EATON | Cutler-Hammer

100-Ampere Busway

Technical Data TD01701002E

Effective November 2005
New Information

Elbow, Busway and Cable Tap Box

Contents

General Information

Eaton's Cutler-Hammer® 100-ampere busway is an excellent solution for supplying multiple small blocks of power for any normal commercial and industrial power system. 100-ampere busway is practical for small shops, laboratories, classrooms and light manufacturing. The flexibility of 100-ampere busway will reduce cost by reducing installation time compared to cable and conduit installations.

General Description

Cutler-Hammer 100-ampere busway consists of a durable steel housing and silver-plated copper rods for maximum use and efficiency. The complete product offering consists of straight sections of plug-in busway, fittings, accessories and plug-in units. 100-ampere busway can be utilized for 3-phase 600 volt systems and single-phase 240 volt systems.

Standards

Cutler-Hammer 100-ampere busway meets the requirements of NEMA®, UL® 857, ANSI and IEEE, and is manufactured in an ISO® 9001 certified facility. The busway is designed for 100-ampere capacity and is available for single-phase 3-wire, 3-phase 3-wire, and 3-phase 4-wire applications. A 50% internal copper ground bar is provided as standard. The short circuit withstand rating is 14 kAIC at 3 cycles.

Construction

Enclosure

The busway housing is made of 20 gauge steel and is painted ANSI 61 gray using a powder coat paint process. The enclosure includes 10 plug-in outlets per 10 foot (3 m) length (five per side). Each plug-in outlet provides complete polarization of the plug-in outlet, ensuring proper phasing, see **Figure 1**. All plug-in outlets are usable at the same time. The plug-in outlet is enclosed by a removable steel knockout cover. Replacement covers are available for outlets no longer being utilized.

Conductors

Electrical conductors are round silver-plated copper rods 9/32 in diameter. The conductors are enclosed between two steel housings that are riveted together in a solid assembly. See **Figure 2** for cross sectional detail.

Conductor joints are made by means of boltless pressure clips, which require no assembly or adjustment by the installer. The busway is not dependent upon the cover screws of the enclosure for maintaining the proper mechanical pressure to ensure a good low resistance joint between electrical conductors of adjacent sections.

The conductors are firmly supported by molded insulators on alternate sides of the busway. Insulators are the type through which it is possible to fully isolate the stabs, as well as afford extra protection in the event of stresses due to fault. Insulators are spaced to allow mounting of the plug-in units opposite to each other without interference.

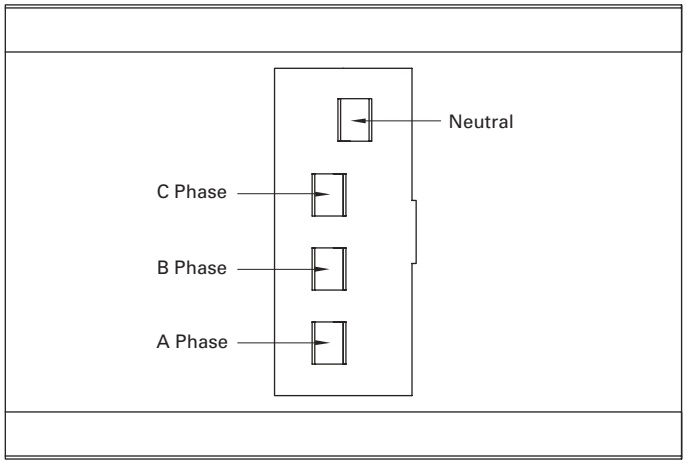


FIGURE 1. POLARIZING PLUG OUTLET

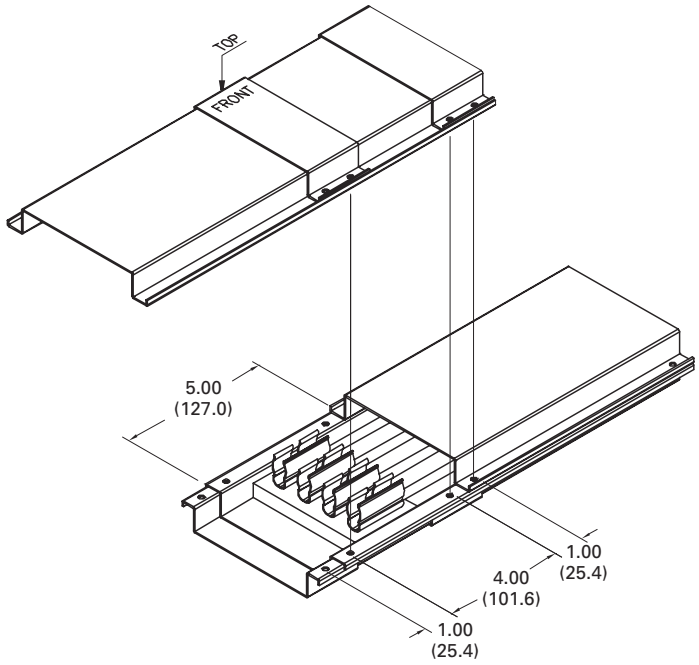


FIGURE 2. TYPICAL JOINT DETAIL

Joint Connections

100-ampere joints are designed for quick and easy assembly by simply snapping on section of busway to another and then securing them by running up the captive cover screws.

Electrical connection is made by special high pressure spring clips which firmly engage the conductors. The enclosure connection is made with a scarf lap type joint secured by captive cover screws. See typical joint detail in **Figure 3**.

TABLE 1. PLUG-IN OUTLETS

STRAIGHT LENGTH FEET (M)	WEIGHT POUNDS (KG)	NUMBER OF OUTLETS
10 (3.0)	29.50 (13.4)	10
5 (1.5)	14.75 (6.7)	6
3 (0.9)	8.85 (4.0)	4
2 (0.6)	5.90 (2.7)	2
1 (0.3)	3.75 (1.7)	2

TABLE 2. LINE-TO-LINE VOLTAGE DROP

The table below gives line-to-line voltage drop at rated current and varying power factors.

PERCENT POWER FACTOR	VOLTAGE DROP
0	0.35
10	0.56
20	0.77
30	0.98
40	1.19
50	1.39
60	1.59
70	1.79
80	2.00
90	2.20
100	2.50

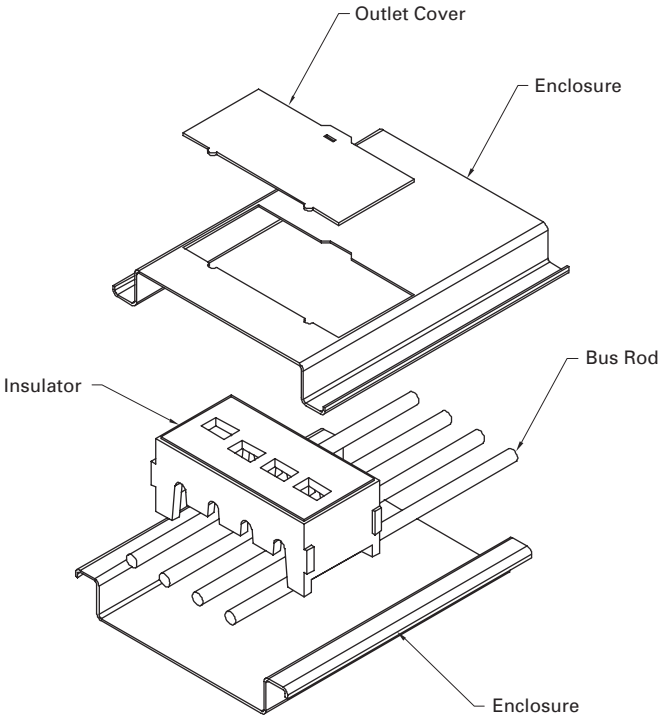


FIGURE 3. CROSS-SECTIONAL DETAIL

Straight Lengths

100-ampere busway comes in lengths of 10 feet, 5 feet, 3 feet, 2 feet and 1 foot (3 m, 1.5 m, 0.9 m, 0.6 m and 0.3 m) with plug-in outlets included in all lengths. **Table 1** shows the total plug-in outlets for each length. All plug-in outlets may be used simultaneously.

Plug-in outlets are made usable by the removal of a steel knockout cover. Replacement outlet covers are available for covering exposed outlets when a plug-in unit is relocated.

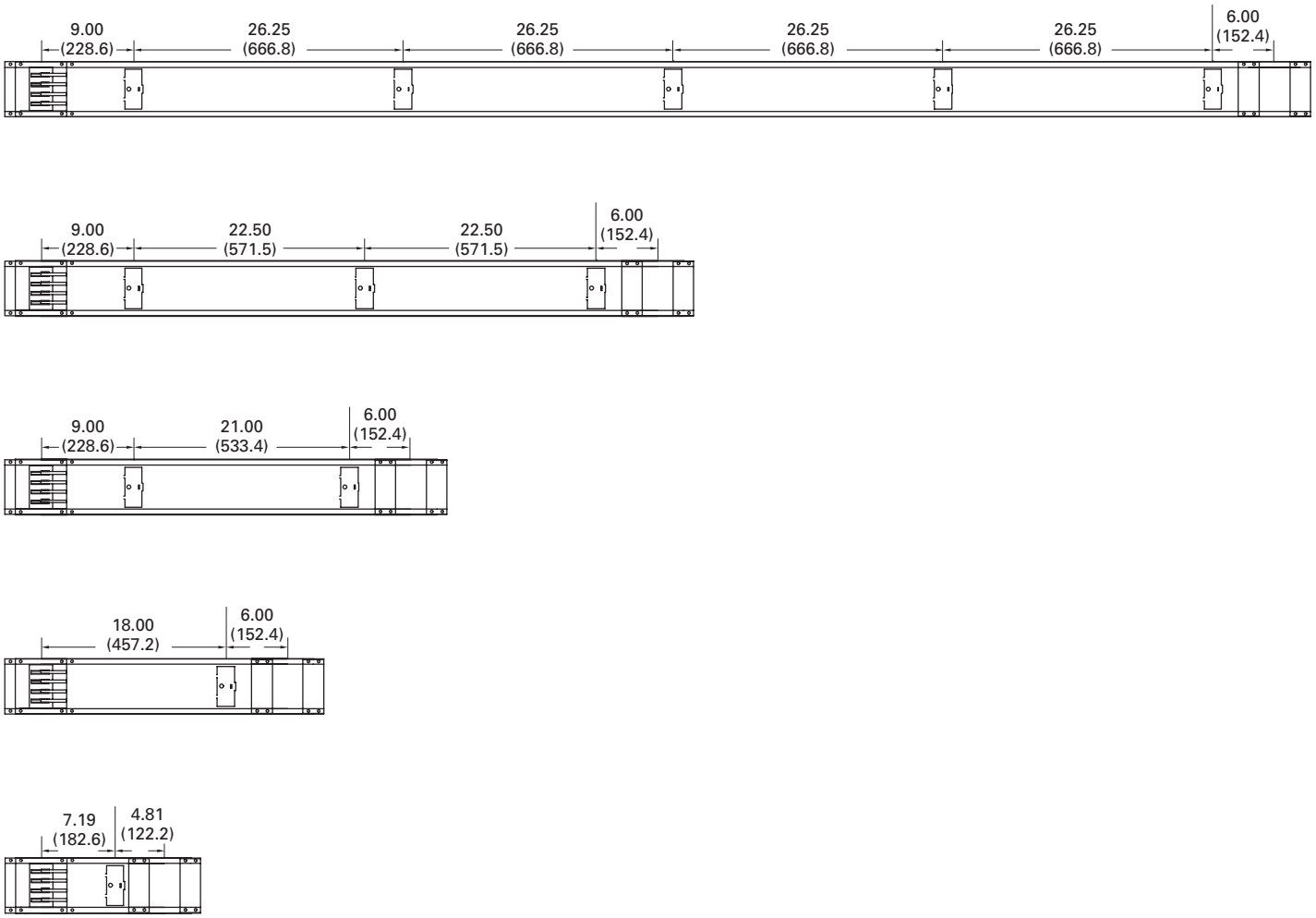


FIGURE 4. TYPICAL STRAIGHT LENGTH DETAIL

Fittings

There are three basic fittings to meet every application need. These include elbows, tees and cable tap boxes and are described in the following pages. When making field measurements and layouts, it should be remembered that dimensions of fittings are given from the centerline of the busway.

Fittings in relationship to straight lengths are described as upward, downward, forward and rearward. This relationship is shown in **Figure 5**.

Elbows

Elbows are used to make 90 degree changes in the direction/routing of the busway runs. There are four types available with each leg of the elbow being 10 inches (254 mm) long, measured from the centerline of the busway to the centerline of the joint. See **Figure 6**.

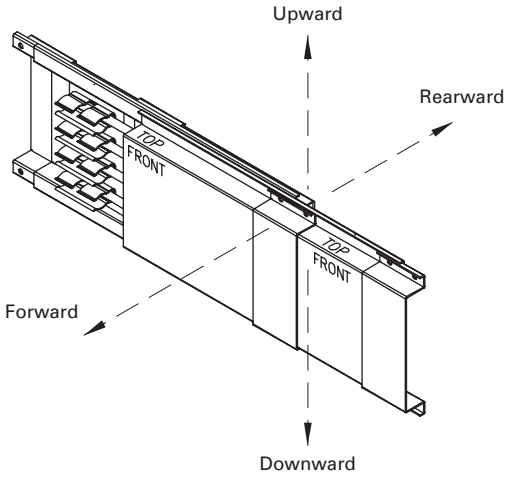
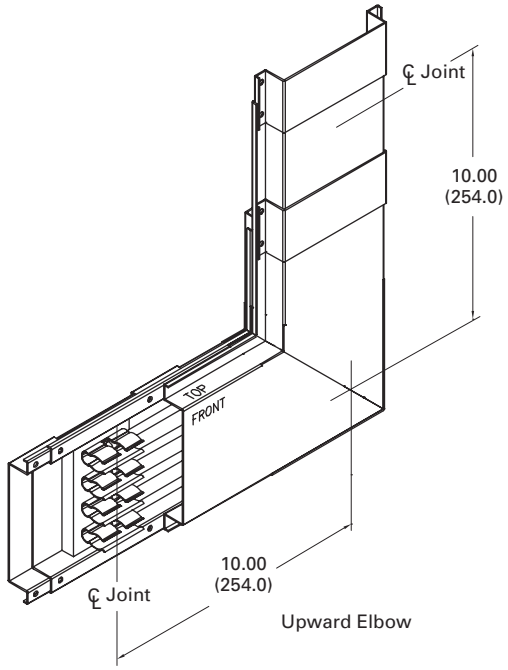
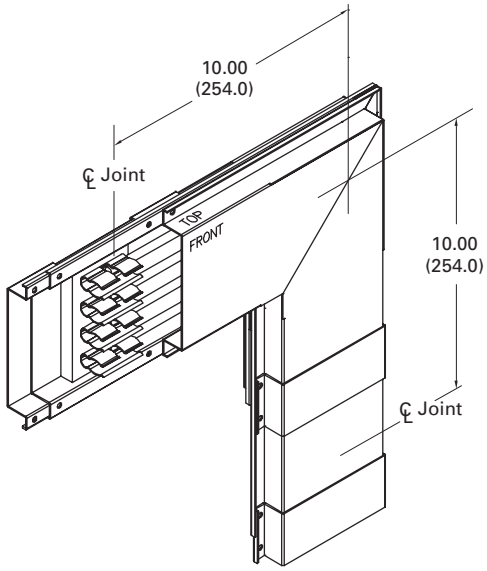


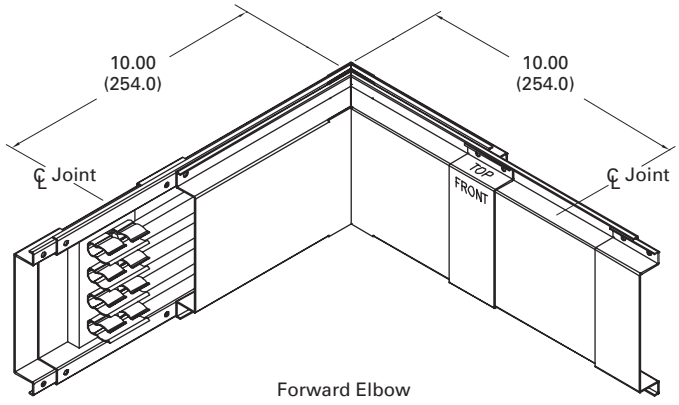
FIGURE 5. FITTING RELATIONSHIP



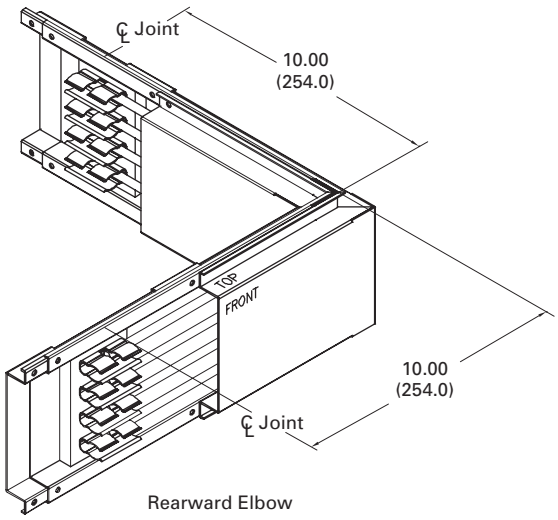
Upward Elbow



Downward Elbow



Forward Elbow

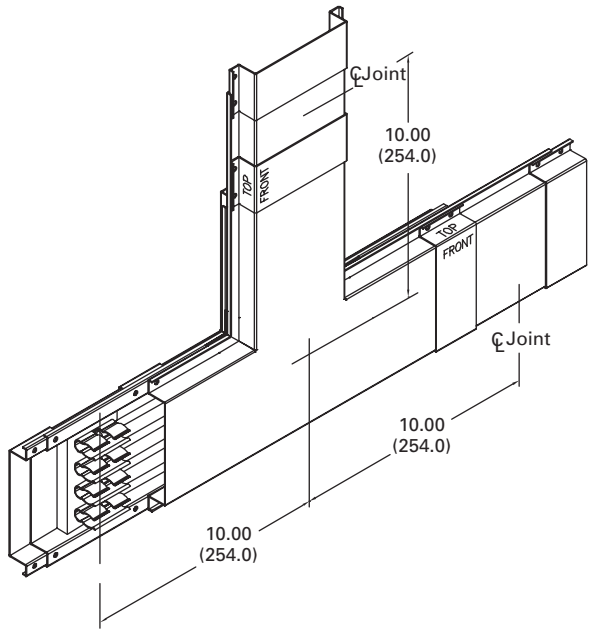


Rearward Elbow

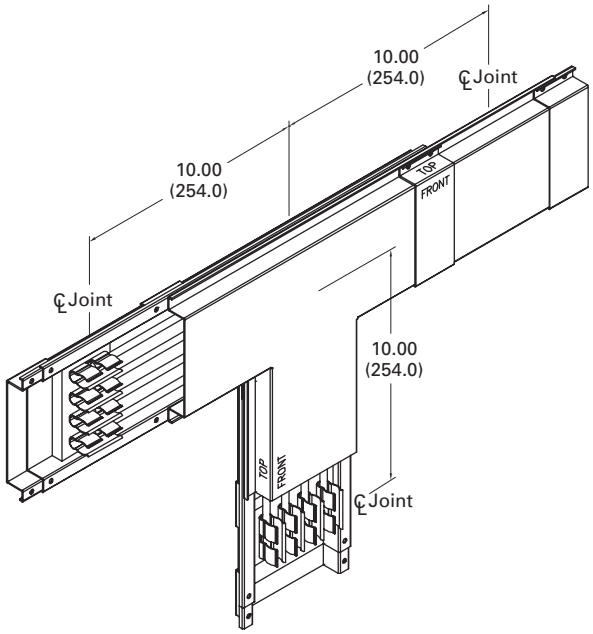
FIGURE 6. ELBOWS

Tees

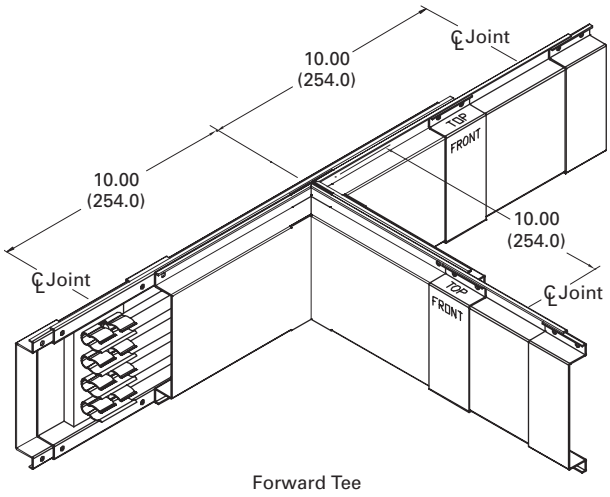
Tees are busway fittings used for making T connections to the busway. The four standard tees are: upward, downward, forward and rearward. Each leg of a tee is 10 inches (254 mm) long, measured from the centerline of the busway to the centerline of the joint.



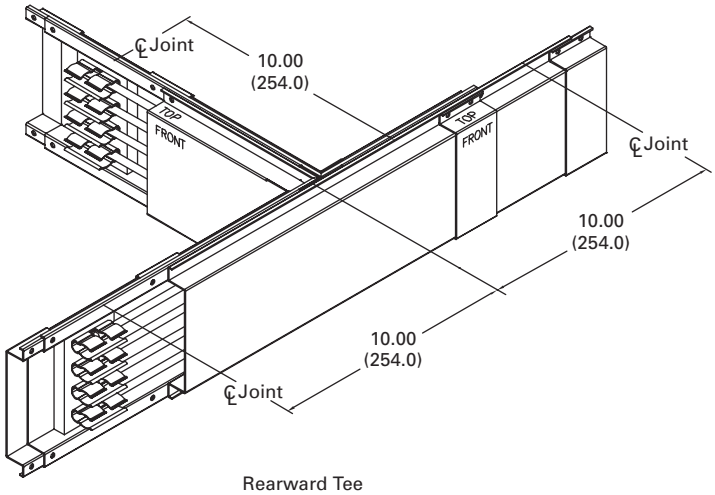
Upward Tee



Downward Tee



Forward Tee



Rearward Tee

FIGURE 7. TEES

Cable Tap Boxes

The standard end cable tap box mounts at either the left or the right end of a busway straight length. Knockouts are provided sized at 1.25, 1.50 and 2.00 inches (31.8, 38.1 and 50.8 mm). The center cable tap box allows busway to be attached to the right and left of the tap box. Knockout configuration is the same as the end cable tap box.

Also available is a plug-in cable tap box with stabs for mounting at a plug-in outlet anywhere along the busway run. Knockouts are provided sized at 0.75, 1.00, 1.25, 1.50 and 2.00 inches (19.1, 25.4, 31.8, 38.1 and 50.8 mm). All tap boxes are rated 100 amperes and include lugs for accepting either copper or aluminum cable.

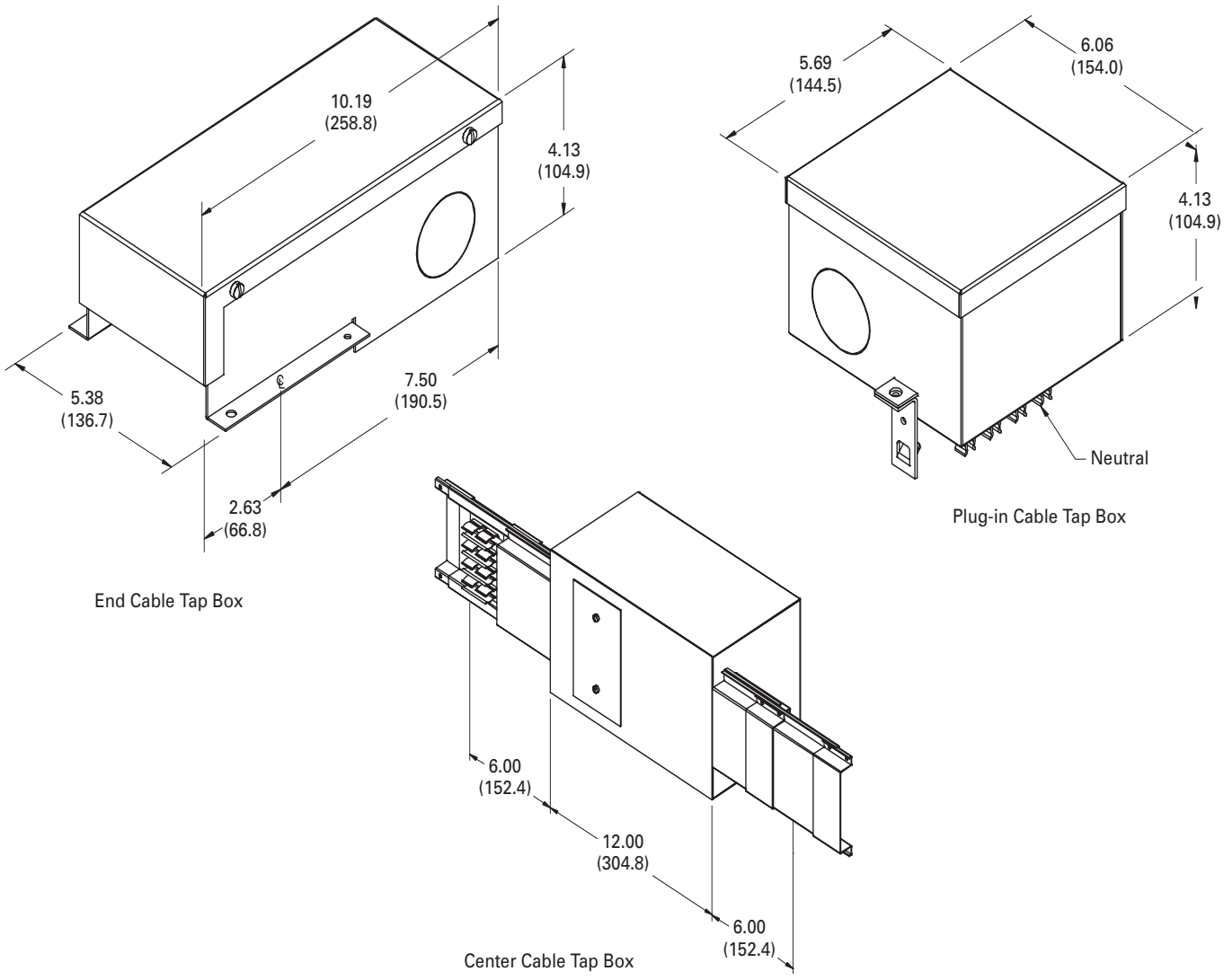


FIGURE 8. CABLE TAP BOXES

End Closer

End closers are used for closing off the end of a busway run. An end closer will end at 4 inches (101.6 mm) to the length of the busway run, measured from the centerline of the joint to the end of the end closer.

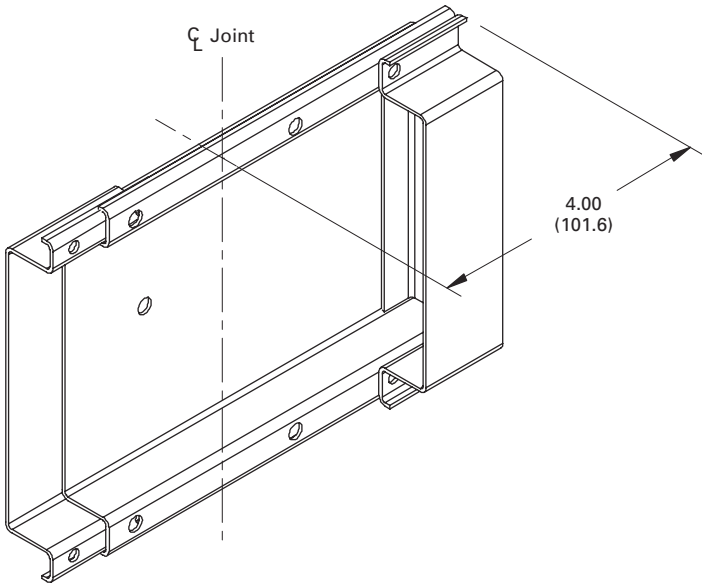


FIGURE 9. END CLOSER

Wall Flange

Wall flanges are used to fit around the busway and close off the opening made to allow the busway run to pass through the wall. Wall flanges are for cosmetic purposes only and, by themselves, do not provide any type of vapor or fire barrier. Wall openings should be cut 1/2 inch (.50 mm) wider and taller than the busway.

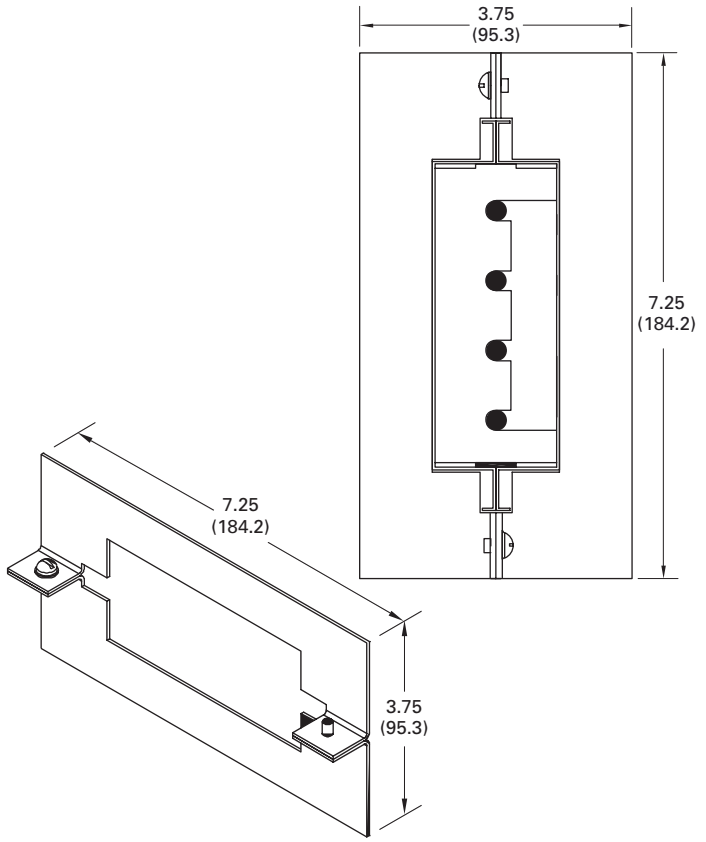
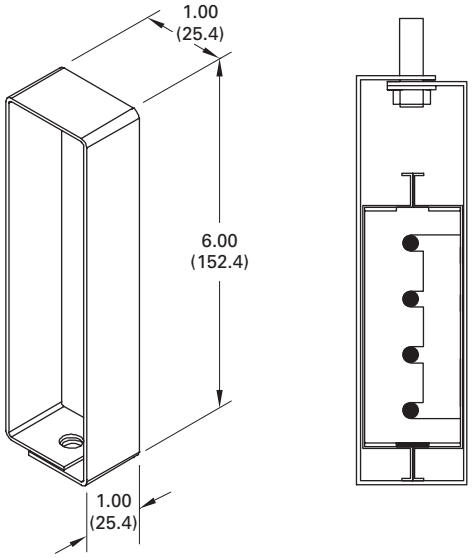


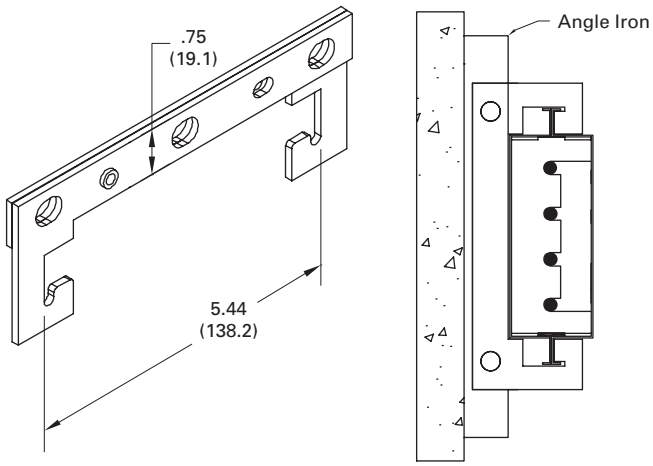
FIGURE 10. WALL FLANGE

Hangers

Hangers are included with the busway; one for each 10-foot (3 m) length of the busway run. The busway is suitable for supporting on 10-foot (3 m) centers when mounted edgewise. The edgewise hanger easily slips over the busway firmly holding the busway on edge. The "C" clamp hanger is used for wall mounting or sway bracing. Customer supplied angle iron must be used in conjunction with the "C" clamp.



Edgewise Hanger



Wall Hanger

FIGURE 11. HANGERS

Plug-in Devices

Plug-in devices plug in through the insulated outlets of the busway enclosure and stab onto the busway conductors. They are available with both fusible and circuit breaker overcurrent protection. Grounds for all plug-in devices are ordered and shipped separately.

Fusible Plug-in Units

Fusible plug-in units are available in 240 volt and 600 volt service ratings. Both offer 30, 60 and 100 ampere current ratings with provisions for Class H fuses. See **Figure 12**.

Circuit Breaker Plug-in Units

Circuit breaker plug-in units are available with provisions for HQP circuit breakers rated 240 volts, 10 – 100 amperes, and FD circuit breakers rated 600 volts, 15 – 100 amperes. Enclosures have provisions to accept any combination of single-, two- and three-pole circuit breakers up to three poles. An external operating handle is available for hook stick or chain operation. See **Figure 13**.

Receptacle Plug-in Units

The receptacle plug-in unit includes provisions for three HQP or FD frame circuit breaker poles and provisions for up to three conventional single gang outlets and blank covers to fill unused spaces. The receptacle plug-in unit does not come with circuit breakers, outlets or wiring. See **Figure 14**.

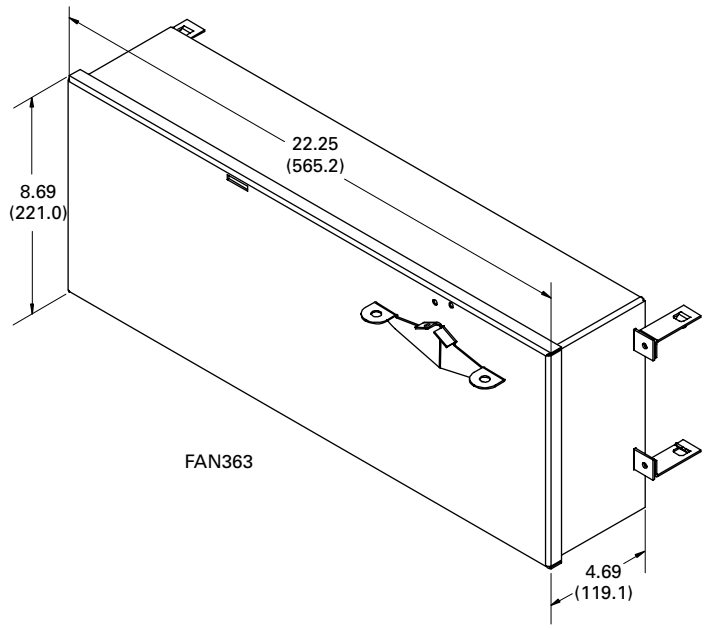


FIGURE 12. FUSIBLE PLUG-IN UNIT

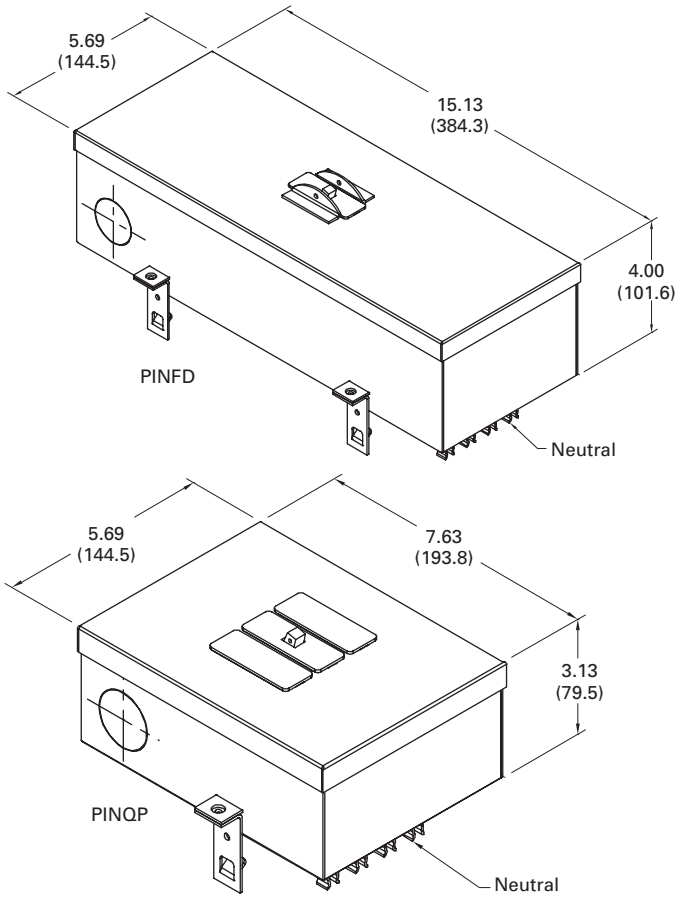


FIGURE 13. CIRCUIT BREAKER PLUG-IN UNIT

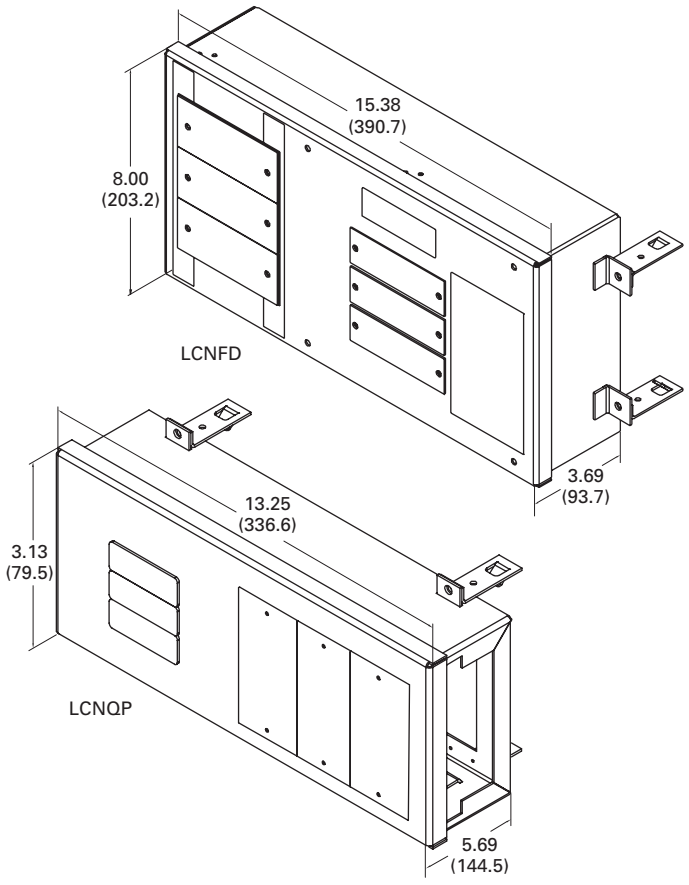


FIGURE 14. RECEPTACLE PLUG-IN UNITS

TABLE 3. 100 AMPERE BUSWAY — COPPER (INCLUDES 50% INTERNAL GROUND BAR)

DESCRIPTION	3-PHASE, 3-WIRE 600 V MAX. CATALOG NUMBER	3-PHASE, 4-WIRE FN 277/480 V CATALOG NUMBER	SINGLE-PHASE, 3-WIRE 120/240 V CATALOG NUMBER
Straight Lengths — Feet (m)			
10 (3)	CST13G	CST14G	CST13NG
5 (1.5)	CST135G	CST145G	CST13N5G
3 (.9)	CST133G	CST143G	CST13N3G
2 (.6)	CST132G	CST142G	CST13N2G
1 (.3)	CST131G	CST141G	CST13N1G
Elbows			
Forward	CFE13G	CFE14G	CFE13NG
Rearward	CRE13G	CRE14G	CRE13NG
Upward	CUE13G	CUE14G	CUE13NG
Downward	CDE13G	CDE14G	CDE13NG
Tees			
Forward	CFT13G	CFT14G	CFT13NG
Rearward	CRT13G	CRT14G	CRT13NG
Upward	CUT13G	CUT14G	CUT13NG
Downward	CDT13G	CDT14G	CDT13NG

TABLE 4. CABLE TAP BOXES

DESCRIPTION	3-WIRE OR 4-WIRE CATALOG NUMBER	GROUND (IF REQUIRED) CATALOG NUMBER
Plug-In	PIB14	PIGS100
End	EB14	GL100
Center	CBIB14G	(Included)

TABLE 5. ACCESSORIES

DESCRIPTION	CATALOG NUMBER
End Closer	EC1
Outlet Cover	OC1
Edgwise Hanger	EH1
"C" Clamp Hanger	FH1
Slip-on Wall Flange	WF1

TABLE 6. FUSIBLE PLUG-IN UNITS

AMPERE RATING	VOLTAGE RATING	FUSIBLE ENCLOSURE CATALOG NUMBER	GROUND (IF REQUIRED) CATALOG NUMBER
30	240	FAN321	PIGS100
60		FAN322	PIGS100
100		FAN323	PIGS100
30	600	FAN361	PIGS100
60		FAN362	PIGS100
100		FAN363	PIGS100

TABLE 7. CIRCUIT BREAKER PLUG-IN UNITS

AMPERE RATING	BREAKER FRAME	CIRCUIT BREAKER ENCLOSURE CATALOG NUMBER	RECEPTACLE ENCLOSURE CATALOG NUMBER	GROUND (IF REQUIRED) CATALOG NUMBER	EXTERNAL HANDLE (REQUIRED FOR HOOK-STICK OPERATION) CATALOG NUMBER
15 – 50	QUICKLAG® HQP	PINQP	LCNQP	PIGS100	HMQP
15 – 100	FD, EHD, FDB	PINFD	LCNFD	PIGS100	HMFD

Specifications

Part 1 — General

1.01 Scope

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

1.02 Related Sections

1.03 References

1.03.1 The low voltage 100-ampere busway and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of ANSI, NEMA, UL and IEEE.

1.03.1.1 NEMA BU.1

1.03.1.2 ANSI/UL 857

1.04 Submittals for Review/Approval

1.04.1 The following shall be submitted to the Engineer:

1.04.1.1 Bill of material including catalog numbers, quantities and descriptions.

1.04.1.2 Descriptive bulletins and product sheets.

1.05 Qualifications

1.05.1 All components shall be of the same manufacturer as the busway.

1.05.2 For the equipment specified herein, the manufacturer shall be ISO 9001 certified.

1.05.3 The manufacturer of this equipment shall have produced similar electrical equipment for a period of 10 years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

1.06 Delivery, Storage and Handling

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

Part 2 — Products

2.01 Manufacturers

2.01.1 Eaton Corporation

2.02 Ratings

2.02.1 The busway shall be Cutler-Hammer type 100-ampere busway and shall be:

1-phase, 3-wire with 50% internal ground.

3-phase, 3-wire with 50% internal ground.

3-phase, 4-wire with 50% internal ground.

As indicated in the contract drawings.

2.03 Construction

2.03.1 The 100-ampere busway and associated fittings shall consist of copper conductors totally enclosed by and supported in a sheet steel housing. The complete installation shall be coordinated throughout, rigid in construction, of uniform size, and neat in symmetrical in appearance. The entire systems shall be constructed using manufacturer's standard sections. Fittings shall be made in such a manner that no increase of enclosure size is required at the splice between adjoining sections.

2.04 Conductors

2.04.1 The conductors shall be fabricated from high strength 98% conductivity copper rods.

2.04.2 Conductors shall be silver-plated their entire length.

2.04.3 Conductor joints shall be made by means of boltless pressure clips which require no assembly or adjustment by the installer.

2.05 Enclosures

2.05.1 The busway housing shall be made of 20 gauge steel painted ANSI 61 by means of a powder coat paint process.

2.05.2 Provide 10 plug-in outlets on a 10-foot section and two plug-in outlets on a 1-foot section.

2.06 Supports

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

2.06.2 Insulators shall be spaced so as to allow mounting of plug-in units opposite to each other without interference.

2.07 Plug-In Devices

2.07.1 All plug-in units are to be polarized for maintaining correct phase orientation.

2.07.2 Plug-in unit enclosures shall be made of 18 gauge steel or heavier.

2.07.3 Enclosures shall be painted ANSI 61 by means of a powder coat paint process.

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Printed in USA
Publication No. TD01701002E/ Z3724
November 2005

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