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INSTALLATION INSTRUCTIONS [GE LEGACY DOCUMENT]

Spectra Series™ LowAmp

Plug-in and feeder busway

GE legacy product
documentation

**Spectra Series™ Low Amp
Plug-In and Feeder Busway**

STORAGE PRECAUTIONS

Before storing, unpack sufficiently to make a check of the busway for possible concealed damage resulting from shipping and handling. If damage has occurred, notify the shipper immediately. If the busway is free of damage, restore packing until ready for installation. Store indoor in a clean, dry area, preferably close to the installation points. Protect the busway from mechanical damage and any contact with, or exposure to, corrosive fumes, liquids, salts or concrete. Failure to store and protect the busway properly can cause serious damage and will void the warranty.

PRE-INSTALLATION PROCEDURE

When possible, deliver the busway to its installation location before unpacking. Large labels on each shipping carton or crate designate the items contained. Additionally, each busway piece is identified with an item number label. Inspect each busway piece for possible damage or contamination. Contact surfaces must be clean. However, no attempt should be made to polish tarnished contact surfaces. Check to make certain that joint insulators are not damaged or cracked and are firmly in place (Megger each piece before installation.)

**INSTALLING SPECTRA SERIES™
LOWAMP BUSWAY**

Establish bus bar phase sequence ("ϕ side" is labeled) to determine how the busway is to be installed so as to maintain correct phasing throughout the system.

Note that phase transposition lengths, when furnished, may relocate the ϕ to the opposite side of the busway run.

Each busway piece has a "bar-end" and a "joint-end", see Figure 1. Normally the busway is oriented end for end with bar-end pointing away from the source.

In vertical risers the "bar-ends" should be up, and the ϕ side should be on the right when facing the plug outlet.

In vertical riser installations, it is easier to lower the busway into place than to raise it.

If installation drawings have been furnished, information regarding the orientation of the busway end for end, and location of the ϕ side or polarization information, as well as other pertinent data will be furnished. These drawings should be carefully followed to insure a proper busway system.

When lifting the busway by fork lift or by crane, distribute and balance the weight to avoid flexing or other damage to the housing.

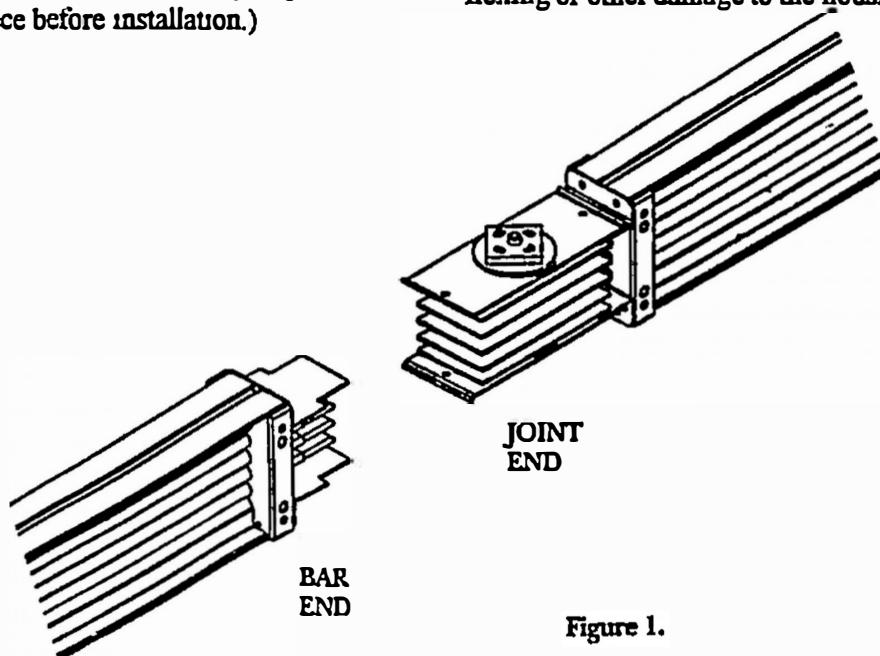


Figure 1.

Installing Spectra Series™ Low Amp Busway (cont.)

WHERE TO START

Start the installation, if at all possible, at the most critical point, such as a main feed box, switchboard or switchgear, an elbow, or other critical fitting or termination

OBSTRUCTIONS

Where a busway run must pass through a wall or floor, an opening one-inch larger than the busway cross-section should be provided. Joints may not occur inside walls or floors per N E C. A flange is available to mask the opening after the busway is installed.

MINIMUM CLEARANCES

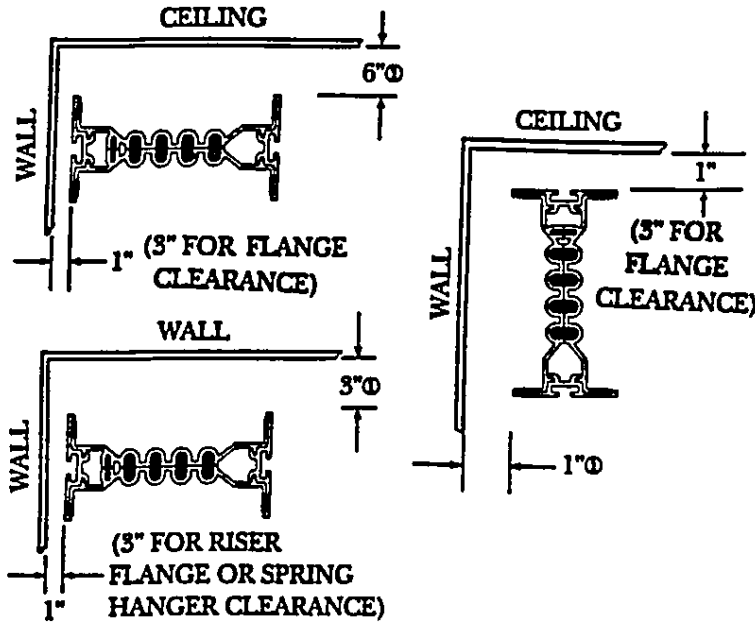


Figure 2

Ø4" minimum provides clearance for 30-100 amp fusible plugs. 7" minimum for 200 amp fusible plugs. 8" minimum for all other plugs. See Table 1

HORIZONTAL MOUNTING

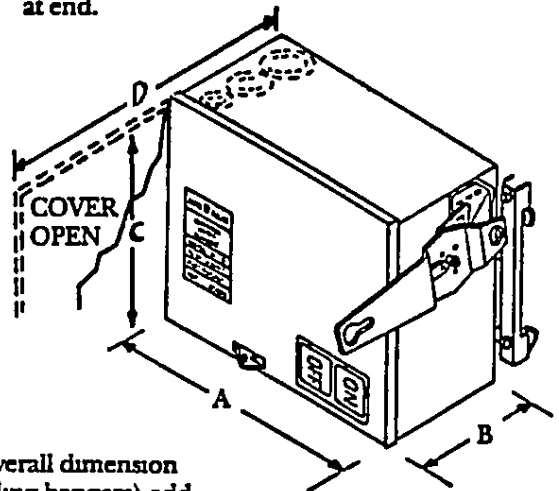
- Overhead Support 1/2" drop rods are recommended. Max 10 foot spacing. Drop rods and other hardware must be furnished by the installer.
- Maintain good alignment of the drop rods along the busway run.
- Avoid hanging drop rods at a busway joint.
- After the busway is secured in the hangers, adjust the hangers on the rods for correct elevation.
- Locate the ϕ side down on the busway so the plugs will be properly oriented.
- Sway braces may be required to keep the run straight or to prevent rotation (furnished by the installer).

Wall or Column Support Single rod hangers (Figure 4 & 5) may be used for mounting busway on walls or columns by the addition of an angle support furnished by the installer.

TABLE 1 PLUG SIZES (INCHES)

Device	Plug Dimensions				Plug Overhang Busway Each Side
	A	B	C	D	
Circuit Breakers					
E-Line	13	8	11	21	2 1/2
SF	21 1/4	9	11	30 1/4	2 1/2
Fusible Switches					
30A, 60A	13	8 3/4	11 1/4	21 3/4	2 5/8
100A	18 3/4			27 1/2	
200A		16		5	
400A		18 3/4	20 1/2	37 1/2	7 3/4

Door hinges at top for all plugs 400 amp and over. Others hinge at end.



For overall dimension (including hangers) add 1 1/2" inches to "A"

Figure 3

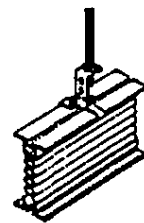


Figure 4. Flatwise (Standard)

SWAY BRACING ANCHOR POINTS WHEN REQ'D

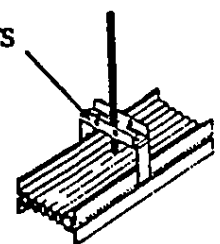


Figure 5. Edgewise

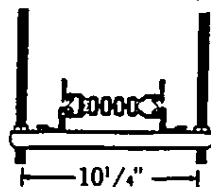


Figure 6 Trapeze Edgewise

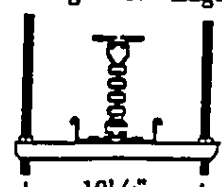


Figure 7 Trapeze Flatwise

VERTICAL MOUNTING

Support busway on 16' centers maximum Assemble hangers to busway after placing the length in position through the floor

RIGID RISER HANGER (See Figure 8)

1. Loosen hanger bolts (A)
2. Assemble hanger to each side of busway
3. Position the hangers on the busway so that the base channel (B) rests on the floor or the support Floor flange (C) may be placed under hanger, but will not support busway weight
4. Hand tighten hanger bolts (A)
5. Anchor base channels (B) to their support
6. Tighten hanger bolts (A)

Install the next length and make the joint assembly (see instruction, joint lengths)

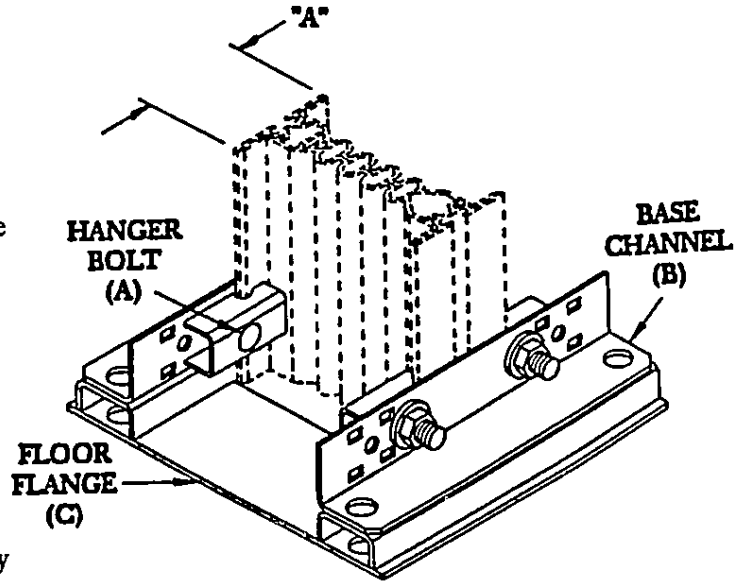


Figure 8 Rigid Riser Hanger

SPRING RISER HANGER (See Figure 9)

Use Table 3 and 4 to determine the weights of the busway and plugs

1. Check hanger for initial height, adjust to 8 inches, if required
2. Determine the required "H" dimension to adjust springs on hanger The "H" dimension must be calculated using the formula below Before placing the hanger to the busway, using the final adjusting nut(s) (E), set springs on hanger to "H" dimension After spring is adjusted to "H" dimension tighten jam nut(s) (F) so spring cannot move

"H" Dimension Formula

$$"H" = 5 \frac{5}{8} - \frac{W}{150}$$

$$W = \frac{\text{Busway wt/ft} \times \text{ft/floor} + \text{wt of devices on floor}}{\text{Total no of springs/floor}}$$

3. Loosen hanger bolts (A)
4. Position hanger against busway and rest hanger base channels (B) on the floor or support Floor flange (C) may be placed under hanger but will not support busway weight
5. Fit hanger clamps (G) to busway housing and hand tighten hanger bolt (A)
6. Anchor base channel (B) to their support
7. Tighten hanger bolts (A)
8. After busway run is installed, starting at the top hanger, raise the initial adjusting nuts (D) of all hangers to the top of the spring studs The studs are crimped to hold the nut in the uppermost position

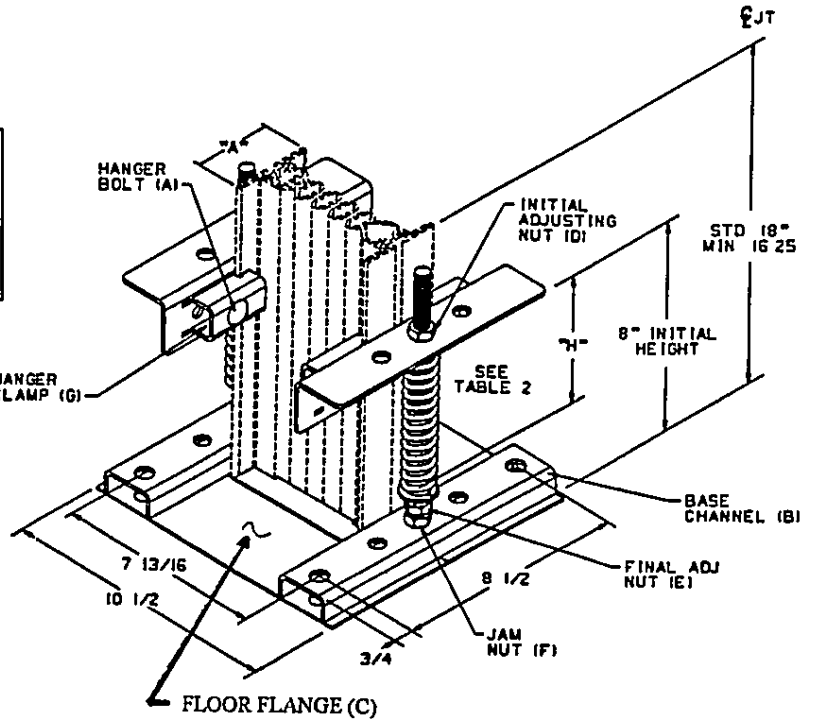


Figure 9 Spring Riser Hanger

NOTES

- 1 SEE NEXT SHEET FOR TABLE 3 AND 4

VERTICAL MOUNTING (CONT.)

TABLE 2 BUSWAY CROSS SECTION

Bar Material	Rated Load Amps	Dimension "A" in
ALUMINUM	225	3
	400	3 3/8
	600	4
	800	5 1/8
COPPER	225	3
	400	3
	600	3 3/8
	800	4

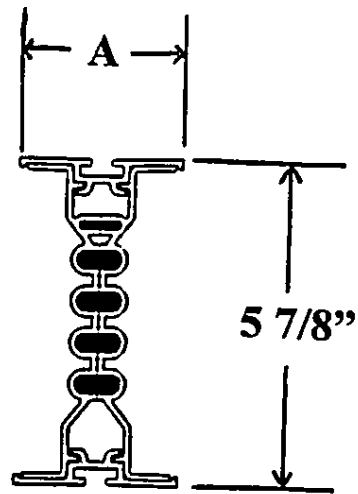


Figure 10 Busway Cross Section

**TABLE 3. Plug Weight (lbs.)
QMR Fusible Switches**

Amperes	Weight
30	24
60	25
100	28
200	46
400	135
Plug Weight (lbs.) - Circuit Breakers	
Frame Type	Weight
E	28
SF	39

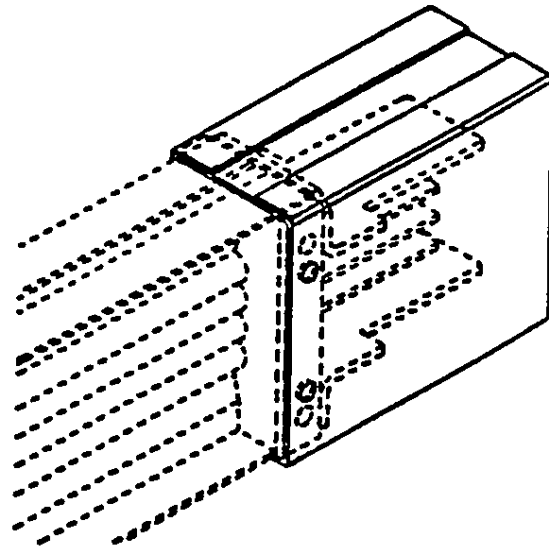


Figure 11 End Box

TABLE 4 Weight(lbs /ft) - Busway

Ampere	Copper		Aluminum	
	3-wire	4-wire	3-wire	4-wire
225	7	8	5	6
400	7	8	6	7
600	8	9	7	8
800	11	12	9	10

INSTALLING END BOX

- Loosen the screw on back of the end box and separate the end box cap from the end box
- Slide the end box over the end of the busway and bolt it to the busway Note make sure the end box is tightly against the busway
- Place the end box cap on the end box and bolt it to the busway
- Tighten the screw on the back of the end box

Installing Spectra Series™ LowAmp Busway (cont.)

JOINING LENGTHS

1. Remove shipping caps from bar end and discard, but retain the bolts
 2. Remove at least one joint cap from the two pieces to be joined, retaining the bolts
 3. Align sections to be joined by matching up "ϕ side" labels attached at ends of each section
 4. If necessary, loosen joint bolt slightly
 5. Slide sections together. Make sure that the busbars interweave the insulators as shown in Figures 12-14
- NOTE** the housing ground side plates must pass between the outside insulators and the joint sides
6. The standard distance between the housings is $8 \frac{3}{8}$ " as shown in Figure 13. However, the joint is also adjustable as shown in Figures 12-14. Simply move the sections in or out to the desired length as shown and remove the twist-outs in both joint caps. See Figure 15
- NOTE** Remove shipping screw to center joint when adjusting to max & min length
7. If not already in place, assemble joint caps and insert all mounting screws **LOOSELY**
 8. Inspect busway run for straightness in all planes, and make adjustments, if necessary, for good alignment
 9. Lubrication grease has been applied to the joint bolt head and thread to reduce friction. Do not remove this grease

10. Tighten the joint bolt to 50 foot-pounds. When the Belleville springs on both sides are flattened, the bolt is fully torqued. The bolt head may be relocated to the opposite side of the busway if it is inaccessible
 11. Tighten all joint cap screws
 12. During installation occasional meggering should reveal any improperly made assemblies. Resistance should not drop below one megohm for 100 feet of busway. Megger the complete run before energizing
- ### TO REMOVE JOINT OR CAPTIVE PIECE OF BUSWAY

Should it become necessary to isolate for testing or trouble shooting a piece or run off Spectra Series™ LowAmp busway the joint is designed for easy removal either during or after installation

1. De-energize the busway. Remove either joint cap
2. Remove the shipping screw, illustrated in Figure 13
3. Grasp the joint sides and pull toward the narrow side of the busway. A gently rocking motion may be necessary to aid the joint in sliding out

NOTE With the joint removed the busway is segmented and section of the run away from the source is electrically isolated from the source

4. To reinstall the joint simply slide the joint back into place. **CARE MUST BE TAKEN TO ASSURE SPLICE PLATES AND INSULATORS ARE PROPERLY POSITIONED**. It is not necessary to reinstall the shipping screw
5. Install joint cap(s), as required
6. Megger complete run of busway before energizing

JOINTS WITH $\pm 5/8$ " INCH ADJUSTABILITY

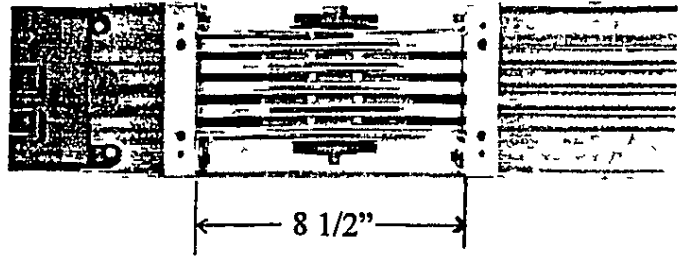


Figure 12 "Minimum"

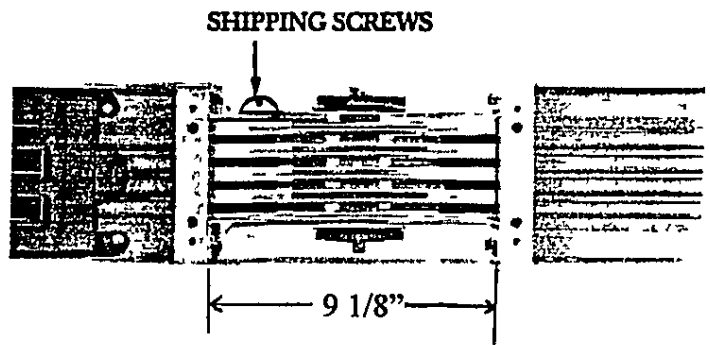


Figure 13 "Standard"

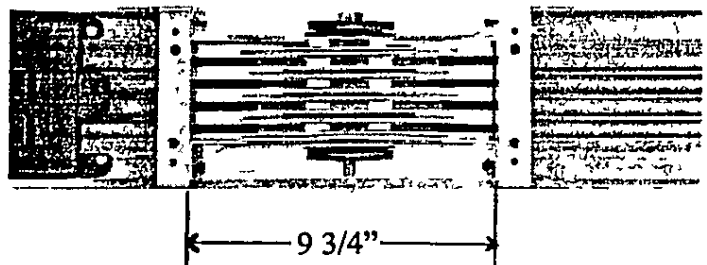


Figure 14 "Maximum"

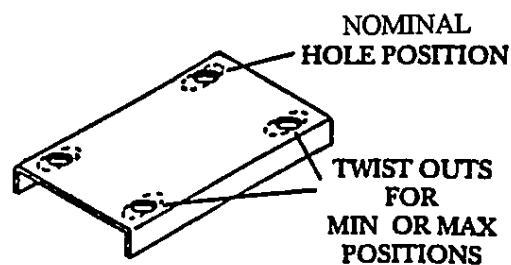


Figure 15 Joint Cap

Installing and Removing Spectra Series™ Low Amp Busway Plugs

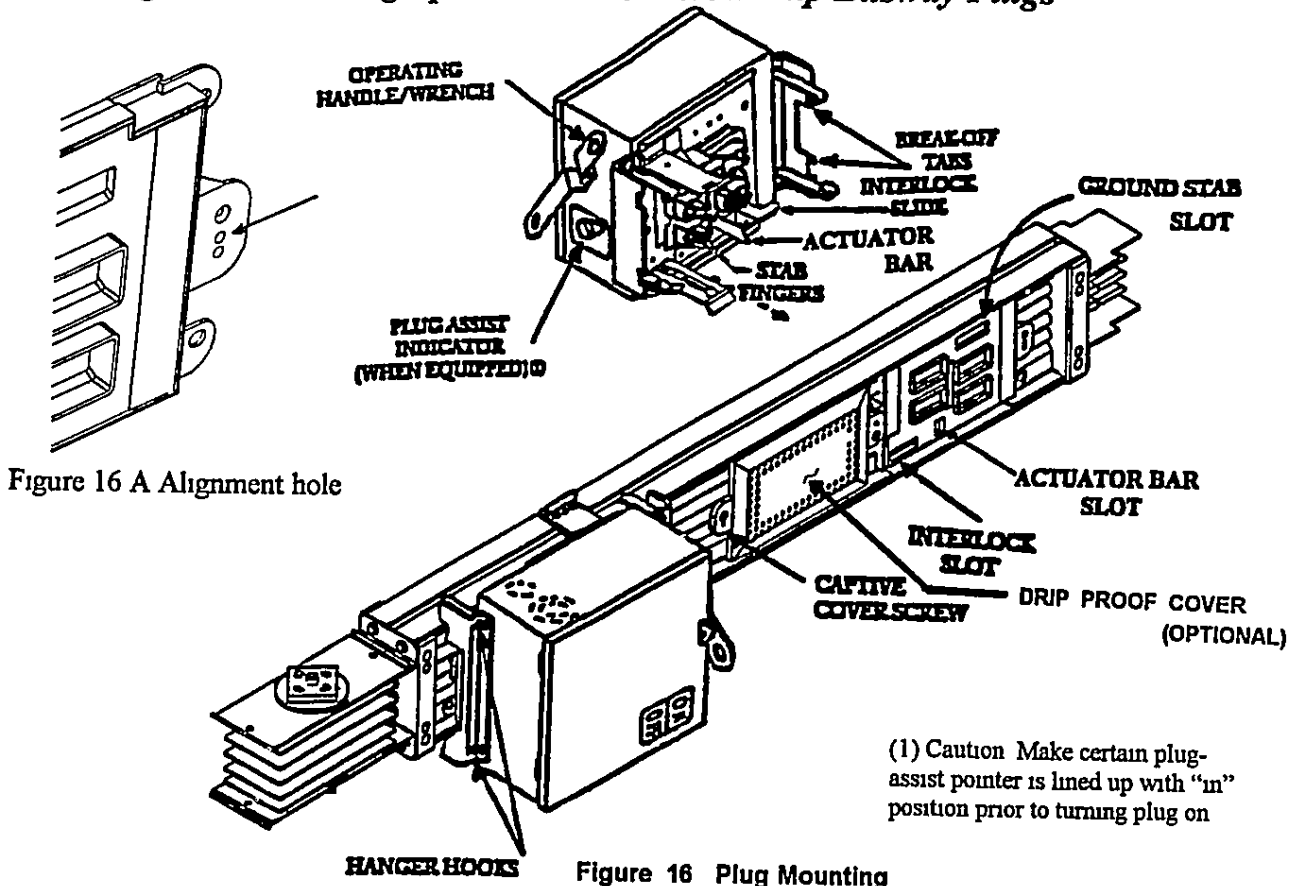


Figure 16 A Alignment hole

Figure 16 Plug Mounting

(1) Caution Make certain plug-assist pointer is lined up with "in" position prior to turning plug on

It is a good safety practice to de-energize the busway before inserting or removing plugs

- Inspect plug before installing on busway
- Stab fingers have been lubricated with grease which should not be removed
- Drip proof plug in busway has a drip proof cover over the outlet. Unscrew the cover and reattach the cover to the left side of the outlet, using the screw on the right side of the cover. This relocates the cover so it is out of the way for plug insertion
- The actuator bar polarizes and locates the plug in the correct position
- Plugs are interlocked permitting engagement and disengagement with the busway when in the OFF position only
- Place the operating handle at the desired position on the plug and secure it with the screw provided
- If plug-assist has been furnished on the plug, the operating handle may be used as a wrench to operate the mechanism
- To install a plug where the rear plug hanger interferes with a joint cap, it is necessary to remove the "break-off tabs", see Figure 16
- On large plugs, drop rod brackets are provided for auxiliary support of the plug in horizontal runs

To Install Plug Not Equipped with Plug-Assist (Figure 16)

1. Move the operating mechanism to the OFF position
2. Take the Plug Alignment Bracket off the plug (not shown) and loosen the two bolts on the hanger hooks
3. Attach the Plug Alignment Bracket to the front of the plug outlet using the center aligning screw and lightly tighten (Figure 16A, Alignment hole)
4. Tighten the two Alignment Bracket hanger hooks with the busway rails

5. With the bus plug in hand, press the front hanger firmly against the Alignment Bracket and slide plug towards busway for stab engagement. **NOTE** The bus plug should be parallel to the busway for proper alignment and engagement
6. Loosen the two rear hanger hook bolts, rotate 180 degrees, and tighten hooks to rails
7. Reattach the two bolts removed in step #2
8. Place the operating handle at the desired position on the plug and secure it with the screw provided

To Install Plug Equipped with Plug-Assist (Figure 16)

1. Move the operating mechanism to the OFF position and ensure the plug-assist indicator is rotated fully toward stab-OUT position
2. Take the Plug Alignment Bracket off the plug (not shown) and loosen the two bolts on the hanger hooks
3. Attach the Plug Alignment Bracket to the front of the plug outlet using the center aligning screw and lightly tighten (Alignment hole, Figure 16A)
4. Tighten the two Alignment Bracket hanger hooks with the busway rails
5. With the bus plug in hand, fit the front hanger with the inside of the Alignment Bracket and slide down for full stab engagement. **NOTE** The bus plug must be parallel to the busway for proper alignment and engagement
6. Loosen the two rear hanger hook bolts, rotate 180 degrees, and tighten hooks to rails
7. Reattach the two bolts removed in step #2
8. Rotate plug-assist indicator fully toward the stabs-in position.
9. Place the operating handle at the desired position on the plug and secure it with the screw provided

To remove plugs first turn device OFF. Then reverse the actions in the appropriate procedure above.

Installing Spectra Series™ LowAmp Indoor Drip Proof Busway

Drip proof busway should only be mounted with bus bars flatwise to the ground, or in the vertical riser orientations

The following material is included in the hardware packages supplied for indoor drip proof busway

Joint caps

Joint covers

Step 1

Pierce the gasket for the joint cap bolt holes and make sure gasket is removed from drain notches on the end of the joint caps for vertical applications

Step 2

Follow the standard LowAmp busway installation instruction, but do not tighten joint caps Use joint caps for alignment only (do not compress the gasket)

Step 3

Torque the joint bolts to 50 foot-pounds Megger the run with a 1000 V_{DC} megger The reading should not drop below 1 mega-ohms per 100 ft

Step 4

To install the joint covers carefully remove the joint caps (additionally temporary bracing maybe needed) Place the joint cover on each side of the joint with the gasket facing in Be sure to install joint cover with the weep holes on the bottom of a flatwise mounting Joint covers **WITHOUT WEEP HOLES MUST** be used for the top of a flatwise run and vertical riser runs The joint covers span across the joint on the narrow side of the busway

Step 5

Reinstall the joint caps around the joint covers making sure that the ends of the joint caps and joint covers are flush Tighten the joint caps using the joint cap screws There should be a very thin layer of grease on the inside of the joint cap to help it slide together if more is needed add as requires Some pressure may be required to deflect gasket in order to slide the joint caps over the joint covers and start screws

NOTES

1. INSPECT COMPLETED RUN TO ASSURE WEEP HOLES ARE PRESENT AND ON THE BOTTOM SIDE OF THE BUSWAY
2. JOINT CAPS AND COVERS MUST BE REPLACED OR REGASKETED ONCE THE GASKET HAS BEEN COMPRESSED FOR MORE THAN 1 DAY CONTACT THE COMPANY FOR DRIP PROOF MATERIAL

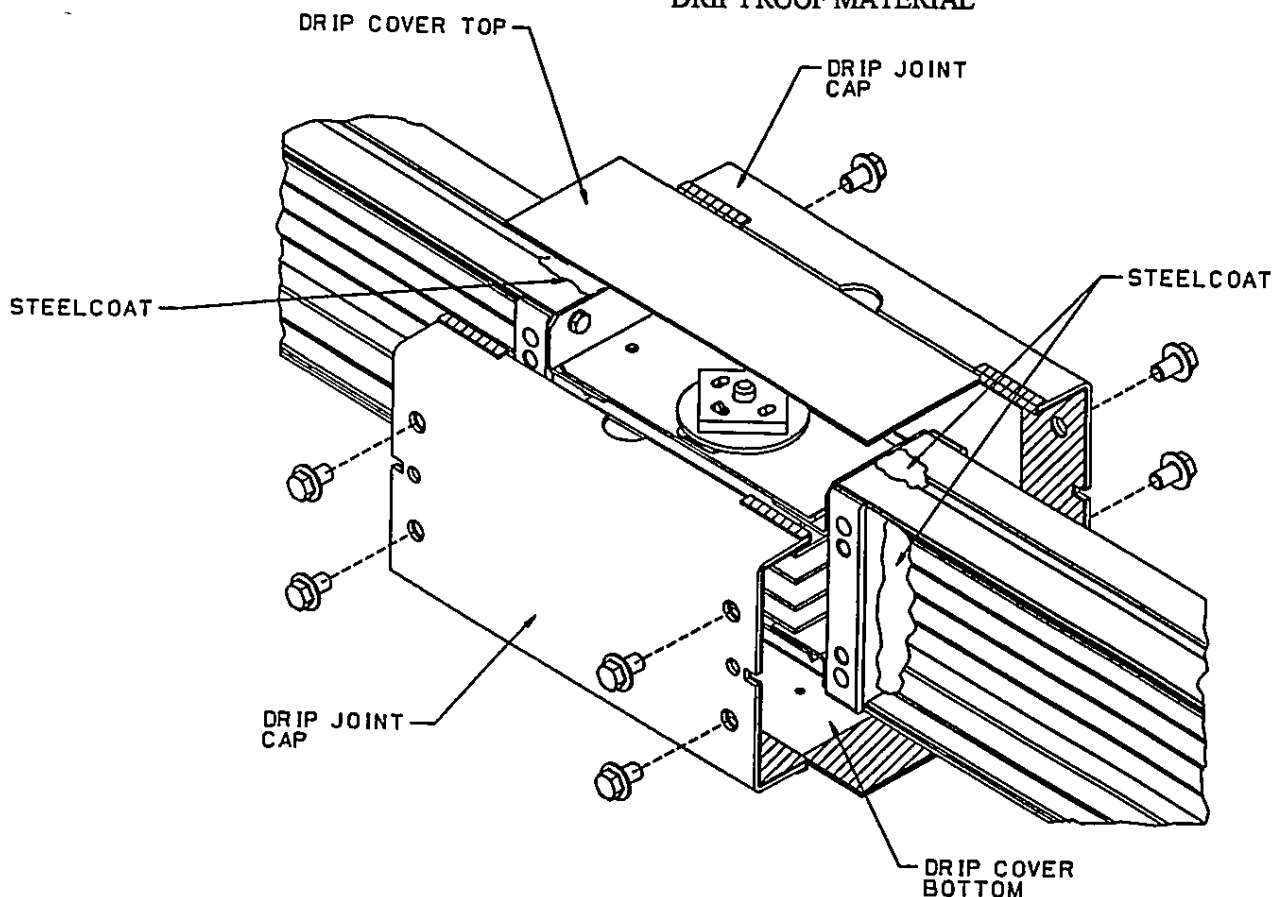


Figure 17 Drip Proof

Installing Spectra Series™ LowAmp Adjustable Straight Length

It is recommended that two people be used in adjusting the Adjustable Straight Length (ASL)

It is recommended that the installing contractor obtain the desired measurement prior to adjusting the ASL's installed length and that the adjustment is performed at ground level on a flat surface as described on the following page
For horizontal mounting, it is recommended that at least one hangers be used on the ASL

The Adjustable Straight Length has an adjustability of ± 6 inches from the nominal 54 inches (shipped in the minimum length of 48 inches) Adjustment can be accomplished using the following guidelines,

Step 1

Lay the ASL on a flat surface, Phase side up
Remove the through bolt inspection plate (Figure 18 Item 1) from the Phase side only

Step 2

Loosen but do not remove the through bolt in the center of the Adjustable Straight Length (Figure 18 Item 2)

Step 3

Loosen but do not remove the eight (8) housing bolts (Figure 18 Item 3) ***These bolts are travel stops and must be in place for proper adjustment.***

Step 4

With an individual at each end, firmly grasp the ASL by the rectangular housing spacers Adjust out or in until desired dimension is obtained

Step 5

Torque the joint through bolt to 50 foot-pounds Verify that the belleville spring washer (Figure 18 Item 4) has flattened after tightening

Step 6

Replace the through bolt inspection plate and tighten

Step 7

Re-tighten the eight (8) housing bolts

Hoist the ASL in place and connect to the busway as outlined in the *Joining Lengths* section on page 5 of GEH-6436 Installation Instruction, Spectra Series™ LowAmp Plug-In and Feeder Busway

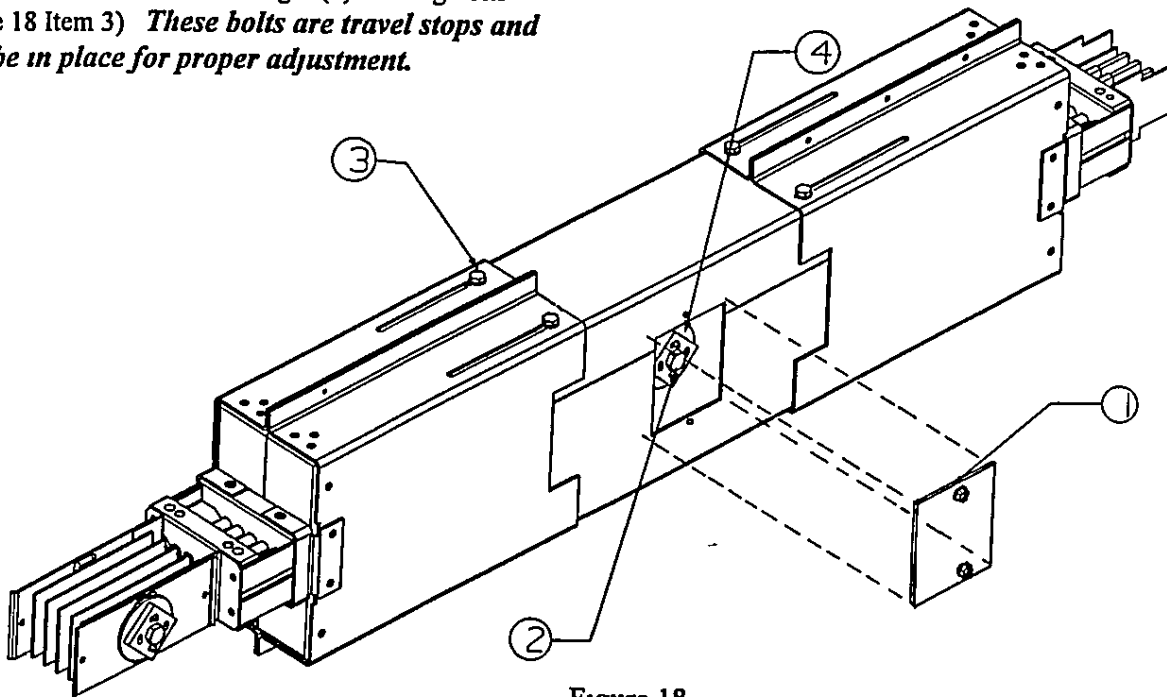


Figure 18

Installing Spectra Series™ LowAmp Adjustable Straight Length (cont.)

DETERMINING THE ASL INSTALLATION LENGTH

Measure Opening "L" as shown from the end of each housing (fig 19) and subtract $18 \frac{3}{16}$ inches (with joints at "Standard", as seen in fig 13) This will provide you with the length "X" of the ASL from end of housing to end of housing (fig 20)

Note "L" minimum equals $57 \frac{1}{8}$ inches, "L" maximum equals $69 \frac{1}{8}$ inches using the "Standard" Joint configuration

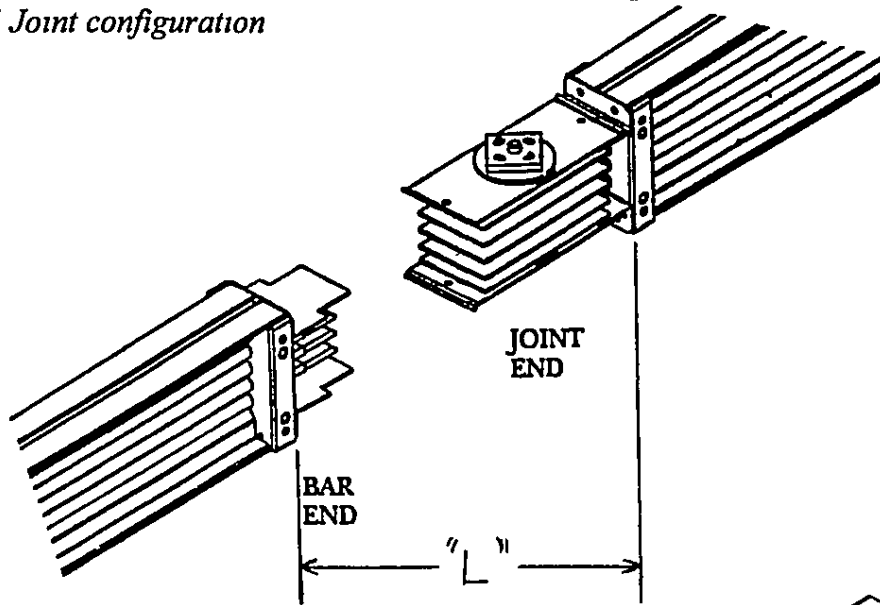


Figure 19

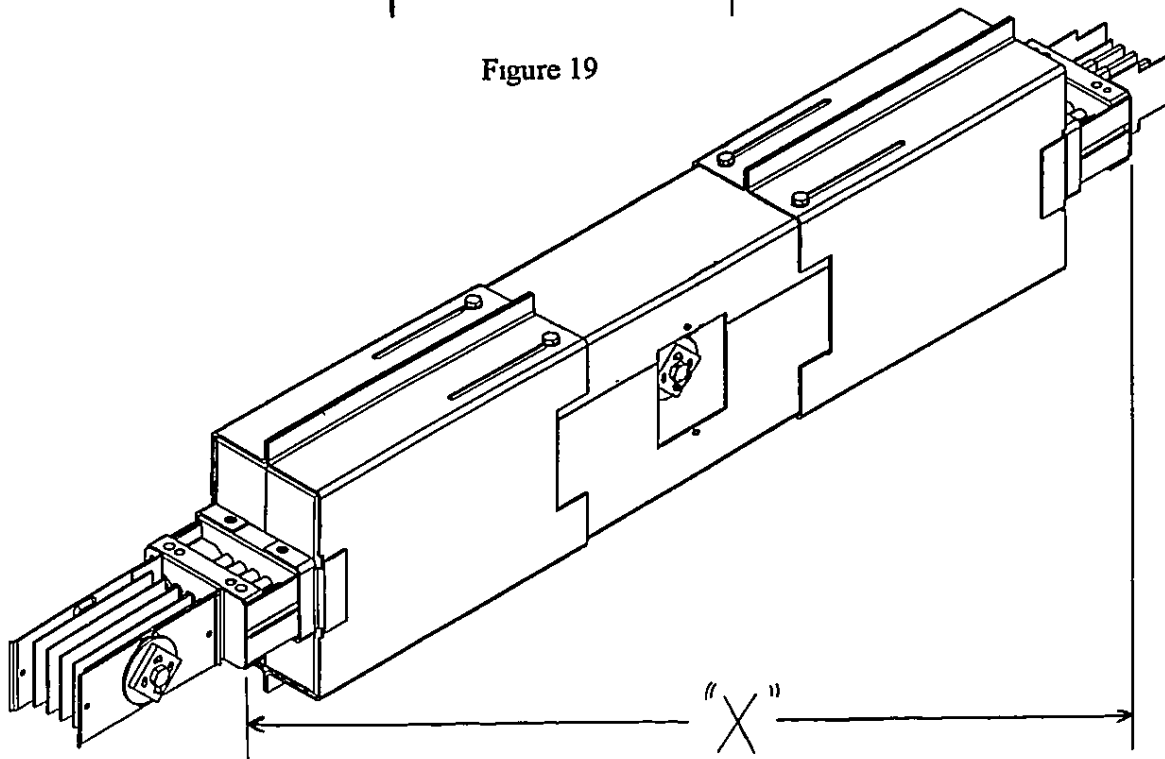


Figure 20

Low Amp Busway Maintenance Procedures

PROTECTING THE BUSWAY

Particular care must be exercised during installation to protect the busway from contaminants

Should the busway inadvertently become contaminated with water, it should be baked dry or replaced. Contact the company for instructions.

INSPECTING THE BUSWAY

Periodic inspections should be made to spot trouble areas or changes in operating condition.

Accumulations of dust, dirt or foreign matter should be removed.

Moisture from leaks or condensation dripping from pipes should be eliminated.

Check for any equipment's installed near the busway that may cause damage because of undue external heating.

Visually inspect the Belleville springs at the joint to ensure that the springs are flat. Flat springs indicate that proper joint pressure is being maintained. It is not necessary to recheck torque on joint bolt as long as visual check is satisfactory.

WARNING. *De-energize the busway before performing any of the following operations. Carefully inspect all visible electrical joints and termination's for tightness of bolts, nut, etc. Check for signs of overheating at joints, termination's, fuse clips, etc., or deterioration in insulating material or melting of sealing compound. Be sure the condition which caused any overheating has been eliminated. Check for missing or broken parts, proper spring tension, free movement, rusting or corrosion, dirt, excessive wear, arc spatter, sooty deposits, tracking. Clean or replace parts as required. Megger the system before re-energizing. The resistance should not be below one megohm for 100 feet of busway. For general instructions regarding handling, installation, operation, and maintenance of busway systems rated 600 volts or less, see NEMA Publication BU1 1.*



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ABB Inc.

Electrification Services

305 Gregson Dr.

Cary, NC 27511 USA

For further information, please visit:

www.electrification.us.abb.com/services

For service, call:

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