Fusible Switch		Weight (Approx.)		Lugs Per Phase and Neutral		Ground Lugs	
Cat. No. Prefix	Ampere Rating	Lb	Kg	Qty.	Size	Qty.	Size
PBQA★	400	118	53.5	1	500 kcmil	1	1/0

★ Contains Class R fuse kits installed at factory.

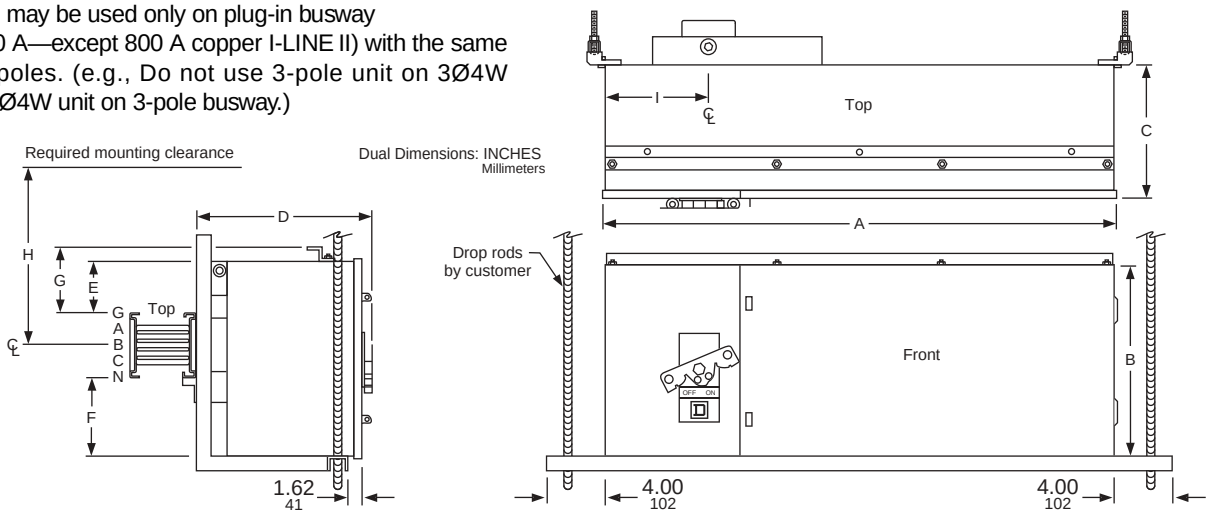
Note: Lugs are compression type.





Fusible Switch Bolt-On Units — 800 A–1600 A (Type "PTQ")

Bolt-on units may be used only on plug-in busway (800 A–4000 A—except 800 A copper I-LINE II) with the same number of poles. (e.g., Do not use 3-pole unit on 3Ø4W busway, or 3Ø4W unit on 3-pole busway.)



Fusible Switch		A		B		C		D		E		F		G		H		I	
Cat. No. Prefix	Ampere Rating	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm
PTQ	800	49.75	1264	18.62	473	12.40	315	16.50	416	4.75	121	7.75	197	6.03	153	9.50	241	5.75	146
	1000	49.75	1264	18.62	473	12.40	315	16.50	416	4.75	121	7.75	197	6.03	153	9.50	241	5.75	146
	1200	56.25	1429	24.25	616	16.00	406	20.10	510	9.00	229	9.25	235	10.28	261	13.75	349	9.00	229
	1600	56.25	1429	24.25	616	16.00	406	20.10	510	9.00	229	9.25	235	10.28	261	13.75	349	9.00	229

Fusible Switch		Weight		Lugs Per Phase and Neutral		Ground Lugs	
Cat. No. Prefix	Ampere Rating	Lb	Kg	Qty.	Size	Qty.	Size
PTQ†	800	230.00	103	3	2/0 – 500 kcmil	2	2/0 – 500 kcmil
	1000	230.00	103	3		2	
	1200	350.00	159	6		2	
	1600	350.00	159	6		3	

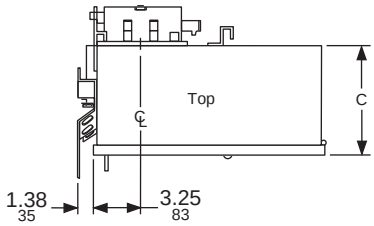
† "PTQ" units plug into one opening, but require space equal to three plug-in openings (See dimension A).

Note: This unit requires a special hanger that is mounting orientation specific. Add "H" on the end of the catalog number for units that will be mounted horizontally, and "V" for units that will be mounted vertically. These mounting frames are NOT interchangeable.

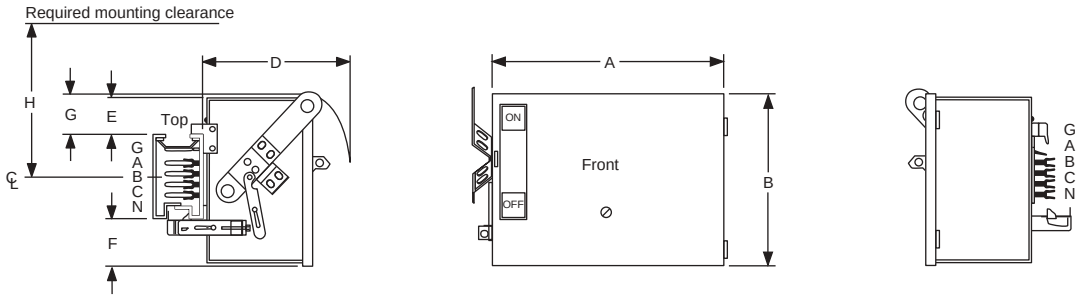
Circuit Breaker Plug-In Units—15 A–250 A

Circuit Breaker		A		B		C		D		E		F		G		H	
Cat. No. Prefix	Trip Range (Amperes)	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm
PFA, PFH	15-100 A	13.00	330	8.25	210	6.62	168	8.62	219	1.12	28	1.12	28	2.00	51	10.00	254
PKA*, PKC, PKH*	125-250 A	16.38	416	8.50	216	8.00	203	9.12	232	1.00	25	1.38	35	2.00	51	11.00	279
PFC	15-100 A	16.38	416	8.50	216	8.00	203	9.12	232	1.00	25	1.38	35	2.00	51	11.00	279

Circuit Breaker		Weight		Lugs Per Phase and Neutral		Ground Lugs	
Cat. No. Prefix	Trip Range (Amperes)	Lb	Kg	Qty.	Size	Qty.	Size
PFA, PFH	15-30 A	28.0	13	1	#14 – 4	1	#10 – #2
PFA, PFH	35-100 A	28.0	13	1	#14 – 1/0	1	#10 – #2
PKA, PKH	125-250 A	39.0	18	1	#4 – 300 kcmil	1	#6 – 2/0
PFC	15-30 A	53.0		1	#14 – 10	1	#10 – 2
PFC	35-100 A	53.0		1	#14 – 3	1	#10 – 2



Dual Dimensions: INCHES
Millimeters

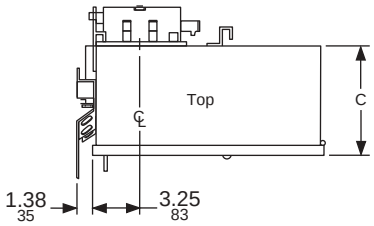


*** Reverse Feeding of Circuit Breaker Plug-In Units**
Circuit breaker plug-in units are capable of reverse feeding a run of plug-in busway. To convert standard plug-in units for this application in the field, order a label kit (Cat # RFLK). For further assistance, contact factory for ordering information.

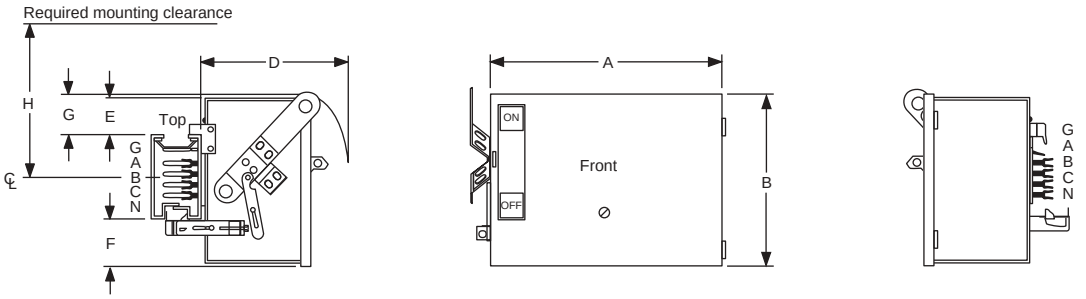
I-LIMITER® Current-Limiting Circuit Breaker Plug-In Units—15 A–250 A

Circuit Breaker		A		B		C		D		E		F		G		H	
Cat. No. Prefix	Trip Range (Amperes)	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm
PFI	15-100 A	16.38	416	8.50	216	8.00	203	9.12	232	1.00	25	1.38	35	2.00	51	11.00	279
PKI	125-250 A	16.38	416	8.50	216	8.00	203	9.12	232	1.00	25	1.38	35	2.00	51	11.00	279

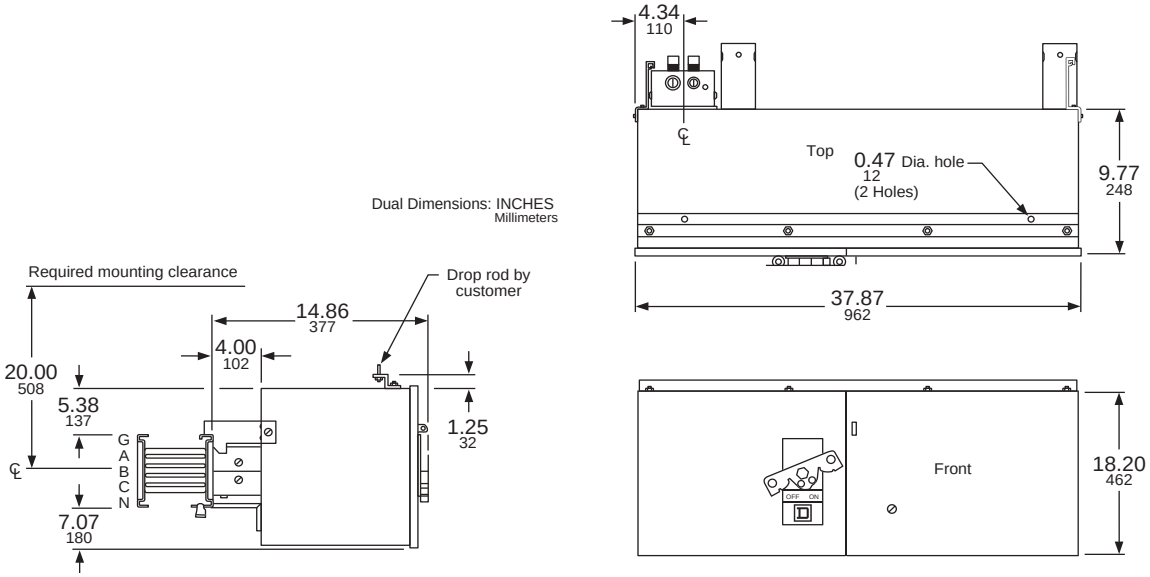
Circuit Breaker		Weight (Approx.)		Lugs Per Phase and Neutral		Ground Lugs	
Cat. No. Prefix	Trip Range (Amperes)	Lb	Kg	Qty.	Size	Qty.	Size
PFI	15-30 A	32.0	15	1	#14 – 4	1	#6 – 1/0
PFI	35-100 A	32.0	15	1	#14 – 1/0	1	#6 – 1/0
PKI	125-250 A	53.0	24	1	#6 – 300 kcmil	1	#10 – #2



Dual Dimensions: INCHES
Millimeters



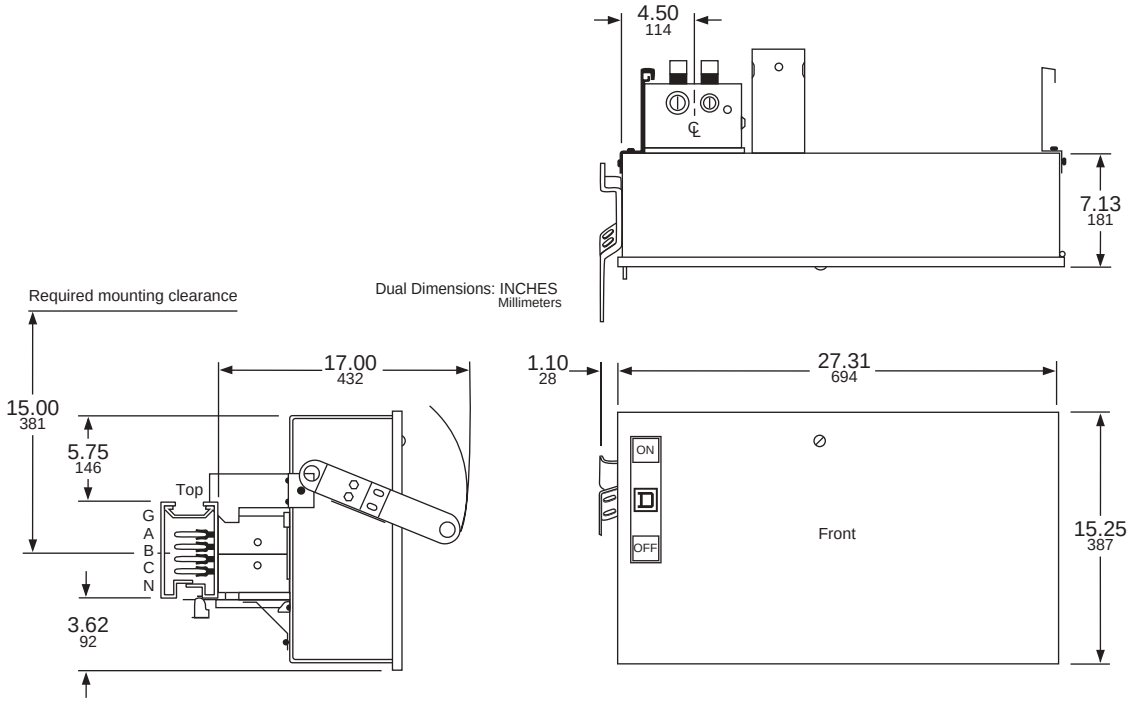
I-LIMITER® Current-Limiting Circuit Breaker Plug-In Units—300 A–600 A



Circuit Breaker		Weight (Approx.)		Lugs Per Phase		Ground Lugs		Lugs On Neutral	
Cat. No. Prefix	Triple Range (Amperes)	Lb	Kg	Qty.	Size	Qty.	Size	Qty.	Size
PBLI▲	300-600	127.0	58	2	#4 – 300 kcmil	1	#6 – 300 kcmil	3	3/0 – 500 kcmil

▲ "PBLI"units plug into one opening, but require space equal to two plug-in openings.

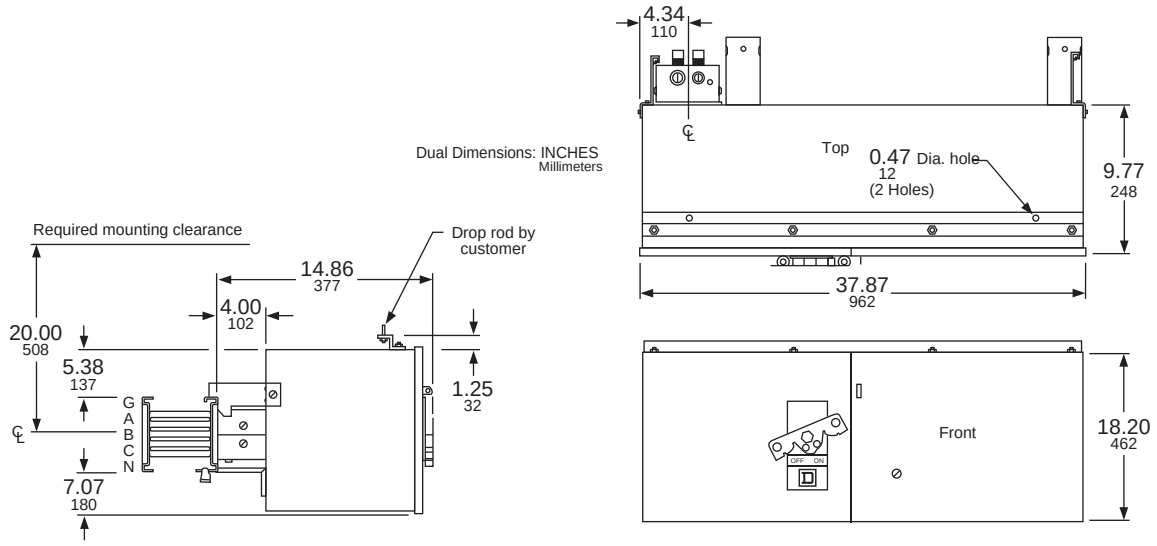
Circuit Breaker Plug-In Units—250 A–400 A



Circuit Breaker		Weight (Approx.)		Lugs Per Phase and Neutral		Ground Lugs	
Cat. No. Prefix	Triple Range (Amperes)	Lb	Kg	Qty.	Size	Qty.	Size
PBLA, PBLH	250-400	78	35	1	#1 – 600 kcmil	1	#6 – 300 kcmil

"PBLA" and "PBLH" units plug into one opening, but require space equal to two plug-in openings.

Circuit Breaker Plug-In Units—300 A–600 A

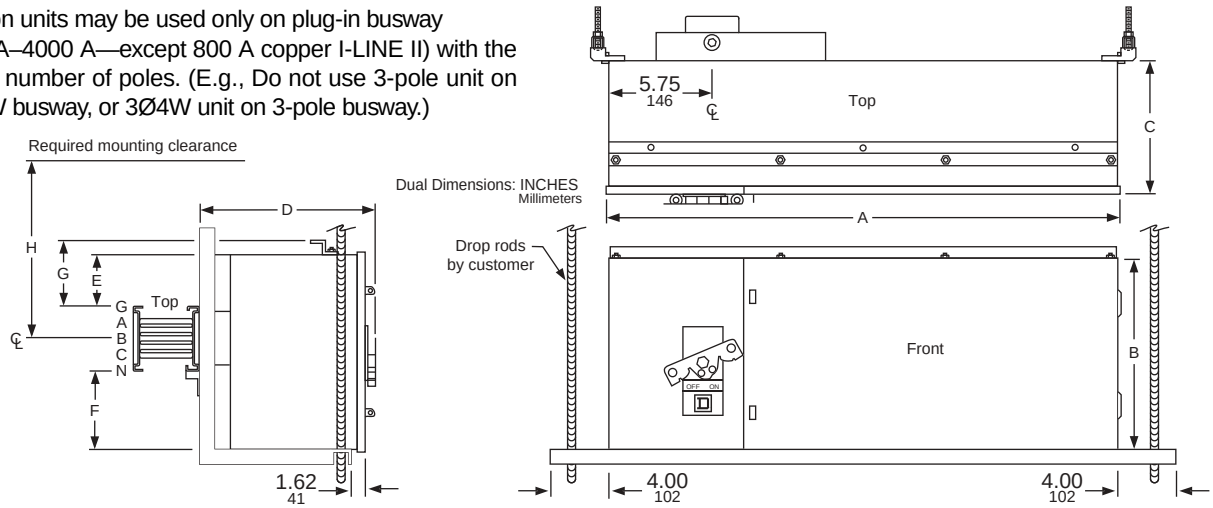


Circuit Breaker		Weight (Approx.)		Lugs Per Phase		Ground Lugs		Lugs On Neutral	
Cat. No. Prefix	Triple Range (Amperes)	Lb	Kg	Qty.	Size	Qty.	Size	Qty.	Size
PBLC▲	300-600	127.0	58	2	4/0 – 500 kcmil	1	#6 – 300 kcmil	2	2/0 – 500 kcmil

▲ "PBLC" units plug into one opening but require space equal to two plug-in openings.

Circuit Breaker Bolt-On Units—500 A–1600 A

Note: Bolt-on units may be used only on plug-in busway (800 A–4000 A—except 800 A copper I-LINE II) with the same number of poles. (E.g., Do not use 3-pole unit on 3Ø4W busway, or 3Ø4W unit on 3-pole busway.)



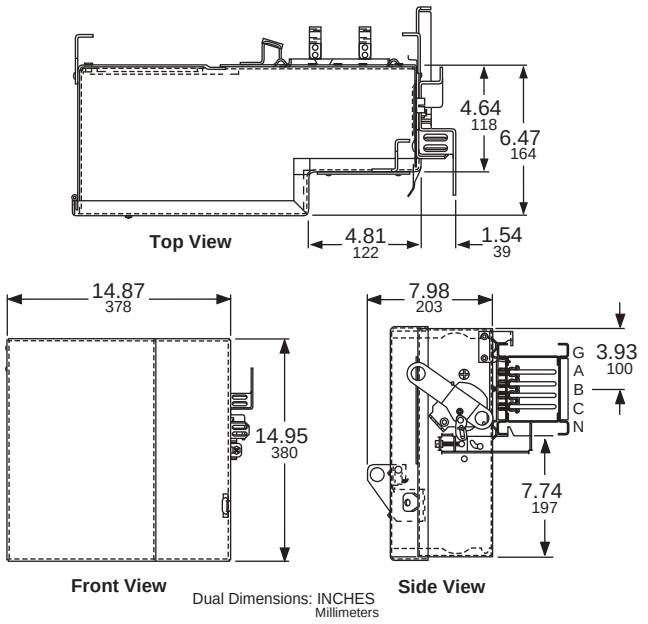
Circuit Breaker		A		B		C		D		E		F		G		H	
Cat. No. Prefix	Trip Range (Amperes)	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm
PTMA†, PTMH	500-1000	31.62	803	14.12	359	12.50	318	16.60	422	2.75	70	5.25	133	4.25	390	7.75	197
PTMX	500-800	31.62	803	14.12	359	12.50	318	16.60	422	2.75	70	5.25	133	4.25	390	7.75	197
PTPA†, PTPH, PTPX	1000-1600	56.75	1441	24.25	656	16.00	406	20.10	510	9.00	229	9.25	235	10.50	648	13.75	349

Circuit Breaker		Weight (Approx.)		Lugs Per Phase and Neutral		Ground Lugs	
Cat. No. Prefix	Triple Range (Amperes)	Lb	Kg	Qty.	Size	Qty.	Size
PTMA†, PTMH	500-1000	160.0	73	3	3/0 – 500 kcmil	2	2/0 – 500 kcmil
PTMX	500-800	160.0	73	3	3/0 – 500 kcmil	2	2/0 – 500 kcmil
PTPA†, PTPH, PTPX	1000-1600	350.0	159	6	2/0 – 500 kcmil	3	2/0 – 500 kcmil

† "PTMA", "PTMH", "PTMX", "PTPA", "PTPH", and "PTPX" units plug into one opening but require space equal to two or three plug-in openings (See Dimension A.)

Note: This unit requires a special hanger that is mounting orientation specific. Add "H" on the end of the catalog number for units that will be mounted horizontally, and "V" for units which will be mounted vertically. These mounting frames are NOT interchangeable.

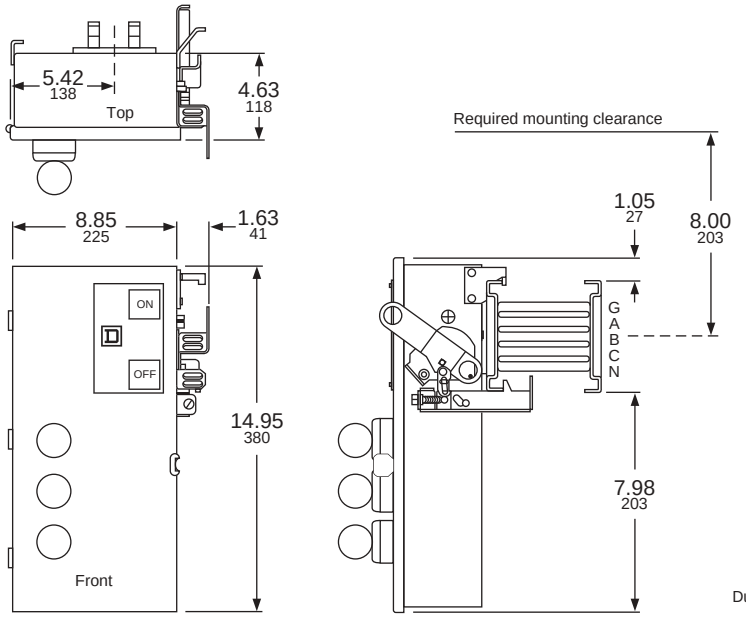
Combination Fusible Switch and Starter—Lighting Contactor—Contactor

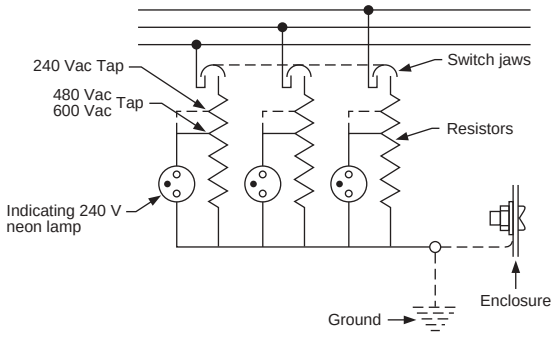


Fusible Switch and Starter/Lighting Contactor/Contactor			
Cat. No. Prefix	Starter or Contactor Size	Lighting Contactor Size	Fusible Switch Rating
PSS, PSC	0-1	. . .	30-60 A
	2	. . .	60 A
	2	. . .	100 A
PSL	. . .	30 A	30 A
	. . .	60 A	60 A
	. . .	100 A	100 A

Note: All device ratings fit in the same enclosure dimensions as shown above.

Ground Detector and Neutralizer





Dual Dimensions: INCHES
Millimeters

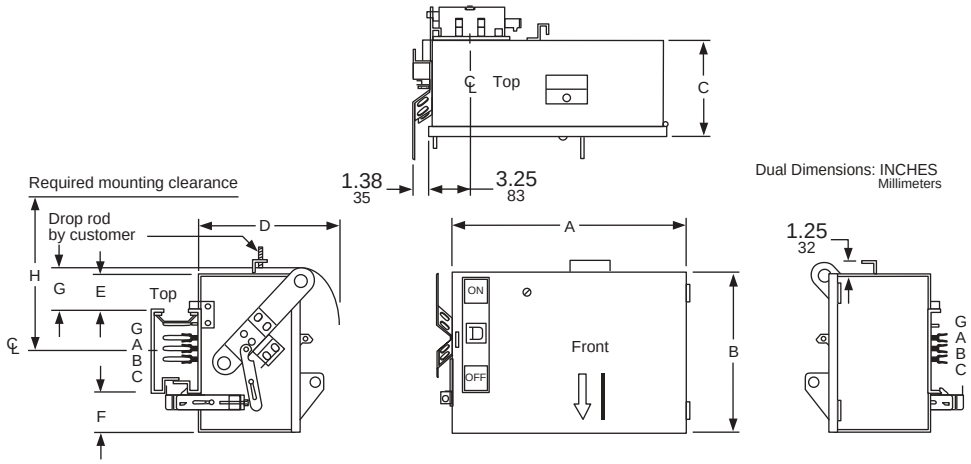
Wiring Diagram

Voltage Rating	Catalog Number	Weight	
		Lb	Kg
240 Vac	PGD-3200G	16.0	35
600 Vac	PGD-3600G	16.0	35

Note: The ground detector and neutralizer plug-in unit consists of a disconnect, a high resistance connection from each phase-to-ground, and neon indicating lights wired in parallel with the resistors. The resistors provide a discharge path for high transient voltages that may be impressed temporarily on the busway system.

The neon indicating lights provide visual indication of grounds in a 3ø3W ungrounded system. Operation of the lights is such that under normal conditions all three lights glow dimly under half voltage. If one phase goes to ground, the indicating light associated with that phase goes out while the other two assume full brilliance under full voltage conditions.

Combination Circuit Breaker And Starter — Contactor



Circuit Breaker and Contactor			A		B		C		D		E		F		G		H	
Cat. No. Prefix	Starter or Contactor Size	Breaker Rating	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm
PBS, PBC	0, 1, 2	15-90 A	20.42	519	9.76	248	6.19	157	8.50	216	1.00	25	2.75	70	1.63	41	10.00	254

1.0 General

1.1 Quality Assurance

All busway products shall be manufactured in a facility that is Quality Systems Registered by Underwriters Laboratories Inc. (UL®) to ISO 9001: 2000.

1.2 Regulatory Requirements

Underwriters Laboratories Listing

a. All straight lengths, fittings, and plug-in units shall be UL Listed.
b. This listing shall include mounting of the busway in any position (e.g., horizontal flatwise, horizontal edgewise, and vertical) without derating.

1.3 Delivery, Storage, and Handling

Refer to NEMA Type Publication BU1.1, which is a guide for proper installation, operation, and maintenance of busway products.

1.4 Maintenance

Refer to NEMA Type Publication BU1.1, which is a guide for proper installation, operation, and maintenance of busway products.

2.0 Products

2.1 Manufacturers

All busway shall be I-LINE/I-LINE II busway manufactured by Square D.

2.2 Manufactured Units

General

a. Furnish and install a complete low impedance prefabricated busway distribution system as shown on the plans.
b. Busway shall be __ Volts, __ phase __ wire with 50% capacity integral ground bus.
c. The ampere ratings, approximate footage, fitting, plug-in units, etc., are shown on the plan. The electrical contractor shall be responsible for routing the busway to coordinate with the other trades. Final field measurements shall be made by the contractor prior to release of the busway for fabrication by the manufacturer.

Short Circuit Rating and Tests

a. The short circuit rating of the busway shall be (consulting engineer's calculated required rating __)RMS symmetrical amperes, which is the ultimate anticipated short circuit current available at the source.
b. The short circuit rating of the busway shall be determined according to UL Standards 857. This rating must be based upon actual tests at the rated short circuit current.

2.3 Basic Construction

Housing

a. The busway housing shall be constructed of code gauge steel and aluminum to reduce hysteresis and eddy current losses and shall be provided with a suitable protective finish of ANSI 49 gray epoxy paint.
b. The busway housing shall be totally enclosed non-ventilated for protection against mechanical damage and dust accumulation.
c. The totally enclosed housing shall be manufactured by the busway manufacturer. Modifications of busway to make it totally enclosed by other than the busway manufacturer voids the manufacturer's warranty. Busway so modified is unacceptable without the written consent of the manufacturer.

Joints

a. The busway joint shall be of the one-bolt type which utilizes a high strength steel bolt(s) and conical washers to maintain proper pressure over a large contact surface area.
b. The bolt shall be torque-indicating and at ground potential.
c. The bolt shall be two-headed design to indicate when proper torque has been applied and require only a standard long handle wrench to be properly activated.
d. Access shall be required to only one side of the busway for tightening joint bolts.
e. On busway 800 A and above, it shall be possible to remove any joint connection assembly to allow electrical isolation or physical removal of a busway length without disturbing adjacent busway lengths.

Bus Bars

a. Bus bars shall be plated.
b. Each bus bar shall be insulated with Class B rated (130 °C (266 °F) vendor certified) polyester film or epoxy powder coated materials.
c. The temperature rise at any point in the busway shall not exceed 55 °C (131 °F) rise above ambient temperature when operating at rated load current.
d. Both feeder and plug-in busway (800 A and above) shall be of sandwich construction, meaning no air gap shall exist between bus bars except at plug-in openings.

Plug-In Openings

a. On plug-in busway, there shall be five deadfront, hinged cover-type plug-in openings on each side of 10-foot (305 cm) lengths.
b. All openings shall be usable simultaneously.
c. Busway shall be installed so that plugs are side mounted to permit practical use of all ten plug-in openings.
d. Each phase position of a plug-in opening shall be individually insulated.
e. It shall be possible to inspect the plug-in opening and bus bars prior to the installation of the plug-in unit.

2.4 Support of Busway

a. Hanger spacing shall be noted on layout drawings and shall not exceed manufacturer's recommendations.
b. Indoor feeder and plug-in busway shall be approved for hanger spacing of up to 10 ft (305 cm) for horizontally mounted runs and 16 ft (488 cm) for vertically mounted runs. Outdoor feeder busway shall be approved for spacing of up to 5 ft (152 cm) for horizontally or vertically mounted runs.

2.5 Voltage Drop

a. The voltage drop (input voltage minus output voltage) specified shall be based on the busway operating at full rated current and at stabilized operating temperature in 30 °C (86 °F) ambient.
b. The three-phase, line-to-line voltage drop shall not exceed 3.1 Volts per hundred feet at 40% power factor concentrated load which may exist during motor starting.
c. The line-to-line voltage drop shall not exceed 4.0 Volts per hundred feet at the load power factor which produces maximum voltage drop in the busway.

2.6 Plug-In Units

a. Plug-in units shall be [circuit breaker type] [fusible switch type with visible blade quick-make and quick-break mechanism].
b. Plug-in units which cannot be operated directly from the floor shall be equipped with suitable means for hookstick operation.
c. The interrupting rating of circuit breaker plug-in units shall be __ RMS symmetrical amperes.

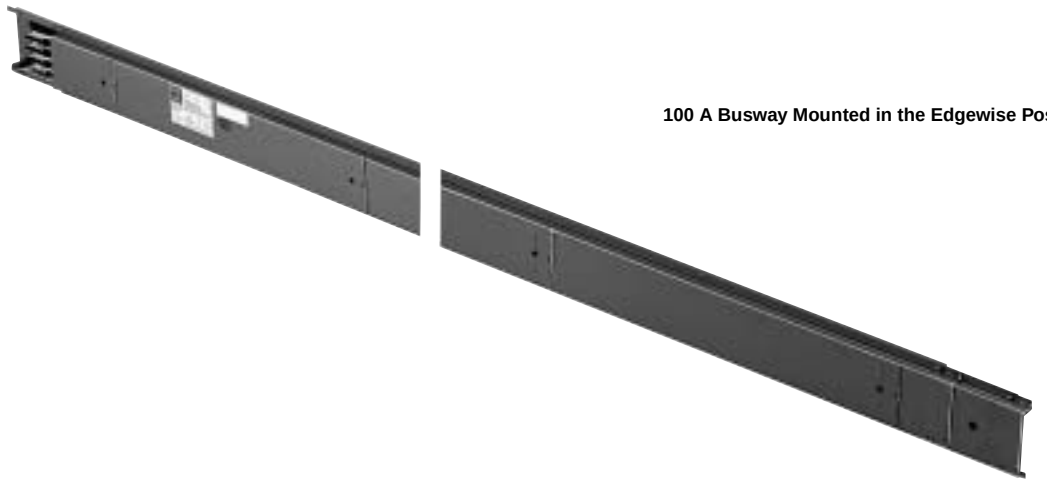
2.7 Plug-In Unit Safety Devices

a. Each plug-in unit rated 100 A or below shall be mechanically interlocked with the busway housing to prevent installation or removal of plug-in units while the switch is in the ON position, and be equipped with an operating handle which always remains in control of the switching mechanism.
b. Plug-in enclosures shall make positive ground connection with the ground bus before the jaws make contact with the phase bars.
   — The ground method shall be such that it cannot be defeated by future painting of the busway housing.
c. The plug-in units shall be equipped with internal barriers to prevent accidental contact of fish tape and conductors with live parts on the line side of the protective device during time of wire pulling.
d. Covers of all plug-in units must have interlocks to prevent the cover from being opened when the switch is in the ON position.

3.0 Execution

3.1 Installation

a. Install busway and accessories in accordance with manufacturer's instructions. Additional instructions are detailed in NEMA Type publication BU1.1, which is provided with the equipment by the electrical manufacturer.
b. Install busway length with expansion fitting at each location where busway run crosses building expansion.
c. Provide curb around interior floor penetrations.
d. Install busway with integral weather seal located where busway penetrates [exterior wall] [roof]. Provide [wall] [roof] flange and seal around opening to maintain weather tight installation.



100 A Busway Mounted in the Edgewise Position

General

We offer a full line of 100 A plug-in busway especially designed for light commercial and industrial jobs. This busway carries up to a 14,000 A short circuit rating and is available for "quick ship" with either copper or aluminum bus bars.

General-duty 100 A busway with ground bus system is also available. A unique grounding jaw ensures positive contact between the busway and plug-in unit.

Compared to cable and conduit, 100 A busway saves costly installation time. What's more, it's reusable, too, if the distribution system is changed in the future. So, consider these features. The next time you have a job that's too small for busway, choose 100 A busway.

Type

Totally enclosed plug-in busway.

Ratings

100 A, continuous full load current.

UL Listing

File Number E22182.

Systems

Rated for 3Ø4W, and for 3Ø3W, up to 600 Volt maximum.

Conductors

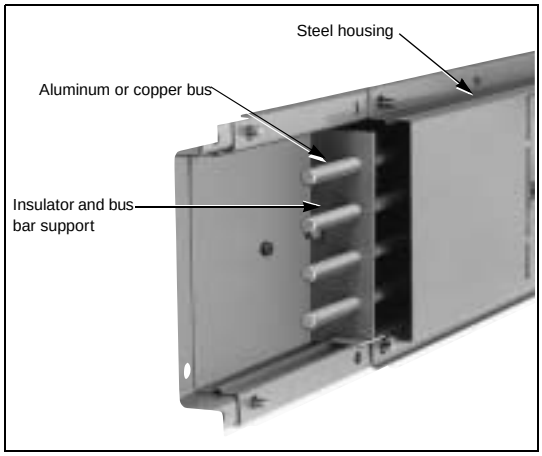
Round, electrical grade aluminum or copper.

Plating

Electro-plated over entire length.

Ground Bus (Optional)

Internal ground bus equal to 50% phase capacity.



Bus Bar Support

Molded bus bar insulators.

Housing

Twenty gauge steel, bonderized and finished with gray epoxy paint. Twistout steel plates cover plug-in access openings along both sides of the housing on 26 1/4-inch (6 mm) centers.

Short Circuit Bracing

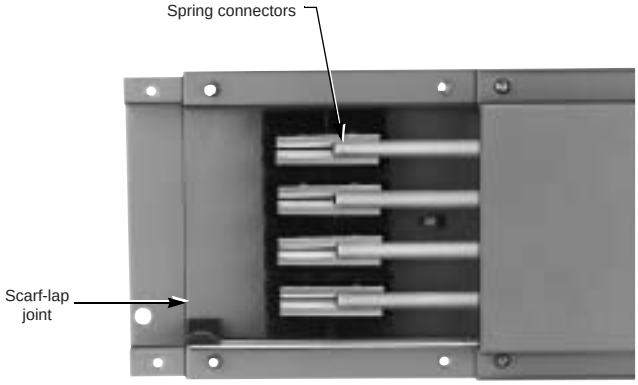
Bracing is provided by the molded insulating supports at each plug-in opening.

Short Circuit Ratings: UL Three Cycle Test (KA, RMS Symmetrical)

	480 V	600 V
Copper Busway	14	14
Aluminum Busway	14	10

Joint

High pressure spring type connectors join electrical conductors at each joint. These connectors are mounted on molded insulators and position the bus bars for joining.



Voltage Drop

In using curve, the following notes are applicable:

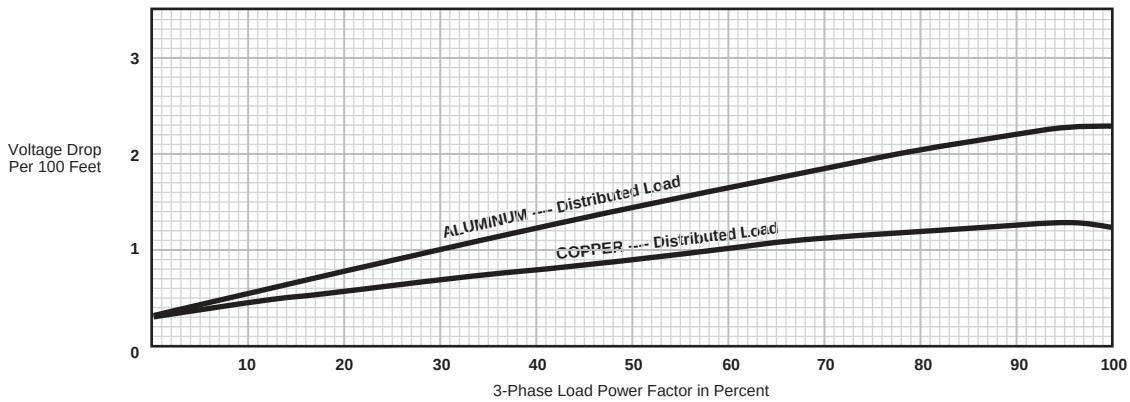
- For balanced 3-phase, line-to-line voltage drop of 4-wire duct, use values from curve.
- For balanced 3-phase, line-to-neutral voltage drop, multiply values from curve by .577.
- For single-phase voltage drop, multiply values from curve by 1.15.
- For other than rated currents, multiply values from curve by $\frac{\text{Actual Current.}}{\text{Rated Current}}$
- For different lengths, multiply values from curve by $\frac{\text{Actual Footage.}}{100\text{ ft}}$

Hangers

Wrap-around type hanger for mounting plug-in busway in the edgewise position is standard. Busway is UL Listed for 10 ft (305 cm) hanger spacing in edgewise position.

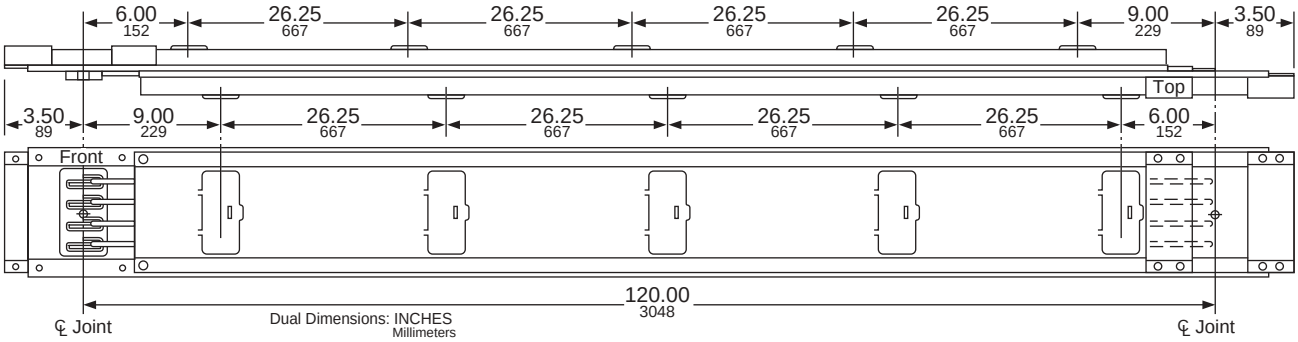
"C" clamp hangers are available for use in either edgewise or flatwise mounting position. UL Listing for flatwise mounting position is with busway hung on 5 ft (152 cm) centers.

Average 3-Phase, Line-To-Line Voltage Drop
In Volts Per 100 Feet At Rated Current
With Balanced 3-Phase Load



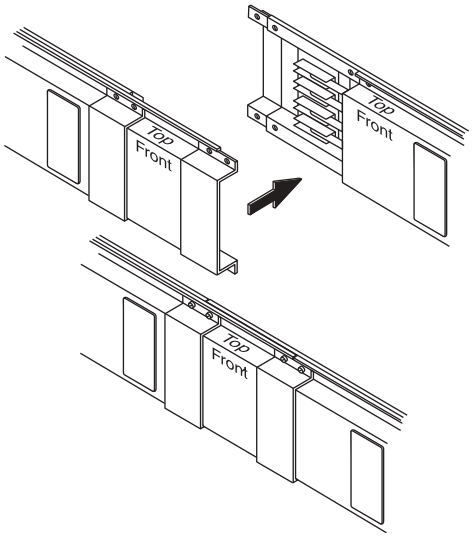
Busway Systems
100 A Plug-In Busway

Straight Lengths

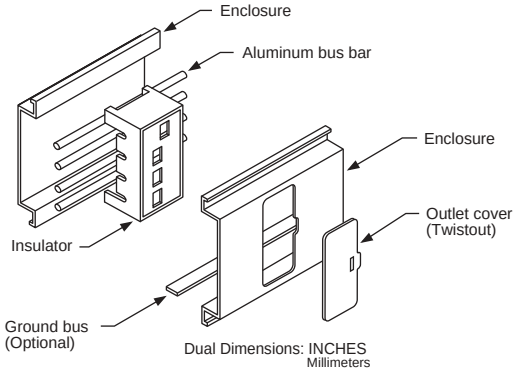


Standard Lengths–Feet	10	5	3
Standard Lengths–Meters	3.05	1.52	0.91
Number of Plug-In Openings	10	6	4

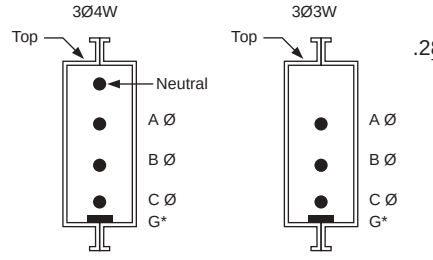
Joint Detail



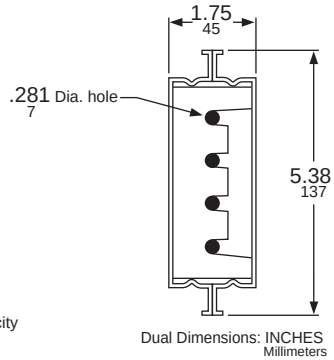
Busway Construction

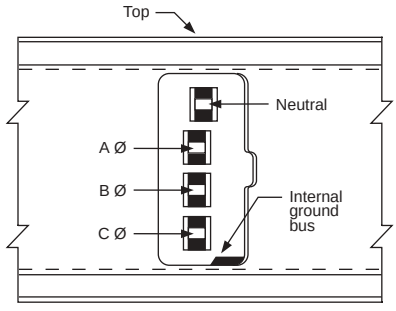


Cross Sections



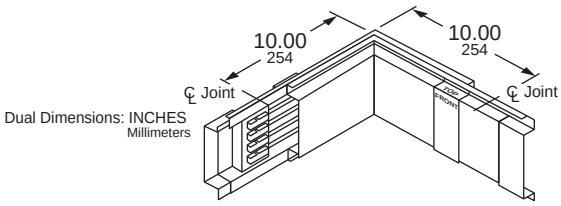
*Optional internal ground bus equal to 50% phase capacity



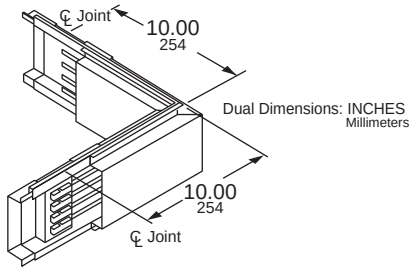


Polarizing Plug Outlet

Elbows

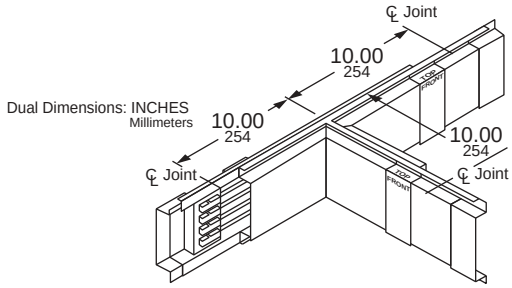


Front Inside: Catalog Number Suffix–LF

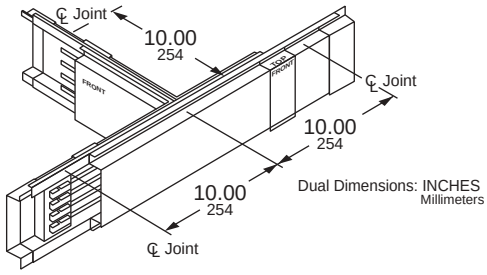


Front Outside: Catalog Number Suffix–LFO

Tees

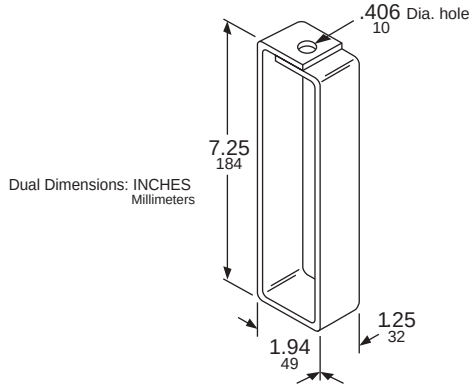


Front Inside: Catalog Number Suffix–TFI

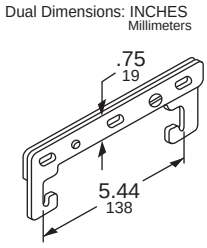


Front Outside: Catalog Number Suffix–TFO

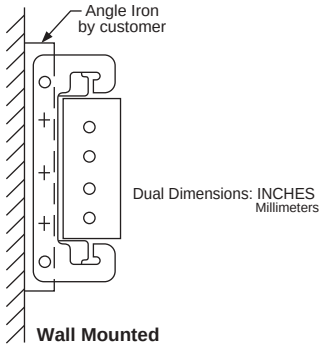
Hangers



Wrap-Around Edgewise
Catalog Number–HP1E

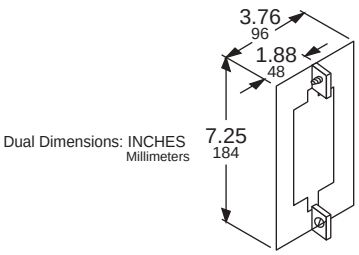


"C" Clamp Flatwise
Catalog Number–HP1F



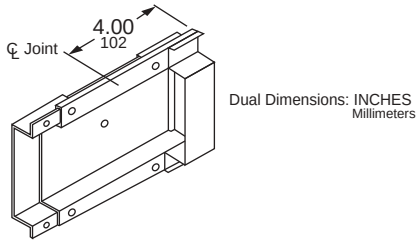
Wall Mounted

Wall Flange End Closure



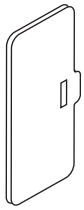
Catalog Number–ACP1WF

End Closure



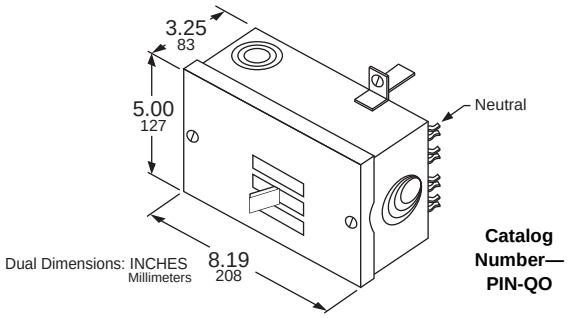
Catalog Number–ACP1EC

Outer Cover



Catalog Number–ACP1OC

Circuit Breaker Plug-In Units

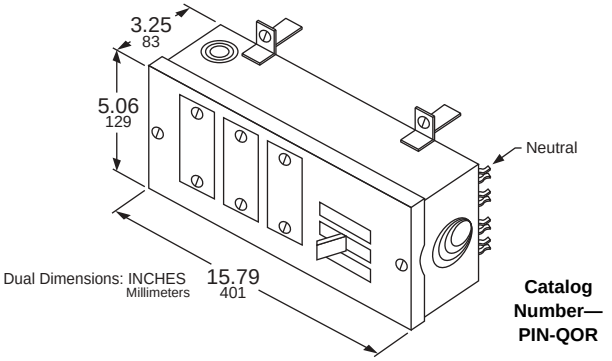


Catalog Number—PIN-QO

Knockout Sizes– .50 in. (13 mm), .75 in. (19 mm), 1.00 in. (25 mm), 1.25 in. (32 mm), K.O.'s in all sides

Lugs – #14 – 1/0 per neutral and ground size of phase lugs determined by circuit breaker ampere rating.

Note: Circuit breakers and enclosures are ordered and shipped separately for ease of installation and are shown assembled above for reference purposes only.

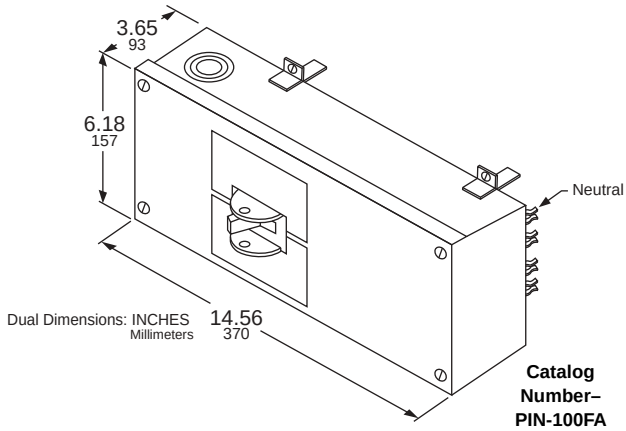


Catalog Number—PIN-QOR

Knockout Sizes– .50 in. (13 mm), .75 in. (19 mm), 1.00 in. (25 mm), 1.25 in. (32 mm)

Lugs – #14 – 1/0 per neutral and ground. Size of phase lugs determined by circuit breaker ampere rating.

Note: Enclosure with space for three QO Circuit Breaker poles and provisions for three duplex receptacles. Circuit breakers are not provided.



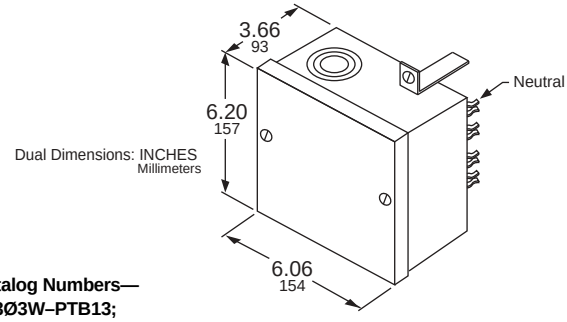
Catalog Number–PIN-100FA

Knockout Sizes–End wall– .50 in. (13 mm), .75 in. (19 mm), 1.00 in. (25 mm), 1.25 in. (32 mm), 1.50 in. (38 mm), 2.00 in. (51 mm) Top and Bottom – .50 in. (13 mm), .75 in. (19 mm), 1.00 in. (25 mm), 1.25 in. (32 mm)

Lugs– #14–1/0 per neutral and ground size of phase lugs determined by circuit breaker ampere rating.

Note: Will accept 15 A–100 A FAL circuit breaker.

Cable Tap Boxes – Plug-In Cable Tap Box

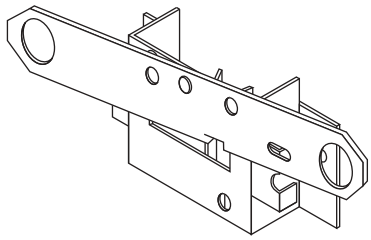


Catalog Numbers—3Ø3W–PTB13; 3Ø4W–PTB14

Plug-In Cable Tap Box

Knockout Sizes– .50 in. (13 mm), .75 in. (19 mm), 1.00 in. (25 mm), 1.25 in. (32 mm), 1.50 in. (38 mm), 2.00 in. (51 mm)
Lugs– #14–2/0 per phase and neutral, #14 – 1/0 per ground

Floor Operated Attachment



Catalog Numbers—PI-1-QO used with PINQO and PIN QOR
PI-1-FA used with PIN 100FA

1.0 General

1.1 Quality Assurance

All busway products shall be manufactured in a facility, which is Quality Systems Registered by Underwriters Laboratories Inc. to ISO 9001: 2000.

1.2 Regulatory Requirements

Underwriters Laboratories Listing

a. All straight lengths, fittings and plug-in units shall be UL Listed.
b. This listing shall include mounting of the 100 A plug-in busway in any position (e.g., horizontal, edgewise and flatwise and vertical) without derating.
c. Plug-in busway shall be 100 A plug-in busway manufactured by Square D.

2.0 Products

2.1 Manufactured Products

General

a. Furnish and install a complete prefabricated plug-in busway distribution system as shown on the plans.
b. Plug-in busway shall be 100 A,_____Volts, _____phase, _____wire.
c. The approximate footage, fittings, plug-in units, etc., are as shown on the plans. The electrical contractor shall be responsible for routing the plug-in busway to coordinate with other trades. Final field measurements shall be made by the contractor prior to release of the plug-in busway for fabrication. Hanger spacing (Shall be as shown on the plans) (Shall not exceed 10 ft (305 cm)).

2.2 Basic Construction

Housing

a. The 100 A plug-in busway shall be of the totally-enclosed type for protection against mechanical damage and dust accumulation.
b. Each plug-in outlet shall be accessible by the removal of a steel twistout cover and shall accept a closing cap when not in use.
c. The entire system shall be constructed using manufacturer's standard sections. As many sections as possible shall be 10-foot (305 cm) lengths.
d. Fittings shall be made in such a way that no increase of housing size is required at the connection between adjoining sections.

Joints

a. Electrical connection shall be made at the joints by high pressure spring type connectors.
b. All hardware required for joining sections shall be captive.
c. Loose hardware will not be permitted.

2.3 Bus Bars

a. The conductors shall be fabricated from round (aluminum) (copper) rods.
b. Conductors are to be electrolytically plated over their entire length.
c. Insulators shall be of the type which isolates the jaws of a plug-in device from each other.
d. Fault current bracing shall be 14,000 RMS amperes for copper busway or 10,000 RMS amperes for aluminum busway.

Plug-In Openings

a. The enclosure shall include ten plug-in outlets in each 10-foot (305 cm) length.
b. All plug-in openings shall be usable simultaneously.

2.4 Support of Busway

Bus bars shall be firmly supported by molded insulators on alternate sides of the housing.

2.5 Plug-In Units

All plug-in units are to be polarized to insure correct phase orientation and shall include a means of securely fastening the device to the plug-in busway housing with a bolted clamp.

General

POWER-ZONE™ metal-enclosed, non-segregated phase medium and low voltage bus systems are custom-designed and manufactured. Standard sizes and ratings and a complete line of components allow each system to be tailored to suit the requirements of each application, while at the same time provide the reliability that our name has stood for around the world for so many years.

Standard bus systems are available in four basic voltage classes: 600 V, 5 kV, 15 kV and 38 kV with a full range of continuous self-cooled current ratings and momentary current ratings. Other voltage classes are available upon request. Components such as equipment terminations, horizontal and vertical elbows, tee-taps, phase transpositions, expansion joints, earthquake and vibration joints, misalignment joints, wall and floor penetration assemblies, fire and smoke barriers, bus supports, etc., are also available for all sizes and ratings.

POWER-ZONE bus design and construction is in strict accordance with ANSI Standard C37.23. It can be supplied with full, round edge 98% IACS copper or 57% IACS aluminum bars. Copper contact surfaces are silver-plated. Aluminum contact surfaces are tin-plated. All aluminum electrical connections are fitted with conical washers to maintain a constant contact pressure.

Standard hardware for conductor joints is plated steel for bare connections not exposed to weather, or insulated connections where the bus rating does not exceed 5000 A. Hardware is stainless steel for bare connections exposed to weather and all connections where the bus ratings exceeds 5000 A.

With the exception of 600 V class, which is normally uninsulated, the bus conductors are insulated with a flame-retardant, non-hygroscopic, high dielectric strength fluidized bed epoxy insulation rated 130°C (266 °F). The 5000 V and 15000 V busway joints are insulated with removable insulating boots, while the 38,000 V busway joints are taped.

The 5 kV and the 15 kV bus conductors are mounted and secured against short circuit forces in molded, track resistant, flame-retardant, non-hygroscopic support blocks of glass-reinforced polyester. The UL molded support insulators are ribbed to maximize both tracking distance and mechanical strength. They are spaced as appropriate to maintain the required short circuit strength of the bus. Semi-conducting silicone rubber corona suppression inserts are used between the conductor and support blocks. Porcelain is optional for 5 kV and 15 kV and is standard for 38 kV. The 600 V supports are glass-reinforced polyester.

The bus conductors are completely enclosed in a grounded metal housing for the protection of both personnel and property. The housings may be totally enclosed depending on the type of installation, and may be fabricated from painted aluminum, steel or stainless steel. Aluminum housings are standard and are recommended for current ratings above 2000 A due to the effects of hysteresis associated with ferrous, magnetic housing materials, such as steel.

On outdoor applications, bottom covers are equipped with screened breathers to eliminate the accumulation of moisture within the housing. In addition, manually or themostatically controlled electric strip heaters are provided to aid condensation control.

To complete the system, a line of steel structural supports is also available for both indoor and outdoor applications.

Housing Construction

Totally enclosed indoor or outdoor.

Housing Material

Aluminum standard; Galvanized or stainless steel optional.

Conductors

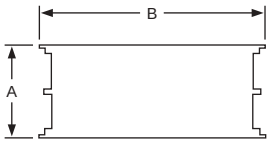
Silver-plated copper or tin-plated aluminum.

Conductor Supports

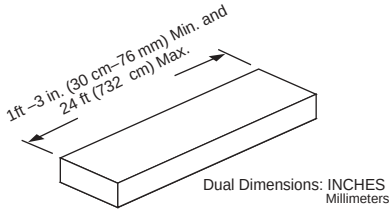
Glass-reinforced polyester or porcelain.

Insulation

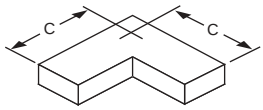
Fluidized bed epoxy (130°C) (266 °F).



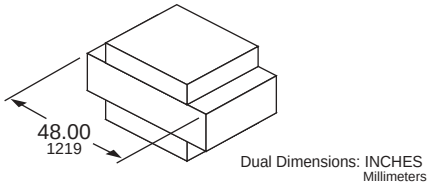
Cross Section



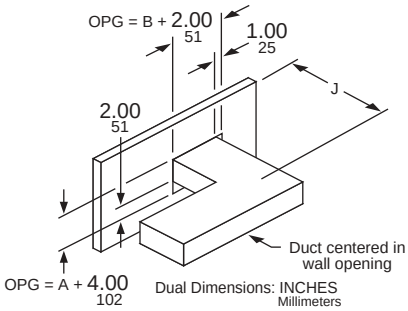
Straight



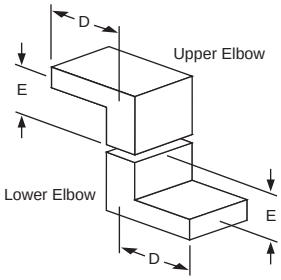
Horizontal Elbow



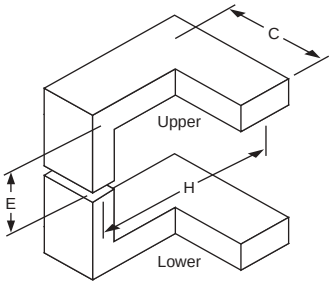
Phase Transposition



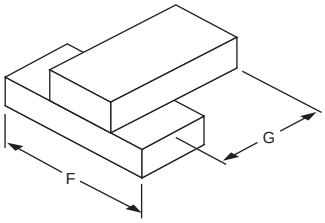
Wall Entrance



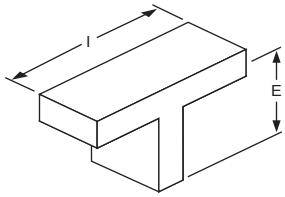
Vertical Elbows



Transition



Horizontal Tee



Vertical Tee

Voltage and Material	Ampere Rating	Wt/Ft Lb	Dimensions										Resistance Microhms Per Phase Per Foot	Watt Loss Per 3-Phase Foot	Reactance Microhms Per Foot	Impedance Microhms Per Foot
			A		B		C		D		E					
			IN	mm	IN	mm	IN	mm	IN	mm	IN	mm				
Copper 600	1200	26	8.00	203	21.00	533	22.00	559	11.38	289	15.00	381	10.72	46	44.29	45.57
	1600	31	8.00	203	21.00	533	22.00	559	11.38	289	15.00	381	8.47	65	40.46	44.27
	2000	43	10.00	254	21.00	533	22.00	559	12.38	314	16.00	406	5.77	69	37.05	37.50
	2500	50	14.00	356	21.00	533	22.00	559	14.38	365	18.00	457	4.70	88	29.23	29.60
	3200	69	14.00	356	27.00	686	25.00	635	14.38	365	18.00	457	3.90	120	31.84	32.08
	4000	104	14.00	356	27.00	686	25.00	635	14.38	365	18.00	457	2.90	139	31.11	31.25
	5000	120	14.00	356	36.00	914	30.00	762	14.38	365	18.00	457	2.55	191	44.22	44.29
	6000	140	24.00	610	36.00	914	30.00	762	19.38	492	23.00	584	2.28	247	30.74	. . .
Aluminum 600	1200	19	8.00	203	21.00	533	22.00	559	11.38	289	15.00	381	13.41	58	43.46	45.48
	1600	23	10.00	254	21.00	533	22.00	559	12.38	314	16.00	406	8.76	67	37.05	38.07
	2000	29	14.00	356	21.00	533	22.00	559	14.38	365	18.00	457	6.16	74	28.79	29.44
	2500	33	14.00	356	27.00	686	25.00	635	14.38	365	18.00	457	5.61	105	31.84	32.33
	3200	43	14.00	356	27.00	686	25.00	635	14.38	365	18.00	457	4.10	126	31.11	31.38
Copper 5000 and 15000	1200	29	14.00	356	27.00	686	25.00	635	14.38	365	18.00	457	15.02	65	56.50	58.46
	1600	35	14.00	356	27.00	686	25.00	635	14.38	365	18.00	457	8.47	65	54.37	55.03
	2000	50	14.00	356	30.00	762	27.00	686	14.38	365	18.00	457	5.77	69	51.20	51.53
	2500	59	14.00	356	36.00	914	30.00	762	14.38	365	18.00	457	4.70	88	48.76	48.98
	3000	77	14.00	356	36.00	914	30.00	762	14.38	365	18.00	457	4.01	108	42.88	43.07
	4000	112	14.00	356	36.00	914	30.00	762	14.38	365	18.00	457	3.45	166	41.93	42.07
	5000	126	24.00	610	42.00	1067	33.00	838	19.38	492	23.00	584	2.77	208	42.54	42.63
	6000	150	24.00	610	42.00	1067	33.00	838	19.38	492	23.00	584	2.40	259	30.11	. . .
Aluminum 5000 and 15000	1200	27	14.00	356	27.00	686	25.00	635	14.38	365	18.00	457	13.41	58	54.37	56.00
	1800	30	14.00	356	30.00	762	27.00	686	14.38	365	18.00	457	8.76	67	51.20	51.95
	2000	37	14.00	356	36.00	914	30.00	762	14.38	365	18.00	457	6.16	74	48.32	48.71
	2500	40	14.00	356	30.00	762	27.00	686	14.38	365	18.00	457	5.68	107	42.52	42.89
	3000	52	14.00	356	36.00	914	30.00	762	14.38	365	18.00	457	4.32	117	41.93	42.15
Copper 38000	600	30	24.00	610	51.00	1295	37.00	940	24.00	610	23.00	584	15.37	17	76.97	78.49
	1200	30	24.00	610	51.00	1295	37.00	940	24.00	610	23.00	584	15.37	66	76.97	78.49
	1800	32	24.00	610	51.00	1295	37.00	940	24.00	610	23.00	584	10.72	82	68.89	69.72
	2000	35	24.00	610	51.00	1295	37.00	940	24.00	610	23.00	584	8.33	100	62.93	63.48
	2500	52	24.00	610	51.00	1295	37.00	940	24.00	610	23.00	584	4.66	87	53.83	54.03
	3000	61	24.00	610	51.00	1295	37.00	940	24.00	610	23.00	584	3.97	107	53.39	53.54
Aluminum 38000	600	27	24.00	610	51.00	1295	37.00	940	24.00	610	23.00	584	25.46	27	76.97	81.07
	1200	29	24.00	610	51.00	1295	37.00	940	24.00	610	23.00	584	17.23	74	68.89	71.01
	1800	30	24.00	610	51.00	1295	37.00	940	24.00	610	23.00	584	13.41	58	68.06	69.36
	2000	32	24.00	610	51.00	1295	37.00	940	24.00	610	23.00	584	11.33	136	62.28	63.30

Voltage and Material	Ampere Rating	Wt/Ft Lb	Dimensions▲										Resistance Microhms Per Phase Per Foot	Watt Loss Per 3-Phase Foot	Reactance Microhms Per Foot	Impedance Microhms Per Foot
			F		G		H		I		J					
			IN	mm	IN	mm	IN	mm	IN	mm	IN	mm				
Copper 600	1200	26	48.00	1219	22.00	559	18.25	464	28.00	711	17.00	432	10.72	46	44.29	45.57
	1600	31	48.00	1219	22.00	559	18.25	464	28.00	711	17.00	432	8.47	65	43.46	44.27
	2000	43	48.00	1219	22.00	559	19.25	489	30.00	762	17.00	432	5.77	69	37.05	37.50
	2500	50	48.00	1219	22.00	559	21.25	540	34.00	864	17.00	432	4.70	88	29.23	29.60
	3200	69	60.00	1524	25.00	635	24.25	616	34.00	864	20.00	508	3.90	120	31.84	32.08
	4000	104	60.00	1524	25.00	635	24.25	616	34.00	864	20.00	508	2.90	139	31.11	31.25
	5000	120	60.00	1524	30.00	762	28.75	730	34.00	864	25.00	635	2.55	191	44.22	44.29
	6000	140	60.00	1524	30.00	762	33.75	857	44.00	1118	25.00	635	2.28	247	30.74	44.29
Aluminum 600	1200	19	48.00	1219	22.00	559	18.25	464	28.00	711	17.00	432	13.41	58	43.46	45.48
	1600	23	48.00	1219	22.00	559	19.25	489	30.00	762	17.00	432	8.78	67	37.05	38.07
	2000	29	48.00	1219	22.00	559	21.25	540	34.00	864	17.00	432	6.16	74	28.79	29.44
	2500	33	60.00	1524	25.00	635	24.25	616	34.00	864	20.00	508	5.61	105	31.84	32.33
	3200	43	60.00	1524	25.00	635	24.25	616	34.00	864	20.00	508	4.10	126	31.11	31.38
Copper 5000 and 15000	1200	29	60.00	1524	25.00	559	24.25	616	34.00	864	20.00	508	15.02	85	56.50	58.46
	1600	35	60.00	1524	25.00	559	24.25	616	34.00	864	20.00	508	8.47	65	54.37	55.03
	2000	50	60.00	1524	27.00	686	25.75	654	34.00	864	22.00	589	5.77	89	51.20	51.53
	2500	59	60.00	1524	30.00	762	28.75	730	34.00	864	25.00	635	4.70	88	48.76	48.98
	3000	77	60.00	1524	30.00	762	28.75	730	34.00	864	25.00	635	4.01	108	42.88	43.07
	4000	112	60.00	1524	30.00	762	28.75	730	34.00	864	25.00	635	3.45	166	41.93	42.07
	5000	126	60.00	1524	33.00	838	36.75	933	44.00	1118	28.00	711	2.77	208	42.54	42.63
	6000	150	60.00	1524	33.00	838	36.75	933	44.00	1118	28.00	711	2.40	259	30.11	. . .
Aluminum 5000 and 15000	1200	27	60.00	1524	25.00	559	24.25	616	34.00	864	20.00	508	13.41	58	54.37	56.00
	1800	30	60.00	1524	27.00	686	25.75	654	34.00	864	22.00	589	8.76	67	51.20	51.95
	2000	37	60.00	1524	30.00	762	28.75	730	34.00	864	25.00	635	6.16	74	48.32	48.71
	2500	40	60.00	1524	27.00	686	25.75	654	34.00	864	22.00	589	5.68	107	42.52	42.89
	3000	52	60.00	1524	30.00	762	28.75	730	34.00	864	25.00	635	4.32	117	41.93	42.15
Copper 38000	600	30	84.00	2134	37.00	940	45.88	1165	48.00	1219	33.00	838	16.37	17	76.97	78.49
	1200	30	84.00	2134	37.00	940	45.88	1165	48.00	1219	33.00	838	15.37	66	76.97	78.49
	1800	32	84.00	2134	37.00	940	45.88	1165	48.00	1219	33.00	838	10.72	82	68.89	69.72
	2000	35	84.00	2134	37.00	940	45.88	1165	48.00	1219	33.00	838	8.33	100	62.93	63.48
	2500	52	84.00	2134	37.00	940	45.88	1165	48.00	1219	33.00	838	4.66	87	53.83	54.03
	3000	61	84.00	2134	37.00	940	45.88	1165	48.00	1219	33.00	838	3.97	107	53.39	53.54
Aluminum 38000	600	27	84.00	2134	37.00	940	45.88	1165	48.00	1219	33.00	838	25.46	27	76.97	81.07
	1200	29	84.00	2134	37.00	940	45.88	1165	48.00	1219	33.00	838	17.23	74	68.89	71.01
	1800	30	84.00	2134	37.00	940	45.88	1165	48.00	1219	33.00	838	13.41	58	68.06	69.36
	2000	32	84.00	2134	37.00	940	45.88	1165	48.00	1219	33.00	838	11.33	136	62.28	63.30

Notes

- Performance values are calculated using a maximum conductor temperature rise of 65 °C (149 °F) and the full rated continuous current in a 20 °C (68 °F) ambient.
- All data is based upon standard 3-phase totally enclosed non-ventilated aluminum enclosures.

The table information is based on standard POWER-ZONE bus construction. Other bus bar sizes and arrangements are available to meet the purchaser's required electrical characteristics and space considerations. Use of steel housing could require a derating of the busway. Consult the factory for more information.

POWER-ZONE Bus Standard Construction:

Bus Bar Material

Copper and aluminum.

Bus Bar Plating

- Copper-Silver (Contact).
- Aluminum-Tin (Contact).

Insulation

- 600 V Uninsulated; Fluidized bed epoxy optional
- 5 kV, 15 kV, 38 kV Fluidized bed epoxy

Bus Bar Supports

5 kV, 15 kV Glass-reinforced polyester standard; Porcelain optional. 38 kV Porcelain standard.

Housing Material

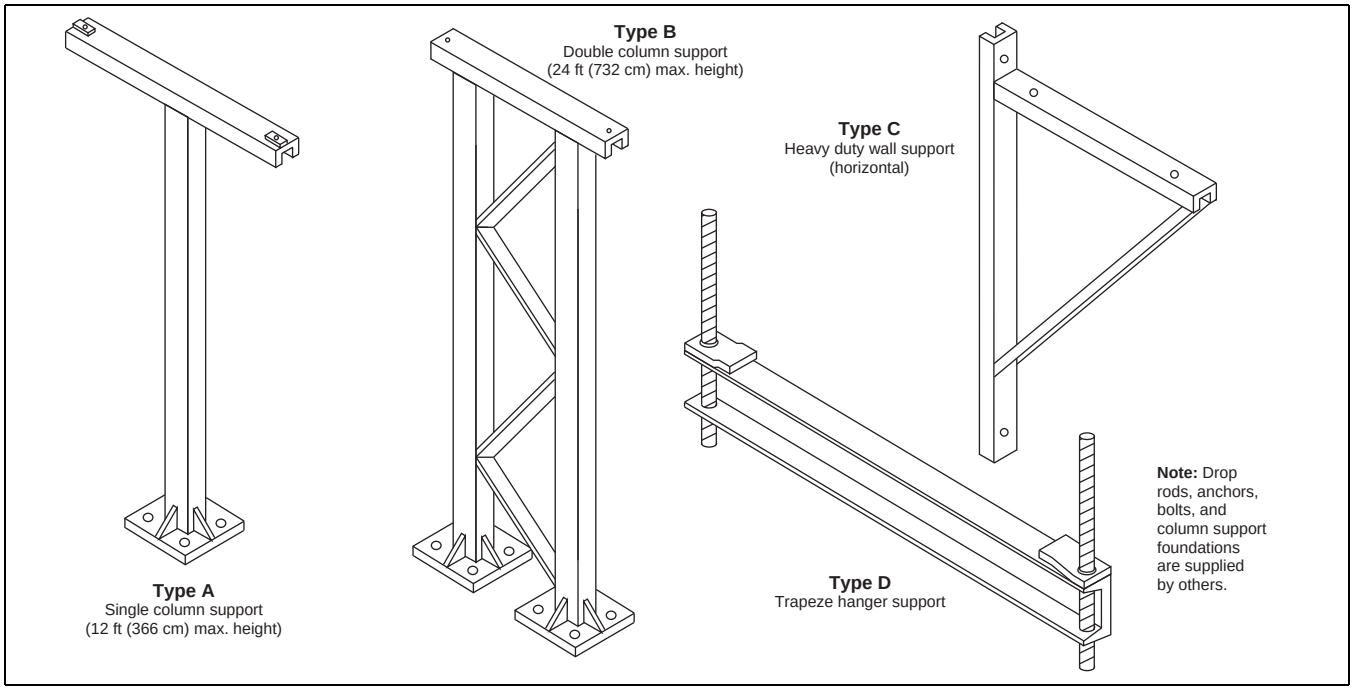
Aluminum standard; Steel optional.

Bus Supports

Indoor trapeze hangers, outdoor single- or double-column supports, and wall-mounted knee braces are available. Outdoor structural steel supports are hot-dipped galvanized after fabrication or primed and painted after fabrication as required. Indoor supports are primed and painted to match the bus housing color.

POWER ZONE™ bus is designed and constructed for unbraced spans of 12– 20 ft (366–610 cm). Consult the factory for longer unbraced spans. Recommended support heights, spacing, and locations are determined by the factory and shown on the bus drawings. Information on moments, reactions, and foundation loading due to rain, wind, snow, or seismic forces can be furnished upon request.

The bus assemblies are mounted to their respective supports by means of hold-down clip angles that permit longitudinal movement of the bus duct to eliminate stresses from thermal expansion and contraction.



Layout and Pricing Instructions

Fitting Description

- Non-segregated phase bus
- 600 V through 15 kV (1200 A–5000 A)
- Aluminum, steel, or stainless steel housing
- Aluminum or copper bus bars
- Insulated with fluidized bed epoxy (5 kV–38 kV)
- Complete line of fittings provides for any configuration
- Indoor trapeze and outdoor column supports
- For use in utilities, industrial, and commercial facilities

POWER-ZONE bus is custom designed, manufactured and tested per ANSI Standard C37.23 to meet customer specifications. It is a completely coordinated package of equipment with all the auxiliary material and supports for connecting transformers, switchgear, MCCs, and motors, in all types of utility, industrial, and commercial facilities.

Transformer Connection

This type of termination should be used whenever the bus is connecting to a transformer, motor, switch, or any connection where the bus bars are connecting to porcelain-mounted equipment terminals. It will include the same components as a flanged end plus one set of flexible braid-type connectors and a terminal box (if required.)

Generator Connection

All "Transformer Connection" information applies with the addition that an enclosure bellows should be included when the busway attaches to a generator.

Bushing Box (Weatherhead)

A bushing box is used on service entrance run where the cable connection to the bus must be made via porcelain bushings. It is comprised of the same components as a transformer connection plus three-through stud-type apparatus bushings, bushing stud connectors (lug pads), and a strip heater.

Ground Bus

The bus housing is designed and constructed to provide an electrically continuous ground path. The side rails of the bus housings are capable of carrying the full-rated phase current continuously and, under short circuit conditions, are capable of carrying fault current for three (3) seconds. Consequently, a separate ground bus is not necessary unless specified.

Wall Entrance Seal

A wall entrance seal consists of an external wall frame and a vapor barrier which prevents air or vapor from passing from one room to another or from outdoors to indoors. One-, two-, and three-hour fire ratings are optional.

Equipment Entrance Seal

An equipment entrance seal should be used whenever a barrier is required to prevent the passing of flame and or gasses between the bus housing and the terminating equipment.

Expansion Fittings

An expansion fitting is used to counteract the strain placed on the bus due to the expansion and contraction of the building or the bus itself. One should be used whenever the bus run crosses a building expansion joint and whenever a straight run of bus exceeds 80 feet (2438 cm).

Housing Bellows (Misalignment) Collar

Required at terminations or wall penetrations when equipment vibrations or seismic forces may cause damage to the bus. It may also be used to adjust for the "settling" of terminating equipment after installation.

Flanged Ends

A flanged end is used to terminate the bus into switchgear, motor control centers, switchboards, or any rigid bus-to-bus connection. It consists of a gasketed equipment flange, up to 1 foot (30 cm) of 3Ø-3W conductor (3Ø4W as applicable), necessary insulation tapes, and required bolting hardware. If additional conductor length is required, add to the footage price on a per foot basis.

Cable Tap Box

A cable tap box includes a gasketed and accessible termination box, lugs, necessary insulation tape (between bus and lugs only), and required bolting hardware. Lug sizes and quantity should be specified by purchaser.

Supporting Steel (Hangers)

Supports are not included in the "per foot" price of the bus and should be added on the basis of one for every 12 to 15 feet (366 to 457 cm). Indoor supports are a trapeze type hanger while outdoor supports are a single- or double-column type support. Consult the factory for other type supports.

Hazardous or Seismic Locations

Consult the factory for bus runs that are to be installed in a location that is classified as hazardous or in a Zone 3 or 4 seismic location.

General Pricing Instruction

1. Prepare a layout sketch (if applicable) of the run(s) showing all dimensions in feet and inches, all wall and floor locations and thicknesses and all fittings such as elbows, tees, flanged ends, cable tap boxes, expansion fittings, transformer connections, etc.
2. Add all dimensions together using the center line of the bus and adjust the total to the higher whole foot.
3. Multiply this total by the per foot price as determined by the type (indoor or weatherproof) (aluminum or copper) and the number of poles and any optional accessories (aluminum or steel enclosures, fiberglass or porcelain conductor supports, etc.,). To this, add the charges for each of the elbows, tees, flanged ends, cable tap boxes, expansion fittings, transformer connections, etc.
4. The sum of these items plus the sum of any optional accessory is the price of the entire bus run.
5. Contact your local representative for assistance in laying out or pricing this product.

Note: Because the bus run is custom-designed and built, there are no “Complete Device” prices.

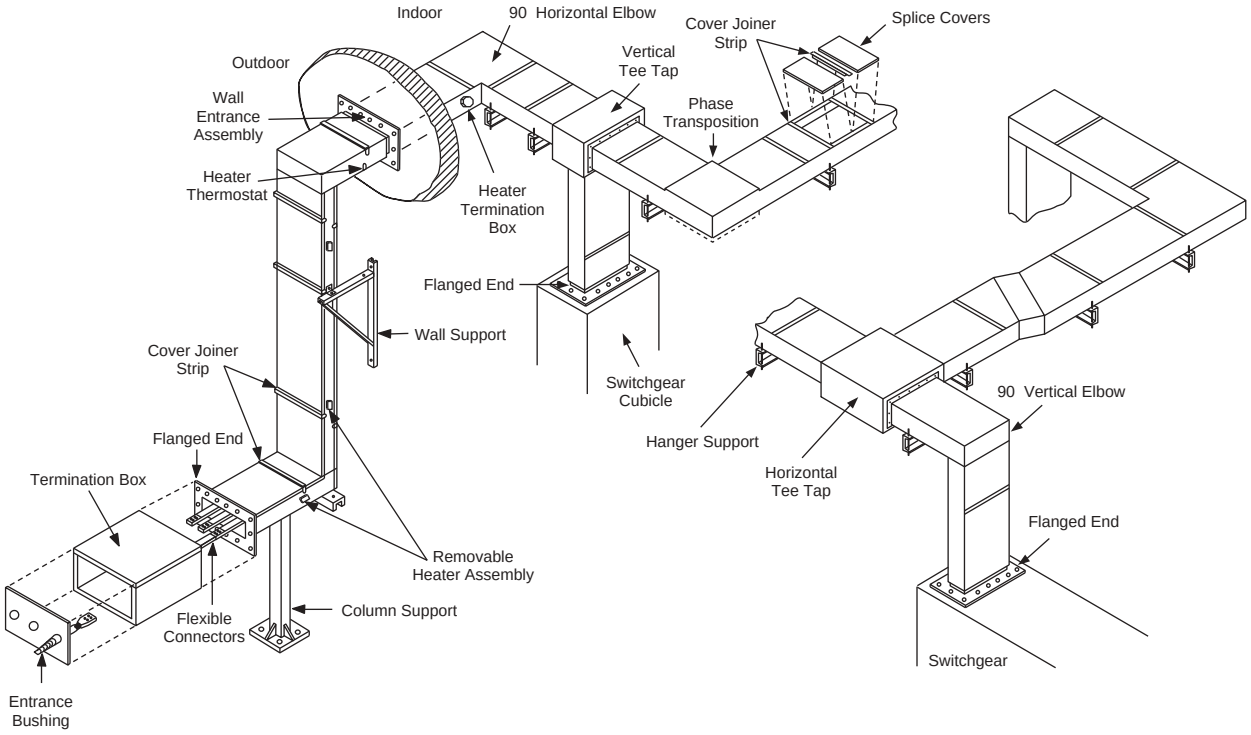
Bus Footage

The per foot price of the bus may be a combination of several prices depending on the job specifications and requirements. Some of these options are special momentary rating, special housing material and/or finish, special conductor supports, heaters and thermostats, and ground bus.

Weatherproof Bus

Weatherproof bus is priced the same as indoor. In addition, all weatherproof runs must be equipped with strip heaters to eliminate condensation and, if applicable, a thermostat. A heater should be priced for every seven feet (213 cm) of bus and no more than 20 heaters can be controlled by one thermostat. Also, each bus run should have its own thermostat. The heaters operate at 120 V.

Typical Layout



1.0 General

1.1 Section Includes

a. This specification describes the electrical and mechanical requirements for metal-enclosed, 600 V through 38 kV class, 60 Hz feeder bus. The bus system described is to be suitable for indoor and outdoor installations, with nominal current ratings maintained in ambient temperatures to 40°C (104 °F).

b. This specification covers only the general requirements of the bus duct assemblies. The specific requirements of each assembly (plan, arrangement, components, etc.) will be shown on drawings provided by the Purchaser. These drawings form the basis for manufacturing and installation drawings developed by the Vendor.

1.2 References

The assemblies shall be constructed, wired and tested in accordance with all applicable sections of the latest listed standards and codes.

- NEMA–National Electrical Manufacturer Association
- ANSI C37.23–American National Standards Institute
- NFPA 70–National Electrical Code

2.0 Products

2.1 Manufacturers

Square D Company–Metal-Enclosed Busway

2.1 Housing

a. The bus duct shall be nonlouvered outdoors and indoors. Housing and accessory flanges, terminal enclosures, etc., shall be primed and painted [steel] [corrosion resistant aluminum] construction. All outdoor hardware exposed to the weather shall be stainless steel. Indoor hardware (unless in corrosive environment) shall be manufacturer's standard.

b. Bus housing shall be steel or aluminum.

c. Outdoor, totally enclosed, nonlouvered housings shall be fitted with screened breathers and space heaters in sufficient quantity and rating to minimize condensation.

d. Space heaters shall be completely factory wired except shipping split connection. Heaters shall be [thermostatically controlled] [manually controlled]. Heater wiring shall be [terminated in a junction box at designated end of bus housing] [provided with 3-ft (91 cm) coiled extension for connection into Purchaser's switchgear power source]. Heaters shall be rated at 240 V and operated at 120 V (1/2 voltage) to maintain low heater surface temperature.

e. All housing and flange gasketing shall be EPDM or other noncorrosive material, and shall be completely concealed for protection against deterioration.

f. The temperature rise at any point on the housing shall not exceed 30 °C (86 °F) above an ambient temperature of 40 °C (104 °F).

g. A fire resistant divider or barrier shall be provided at all points where the bus duct extends through building walls.

2.3 Phase Bus Bars

a. Phase bus bars shall be of the metal-enclosed busway type.

b. Bus bars shall be full round edge rectangular [98% IACS copper] [57% IACS aluminum] of sufficient cross-section to provide full current rating without exceeding a hot spot temperature rise of 65 °C (149 °F) in a 40 °C (104 °F) ambient.

c. Phase bus bars shall be mounted and secured against movement during short-circuit in tracking-resistant, glass-reinforced polyester blocks, or an approved equal, spaced along the bus run as required to meet the short-circuit current rating. The support blocks can be ribbed to provide long creepage paths and fitted with corona suppressors, consisting of silicone rubber inserts between the insulated bus bars and support blocks.

d. Phase bus bars, at 5 kV class and above, shall be insulated with epoxy, rated for continuous operation at 130 °C (266 °F).

e. Contact surfaces of copper bus bars shall be silver plated electrically by tank or brush method. Contact surfaces of aluminum bus bars shall be electro-tinned. All bus bar connections shall be bolted.

f. Bolts shall pass through the bus bar conductors, and shall be capable of being properly torqued and locked in place, to provide and maintain full and uniform pressure under all operating conditions. (Torque requirements in ft/lb shall be furnished by Manufacturer.)

g. In no case shall the temperature of such bus bar joint exceed 65 °C (149 °F) above an ambient temperature of 40 °C (104 °F). An internal ground bus [shall] [shall not] be furnished which will electrically connect together all equipment connected to the bus duct.

h. If the bus duct enclosure is so constructed and connected that it provides a continuous path for ground current, it may serve as the ground bus. If the enclosure is used as the ground bus, a tooth-type lock washer shall be furnished under each bolt head and each nut at connections between sections of bus duct. If the enclosure is not so constructed, the bus duct shall be furnished with a [aluminum] [copper] ground bar inside the housing. The ground bus shall have suitable terminating pads for Purchaser's connections to station ground system.

i. Flexible connectors shall be provided for connecting bus to porcelain apparatus bushings. All necessary adapter bars and spacers, bolting hardware and insulating materials, for connections to transformer or switchgear terminals, shall be provided and the proper coordination of connections between bus and terminal equipment shall be the responsibility of the bus Manufacturer

j. Purchaser will provide Manufacturer with applicable switchgear and transformer drawings for matching and coordination requirements prior to fabrication.

2.4 Ratings

a. The maximum hot-spot temperature rise at any point in the bus, at continuous rated load, shall not exceed 65 °C (149 °F) above an ambient temperature of 40 °C (104 °F).

b. The ratings of the bus duct shall be:

- — Voltage Class: ___ Volts
- — Continuous Current Ratings: ___ Amperes
- — Short Circuit Rating: Momentary Current Amps ___ RMS asymmetrical.
- — Short Time Current Amps ___ RMS symmetrical. (Not less than short time ratings of protective devices.)
- — Basic Insulation Level (BIL): ___ kV

2.5 Supports

Bus duct supports shall be [indoor trapeze type] [outdoor column type with base plates for attaching to Purchaser's foundations] [knee-brace type for wall mounting].

Square D Company
5735 College Corner Rd.
Oxford, OH 45056, USA
1-888-SquareD
(1-888-778-2733)
www.SquareD.com

Schneider Canada Inc.
19 Waterman Avenue,
M4B 1 Y2
Toronto, Ontario
1-800-565-6699
www.schneider-electric.ca

Catalog No. 5600CT9101R8/02 August 2002
Replaces 5600CT9101R4/01 dated 09/01.