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 indoors 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™ BUSWAY

Establish bus bar phase sequence ("0 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 0 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-ends pointing away from the source.

In vertical risers the "bar-ends" should be up, and the 0 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 0 side, 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™ 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 thru 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

<table>
<thead>
<tr>
<th>CEILING</th>
<th>WALL</th>
<th>WALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>6”</td>
<td>1”</td>
<td>3/4”</td>
</tr>
<tr>
<td>(3” FOR RISER FLANGE OR SPRING HANGER CLEARANCE)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 2.

Table 2 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.

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 by the installer.

Table 1. Plug Sizes (Inches)

<table>
<thead>
<tr>
<th>Device</th>
<th>Plug Dimensions</th>
<th>Plug Overhang Busway Each Side</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Circuit Breakers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-Line</td>
<td>16”/4</td>
<td>6”/4</td>
</tr>
<tr>
<td>TB1</td>
<td>16”/4</td>
<td>6”/4</td>
</tr>
<tr>
<td>F-J-K</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>TB4</td>
<td>29</td>
<td>10”/4</td>
</tr>
<tr>
<td>KM</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>TB6-TB8</td>
<td>43”/4</td>
<td>43”/4</td>
</tr>
<tr>
<td>Fusible Switches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30A, 60A</td>
<td>11”/4</td>
<td>11”/4</td>
</tr>
<tr>
<td>100A</td>
<td>16”/4</td>
<td>16”/4</td>
</tr>
<tr>
<td>200A</td>
<td>16”/4</td>
<td>16”/4</td>
</tr>
<tr>
<td>400A</td>
<td>17”/4</td>
<td>19”/4</td>
</tr>
<tr>
<td>600A</td>
<td>23</td>
<td>23</td>
</tr>
</tbody>
</table>

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. One Stack (Standard) Flatwise

Figure 5. One Stack Edgewise

Figure 6.

Figure 7.
VERTICAL MOUNTING

Support busway on maximum 16’ centers. Use Table 3 to determine the number of springs required based on busway weight, as shown in Tables 4 and 5.

To assemble hangers to busway (Figure 6, 8 & 9) after placing the length in position thru the floor:

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 other support. Floor flange (C) may be placed under hanger, but will not support busway weight.
5. Anchor base channels (B) to their support.
6. Tighten hanger bolts (A).

Install the next length and make the joint assembly (see instructions on next page).

7. Check to ensure hanger has 8” initial floor clearance.

Adjustment of springs (if furnished, Figure 9):

8. Determine required “H” dimension of hanger springs, found on layout drawing or using formula below. Using final adjusting nut(s) (E), set springs on hangers to “H” dimension. After spring is adjusted, tighten jam nut (F) so spring will not move.

"H" Dimension Formula

\[ H = \frac{5\frac{1}{2} - \frac{W}{W}}{150} \]


10. Position hanger against busway and rest hanger base channels (B) on their supports (installer furnished).

11. Fit hanger clamps (G) to busway housing and hand tighten hanger bolt (A).

12. Anchor base channel (B) to its support.

13. Tighten hanger bolts (A).

14. 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.

---

**TABLE 2. HANGER DIMENSIONS (INCHES)**

<table>
<thead>
<tr>
<th>Bars per Phase</th>
<th>Ampere Rating</th>
<th>Busway “A”</th>
<th>Hanger “B”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>Alum.</td>
<td>4”/s</td>
<td>10”/1”</td>
</tr>
<tr>
<td>225-600</td>
<td></td>
<td>225-600</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td>800</td>
<td>5”/s</td>
<td></td>
</tr>
<tr>
<td>1350</td>
<td>1000</td>
<td>6”/s</td>
<td>14</td>
</tr>
<tr>
<td>1600</td>
<td>1200</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>1350</td>
<td>8”/s</td>
<td></td>
</tr>
<tr>
<td>1600</td>
<td>1200</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>1350</td>
<td>8”/s</td>
<td></td>
</tr>
<tr>
<td>2500</td>
<td>2000</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td>2500</td>
<td>15”/1”</td>
<td>2b</td>
</tr>
<tr>
<td>4000</td>
<td>3000</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>5000</td>
<td>4000</td>
<td>23</td>
<td></td>
</tr>
</tbody>
</table>

**TABLE 3. BUSWAY SPRINGS**

<table>
<thead>
<tr>
<th>Busway Height (Lbs.)</th>
<th>No. Springs <em>Req’d</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>0-600</td>
<td>1</td>
</tr>
<tr>
<td>601-1200</td>
<td>2</td>
</tr>
<tr>
<td>Over 1200</td>
<td>3</td>
</tr>
</tbody>
</table>

**TABLE 4. WEIGHT (LBS.) QMR FUSIBLE SWITCHES**

<table>
<thead>
<tr>
<th>Ampere</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>24</td>
</tr>
<tr>
<td>60</td>
<td>25</td>
</tr>
<tr>
<td>100</td>
<td>28</td>
</tr>
<tr>
<td>200</td>
<td>46</td>
</tr>
<tr>
<td>400</td>
<td>135</td>
</tr>
<tr>
<td>600</td>
<td>160</td>
</tr>
</tbody>
</table>

---

**Figure 8. Rigid Riser Hanger**

**Figure 9. Spring Riser Hanger**
VERTICAL MOUNTING (CONT.)

TABLE 5. WEIGHT (LBS./FT.) BUSWAY

<table>
<thead>
<tr>
<th>Ampere</th>
<th>Copper 3-wire</th>
<th>4-wire</th>
<th>Aluminum 3-wire</th>
<th>4-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>225</td>
<td>8</td>
<td>9</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>400</td>
<td>8</td>
<td>9</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>600</td>
<td>8</td>
<td>9</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>800</td>
<td>8</td>
<td>9</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>1000</td>
<td>10</td>
<td>12</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>1200</td>
<td>12</td>
<td>15</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>1350</td>
<td>14</td>
<td>17</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>1600</td>
<td>16</td>
<td>20</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>2000</td>
<td>21</td>
<td>26</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>2500</td>
<td>29</td>
<td>37</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>3000</td>
<td>32</td>
<td>40</td>
<td>19</td>
<td>23</td>
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<tr>
<td>4000</td>
<td>42</td>
<td>52</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>5000</td>
<td>58</td>
<td>74</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

JOINTING LENGTHS

1. Remove at least one joint cap from the two pieces to be joined, retaining the bolts.

2. Align sections to be joined by matching up "ø side" labels attached at ends of each section.

3. If necessary, loosen joint bolt slightly.

4. Slide sections together. Make sure that the busbars interweave the insulators as shown in Figures 10-12.

   NOTE: the housing ground side plates must pass between the outside insulators and the joint sides.

5. The standard distance between the housings is 8'/s" as shown in Figure 10. However, the joint is also adjustable as shown in Figures 11-12. Simply move the sections in or out to the desired length as shown and remove the twist-outs in both joint caps. See Figure 13.

   Note: Remove shipping screw to center joint when adjusting to max. length.

6. If not already in place, assemble joint caps and insert all mounting screws LOOSELY.

7. Inspect busway run for straightness in all planes, and make adjustments, if necessary, for good alignment.

8. Lubrication grease has been applied to the joint bolt head and thread to reduce friction. Do not remove this grease.

9. 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.

10. Tighten all joint cap screws.

11. 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.
Installing and Removing Spectra Series™ Busway Plugs

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.

Busway plug-in outlets are made accessible by hinging the outlet cover 180° to a retaining friction latch.

An alignment pin polarizes and locates the plug in the correct position only.

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 14.

On large plugs, drop rod brackets are provided for auxiliary support of the plug on horizontal rung.

To Install Plug Not Equipped with Plug-Assist:
(Figure 14)

1. Make sure device is in OFF position.
2. Loosen the four bolts on the hanger hooks.
3. Insert alignment pin into housing hole.
4. Push stabs into full contact with the busway.
5. Engage the four hanger hooks with the busway rails and tighten bolts.

To Install Plug Equipped with Plug-Assist:
(Figure 14)

1. Make sure device is in OFF position and plug-assist indicator is rotated fully toward stabs-out position.
2. Loosen the four bolts on the hanger hooks.
3. Insert alignment pin into housing hole.
4. Engage the four hanger hooks with the busway rails. Tighten bolts and wire device.
5. Rotate plug-assist indicator fully toward the stabs-in position.

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

Caution: Make certain plug-assist pointer is lined up with "in" position prior to turning plug on.

Figure 14. Plug Mounting
Installing Spectra Series™ Outdoor Feeder Busway

Install the busway using the instructions for indoor busway with the following exceptions for outdoor busway joints:

**Joint Cap:** Joint Caps are packaged in the hardware package. Remove the four shipping joint gasket protectors (painted yellow) and retain the joint cap mounting 1/2-13 x 1/2 bolts. Install the joint caps and tighten completely. Some pressure may be required to deflect gasket in order to start screws.

Note that for busway mounted edgewise, the bottom joint cap will be marked "BOTTOM CAP." This cap will have weep holes.

**Joint Covers:** These covers span the joint on the wide side of the busway. Attach the covers span the joint on the wide side of the busway. Attach the covers with the 1/4-20 x 1/4 screws. Pierce the gasket with a sharp tool such as an awl.

Note that for busway mounted flat, the bottom cover will be marked "BOTTOM COVER." This cover will have weep holes in the dimple(s).

**Water Barriers:** These are "Z" shaped brackets that are factory assembled with the same bolts that hold the joint sides to the busway. For vertical riser installations, the water barriers on the bottom side will have weep holes factory installed.

Figure 15.
Installing Spectra Series™ Indoor Drip Proof Busway

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

Joint caps
Joint covers & hardware
Nut angles
Caulking

Install the busway using the instructions for indoor busway with the following exceptions for indoor drip proof busway:

**Joint Cap:** Remove the four shipping joint gasket protectors (painted yellow) and retain the joint cap mounting \( \frac{3}{16} \times \frac{3}{8} \) bolts. Install the joint caps and tighten completely. Pierce the gasket with a sharp tool such as an awl. Some pressure may be required to deflect gasket in order to start screws. Note that for busway mounted edgewise, the bottom cap will be marked "BOTTOM CAP". This cap will have weep holes.

**Joint Cover(s):** The covers span the joint on the wide side of the busway. Attach the cover(s) with the \( \frac{1}{4} \times 20 \times \frac{3}{16} \) screws. Pierce the gasket with a sharp tool such as an awl. Note that for busway mounted flat, there is only a cover on the top side. For vertical risers, there is a cover on both sides.

The nuts for the joint cover(s) are angle brackets that interlock with the busway housing and have tapped holes to receive the \( \frac{1}{4} \times 20 \) screws.

Caulk along the legs of the joint caps and the busway housing between the joint covers and the corner of the joint cap.

**Water Barriers:** These are "Z" shaped brackets that are factory assembled with the same bolts that hold the joint sides to the busway. For vertical riser installations, the water barriers on the bottom side will have weep holes factory installed.

![Diagram of busway assembly](image-url)

**Figure 16.**
**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 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 terminations for tightness of bolts, nuts, etc.

Check for signs of overheating at joints, terminations, 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 BUL.1.