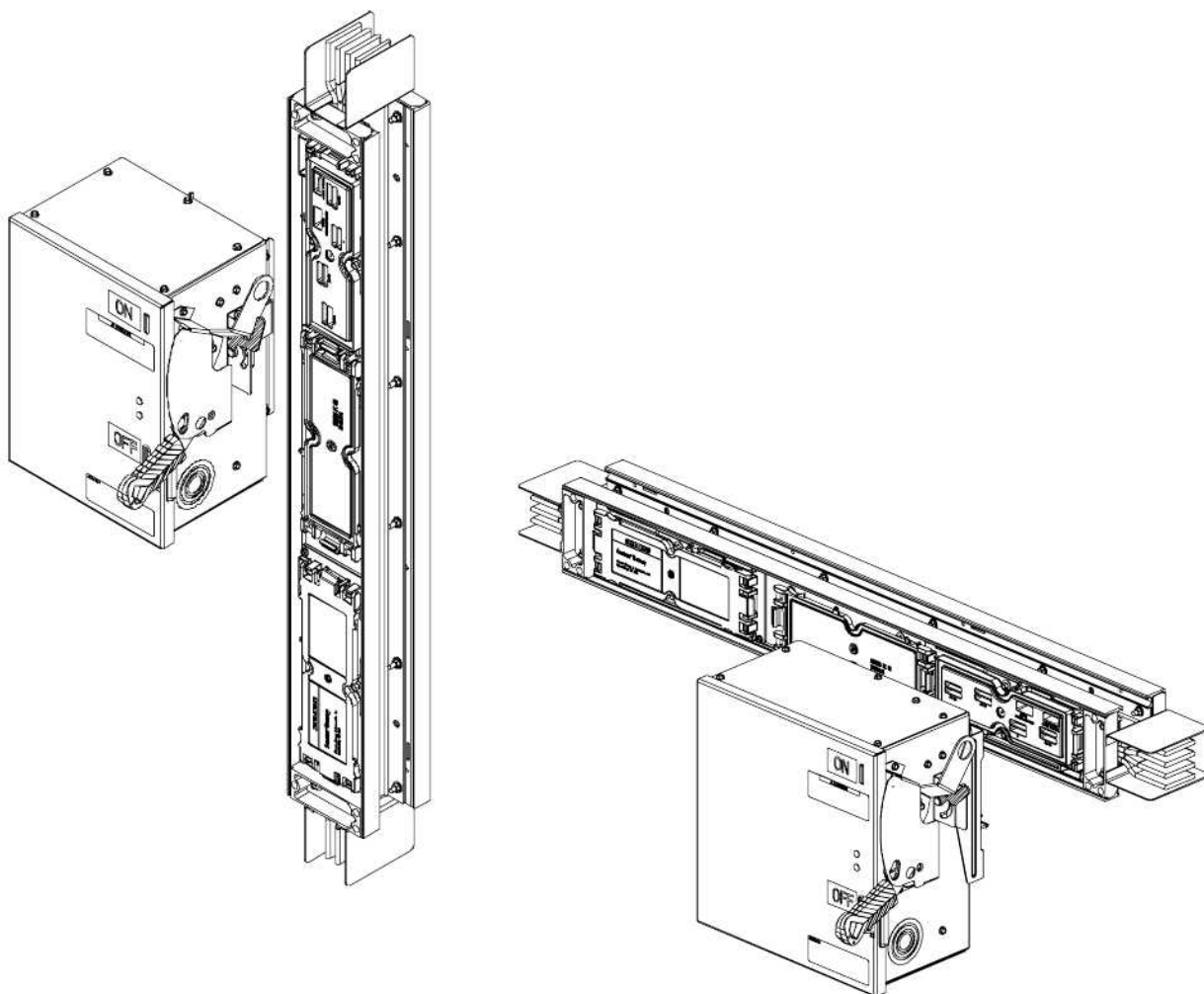


Storage, Installation and Maintenance Instructions for SENTRON Busway Systems



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	 DANGER • Hazardous voltages and exposed electrical conductors will cause death, serious injury, or property damage. • De-energize before working inside busway system. Only qualified personnel should work on or around this equipment after becoming thoroughly familiar with all warnings, safety notices, and maintenance procedures contained herein.	
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1.0 DEFINITIONS

1.1 QUALIFIED PERSONNEL

FOR THE PURPOSE OF THIS MANUAL AND PRODUCT LABELS, A QUALIFIED PERSON IS ONE WHO IS FAMILIAR WITH THE INSTALLATION, CONSTRUCTION AND OPERATION OF THE EQUIPMENT AND THE HAZARD INVOLVED. IN ADDITION, HE OR SHE HAS THE FOLLOWING QUALIFICATIONS:

- Is trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety procedures.
- Is trained in the proper care and use of protective equipment such as rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc., in accordance with established safety practices.
- Is trained in rendering first aid.

1.2 DANGER

FOR THE PURPOSE OF THIS MANUAL AND PRODUCT LABELS, **DANGER** INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.

1.3 WARNING

FOR THE PURPOSE OF THIS MANUAL AND PRODUCT LABELS, **WARNING** INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.

1.4 CAUTION

FOR THE PURPOSE OF THIS MANUAL AND PRODUCT LABELS, **CAUTION** INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, MAY RESULT IN MINOR OR MODERATE INJURY.

1.5 TIP

FOR THE PURPOSE OF THIS MANUAL AND PRODUCT LABELS, **TIP** INDICATES A PRACTICE, TECHNIQUE OR AWARENESS THAT MAY EASE INSTALLATION.

2.0 STORAGE INSTRUCTIONS

Upon receipt, immediately inspect busway components for possible concealed damage from shipping and/or handling. If damage has occurred, file a claim with the carrier. If there is no damage, restore the packaging to its original condition to prepare for job site storage.

Store busway indoors in a clean and dry area. Protect against mechanical damage and exposure to lime dust (concrete), water, corrosive fumes or liquids and salts. Failure to properly store and protect the busway can cause damage and will void the warranty.

3.0 PREPARING FOR INSTALLATION

Deliver busway to installation location prior to unpacking. Shipping crates/cartons display exterior identification of the packaged busway components. Each busway component is further identified by an item number located on the nameplate, which corresponds to the item number on the busway installation drawing(s).

Inspect each busway component for possible damage. Consult the factory if damage is found. Confirm that the contact surfaces are not damaged and are clean and dry. Abrasives should not be used on these surfaces because contact surfaces are electroplated. Inspect joint insulators for cracking or any sign of damage.

Megger test each busway component at 1000 volts, phase to phase (including neutral) and phase to ground to detect incorrect installation and verify insulation integrity. Busway should be disconnected from any line or load devices when performing a megger test. Minimum readings should be no less than:

Megohms > 1000 for each component

WARNING: If readings are below this minimum, do not assemble busway or apply power to the installed busway and contact Siemens.

4.0 PHASE SEQUENCE

Typical busbar phase sequence is G-A-B-C-N top to bottom when internal (or isolated) ground and neutral are provided. Joint supports on the end of each busway section include an arrow that points to the "A phase or Ground" side of the busway (Figure 13). The rating nameplate is placed on the "neutral side".

WARNING: When phase transpositions are utilized, this convention may change. Busway installation drawings indicate phase sequence and arrow position for each portion of the busway run. The item number sequence identified on these installation drawings must be followed exactly to ensure proper installation.

5.0 EXTERIOR WALL PENETRATIONS

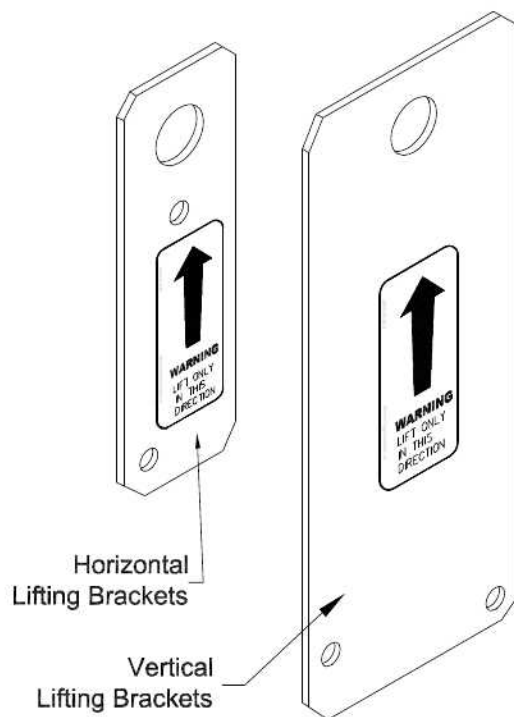
Where SENTRON outdoor busway passes through a building's exterior wall, the installation of a SENTRON wall flange is recommended to close off the wall opening around the busway. The Wall, Ceiling and Floor Flange Installation Instructions Document, #31-9923-01, which is supplied with the flange, describes and illustrates the assembly and caulking requirements.

NOTE: No joint components may fall within a wall or floor penetration.

TIP: To minimize the possibility of water flowing into the building, the busway should be installed with a slight (1 to 5 degree) slope away from the building.

6.0 INSTALLING SENTRON BUSWAY

Use Siemens lifting kit SXLK during installation for lifting busway in horizontal or vertical applications. Follow the instructions included in the kit. Do not use busway hardware for lifting unless this kit is used.



WARNING: Lifting busway without Siemens lifting kit SXLK may result in busway damage, serious injury or death.

CAUTION: Housing end ramps (Figure 12) provide ground continuity as well as sealing surfaces on water resistive ratings. Do not damage these housing end ramps prior to or during installation. Water resistive ratings may be jeopardized if the end ramps are damaged.

It is recommended to start the installation at the beginning of the busway run, e.g., at the switchboard or switchgear termination. Starting at the center of a busway run may result in improper location and require subsequent adjustment.

Wall, ceiling and floor flanges are available to close off the area around the busway as it passes through a wall or floor. An opening 1 inch (26mm) larger than busway cross-section should be provided. Fire rated installations are available for both gypsum wallboard and concrete penetrations. Refer to Fire Stop Material Installation Instructions Document #31-9934-01. For ordering and installation information, contact your local Siemens sales office.

NOTES:

- No joint components may fall within a wall or floor penetration.
- Minimum clearances for installing feeder busway are shown in Figure 1.
- Minimum clearances for plug-in busway are shown in Figures 2 and 2.1. See Supplemental Instructions Document #31-9983-01 for 8PM bus plug minimum clearances.
- Minimum clearances for wall mounted hanger applications may be less than shown in Figure 1. Refer to the SENTRON Selection & Application Guide for details.

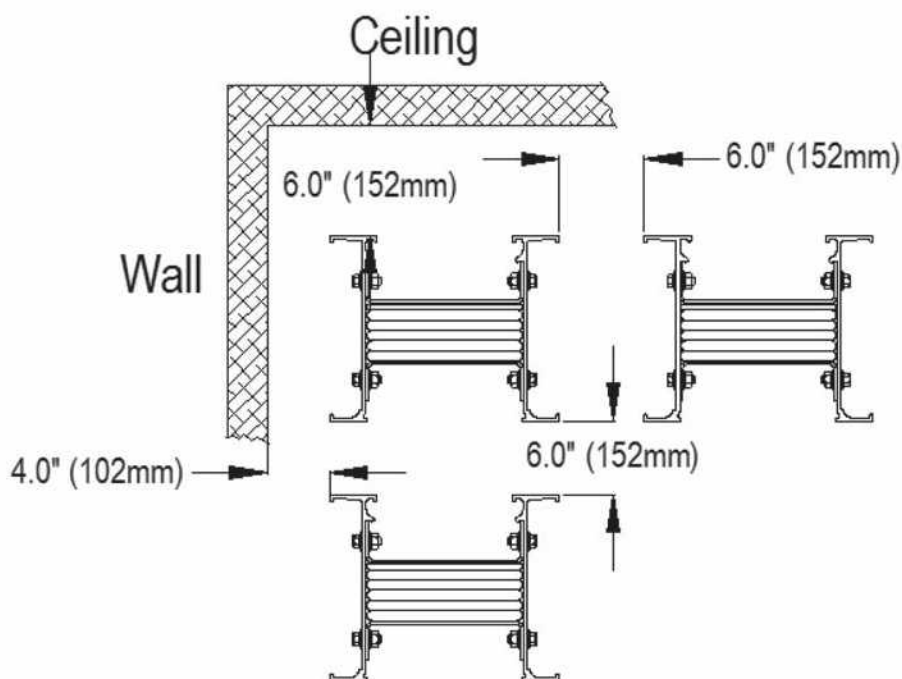
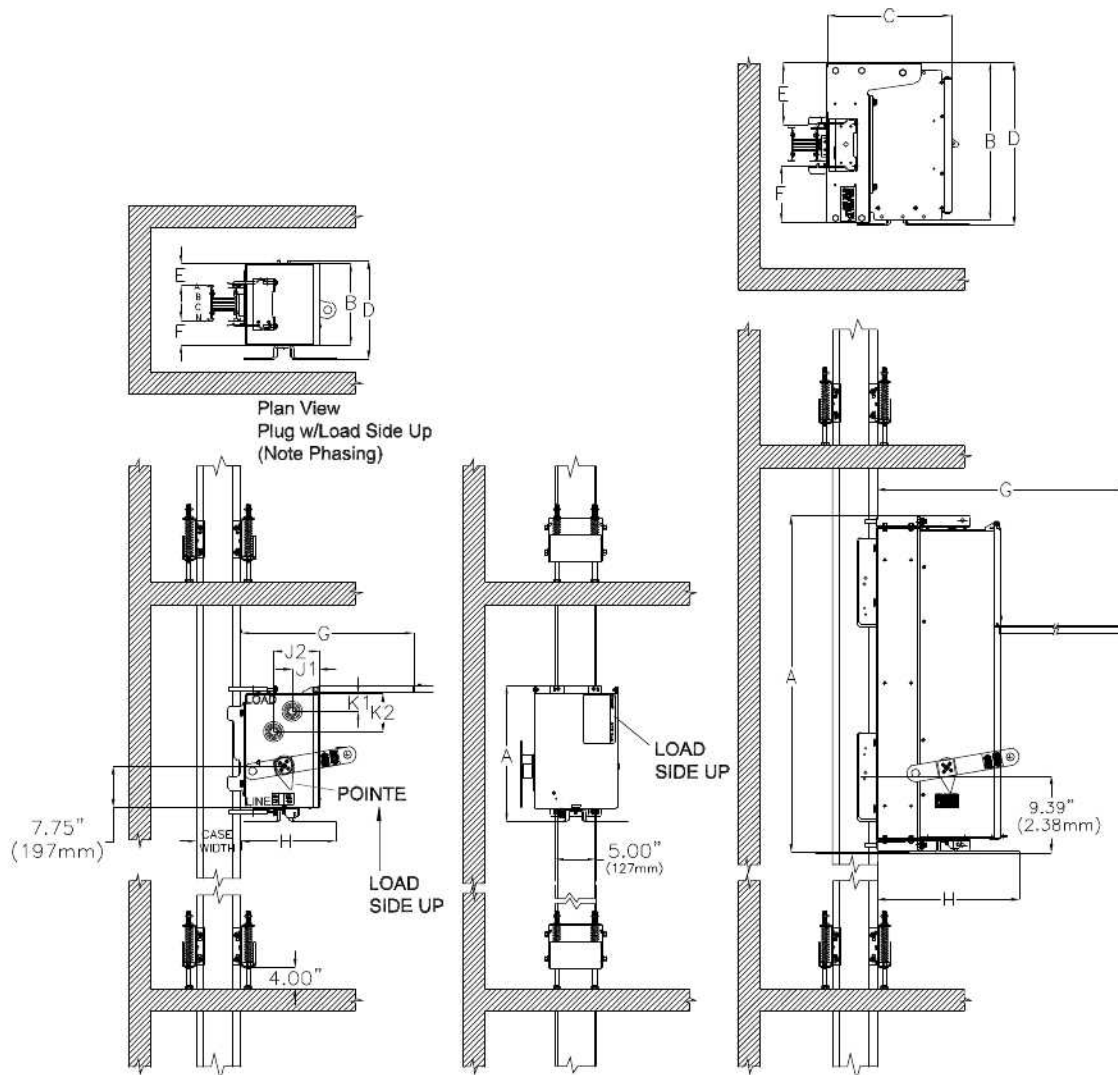


Figure 1. Minimum Installation Clearances - Feeder
(4" = 102 mm, 6" = 152 mm)

6.1 SENTRON Wall Clearance/Bus Plug Dimensions



Dim	CIRCUIT BREAKER PLUGS SENTRON										FUSIBLE SWITCH PLUGS SENTRON					
	No Cradle					Cradle					No Cradle			Cradle		
	E Frame Std Current Limiting	F Frame Std Current Limiting	J Frame *3 Std Current Limiting	L Frame Std Current Limiting	M Frame Std Current Limiting	E Frame Std Current Limiting	F Frame Std Current Limiting	J Frame *3 Std Current Limiting	L Frame Std Current Limiting	M Frame Std Current Limiting	30/60 Switch	100 Switch	200 Switch	400 Switch	400 Compact Switch	600 Switch
A	17.00 (432)	22.00 (559)	22.00 (559)	27.00 (686)	23.50 (597)	30.50 (775)	41.50 (1054)	41.50 (1054)	41.50 (1054)	41.50 (1054)	17.00 (432)	22.00 (559)	23.50 (597)	41.00 (1041)	23.25 (591)	41.50 (1054)
B	10.25 (260)	10.25 (260)	10.25 (260)	10.25 (260)	16.75 (425)	16.75 (425)	19.75 (502)	19.75 (502)	19.75 (502)	19.75 (502)	10.25 (260)	10.25 (260)	16.75 (425)	16.75 *1 (425)	16.75 *1 (425)	19.75 (502)
C	9.25 (235)	9.25 (235)	9.25 (235)	9.25 (235)	11.25 (288)	11.25 (288)	15.25 (387)	15.25 (387)	15.25 (387)	15.25 (387)	9.25 (236)	9.25 (236)	11.25 (288)	15.25 (387)	15.75 (400)	15.25 (387)
D	12.25 (311)	12.25 (311)	12.25 (311)	12.25 (311)	18.75 (478)	18.75 (478)	20.00 (508)	20.00 (508)	20.00 (508)	20.00 (508)	12.25 (311)	12.25 (311)	18.75 (478)	19.25 (489)	18.25 (484)	20.00 (508)
E	2.50 (64)	2.50 (64)	2.50 (64)	2.50 (64)	5.75 (148)	5.75 (148)	7.75 (197)	7.75 (197)	7.75 (197)	7.75 (197)	2.50 (64)	2.50 (64)	5.75 (146)	5.75 *2 (146)	5.75 *2 (146)	8.00 (203)
F	2.50 (64)	2.50 (64)	2.50 (64)	2.50 (64)	5.75 (146)	5.75 (146)	7.00 (178)	7.00 (178)	7.00 (178)	7.00 (178)	2.50 (64)	2.50 (64)	5.75 (146)	5.75 *2 (146)	5.75 *2 (146)	8.25 (210)
G	26.00 (660)	31.00 (787)	31.00 (787)	36.00 (914)	34.50 (876)	41.50 (1054)	41.50 (1054)	41.50 (1054)	41.50 (1054)	41.50 (1054)	26.00 (660)	31.00 (787)	34.50 (876)	42.00 (1067)	36.50 (927)	41.25 (1054)
H	14.25 (362)	14.25 (362)	14.25 (362)	14.25 (362)	16.50 (419)	16.50 (419)	17.50 (445)	17.50 (445)	17.50 (445)	17.50 (445)	14.25 (362)	14.25 (362)	16.50 (419)	18.00 (457)	18.00 (457)	17.50 (445)
J1	3.50 (89)	3.50 (89)	3.50 (89)	3.50 (89)	4.00 (102)	4.00 (102)	-	-	-	-	3.50 (89)	3.25 (83)	4.00 (102)	-	10.75 (273)	-
J2	-	-	-	-	-	-	-	-	-	-	-	-	7.00 (178)	-	-	-
K1	2.25 (57)	2.25 (57)	3.25 (83)	3.25 (83)	3.25 (83)	3.25 (83)	-	-	-	-	2.25 (57)	3.00 (76)	3.25 (83)	-	3.50 (89)	-
K2	-	-	-	-	-	-	-	-	-	-	-	-	7.75 (197)	-	-	-

LEGEND:

- A = Length of enclosure including handle
- B = Height of enclosure
- C = Depth of enclosure
- D = Height of enclosure including optional handle location
- E = Extension of plug above top of busway
- F = Extension of plug below bottom of busway
- G = Cover (depth) clearance for enclosure
- H = Depth of enclosure from handle to edge of busway
- J = Knockout/pilot hole location (horizontal)
- K = Knockout/pilot hole location (vertical)

Note: All dimensions are shown in inches and millimeters ().

*1 = Add 2.00" (51 mm) to include height of box aux. mtg. flanges.

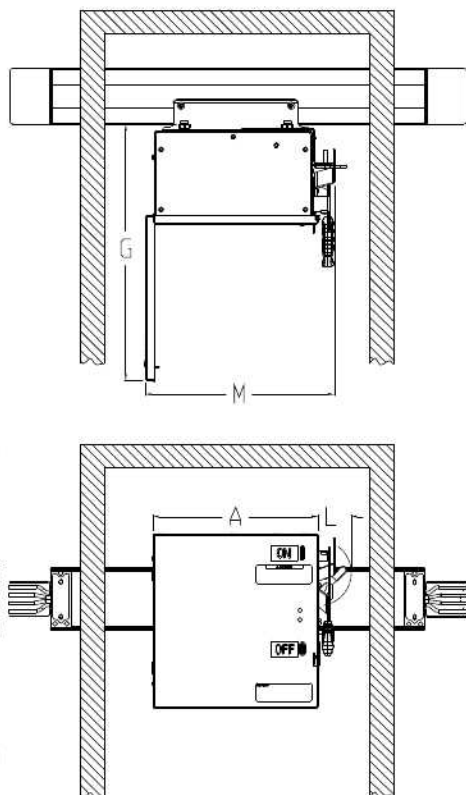
*2 = Add 1.00" (25 mm) to include box aux. mtg. flange height.

*3 = 200%N Applications
- For J-Frame use L-Frame Dims.

Figure 2. Minimum Installation Clearances - Plug-In With SENTRON Bus Plugs

6.2 SENTRON SLVB Wall Clearance/Bus Plug Dimensions

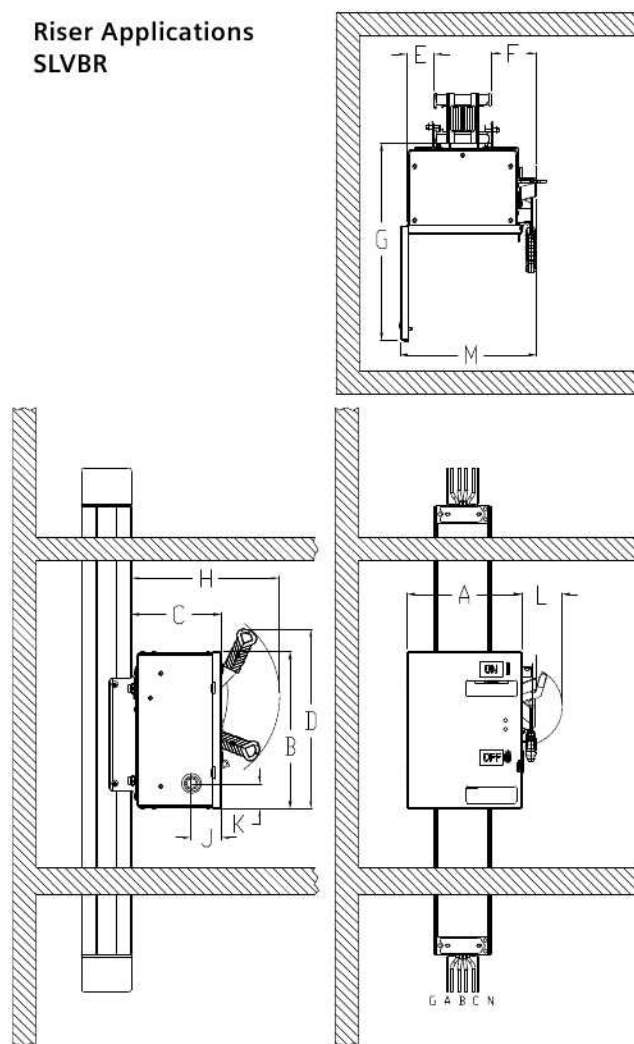
Horizontal Applications SLVBH



Wall Clearance and Bus Plug Dimensions Horizontal

Dim.	30	60	100	200
A	13.13 (333)	13.13 (333)	13.13 (333)	14.68 (372)
B	13.86 (352)	14.86 (377)	15.86 (402)	22.86 (580)
C	7.96 (202)	7.96 (202)	7.96 (202)	10.58 (268)
D	15.89 (403)	16.68 (423)	17.68 (449)	24.66 (626)
E	2.67 (67)	2.67 (67)	2.67 (67)	2.67 (67)
F	6.19 (157)	7.19 (182)	8.19 (208)	15.19 (385)
G	20.39 (517)	20.39 (517)	20.39 (517)	24.76 (628)
H	13.09 (332)	13.09 (332)	13.09 (332)	16.55 (420)
J	2.65 (67)	2.65 (67)	2.65 (67)	3.40 (86)
K	2.18 (55)	2.18 (55)	2.18 (55)	3.18 (80)
L	2.65 (67)	2.65 (67)	2.65 (67)	2.65 (67)
M	15.07 (382)	15.07 (382)	15.07 (382)	16.82 (427)

Riser Applications SLVBR



Wall Clearance and Bus Plug Dimensions Riser

Dim.	30	60	100	200
A	10.13 (257)	10.13 (257)	11.13 (282)	14.68 (372)
B	13.86 (352)	14.86 (377)	15.86 (402)	22.86 (580)
C	7.96 (202)	7.96 (202)	7.96 (202)	10.58 (268)
D	15.89 (403)	16.68 (423)	17.68 (449)	24.66 (626)
E	2.38 (60)	2.38 (60)	3.38 (85)	4.75 (120)
F	4.06 (103)	4.06 (103)	4.06 (103)	6.44 (163)
G	17.39 (441)	17.39 (441)	18.39 (467)	24.76 (628)
H	13.09 (332)	13.09 (332)	13.09 (332)	16.55 (420)
J	2.65 (67)	2.65 (67)	2.65 (67)	3.40 (86)
K	2.18 (55)	2.18 (55)	2.18 (55)	3.18 (80)
L	3.55 (90)	3.55 (90)	3.55 (90)	3.55 (90)
M	12.07 (306)	12.07 (306)	13.07 (331)	16.82 (427)

Note: All dimensions are shown in inches and millimeters ().

Figure 2.1 Minimum Installation Clearances - Plug-In With SENTRON SLVB Bus Plugs

7.0 HORIZONTAL INSTALLATION SUPPORTS

Trapeze hangers (Figures 3 and 4) and single drop rod hangers (Figure 8) are used to support horizontal busway runs on maximum 10' (3.05m) centers. 1/2 inch (13 mm) steel drop rods and hardware are to be furnished by installer. See Hanger Installation Instructions Document #31-9931-01 for complete procedures.

Avoid positioning hangers at busway joints and plug-in openings where possible. Maintain good alignment along the busway run. Sway brace brackets SXSB (Figure 8.2) may be required to maintain straight alignment and prevent rotation or sway of the busway, especially when bus plugs are installed.

7.1 Trapeze Hanger Installation

7.1.1 Center busway on the trapeze hanger at desired location.

7.1.2 Install a hanger clamp on each side of the busway with the hardware provided. Ensure that the hanger clamp tabs are positioned in the hanger clamp tab slots (Figures 3 and 4).

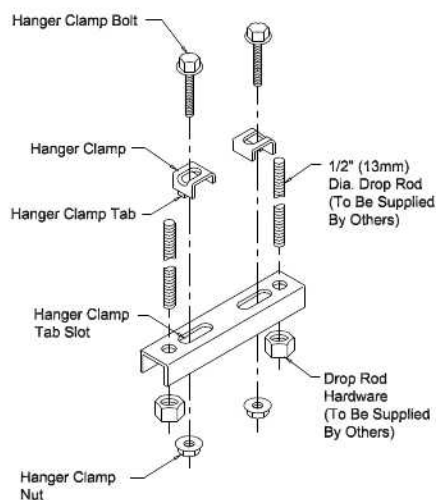


Figure 3. Trapeze Hanger

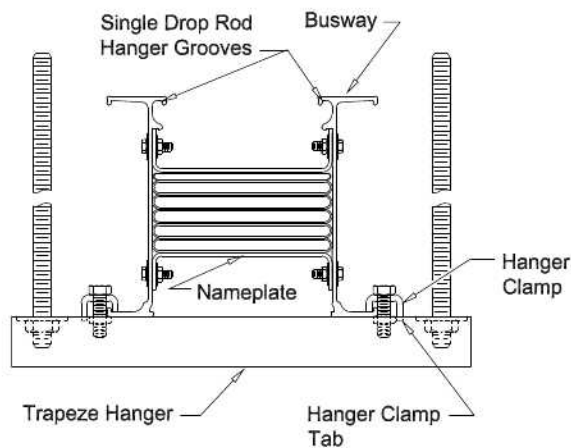


Figure 4. Trapeze Hanger (Installed)

7.2 Wall Hanger Installation

7.2.1 Center busway on the wall hanger at desired location. Install a hanger clamp on each side of the busway with the hardware provided. Ensure that the hanger clamp tabs are positioned in the hanger clamp tab slots (Figures 5, 6 and 7).

7.2.2 Omission of hanger clamps may result in undesirable busway rotation when installing the bus plugs.

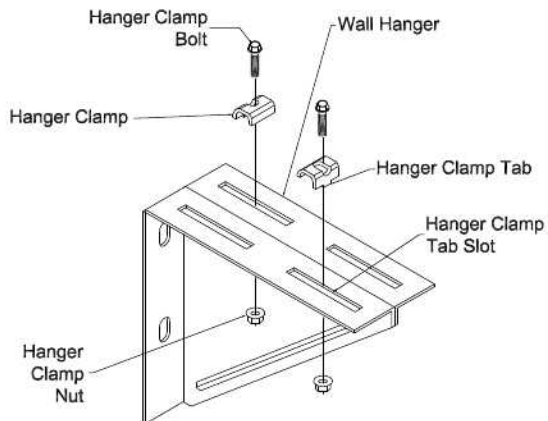


Figure 5. Wall Hanger

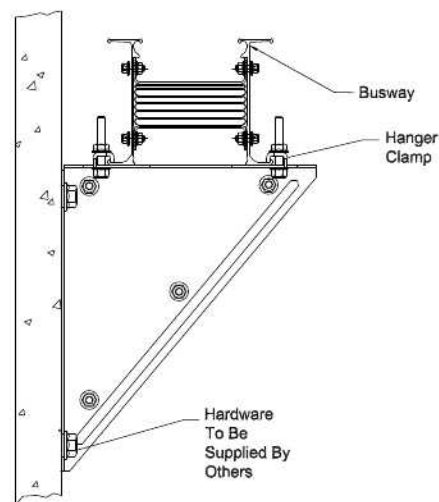


Figure 6. Flatwise Mounted Wall Hanger

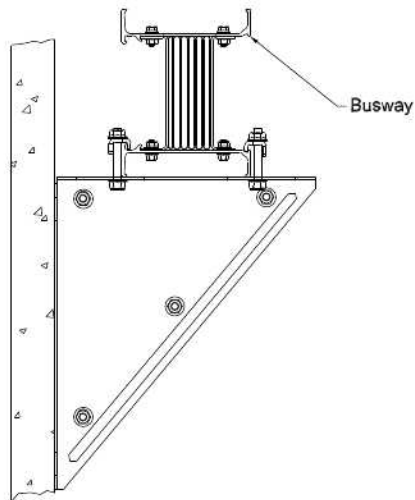


Figure 7. Edgewise Mounted Wall Hanger

7.3 Single Drop Rod Hanger Installation (Single Bar Per Pole Only)

WARNING: Busway must be oriented as shown in Figure 8 for single drop rod hanger installation.

TIP: Sway brace brackets SXSb are recommended for single drop rod hanger installations (SEE Section 7.4 for sway brace bracket installation)

7.3.1 Two hanger clamps should be loosely assembled to the hanger as shown.

7.3.2. Slide the hanger assembly from one end of the busway section to the desired mounting position.

7.3.3 Tighten both clamp bolts using a 1/2 inch (13mm) wrench to 15 ft-lbs. (20 N-m) maximum.

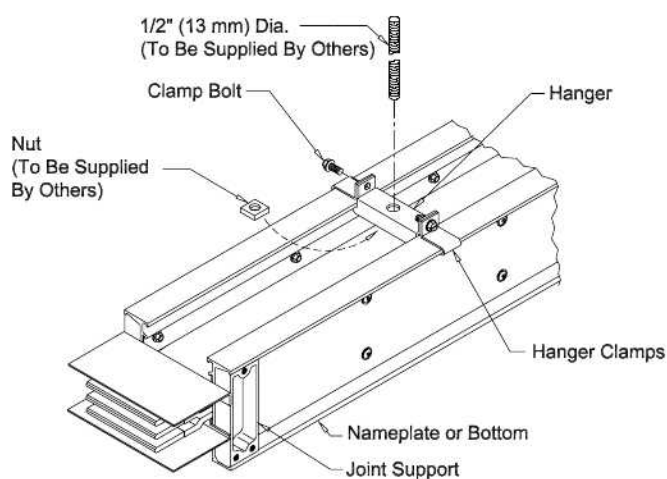


Figure 8. Single Drop Rod Hanger

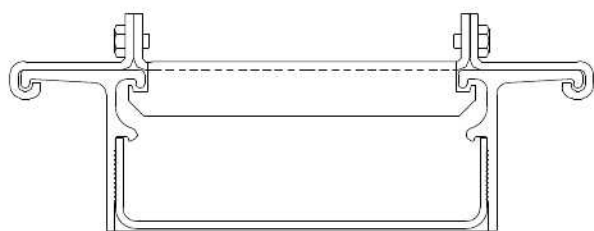


Figure 8.1 Hanger Mounting Detail

7.4 Sway Brace Bracket Installation

NOTE: Sway brace brackets are intended for use on horizontal busway installation.

7.4.1 The mounting clamps should be loosely assembled to the bracket.

7.4.2 Hook the top and bottom mounting clamps on the busway side channel and hand tighten hardware.

7.4.3 Attach a suitable brace to the bracket at the desired location and anchor the other end of the brace to a secure structural member.

7.4.4 Tighten both clamp bolts using a 1/2 inch (13mm) wrench to 15 ft-lbs (20 N-m) maximum.

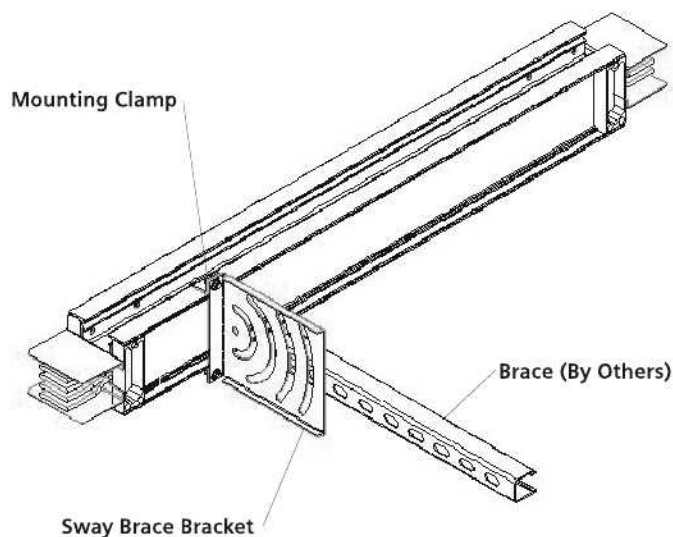


Figure 8.2 Sway Brace

8.0 VERTICAL INSTALLATION SUPPORT

Spring hangers are used to support vertical (riser) busway on maximum 16-foot (4880 mm) centers.

NOTE: No joint may be installed less than 16" (406 mm) above the floor. No joint component should fall within the floor penetration.

After installing the busway section through the floor, perform the following procedure (Figure 9).

8.1 Firmly press one spring hanger onto each side channel until it snaps into place.

NOTE: The heads of the support bolts must be facing down.

8.2 Slide the hangers down until the support bolt heads rest on the steel support brackets (supplied by the installer). The support brackets must be mounted to the floor and may be installed over a floor flange as shown.

NOTE: The floor flange does not provide support for the busway. Steel support brackets supplied by others are required.

TIP: The bolt heads rest on the support brackets.

8.3 While holding the hanger firmly against the side channel, tighten each piercing screw using a 1/2 inch (13mm) wrench. Tighten the piercing screws until the screws pierce through the side channel flanges and the heads are pressed tight on the hanger. Do not adjust the leveling or the jam nuts at this time.

8.4 After completing the entire busway and spring hanger installation, start at the highest spring hanger in the busway run (usually on the top floor of the building) and loosen and move all jam (upper) nuts to the top of the support bolts using a 3/4 inch (19 mm) wrench (Figure 9).

8.5 Raise the leveling (lower) nuts until they contact the jam nuts. Tighten the two (2) nuts against each other (Figure 9.1 Installed Position).

CAUTION: Do not allow the support bolt to rotate when tightening the jam nuts.

NOTE: Expect a .75" to 1.00" rise (19-25mm) in the busway run as the spring force and busway weight equalize.

8.6 Continue down the installation until all busway supports have been adjusted. Installation is now complete.

8.7 Inspect installation periodically to ensure that the bolt heads rest against the floor brackets. Contact Siemens if adjustment is required.

TIP: The following may indicate adjustment is required.

- Fully compressed springs
- Bolt heads not touching floor brackets
- Distortion of run

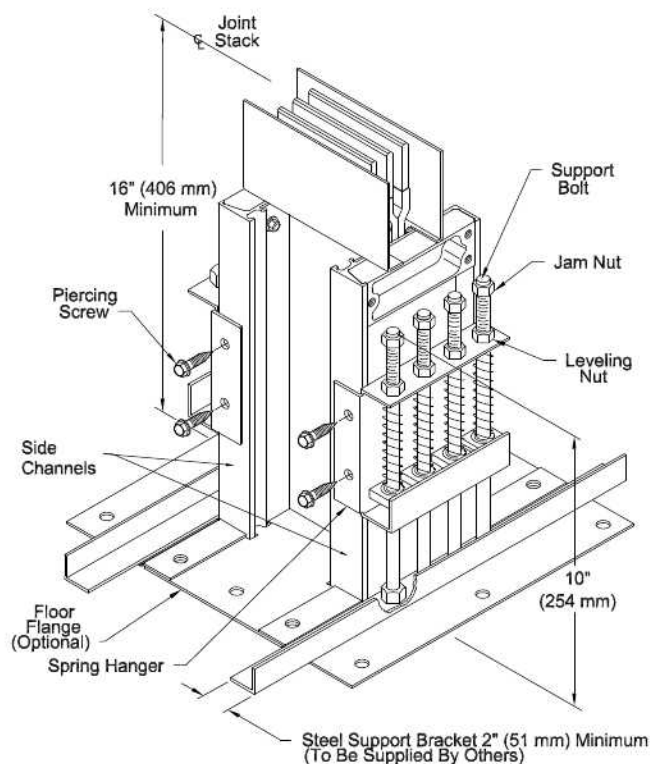


Figure 9. Spring Hanger

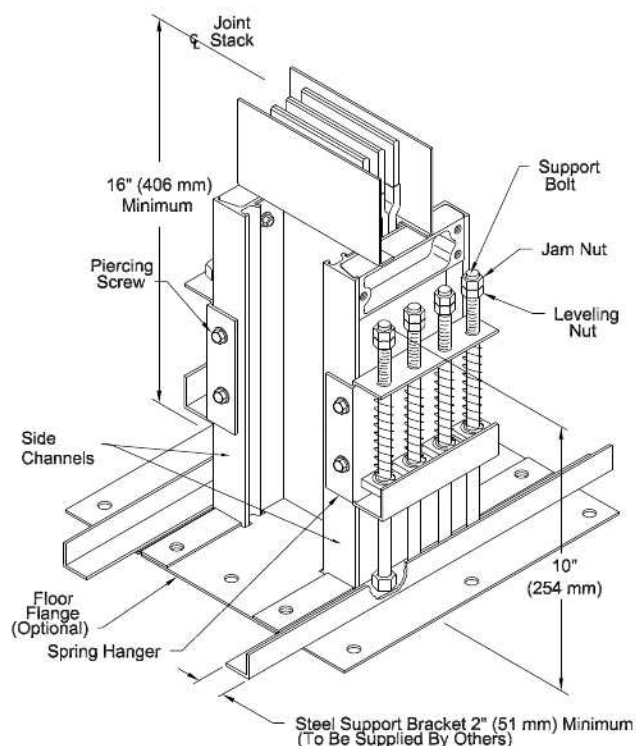


Figure 9.1 Spring Hanger (Installed Position)

9.0 JOINING BUSWAY SECTIONS TOGETHER

9.1 Assembly Instructions for Indoor IP40 Ratings

9.1.1 From the end of the busway without a joint stack, remove the two (2) L-shaped end protectors and discard. Retain the four (4) screws (Figure 10).

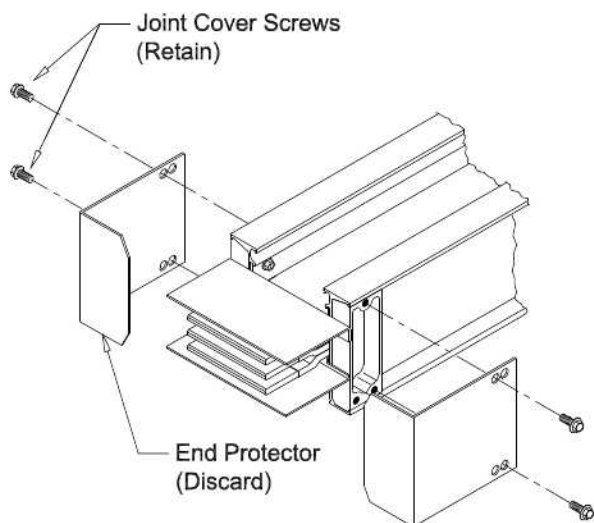


Figure 10. End Protectors

9.1.1.2 From the end of the busway with a joint stack, remove the joint covers and joint stack retainer. Discard the joint stack retainer (Figure 11).

CAUTION: Refer to section 3.0. Inspect and test each section of busway prior to installation.

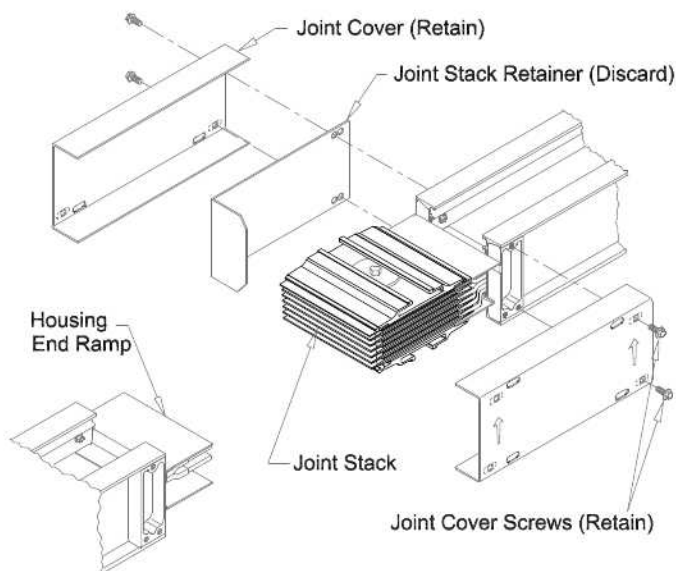


Figure 11. Joint Assembly

9.1.2 Align the busway sections and confirm that the arrows on the joint supports of the two (2) busway sections to be joined are pointing in the same direction (Figures 12 and 13).

TIP: To ease the assembly process, loosen the joint bolt(s) a few turns, but do not disengage the joint bolt from the joint bolt nut(s).

WARNING: Ensure that the bus bars and housing end ramps (Figure 12) engage properly between the joint stack insulator plates as shown in Figure 12. Refer to the CAUTION note of section 6.0.

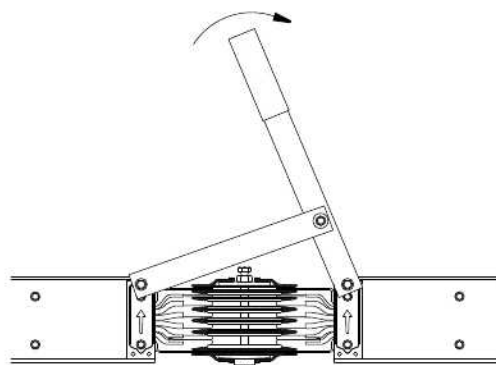


Figure 11.1 SXBAT

WARNING: If the busway is other than IP40, the top and bottom joint stack plates will have strip gaskets installed along the underside of the edges. Care must be taken to avoid damaging the gaskets that seal the end ramps and housing (Figure 22). Do not dislodge or roll the gaskets out of position. To ease the assembly process, it may be necessary to loosen the joint bolt(s) an additional amount. However, do not remove the joint bolt nut(s).

NOTE: If the gaskets are damaged they must be replaced.

9.1.3. Fasten one joint cover to the end of the busway with the joint stack to assist in alignment and assembly.

WARNING: The embossed arrows on the joint covers must point in the same direction as the arrows on the joint supports.

9.1.4 Slide the busway sections together using SENTRON Busway Assembly Tool Catalog #SXBAT (Figure 11.1). Continue assembly until the holes in the joint cover align with the holes in the joint support.

NOTE: For busway with a 200% neutral, two (2) bus bars (neutral circuit only) will engage between adjacent insulator plates as shown in Figure 13.

TIP: SENTRON Busway joints are adjustable to plus or minus 5/8 inch (16mm), when required. To assist in keeping the busway installation straight, try to minimize the use of the adjustment feature. The standard dimension between the two joint supports is 8 1/4 inches (210 mm) as shown in Figure 13. When adjustment is required, remove the appropriate knockout tabs in each joint cover as shown in Figure 13.

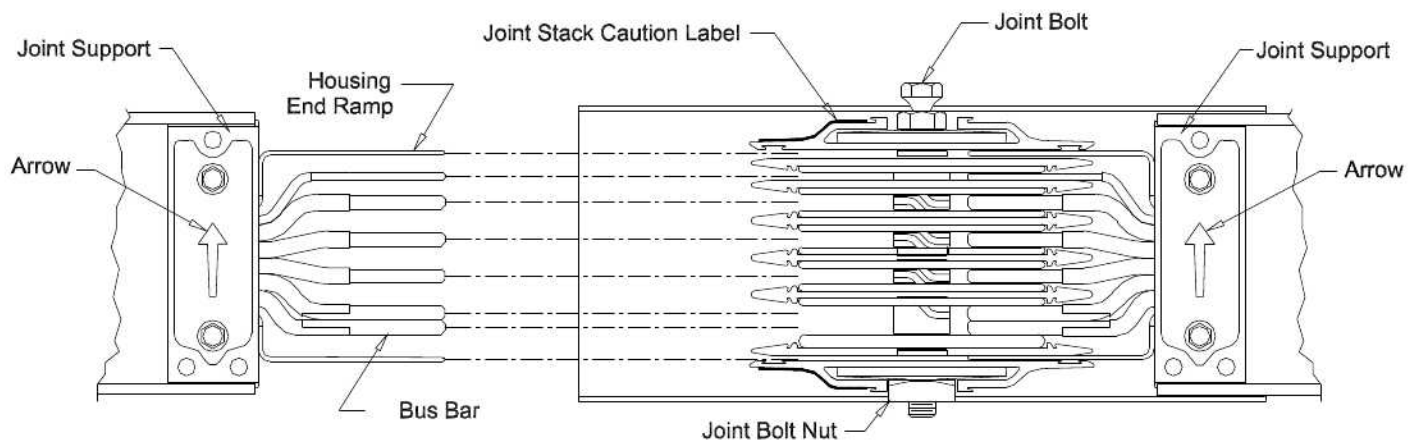


Figure 12. Joint (Assembling)

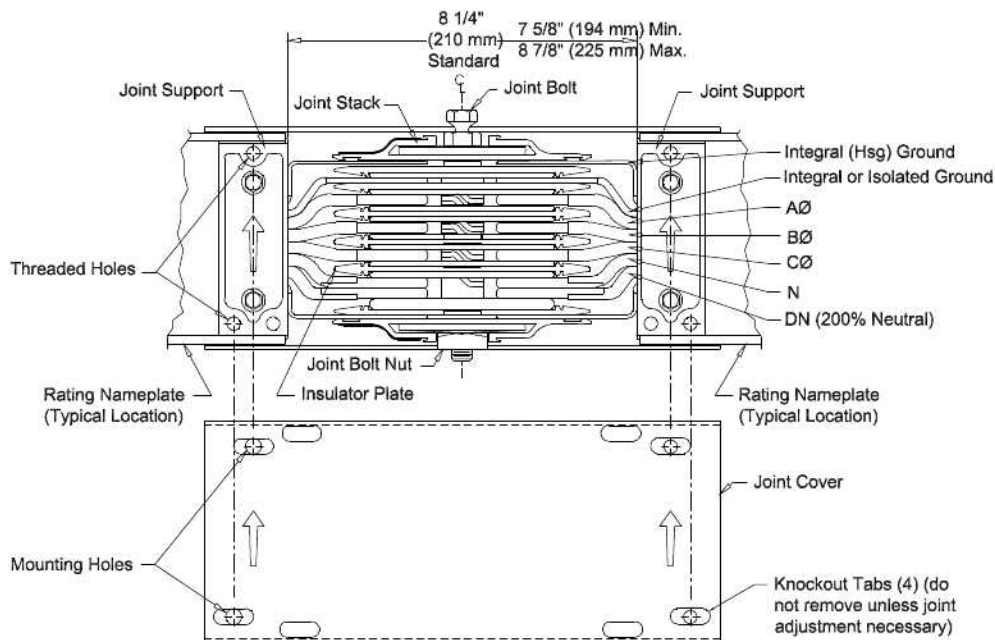


Figure 13. Joint (Assembled)

9.1.5 Carefully align the edges of the joint stack with the edges of the housing and end ramps. Center the joint stack between the joint supports as shown in Figure 13. Loosely fasten the remaining joint cover to the busway to verify alignment. The mounting holes in the joint cover should line up with the threaded holes in the joint supports when the busway sections are properly aligned (Figure 13).

9.1.6 Using a 5/8 inch (16mm) socket wrench, tighten each double-headed joint bolt until the outer 5/8 inch (16 mm) bolt head twists off (approx. 50 ft-lbs./68 N-m). The red fluorescent joint bolt label, located between the two (2) heads, will also come away (Figure 14). Retain the bolt head and label. This process provides proper tightening torque and visual indication of initially tightened joints. The bottom 3/4 inch (19 mm) bolt head is permanent for future joint maintenance (Figure 14).

WARNING: After completing installation, re-check all joint bolts with a torque wrench for 50 to 55 ft-lbs (68 to 79 N-m) torque. A joint bolt without a red tag may still not be tight. The bolt(s) may have been loosened to adjust or test the busway.

WARNING: Perform megger testing of the busway before energizing. Busway should be disconnected from line and load devices when performing a megger test.

9.1.7 For other than IP40 busway, remove the joint covers and install the joint bolt cover by engaging the grooves on the top plate of the joint stack and sliding the cover across the top of the joint stack plate until centered. (Figure 13.1)

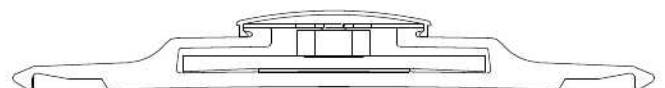


Figure 13.1 Joint Bolt Cover

9.1.8 (IP40) Tighten joint cover mounting screws to 10 ft-lbs. (14 N-m). **(IP55, IP66, NEMA3R)** Tighten joint cover mounting screws to 3 ft-lbs. (4 N-m).

WARNING: Do not over torque joint cover bolts. Make sure sections of busway are properly aligned before installing joint covers. Failure to follow these instructions may cause damage to the threaded joint supports or joint cover gaskets and may permit water to enter the busway.

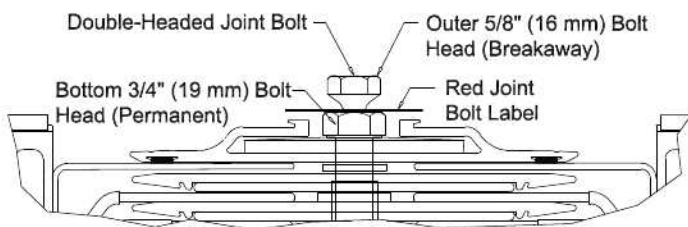


Figure 14. Double-Headed Joint Bolt

TIP: As the busway run is installed, a megger test should be performed periodically to identify any incorrectly assembled joints.

WARNING: A megger test must be performed after the run is completed. Disconnect the busway from any line and load devices before performing a megger test. Minimum test readings should be no less than:

Megohms = 100 for systems 0 to 50 ft (0 to 15m)
 = 50 for systems 50 to 200 ft (15 to 60 m)
 = 20 for systems over 200 ft (60 m)

NOTE: Contact Siemens if readings are lower.

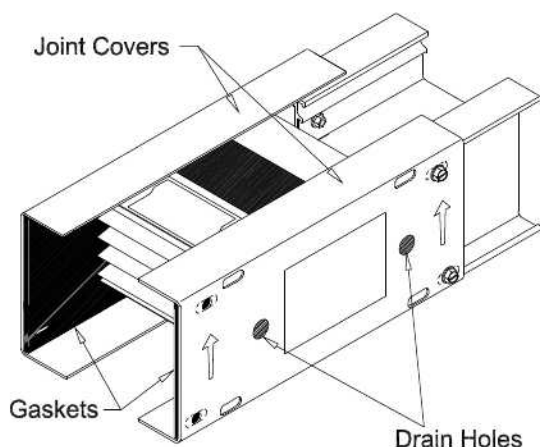


Figure 15. Water Resistant/Outdoor Joint

9.2 Assembly Instructions for IP55, IP66 and NEMA 3R Busway

NOTE: Perform all instructions described in steps 9.1.1 to 9.1.8.

WARNING: Do not tighten gasketed joint covers to 10 ft-lbs. Tighten gasketed joint covers to 3 ft-lbs. (4 N-m)

WARNING: Only feeder busway having a "Suitable for Outdoor Use" label should be installed outdoors.

9.2.1 For other than IP40 busway, remove the joint covers and install the joint bolt cover by engaging the grooves on the top plate of the joint stack and sliding the cover across the top of the joint stack plate until centered. (Figure 13.1)

9.2.2 Additional Instructions for NEMA 3R Type Outdoor Busway (US Only).

9.2.2.1 Joint Drain Holes - Each joint area of 3R Type Outdoor busway is fitted with twelve (12) drain holes in the joint area, two (2) drain holes in each joint cover and eight (8) drain holes on the end ramps of the housings. These joint drain holes are sealed with plastic plugs from the factory. Do not remove any drain hole plugs until the busway is installed. Do not remove any drain hole plugs except as described below. (Figures 15 and 16)

WARNING: Do Not Remove drain hole plugs from vertical busway joints.

WARNING: Drain hole plug removal procedure depends on the orientation of the joint. Removal of the incorrect drain hole plugs will permit water to enter the busway. Carefully follow the following instructions.

9.2.2.2 Horizontal Joints - Remove the lower two (2) drain hole plugs from the end ramps of each busway section. Four (4) per joint only. No other drain holes should be removed. See Figure 16.

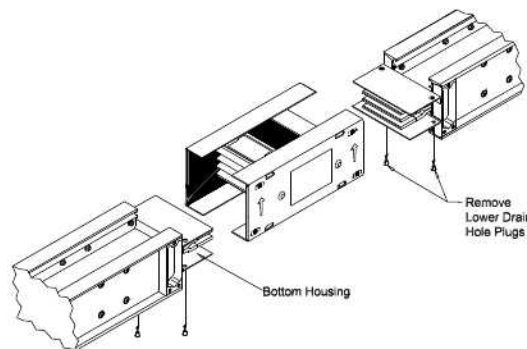


Figure 16. Drain Holes in Horizontal Joint

9.2.2.3 Edge Joints - Remove the two (2) drain hole plugs from the lower most joint cover only. See Figure 17.

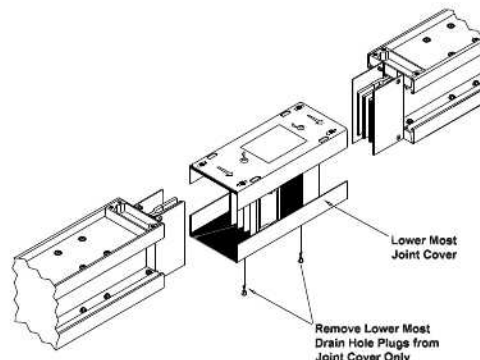


Figure 17. Drain Holes in Edge Joint

9.2.2.4 Vertical Joints - No drain hole plugs should be removed.

9.2.2.5 Fittings - Fittings are treated like straight sections except that one fitting may have joints installed in different orientations, for example, one joint horizontal but another vertical. Remove the drain hole plugs at each joint according to the orientation of the joint.

9.2.3 For other than IP40 busway, carefully install the gaskets supplied in the Weatherproof Parts Kit onto the inside of the joint covers. Reinstall both joint covers.

9.3 Joining Busway Lengths Together Using Elbow Stacks

9.3.1 The following installation instructions apply to indoor rated (IP40) elbow stack fittings. Two (2) types of fittings are available, edge elbow stack (Figure 18) and flat elbow stack (Figure 19). These installation instructions apply to either construction.

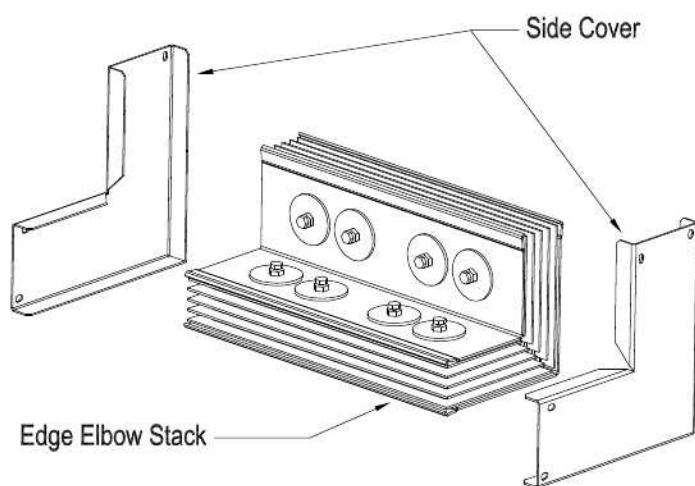


Figure 18. Edge Stack Elbow Assembly

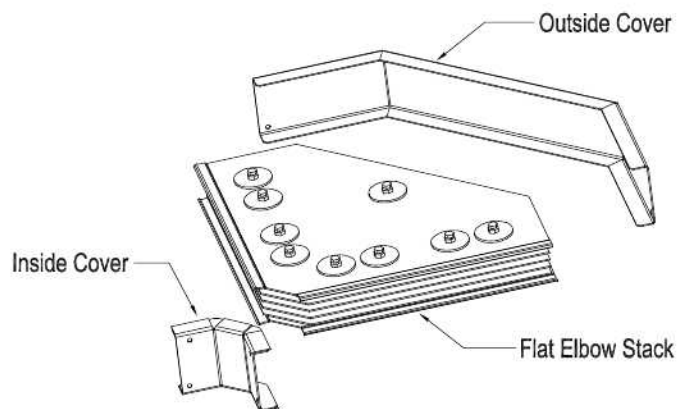


Figure 19. Flat Stack Elbow Assembly

9.3.2 With both covers removed, align the elbow stack with the busway and confirm that the bars in the busway will slide between the corresponding insulator plates in the elbow stack.

TIP: Start the corner of the elbow stack on the busway at an angle, and rotate it into position.

WARNING: Inspect the connection to ensure that the busway and ramps are installed between the elbow stack housing and adjacent insulator plates, as shown in Figure 20.

NOTE: For 200% neutral, two (2) bus bars (neutral circuit only) will install between adjacent connector plates.

9.3.3 Slide the elbow stack onto the busway, ensuring that the bus bars slide between the corresponding connector plates in the elbow stack. The elbow stack should be installed onto the busway until it reaches a positive stop. To ease the assembly process, it may be necessary to loosen the joint bolt(s). However, do not remove the joint bolt nut(s). The depth of engagement for the elbow stack fittings is adjustable $\pm 3/16$ inch.

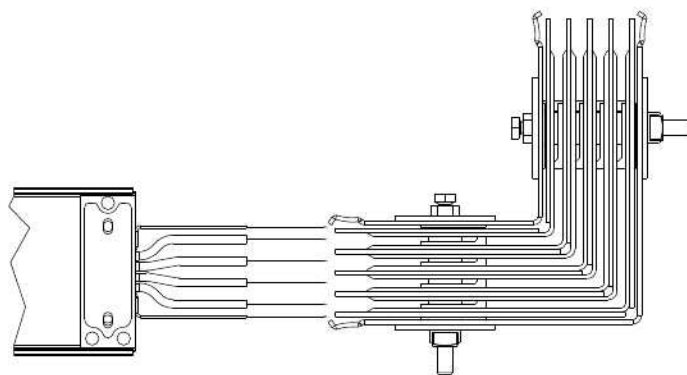


Figure 20. Side View of Edge Elbow Stack being Installed

9.3.4 Verify the elbow stack fitting is installed square with the busway by viewing the elbow stack from above or below (Figure 21) and using the sides of the elbow stack as a reference to ensure it is aligned with the busway. Loosely install the elbow side covers to the busway to verify alignment. The mounting holes in the elbow stack side covers should line up with the threaded holes in the joint supports when the busway is properly aligned with the elbow stack fitting.

9.4 Indoor Water Resistant IP55 Rated Elbow Stacks

9.4.1 IP55 elbow stacks are installed using the same methods as those identified in the preceding section, with additional instructions necessary to ensure the weather resistant features are properly installed.

9.4.2 IP55 elbow stacks utilize black closed cell sponge gaskets on the side covers and top and bottom housings to prevent ingress of water.

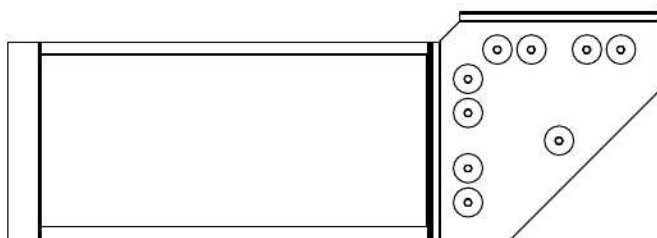


Figure 21. Alignment of Elbow Stack with Busway

9.4.3 Care must be taken to avoid damaging the gaskets that seal the end ramps and housings (Figure 22). Do not dislodge or roll the gaskets out of position. To ease the assembly process, it may be necessary to loosen the joint bolt(s) an additional amount. However, do not remove the joint bolt nut.

NOTE: Any damaged gasket must be replaced.

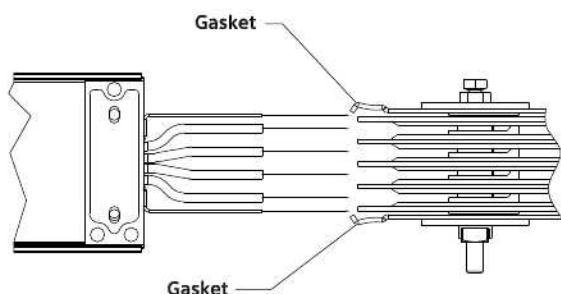


Figure 22. Side View of End Ramp Gasket

9.4.4 IP55 elbow stack covers are provided with factory installed gaskets. Loosely install the elbow stack side covers and then gradually tighten to make an even seal around the full perimeter of the housing.

9.4.5 After the covers are installed, tighten and torque all mounting bolts to 3 ft-lbs (4 N-m). Inspect all gaskets to ensure a water resistant seal has been achieved.

10.0 BUSWAY TERMINATIONS

10.1 When mounting a flanged end busway section on an enclosure, all required mounting hardware, gaskets and caulk are to be supplied by the installer. (Figure 25)

10.1.1 Seal the busway flange and enclosure interface using a weather proof caulk. Apply a generous bead of caulk around the enclosure cutout and mounting holes (Figure 24). After all mounting hardware is installed, apply caulk around the perimeter of the flange plate and cover all mounting hardware or unused holes with caulk.

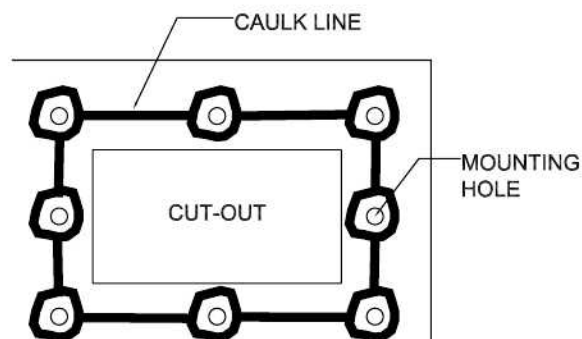


Figure 24. Caulk Line

10.2 Busway sections not terminating at or in an enclosure must be closed with an end closer. Installation instructions are provided with each end closer kit.

10.3 Busway flanges or busway sections that are not supplied with an integral enclosure for the bus or cable connections must be protected from mechanical damage and ingress of contaminants by a suitable enclosure provided by the installer (Figure 25).

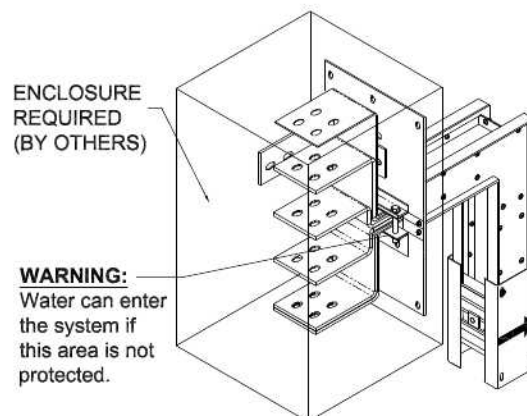


Figure 25. Enclosure Requirements

11.0 SENTRON BUS PLUGS

NOTE: For detailed instructions, refer to the individual bus plug interior instructions located on the interior surface of the bus plug cover.

11.1 General Information

11.1.1 For SENTRON 8PM Bus Plugs refer to document # 31-9983-01.

NOTE: Consult factory if SENTRON SX Bus Plugs are to be used on SENTRON High Amp Busway manufactured after 10/2001.

NOTE: SENTRON Bus Plugs manufactured after 4/2005 will not install on SENTRON Low Amp Busway. Contact SIEMENS for application information.

11.1.3 Some configurations of SENTRON Bus Plugs utilize a dual position handle. Follow the instructions located inside the bus plug cover to position the handle as required for either horizontal or vertical installation, see Figures 26 and 27.

11.1.3.1 SENTRON SLVB Bus Plugs utilize a Horizontal "SLVBH" and Riser "SLVBR" configuration for horizontal and riser applications see Figures 28 and 29.

11.1.4 If service or testing is required while the installation plug is in the **ON** position, the cover interlock can be defeated by rotating the cover interlock screw counter-clockwise (Figures 26 - 29). Service should only be performed by qualified personnel.

11.1.5 The bus plug contact fingers are lubricated with an oxide inhibiting grease at the factory. The grease should not be removed.

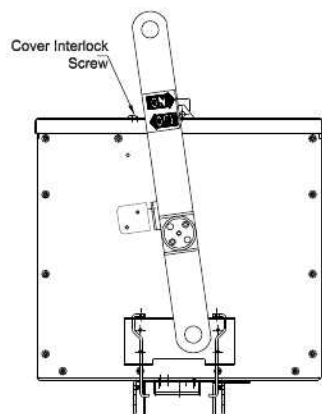


Figure 26. SENTRON Plug Handle Horizontal Installation

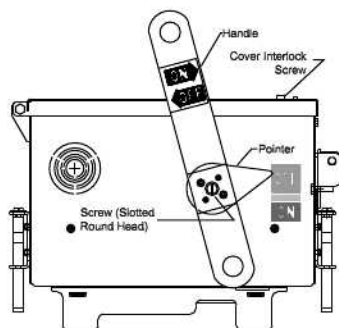


Figure 27. SENTRON Plug Handle Vertical Installation

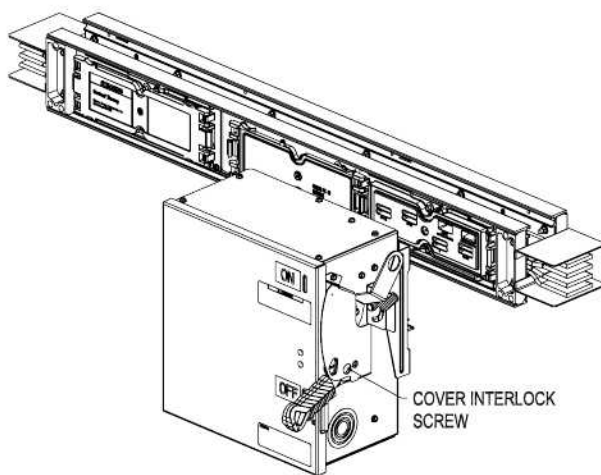


Figure 28. SENTRON SLVB Plug Horizontal Installation

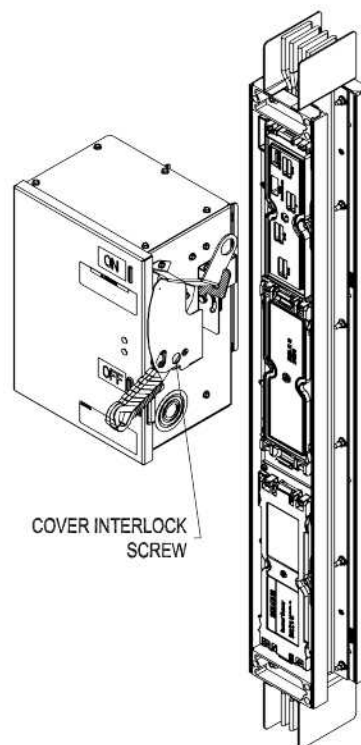


Figure 29. SENTRON SLVB Plug Riser Installation

CAUTION: Auxiliary drop rods, supplied by the installer are required to properly support 400A and larger bus plugs.

11.1.6 For riser applications, flexible conduit should be used for load connections. 400A and larger bus plugs require qty one (1) of Siemens spring kit SXSK. The spring should be compressed approx. 1.5" from the relaxed state, see Figure 30. (If ordering an alternate spring, use the following: Spring Rate= 35 lb/in, Free Length=4-5 in., ID=.56 min.).

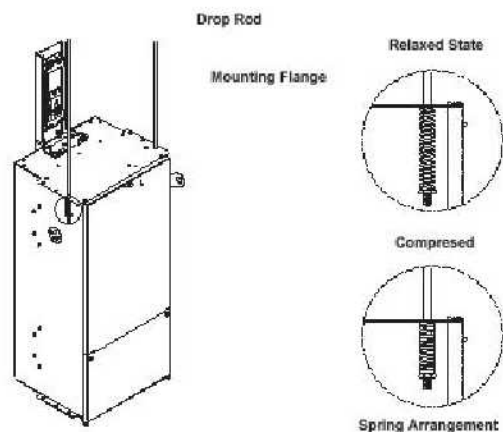


Figure 30. Typical Vertical Support Arrangement

11.2 SENTRON Bus Plug Pre-Installation Inspection and Guidelines

11.2.1 Inspect the bus plug crates/carton for external damage. Remove the bus plug from the carton and inspect for external damage. Verify the contact fingers are not damaged, bent or deformed (Figure 34 and 35).

CAUTION: Do not damage the contact fingers, support rails or alignment tabs during transportation of the bus plug to the busway.

TIP: For larger bus plugs (400A and larger), a hoist or other suitable lifting device should be used to position the bus plug during installation.

11.3 SENTRON Small Bus Plug Installation Procedures

Applies to:

- All 30, 60, 100, 200A fused switches
- All E frame circuit breakers
- 400 A fused switches without 200% neutral
- F and J frame circuit breakers without 200% neutral

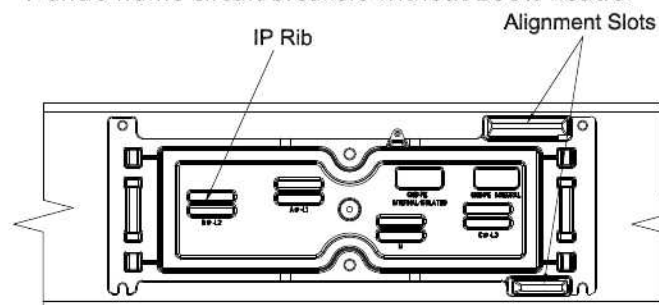


Figure 31. Plug-In Outlet

CAUTION: See caution under 11.1.5 and see notes 11.1.6

NOTE: The following are general procedures for bus plug installation. Refer to the instructions located on the inside of the bus plug cover for detailed instructions.

11.3.1 Ensure that the bus plug handle is in the **OFF** position.

11.3.2 Back-out the four (4) bus plug mounting screws. The screws are captive and should not be removed. (Figures 34 and 35).

NOTE: Ensure that the busway interlock lever is in the disengaged position.

11.3.3 Open the desired busway plug-in outlet cover and locate the twin alignment slots in the busway side channel. (Figures 31, 36, 37 and 38).

11.3.4 Align the twin alignment/interlock tabs on the back of the bus plug (Figures 34 and 35) with the twin alignment slots in the busway side channel.

11.3.5 Just prior to the contact fingers engaging the busway, ensure that the contact fingers are aligned correctly. Ensure that the finger is centered with the IP Rib (Figure 31) in the center of the corresponding plug-in outlet window.

CAUTION: Install the bus plug straight and level. Tilting and/or forcing the plug may result in improper installation and/or damage to the bus plug and busway.

11.3.6 Push the bus plug straight into the busway plug-in outlet until the stop feature contacts the busway side channel. Visually inspect the interface at the verification windows (Figure 32).

11.3.7 (SLVB ONLY) Engage the busway interlock by rotating the interlock lever to the engaged position (Figure 33). Tighten the four (4) mounting screws in the support rail to a max of 24 in-lb.

11.3.8 (NON SLVB) Make sure clamp hooks are over duct flanges and then tighten the four (4) mounting screws in the support hooks of the bus plug to 25 in-lbs (2.83 N-m) maximum.

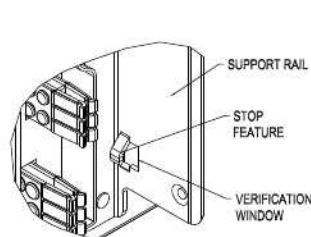


Figure 32. Verification Window

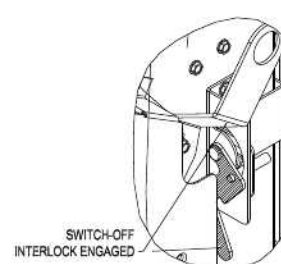


Figure 33. Interlock Engaged

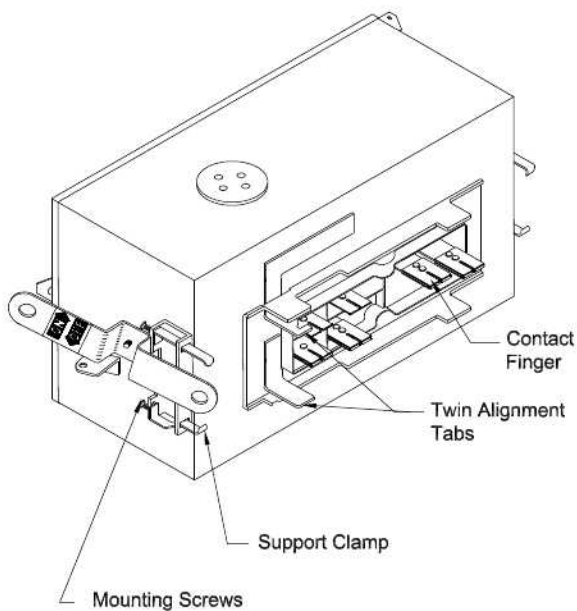


Figure 34. SENTRON Bus Plug (Rear View)

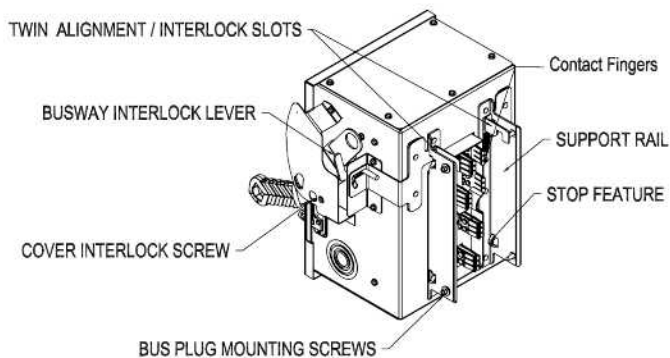


Figure 35. SENTRON SLVBR Bus Plug (Rear View)

11.4 SENTRON Small Bus Plug Removal Procedures

Applies to:

- All 30, 60, 100, 200A fused switches
- All E frame circuit breakers
- 400A fused switches without 200% neutral
- F and J frame circuit breakers without 200% neutral

11.4.1 Ensure that the bus plug is in the **OFF** position.

11.4.2 Loosen the four (4) bus plug mounting screws.

11.4.3 Pull the bus plug straight off of the busway.

11.4.4 Close the plug-in outlet covers at all unused openings.

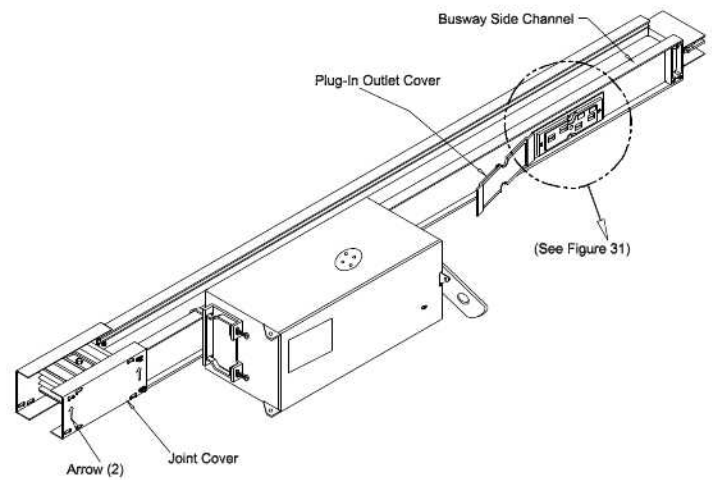


Figure 36. SENTRON Bus Plug with SENTRON Busway

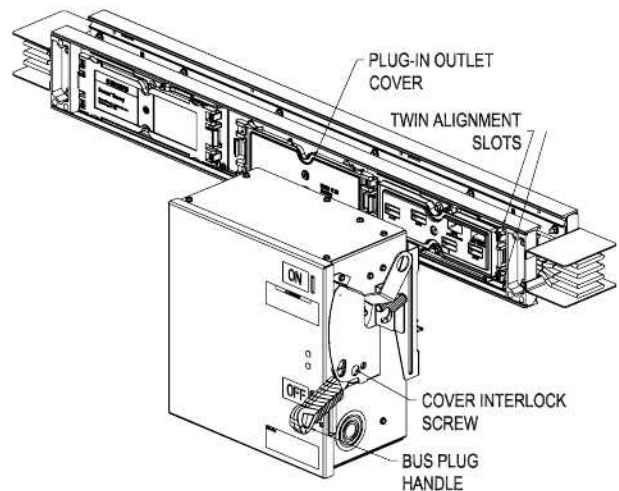


Figure 37. SENTRON SLVBH Bus Plug with SENTRON Busway

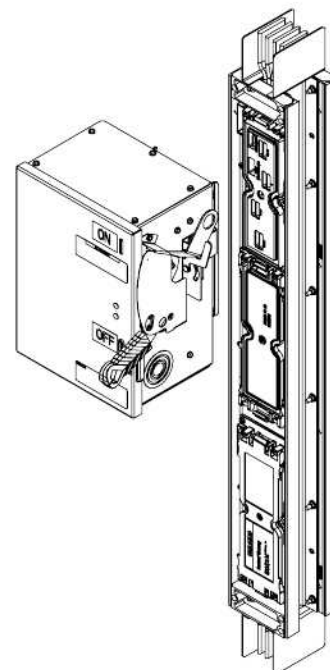


Figure 38. SENTRON SLVBR Bus Plug with SENTRON Busway

11.5 SENTRON Large Bus Plug Installation Procedures

Applies to:

- All 600A fused switches
- All L and M frame circuit breakers
- 400A fused switches with 200% neutral
- F and J frames circuit breakers with 200% neutral

CAUTION: Auxiliary drop rods, supplied by the installer, are required to properly support 400A and larger bus plugs see 11.1.6.

NOTE: The following are general procedures for bus plug installation. Refer to the instructions located on the inside of the bus plug cover for detailed instruction.

11.5.1 De-energize busway. Ensure that the bus plug is in the **OFF** position.

11.5.2 Bus plugs with mounting frames - Installation Procedures

11.5.2.1 Remove the support rail retaining screws and the two (2) side mounting bolts (Figure 39) and loosen the four (4) bus plug mounting bolts (Figure 40). Retain the removed screws. Remove mounting frame from bus plug.

11.5.2.2 Loosen the four (4) support clamp mounting screws. Remove the four (4) mounting frame retaining screws from the mounting frame (Figure 39). Retain the removed screws.

11.5.2.3 Open the desired busway plug-in outlet covers and locate the alignment slots in the busway plug-in outlet (Figure 31).

11.5.2.4 Align the alignment tab on the back of the mounting frame (Figure 39) with the alignment slots in the busway side channel.

11.5.2.5 Push mounting frame straight onto the busway.

11.5.2.6 Make sure the clamp hooks are over the busway side channel and then tighten the four (4) support clamp mounting screws on the support clamps of the mounting frame. This will engage the clamps behind the busway side channel. Re-install the four (4) mounting frame retaining screws removed earlier. Ensure that the screws are driven fully behind the busway side channel (Figure 40). The mounting frame is now secured to the busway.

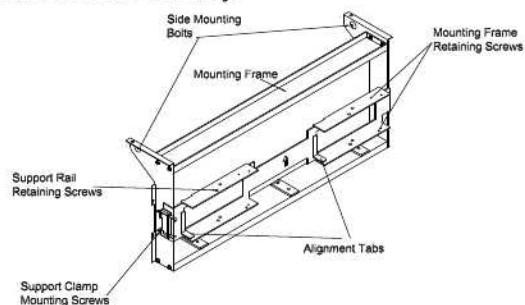


Figure 39. Mounting Frame (Rear View)

11.5.2.7 Install auxiliary drop rods to support the mounting frame. See caution under 11.5 and 11.1.7.

11.5.2.8 Push bus plug straight into the mounting frame.

11.5.2.9 Tighten the four (4) bus plug mounting bolts until the bus plug contacts the four (4) rubber stops on the mounting frame. Re-install the four (4) support rail retaining screws and the two (2) side mounting bolts that were removed earlier. The bus plug is now secured to the mounting frame and the busway.

11.5.3 Bus plugs without mounting frame - Installations Procedures

11.5.3.1 Perform all instructions described in steps 11.3.1 to 11.3.7.

11.6 SENTRON Large Bus Plug Removal Procedures

Applies to:

- All 600A fused switches
- All L and M frame circuit breakers
- 400A fused switches with 200% neutral
- F and J frame circuit breakers with 200% neutral

11.6.1 De-energize busway. Ensure that the bus plug is in the **OFF** position.

11.6.2 Bus plugs with mounting frame - Removal Procedures

11.6.2.1 Remove mounting hardware.

11.6.2.2 Disconnect auxiliary supports from bus plug.

11.6.2.3 Pull the bus plug straight off the busway.

11.6.2.4 Disconnect auxiliary drop rods from mounting frame.

11.6.2.5 Loosen the four (4) support clamp mounting screws and remove the four (4) retaining screws from the mounting frame.

11.6.2.6 Disengage the clamps from behind the busway side channel and pull the mounting frame straight off the busway.

11.6.2.7 Close the plug-in outlet covers at all unused openings.

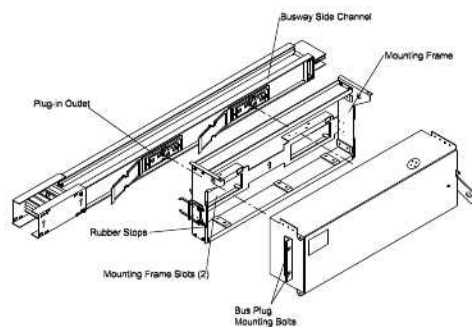


Figure 40. Bus Plug with Mounting Frame

	 DANGER • Hazardous voltages and exposed electrical conductors will cause death, serious injury, or property damage. • De-energize before working inside busway system. Only qualified personnel should work on or around this equipment after becoming thoroughly familiar with all warnings, safety notices, and maintenance procedures contained herein.	
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11.6.3 Bus plugs without mounting frame - Removal Procedures

11.6.3.1 Perform all instructions described in steps 11.4.1 to 11.4.4

12.0 Busway Checkout and Maintenance Procedures

During initial installation, joint bolts are to be tightened until the outer 5/8" (16mm) bolt head shears off (approx. 50 ft-lbs.) (68 N-m) using the double-headed joint bolt. Check torque after six (6) months. Re-tighten to 50 to 55 ft-lbs. (68 to 75 N-m) as required. Re-check torque annually thereafter. An infrared thermometer may be used to thermally scan the run to identify potential hot spots.

WARNING: After completing installation, re-check all joint bolts with torque wrench for 50 to 55 ft-lbs (68-79 N-m) torque. A joint bolt without a red tag may still not be tight. Bolt(s) may have been loosened to adjust or test the busway.

WARNING: Perform megger testing of the busway before energizing. Busway should be disconnected from line and load devices when performing a megger test.

Keep busway free of dust, dirt and/or foreign matter. Moisture from roof leaks or dripping pipes should be eliminated. Inspect the busway system periodically. Should the busway become contaminated with water contact the local Siemens sales office.

WARNING: De-energize the busway before performing any of the following operations:

- If there are signs of overheating, visually check for deterioration or contamination of insulation and contact surfaces. Check tightness of nuts, bolts etc.
- Check for missing or broken parts, corrosion, wear, dirt or signs of arcing. Clean or replace parts as required.
- After any repair work, isolate the busway from any line and load devices and megger test the busway system. Be certain that all joints are properly torqued before re-energizing. Minimum megger readings should be no less than:

Megohms = 100 for systems 0 to 50 ft (0 to 15 m)
 = 50 for systems 50 to 200 ft (15 to 60m)
 = 20 for systems over 200 ft (60m)

NOTE: Contact Siemens if readings are below this minimum.

For general information regarding handling, installation, operating and maintenance of busway systems, refer to NEMA Publication No. BU 1.1.

NOTE: THESE PROCEDURES DO NOT REPRESENT AN EXHAUSTIVE SURVEY OF MAINTENANCE STEPS NECESSARY TO ENSURE SAFE OPERATION OF THE EQUIPMENT. PARTICULAR APPLICATIONS MAY REQUIRE ADDITIONAL PROCEDURES. SHOULD ADDITIONAL INFORMATION BE DESIRED OR SHOULD PARTICULAR PROBLEMS ARISE WHICH ARE NOT COVERED SUFFICIENTLY FOR THE PURCHASER'S PURPOSES, THE MATTER SHOULD BE REFERRED TO THE LOCAL SIEMENS SALES OFFICE OR CALL 1-800-241-4453 FOR EMERGENCY CUSTOMER SERVICE.

NOTE: THESE INSTRUCTIONS DO NOT PURPORT TO COVER ALL DETAILS OR VARIATIONS IN EQUIPMENT, NOR TO PROVIDE FOR EVERY POSSIBLE CONTINGENCY TO BE MET IN CONNECTION WITH THE INSTALLATION, OPERATION OR MAINTENANCE OF A SIEMENS BUSWAY SYSTEM. SHOULD ADDITIONAL INFORMATION BE DESIRED OR SHOULD PARTICULAR PROBLEMS ARISE WHICH ARE NOT COVERED SUFFICIENTLY FOR THE PURCHASER'S PURPOSES, THE MATTER SHOULD BE REFERRED TO THE LOCAL SIEMENS SALES OFFICE. THE CONTENTS OF THIS INSTRUCTION MANUAL SHALL NOT BECOME PART OF OR MODIFY ANY PRIOR OR EXISTING AGREEMENT, COMMITMENT OR RELATIONSHIP. THE SALES CONTRACT CONTAINS THE ENTIRE OBLIGATION OF SIEMENS. THE WARRANTY CONTAINED IN THE CONTRACT BETWEEN THE PARTIES IS THE SOLE WARRANTY OF SIEMENS. ANY STATEMENTS CONTAINED HEREIN DO NOT CREATE NEW WARRANTIES OR MODIFY THE EXISTING WARRANTY.

