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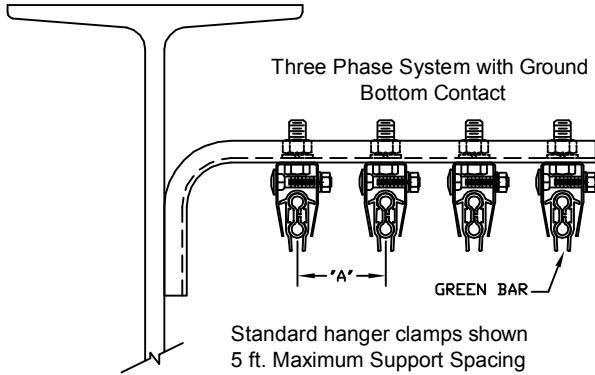
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INSTALLATION INSTRUCTIONS DUCT-O-BAR FIGURE EIGHT SYSTEMS

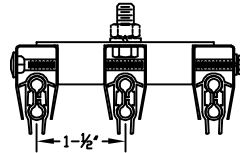
I. TYPICAL INSTALLATIONS:

A. Standard Vertical Mounted Conductors

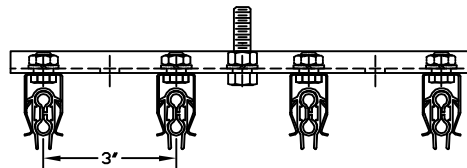


Note: NEC requires a ground bar on all systems.
 B-100-BR13A SHOULD NOT BE USED WITH TANDEM COLLECTORS.

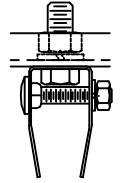
Triple Hanger Assembly
 (PART SHOWN: B-100-2F3)



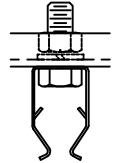
Quad Hanger Assembly
 (PART SHOWN: FE-908-2SF4-3)



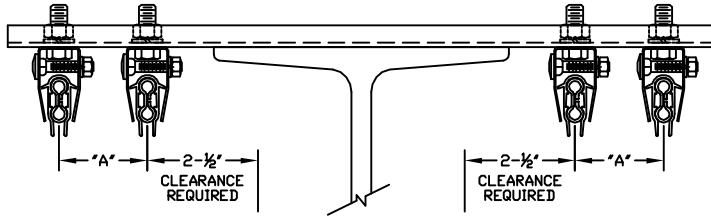
Steel Clamp-Type Hanger
 (TIGHTEN TO 150 in-lb)



Steel Snap-In Hanger
 (TIGHTEN TO 150 in-lb)



B. Monorail and Underhung Applications

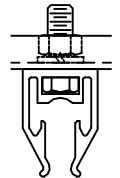


Spring type hanger clamps may also be used as shown except on curves.

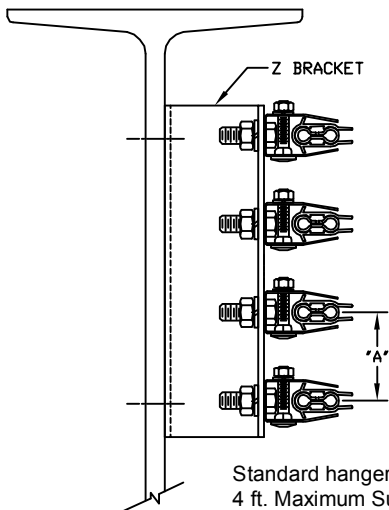
Install two conductors on one side of the beam and two conductors on the opposite side to balance the collector spring forces, particularly on light weight hoists.

*NOTE: Plastic Hangers Should Not Be Used For Temperatures 130°F And Higher

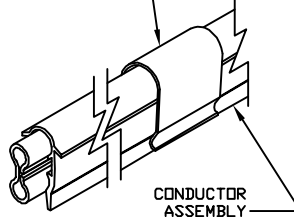
Plastic Snap-In Hanger
 (TIGHTEN TO 50 in-lb)



C. Lateral Mounted Conductors



SPRING COVER CLIP
 PART NUMBER B-100-2L



Spring cover clips are located at mid-span between each pair of hanger clamps on lateral mounted systems.

Clamp Hangers are recommended for lateral systems.

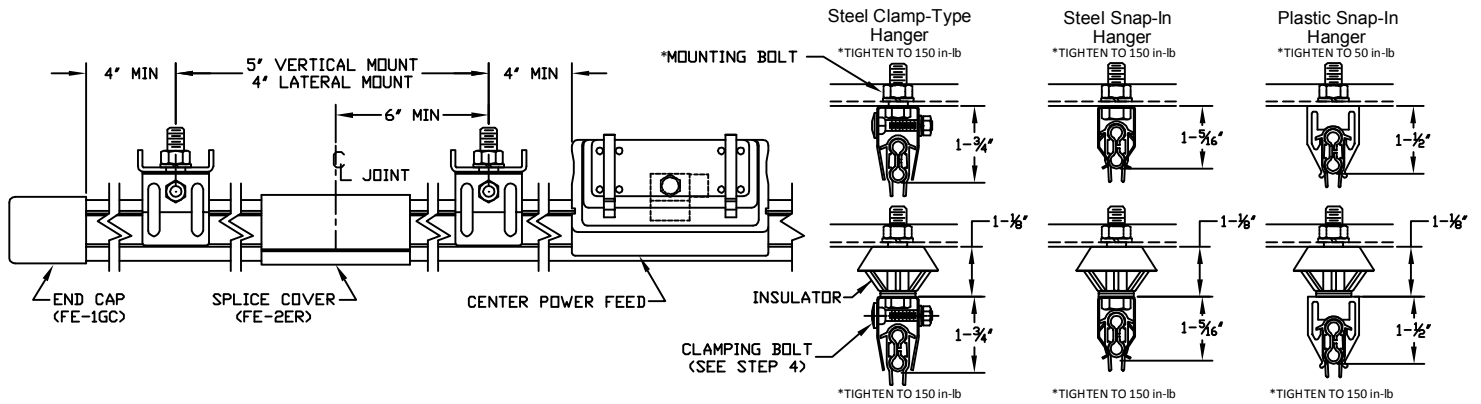
*NOTE: Plastic Snap-in Hangers Should Not Be Used On Lateral Systems

DIMENSION A (MINIMUMS)	
1-1/2"	- Minimum (Collectors Staggered)
1-1/2"	- Minimum for PS Series Collectors
2"	- Minimum (Collectors Adjacent)
2"	- Minimum (With Insulators)
3"	- Minimum (Curves)
3"	- (When pickup guides are used)

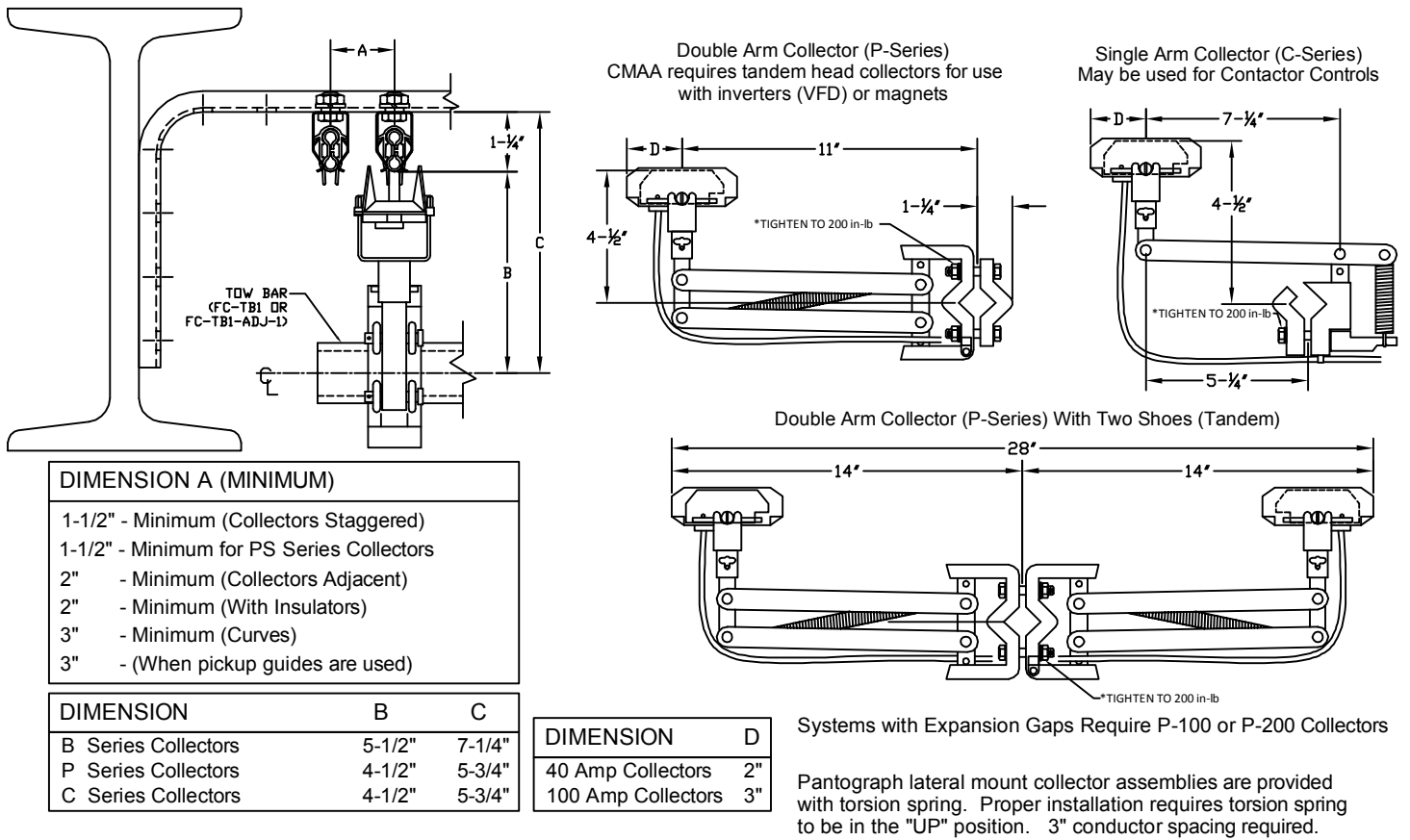
⚠ WARNING

MAKE CERTAIN POWER SUPPLY IS DISCONNECTED BEFORE INSTALLING, REPAIRING, OR WORKING IN THE PROXIMITY OF ANY ELECTRICAL SYSTEM. ONLY QUALIFIED ELECTRICAL PERSONNEL SHOULD INSTALL OR REPAIR THESE PRODUCTS.

II. INSTALLATION DIMENSIONS - CONDUCTOR ASSEMBLY



III. INSTALLATION DIMENSIONS - CONDUCTOR ASSEMBLY



DIMENSION A (MINIMUM)	
1-1/2"	- Minimum (Collectors Staggered)
1-1/2"	- Minimum for PS Series Collectors
2"	- Minimum (Collectors Adjacent)
2"	- Minimum (With Insulators)
3"	- Minimum (Curves)
3"	- (When pickup guides are used)

DIMENSION	B	C
B Series Collectors	5-1/2"	7-1/4"
P Series Collectors	4-1/2"	5-3/4"
C Series Collectors	4-1/2"	5-3/4"

DIMENSION D	
40 Amp Collectors	2"
100 Amp Collectors	3"

Systems with Expansion Gaps Require P-100 or P-200 Collectors

Pantograph lateral mount collector assemblies are provided with torsion spring. Proper installation requires torsion spring to be in the "UP" position. 3" conductor spacing required.

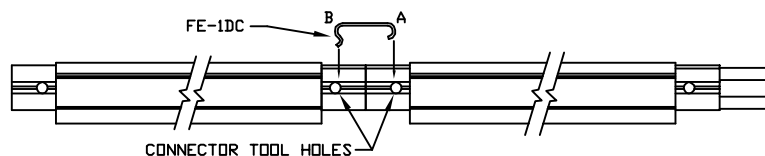
IV. JOINT KEEPER CLIP (FE-1DC)

Joint keepers are designed to prevent the conductors from pulling apart at the joints. These joint keepers are only used for FE-758, FE-1608, FE-2008, and FE-3008 Conductor Bar Systems where light gage and softer metals such as copper are used. Failure to install the Joint Keeper on these systems may result in reduced or no conductivity, conductor bar separation, collector derailment or system alignment problems.

For extreme conditions or to repair existing joints that have been damaged, a Joint Repair Kit may be required (Catalog Number FE-2008-1D).

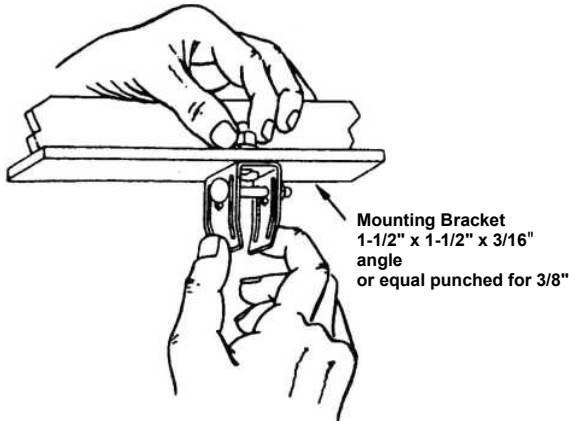
INSTALLATION INSTRUCTIONS

- After the conductor bar sections have been joined together, install the joint keeper clip by inserting the small end (A) into the connector tool hole from the seam side of the bar.
- To snap the other end of the joint keeper (B) into the other connector tool hole, line up the clip near the hole, then apply pressure to the clip in the area shown by the arrow. Use pliers or other tool, if necessary, to force the clip into the hole. The clip should now be flush with the seam.
- Install the splice cover over the exposed sections of the conductor bar in the normal manner.



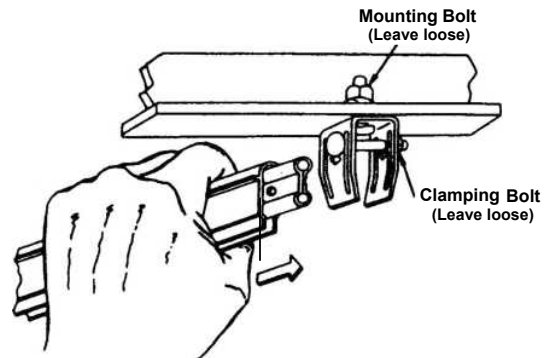
INSTALLATION PROCEDURE

Step 1 - Hanger Clamp Installation



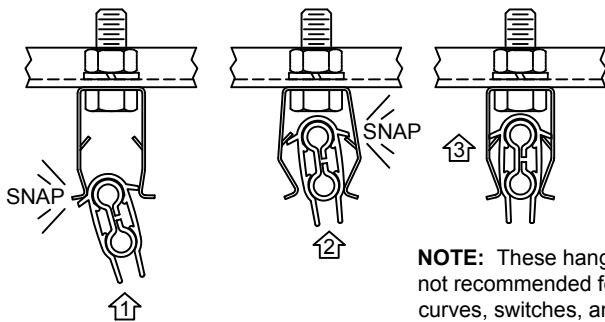
Fasten the hanger clamps on the hanger brackets and leave the mounting and clamping bolts loose.

Step 2 - Conductor Assembly Installation (Standard Hangers)



Slide the conductor bar into the hanger clamps. Proceed to Step 3.

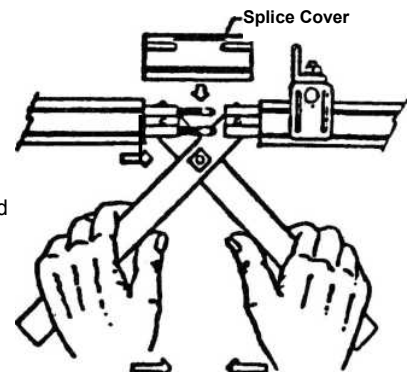
Step 2A - Conductor Assembly Installation (Spring Hangers)



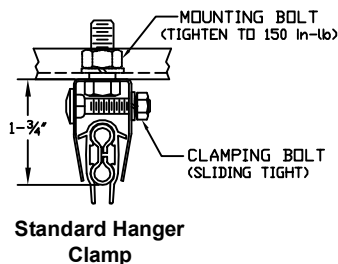
NOTE: These hangers not recommended for curves, switches, and runs less than 30' long.

Step 3 - Joining Conductor Bar Sections

Draw the adjacent conductor bars together with the connector tool. Snap splice cover over completed joint. Proceed to the next joint.

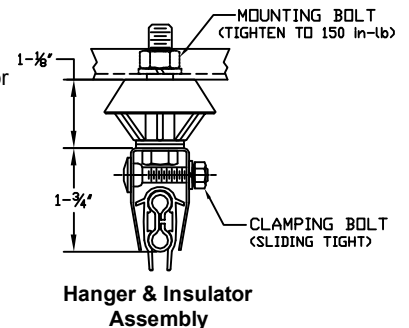


Step 4 - Hanger Clamp Tightening and Adjustment (Standard Hangers Only)



Standard Hanger Clamp

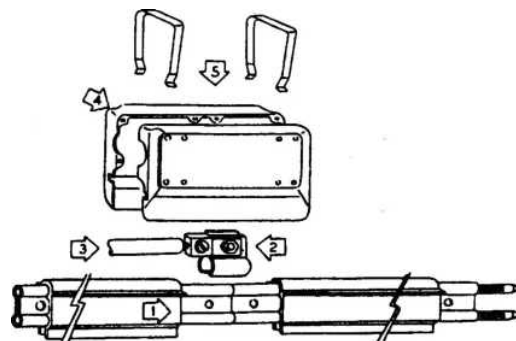
Tighten the mounting bolts firmly after aligning the conductor bar in the hanger clamps. Adjust the Clamping Bolts to SLIDING TIGHT (Max. 24 in-lb - **POWER TOOLS NOT RECOMMENDED**) as the conductor assembly should be able to slide freely through the hangers and yet be held securely in place. Hangers can also be used as anchors, in which case they should be tightened to 84 in-lb.



Hanger & Insulator Assembly

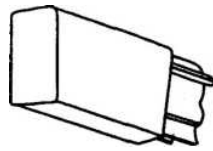
Step 5 - Center Power Feed Installation

(1) Locate at conductor joint or notch the conductor insulating cover to accept the connector clamp. (2) Install the connector clamp and (3) the power feed-in cable. (4) Place the power feed insulating case halves around the connector clamp and (5) secure with the two spring clips.



Step 6 — End Cap Installation

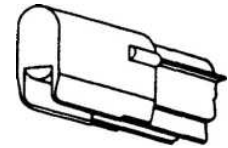
Cut off the exposed ends of all conductors flush with the cover and install the end cap all the way on.



FE-IGC END CAP

TRANSFER CAP

The transfer cap is installed in lieu of end cap at all switches, interlocks and discontinuous circuits with pickup guides.



USE FE-758-GCT WITH FE-758-2 CONDUCTOR

USE FE-908-GCT WITH 110, 160, 250, & 350 AMP CONDUCTORS

Step 7 — Collector Installation (Refer to Installation Dimensions on Page 2.)

Step 8 — General Comments — Final Inspection

In either type of mounting, sight down the installed conductors and straighten any chance bends or misalignment.

Check to be sure that the collector shoe passes freely around the cover, the collector brush passes freely between the lips of the cover without rubbing, and that it makes good contact with the conductor bar.

SPRAY PAINTING

If at all possible, all spray painting of the surroundings should be done prior to installation of the DUCT-O-BAR run. If spray painting must be done after the installation has been made, **extreme care** must be taken, by the use of masks, tape or similar methods, to protect the **contact surfaces** of the conductors. Paint on these surfaces will cause serious inoperative difficulties.

HEAT

Standard DUCT-O-BAR Vinyl Cover is not meant to be used in high heat areas. The standard cover will not support combustion, but will start to flow at 160°F. A special High Temperature Cover is recommended when surface heat exceeds 150°F. Consult the factory.

CAUTION

Do not over tighten hangers. DUCT-O-BAR must be able to slide freely during temperature variations to allow for expansion and contraction of bar and cover.

MISCELLANEOUS APPLICATIONS

CURVES

Standard Figure-8 bars can be bent to form curved sections without damaging the insulating cover or conductor. Bends with a five-foot radius or greater can be done in the field by using a fly wheel, monorail beam, or similar object to bend the conductor to approximately the necessary radius. Hangers used on curved sections must be placed at intervals of 2-1/2 feet maximum — and closer if required. Use B-100 cross bolt clamp type hangers and P-Series collectors. The minimum spacing between conductors on curves is three inches. For curves with a five-foot radius or more, use five-inch collector shoes. For curves with less than a five-foot radius, use three-inch collector shoes. Factory bent curves are recommended, especially under five foot radius.

DISCONTINUOUS CIRCUITS

On discontinuous circuits, a pickup guide assembly must be installed to ensure that the self-centering type collectors engage and disengage the conductor bar. The pickup guide (FE-2JNN3 is illustrated) must have its own support point. Refer to the chart below for proper spacing.

SUPPORT BRACKET LOCATION FOR PICKUP GUIDE	
Hanger Clamps Used on System	Move Pickup Guide Support Bracket Up
B-100-2FF	5/16"
FE-908-2SF	3/4"
FE-908-2PF	9/16"
Mushroom Type Insulator	Add 1-1/8" to Above Dimensions

INTERLOCKS, SWITCHES, OR FIXED GAPS

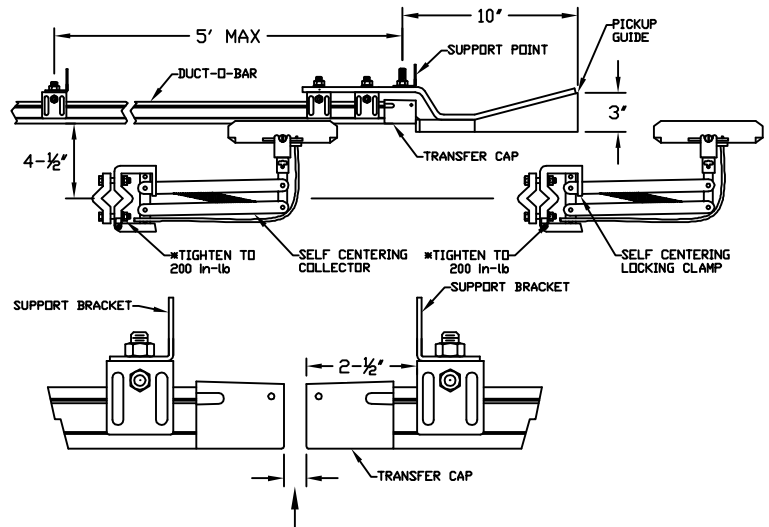
The maximum fixed gap occurring at interlocks is one inch when using 100 amp P-Series collectors and 1/2 inch when using 40 amp collectors. Use transfer caps as shown to ensure that the collector brushes transfer evenly and smoothly. Also round both ends of the contact brushes to facilitate the transfer. Use clamp type hangers only.

FIELD CUTTING

Conductor bar ends must be drilled as follows to accept proper connector pins:

FE-758 Letter "M" Drill FE-2008 Letter "G" Drill
 FE-908 17/64" Drill FE-1608 Letter "G" Drill
 FE-3008 17/64" Drill

De-burr bar ends after cutting



MAX. 1/2" GAP FOR 40 AMP COLLECTORS.
 MAX. 1" GAP FOR 100 AMP COLLECTORS.

OTHER SPECIAL APPLICATIONS

Consult the factory for installation procedures and recommendations on special applications not shown.

EXPANSION GAP AND ANCHORING REQUIREMENTS

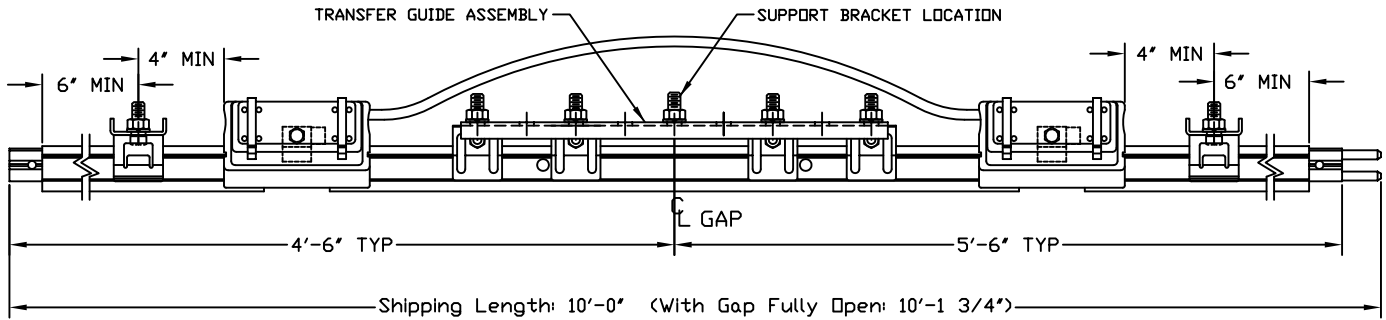
Note the support bracket location above the Transfer Guide Assembly.

There must be a bracket location at this point to support the Expansion Gap Assembly and to assure that the expansion takes place smoothly through the Transfer Guide

Shipping Length: 10'-0" With Gap Fully Open: 10'-1-3/4"

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EXPANSION GAP AND ANCHORING INSTRUCTIONS

The number of expansion gap assemblies and anchor clamp sets varies with each system. Before starting the installation, unpack and count the items included in the shipment, so a layout sketch can be made for positioning the expansion gaps and anchors in the runway conductors.

There should be one more set of anchor clamps in each run than the number of expansion gap assemblies. Expansion gap assemblies should be placed so that equal lengths of conductor are between the gaps and the end of the runway. **If a system used one expansion gap set, the expansion gap would be placed in the center of the runway, and the anchors would be placed on either side, half way between the expansion gap and the end of the runway.**

The following information will provide a guide for the installer for placing the assemblies and anchors in the system and how to determine the gap settings. *The gap settings must be made as the assemblies are installed.*

EXPANSION GAP INSTALLATION

A 10' Expansion Gap Assembly is installed in the same manner as other 10' sections of conductor bar. It is critical that the expansion gap is mounted as shown in the above picture to secure the assembly and allow the bar to expand as designed. For shipping purposes, the gap has been completely closed and must be adjusted accordingly to ambient temperature during installation. Set the gap according to the table below. Install the anchor clamps (also attached to the expansion gap) as shown on the enclosed supplementary installation instructions. Recheck the gap setting after installation of conductor bars.

Systems with Expansion Gaps require P-100 or P-200 type Collectors

See "Anchor Installation and Placement" on the following page.

Set the gaps according to one of the following charts. The gap width is set widest at the lowest ambient temperature. For assistance on any temperature ranges that do not match the charts, contact the factory.

INDOOR INSTALLATIONS			
OPERATING TEMPS		GAP SETTING	
MIN.	MAX.	AMBIENT TEMPERATURE	GAP WIDTH
50° F	100° F	55° F	1-1/2"
		75° F	1"
		95° F	1/2"
55° F	105° F	60° F	1-1/2"
		80° F	1"
		100° F	1/2"
60° F	110° F	65° F	1-1/2"
		85° F	1"
		105° F	1/2"

OUTDOOR INSTALLATIONS			
OPERATING TEMPS		GAP SETTING	
MIN.	MAX.	AMBIENT TEMPERATURE	GAP WIDTH
-10° F	90° F	0° F	1-1/2"
		40° F	1"
		80° F	1/2"
		100° F	1/2"
0° F	100° F	10° F	1-1/2"
		50° F	1"
		90° F	1/2"
10° F	110° F	20° F	1-1/2"
		60° F	1"
		100° F	1/2"

ANCHOR INSTALLATION AND PLACEMENT

FIGURE 1

For conductors that do NOT have any expansion gaps, place a B-100-2FEA anchor assembly at a hanger location which is at or near the center of each of the conductor runs.

Expansion takes place in both directions from an anchor location.

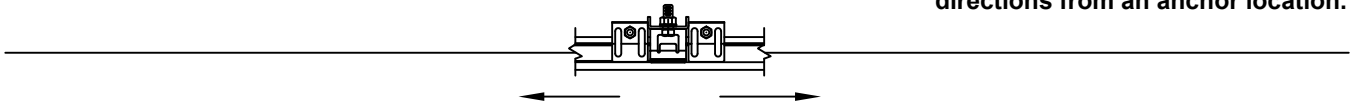


FIGURE 2

For conductors that have ONE expansion gap assembly in each conductor run, install a B-100-2FEA anchor assembly at a hanger location which is approximately half-way between the expansion gap and each end of the system.

A system requiring one expansion gap assembly would have one placed at the center of each runway conductor.

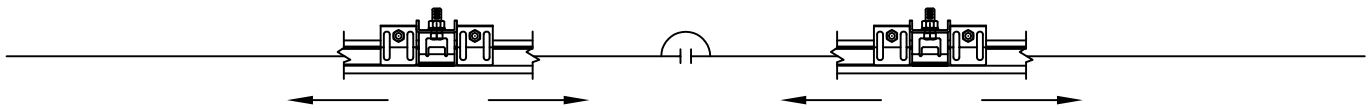
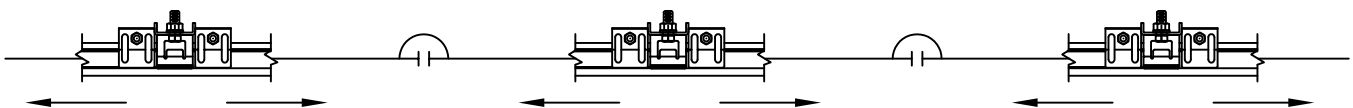


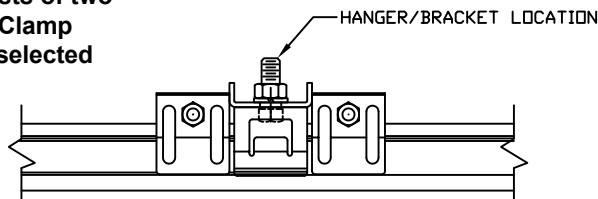
FIGURE 3

For conductors that have TWO expansion gap assemblies in each conductor run, install a B-100-2FEA anchor assembly half-way between the expansion gap assemblies and between the assemblies and each end of the system.

A system requiring two expansion gap assemblies would have one placed at approximately 1/3 of the runway length in from each end of the system.



The B-100-2FEA consists of two clamp hanger bodies. Clamp one on each side of a selected hanger location.



The B-100-2FEA anchors are epoxy coated for high visibility.

Anchors provide controlled expansion toward the gap assemblies and toward the ends of the conductor system. They eliminate sliding due to collector friction which de-calibrates the expansion gap settings.