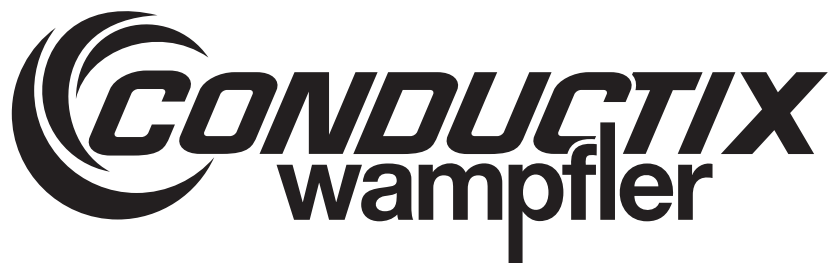


8-Bar

Installation, Operation & Maintenance Manual



CONDUCTIX INCORPORATED

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Seller agrees to repair or exchange the goods sold hereunder necessitated by reason of defective workmanship and material discovered and reported to Seller within one year after shipment of such goods to Buyer.

Except where the nature of the defect is such that it is appropriate, in Seller's judgment, to effect repairs on site, Seller's obligation hereunder to remedy defects shall be limited to repairing or replacing (at Seller's option) FOB point of original shipment by Seller, any part returned to Seller at the risk and cost of Buyer. Defective parts replaced by Seller shall become the property of Seller.

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Need Field Service for our products? We Can Handle It!

Ask us for a quote on expert system installations, inspections, preventative maintenance, and repairs/retrofits.

As the world's largest single source manufacturer of mobile electrification products, Conductix-Wampfler has the unique ability to offer a degree of service not found anywhere else. Conductix-Wampfler's team of highly qualified service technicians and engineers have years of experience servicing our complete line of products.

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- **Annual Service contracts**
- **Installation**
- **Commissioning**
- **Installation supervision** to ensure your installers avoid common mistakes.
- **Troubleshooting** to get you up and running.
- **Pre-planned inspections** to complement your preventive maintenance program.

Call 1-800-521-4888 for further details.



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SECTION 1 - SAFETY

1.0 Safety Information Responsibility

1.0.1 All owner, operator, and maintenance personnel must read and understand all manuals associated with this product before installation, operation, or maintenance.

1.0.2 The manual provides information on the recommended installation, operation, and maintenance of this product. Failure to read and follow the information provided could cause harm to yourself or others and/or cause product damage. No one should install, operate, or attempt maintenance of this product prior to familiarizing themselves with the information in this manual.

1.1 Safety Messages

The following safety messages are used in this manual to alert you to specific and important safety related information.

CAUTION

CAUTION indicates unsafe actions or situations that have the potential to cause injury, and/or minor equipment or property damage.

DANGER

DANGER indicates hazards that have the potential to cause severe personal injury or death.

WARNING

WARNING indicates unsafe actions or situations that have the potential to cause severe injury, death, and/or major equipment or property damage.

NOTE

NOTE is used to alert you to installation, operation, programming, or maintenance information that is important, but not hazard related.

1.2 Limitation of Liability

1.2.1 All data and information in this mounting instructions have been compiled in compliance with the applicable standards and regulations, best practice and our many years of experience and knowledge.

1.2.2 The manufacturer accepts no liability for damages resulting from:

- Failure to comply with this document
- Improper use
- Use by untrained personnel
- Unauthorized modifications
- Technical changes
- Use of unauthorized replacement parts and accessories
- The actual scope of delivery may differ from the explanations and descriptions provided here if the model in question is a special one, if additional equipped has been ordered or due to recent technical changes.

1.2.3 The obligations agreed upon in the delivery agreement and our General Terms and Conditions of business apply, as do the delivery conditions of the manufacturer and the legal regulations applicable at the time the contract was concluded.

1.2.4 All products are subject to technical modifications in the context of improvement of function and further development.

SECTION 1 - SAFETY

1.3. Personnel Requirements-Qualifications

WARNING

- **Inadequately trained persons are at risk of injury!**
Improper use can result in serious personal injury or material damage. All activities must only be performed by qualified personnel.

1.3.1 Only persons who can be expected to perform their work reliably are acceptable personnel. People whose reactions are impaired by drugs, alcohol or medications, for example, are not authorized.

1.3.2 When selecting personnel, follow all age- and occupation-specific guidelines applicable at the location of use.

1.3.3 The following qualifications are specified in the operating instructions for certain fields of activity.

1.3.4 Trained personnel and operators

- Will have participated in a training session, given by the owner, on the tasks assigned to them and the potential hazards in case of improper conduct.
- The owner of the machine or system must document that the appropriate training has taken place.

1.3.5 Specialist personnel

- Will consist of persons capable of performing assigned tasks and independently identifying and avoiding potential hazards based on their specialist training, knowledge and experience as well as their knowledge of the applicable regulations. Persons are deemed to be technically qualified if they have successfully completed training as a master electrician, apprentice electrician, electrical engineer or electrical technician. Persons are also considered technically qualified if they have been employed in an appropriate capacity for several years, receiving theoretical and practical training in that line, and their knowledge and skills have been tested by a specialist in the appropriate field of training.
- The machine or system owner must document that the appropriate certificates or other proofs of qualification have been or are being provided.

1.4 Personnel Requirements-Unauthorized Personnel

WARNING

- **Danger due to unauthorized personnel!**
Unauthorized persons who do not meet the requirements described here are not acquainted with the dangers in the working area. Keep unauthorized personnel away from the working area. In case of doubt, address the person and direct them away from the working area. Stop working, as long as unauthorized persons are in the working area.

SECTION 1 - SAFETY

1.5 Personnel Requirements-Training

1.5.1 Before commissioning the equipment, personnel must be trained by the owner. Log the implementation of training for better traceability.

Example of a training log:

Date	Name	Training Type	Training Instructor	Signature
11/5/2019	John Doe	First safety training for personnel	Dave Miller	

1.6 Personal Protective Equipment

1.6.1 For every task, always use:

Safety helmet: For protection against falling or flying parts and materials.

Protective gloves: For the protection of hands against friction, scrapes, puncture or deeper wounds, as well as against contact with hot surfaces.

Protective work clothing: Primarily for protection against entrapment by moving machine parts. Work clothing must be close fitting with a low resistance to tearing; it must have close-fitting sleeves and no protruding parts.

Protective footwear: For protection against heavy falling parts and slipping on slippery floors.

For special tasks, specific protective equipment is required when executing particular tasks:

Safety eye wear: For eye protection against harmful influences such as strong light, chemicals, dust, splinters or weather effects.

Hearing protection: For protection against loud noises and to prevent acoustic trauma.

Breathing mask (FFP-3 - according to country-specific requirements): For protection against materials, particles, and organisms.
In this case, for protection against the dust produced by the abrasion of carbon brushes and the PVC insulation of the conductor rail.

SECTION 2 - PRODUCT DISPOSAL

2.0 Product Disposal and Recycling

2.0.1 Once the product has reached its end of life it must be disassembled and disposed of in accordance with local and regional environmental requirements.

2.0.2 In the absence of a return and disposal agreement, disassembled components must be recycled as follows:

- All metallic parts must be sorted and recycled by material type
- All plastic components must be sorted and recycled by material type
- All other components are to be disposed of in accordance with their material composition. Take care with items identified as Substances of Concern.

2.0.3 Local authorities or special disposal companies can provide information about environmentally appropriate disposal.

SECTION 3 - TERMINOLOGY

3.0 Standard Terminology

3.0.1 Listed below are common terms and their definitions of the parts and functions you will commonly see in this manual.

Anchor Clamp - Connects the bar to the structure and controls movement of the conductors during thermal expansion and contraction.

Anchor Tight - The clamping force required to overcome movement due to the heating and cooling of the conductor bar.

Collector - Transfers power from the bar to the moving machine. Connects to a one inch mounting staff.

End Cover - Caps off the end of the conductor bar.

Hanger Bracket - Attaches to crane beam or other structure to support multiple hangers.

Hanger Clamp - Suspends the conductor bar from hanger bracket.

Power Feed - Conducts the power source to the conductor bar.

Sliding Tight - The clamping force required to hold the bar in place while allowing movement due to the heating and cooling of the conductor bar. Plastic and Steel Snap-In Hangers are both designed to provide a sliding tight fit. For metal hangers with cross bolts, tighten until .02-.05 inch clearance remains between the hanger clamp and the conductor bar.

NOTE:

- All hanger clamps that are not specified to be anchor tight must be installed sliding tight to assure reliable operation.

SECTION 4 - INSTALLATION OVERVIEW

4.0 Required Hand Tools

- Torque Wrench
- Socket Wrench Set
- Small Ball Peen Hammer
- Hacksaw
- Screwdriver Set
- 3/8" Drill and Drill Bit Set
- Small file set

4.1 Basic 8-Bar Components

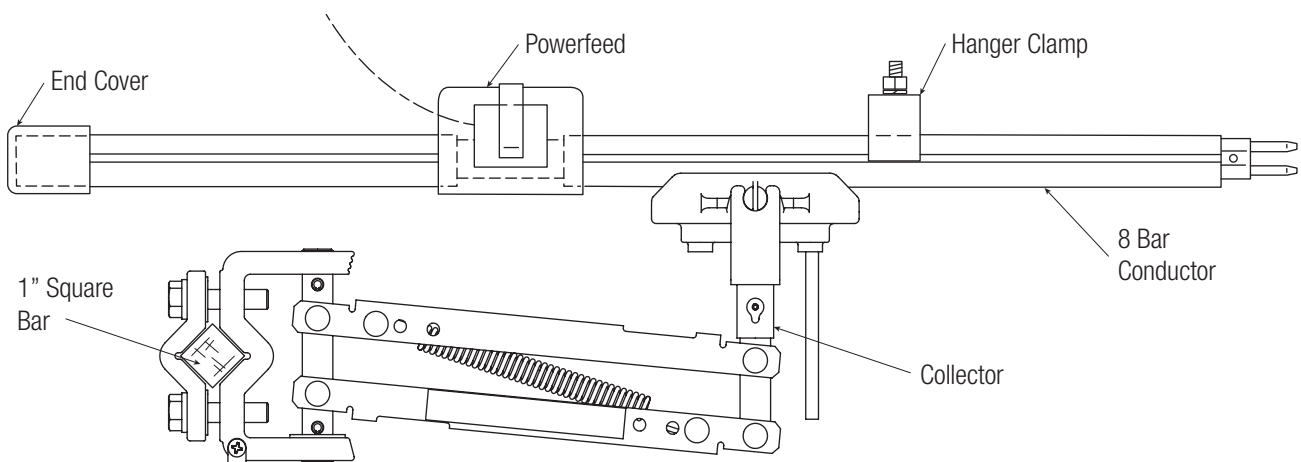


Figure: 4-1

4.1.1 Storage - Conductor bar should be stored overnight in the installation environment to assure that the bar has equalized to the ambient air temperature. The bar must be installed with a relatively uniform temperature to allow proper gaging of the expansion gap setting.

4.1.2 Standard Mounting - Conductix-Wampfler 8-Bar is typically installed with bar profile oriented vertically and the collector shoe entering from the bottom. Installations that operate in a wet or dirty atmosphere or corrosive environment must be vertically mounted.

4.1.3 Lateral Mounting - Some installations require the collector shoe to enter from the side. Conductix-Wampfler 8-Bar can be adapted to this configuration when required. Consult the factory for further assistance.

4.1.4 Additional Information - Any questions regarding the installation or use of Conductix-Wampfler 8-Bar that are not addressed in this manual can be answered by Conductix-Wampfler Engineering. Contact the factory: **800-521-4888**.

SECTION 5 - TYPICAL INSTALLATIONS

5.0 Standard Vertical Mounting Web Brackets

NOTE:

- Mounting dimensions depend on bracket and hangers used in installation.

5.0.1 "A" - Hanger/Conductor Bar/Collector Spacing

- 3" Recommended
- 2" Minimum (Collectors Adjacent)
- 1.5" Minimum (Collectors Staggered)
- 3" or 4" when Pickup Guides are used
- 2" Minimum in systems with curve
- 2" Minimum (Insulated Hangers)

5.0.2 "B" - Support to Contact Surface

- 1.8" Plastic Snap-In, Cross-Bolt and Anchor Clamp with space
- 1.4" Steel Snap-In and Anchor without space

NOTE:

- For Hangers with insulators add 1" to above dimensions

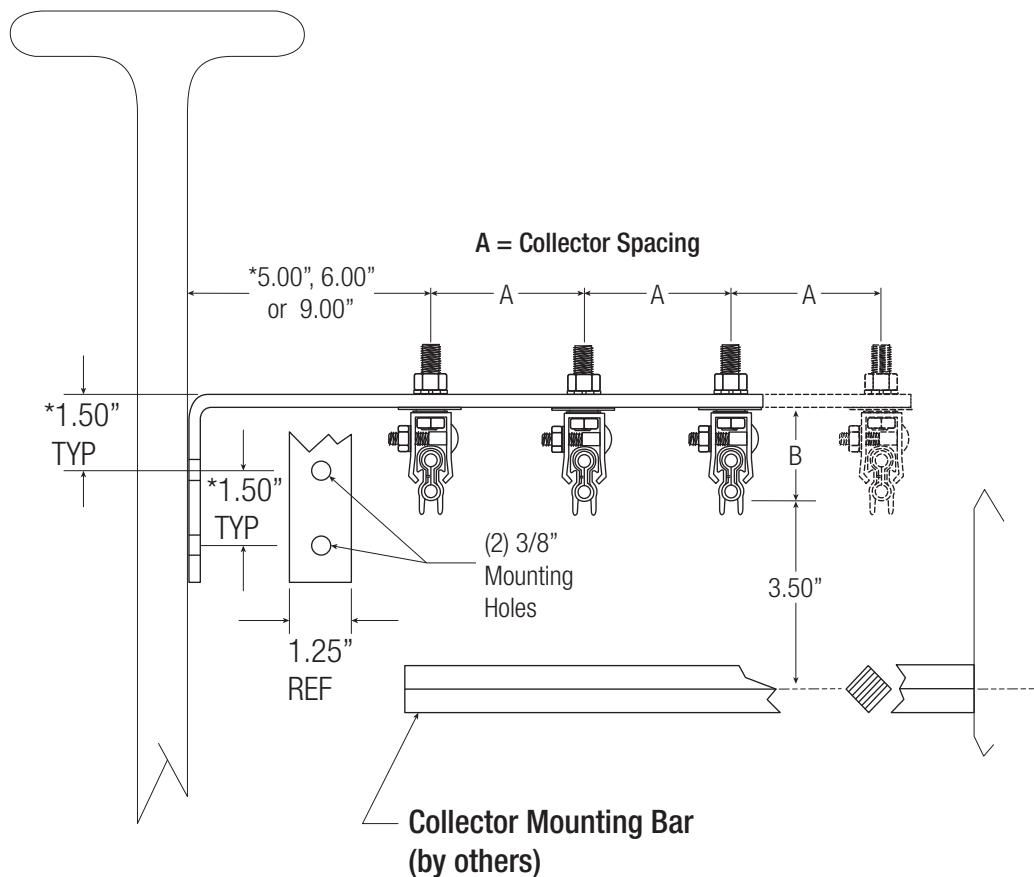


Figure: 5-1

SECTION 5 - TYPICAL INSTALLATION

5.1 Standard Monorail / Under Hung Crane Application

- Flange Brackets

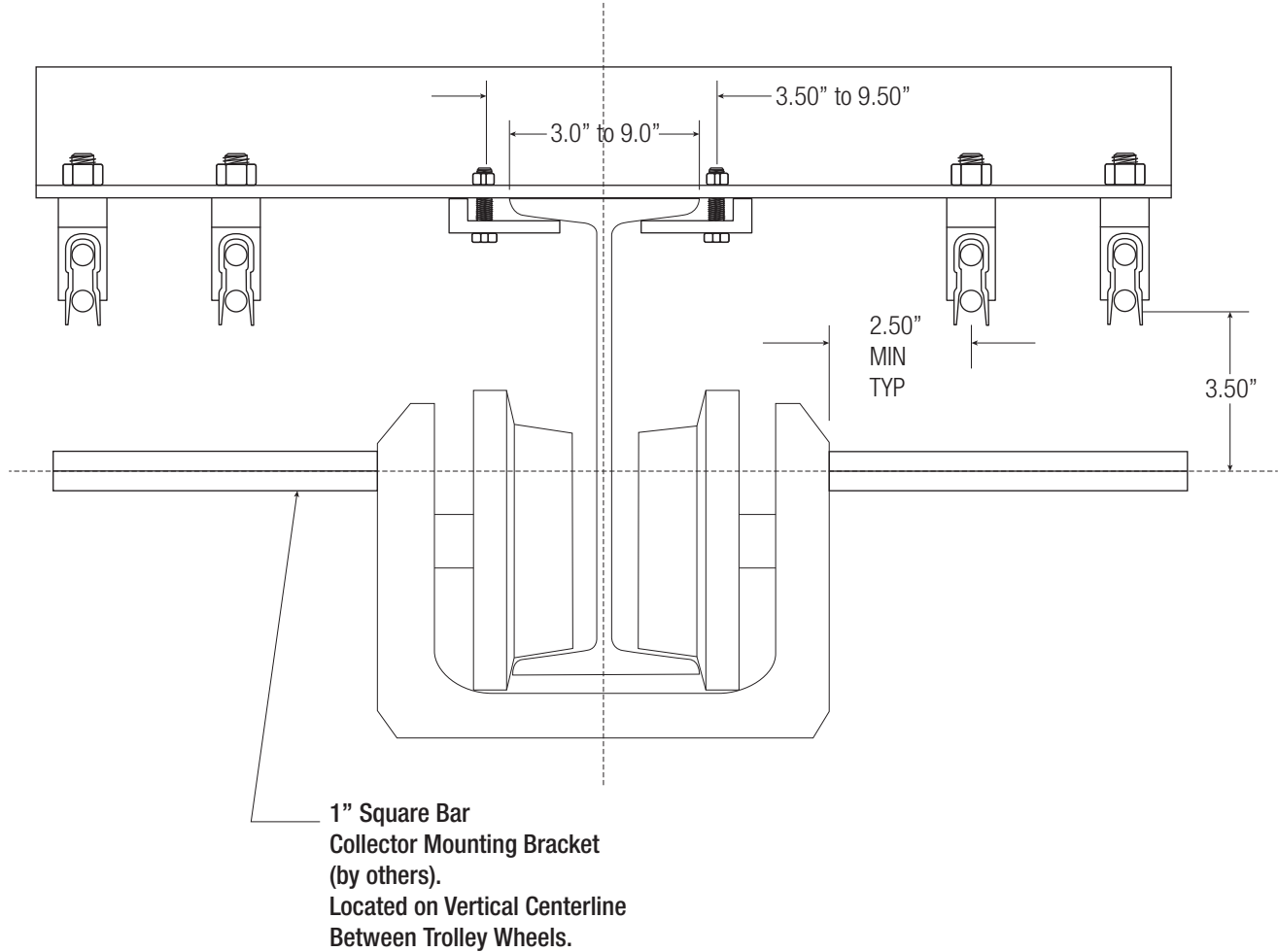


Figure: 5-2

SECTION 5 - TYPICAL INSTALLATION

5.2 Lateral Mounting

NOTE:

- Not recommended for wet or dirty environments

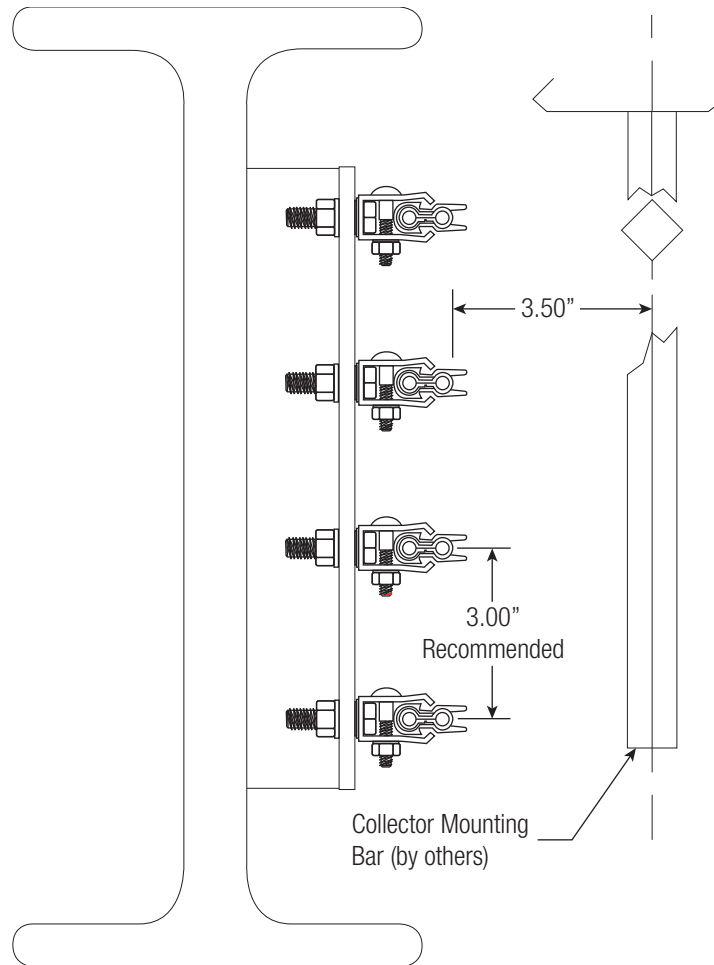


Figure: 5-3

SECTION 5 - TYPICAL INSTALLATIONS

5.3 Plastic Snap-In Hanger Clamps

NOTE:

- Not recommended for lateral mount or curves

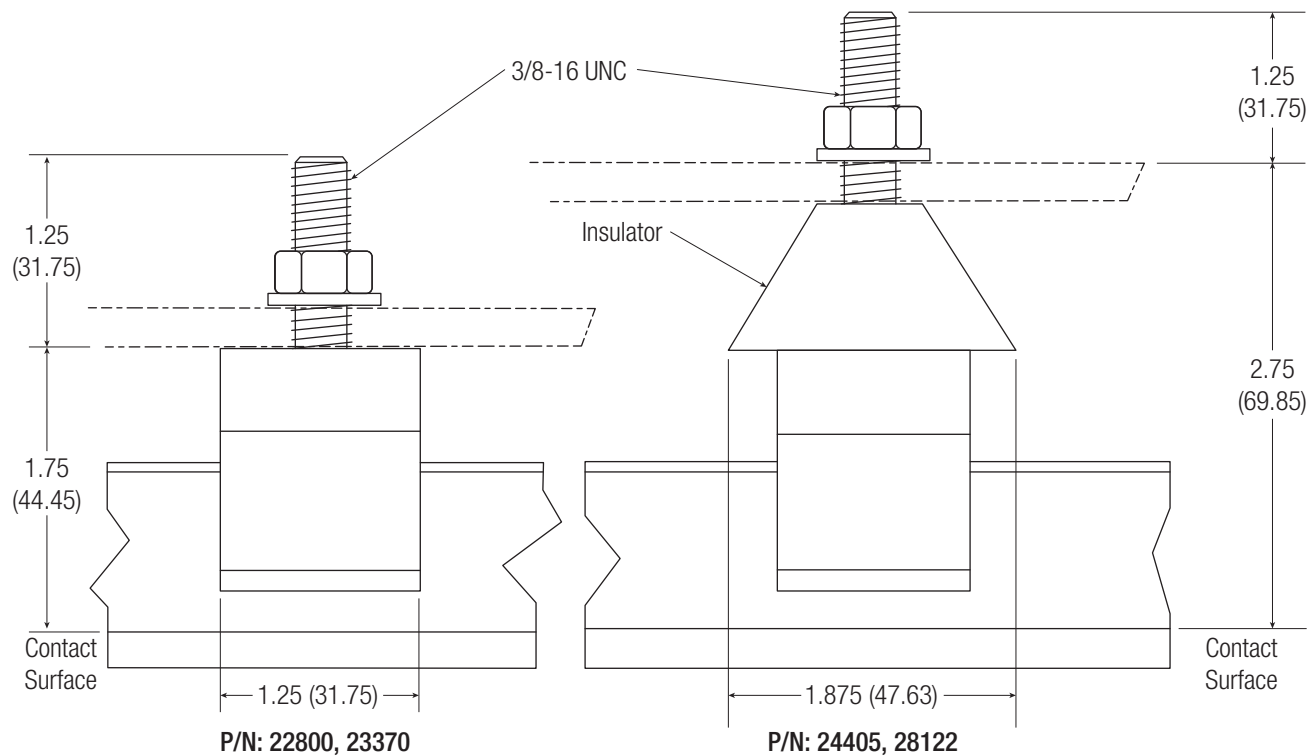


Figure: 5-4

SECTION 5 - TYPICAL INSTALLATIONS

5.4 Steel Snap-In Hanger Clamps

NOTE:

- Not recommended for lateral mount or curves

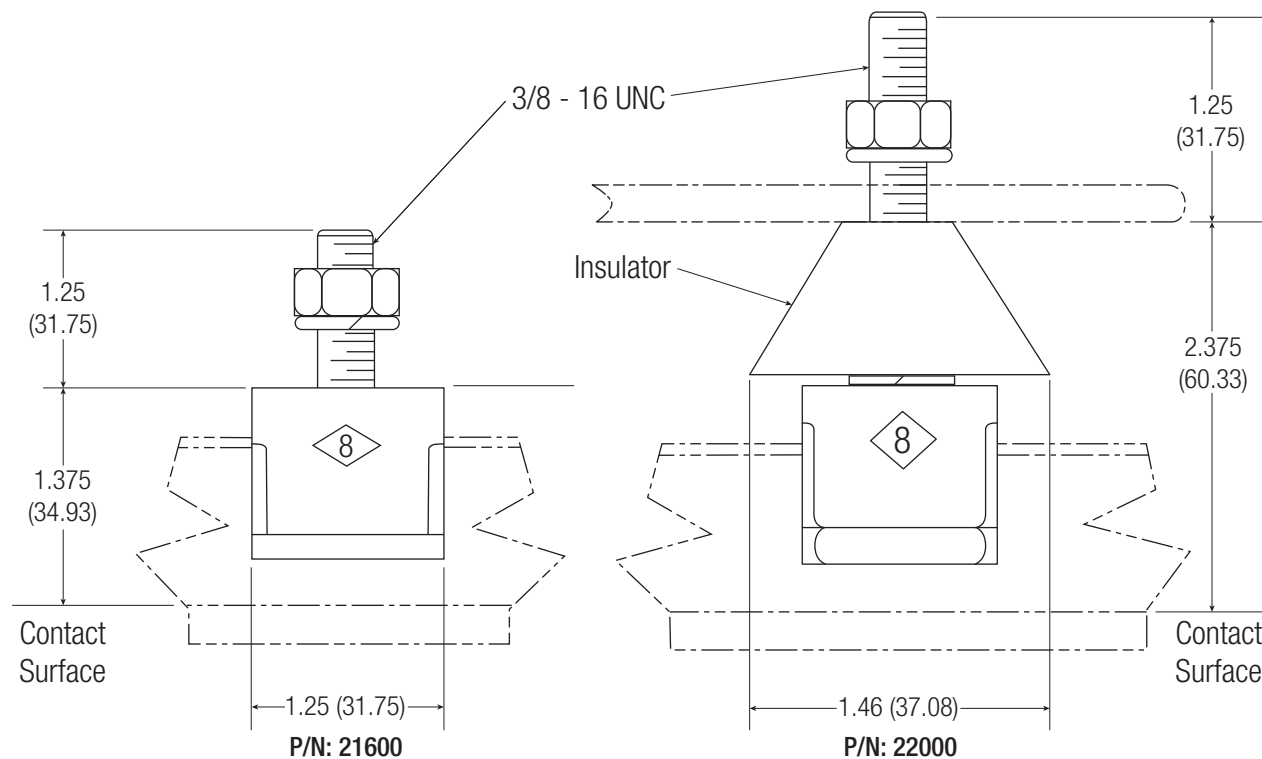


Figure: 5-5

SECTION 5 - TYPICAL INSTALLATIONS

5.5 Cross-Bolt Hanger Clamps

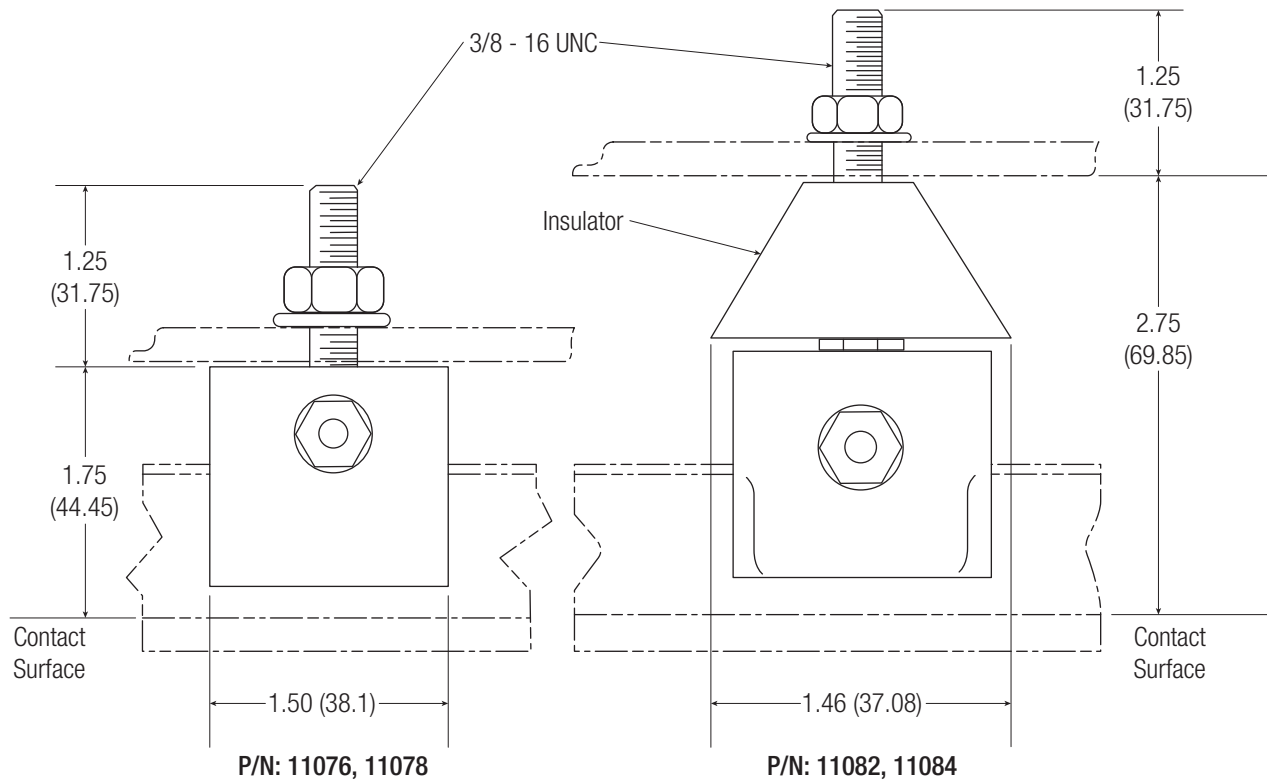


Figure: 5-6

SECTION 5 - TYPICAL INSTALLATIONS

5.6 Anchor Clamps



Figure: 5-7

SECTION 6 - TYPICAL LAYOUT FOR STRAIGHT RUNWAYS

NOTE:

- This information applies only to straight bottom entry runway installations of conductor bar. Installations that include curved sections require special consideration. Please contact factory for assistance.

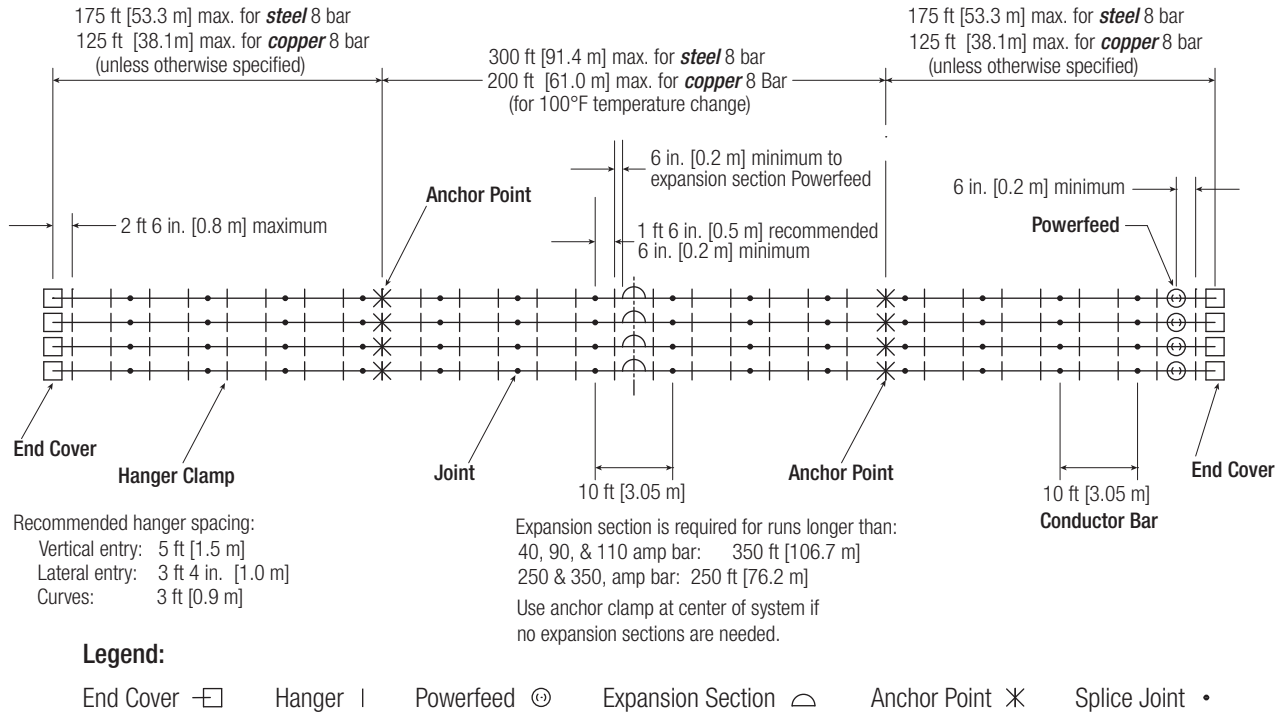


Figure: 6-1

SECTION 7 - TYPICAL COLLECTOR MOUNTING

7.0 Standard Vertical Mount "C" Base - Standard Mount - XA-8BC-30S-19-JC

NOTE:

- Torque mounting hardware to 8-10 ft-lbs.

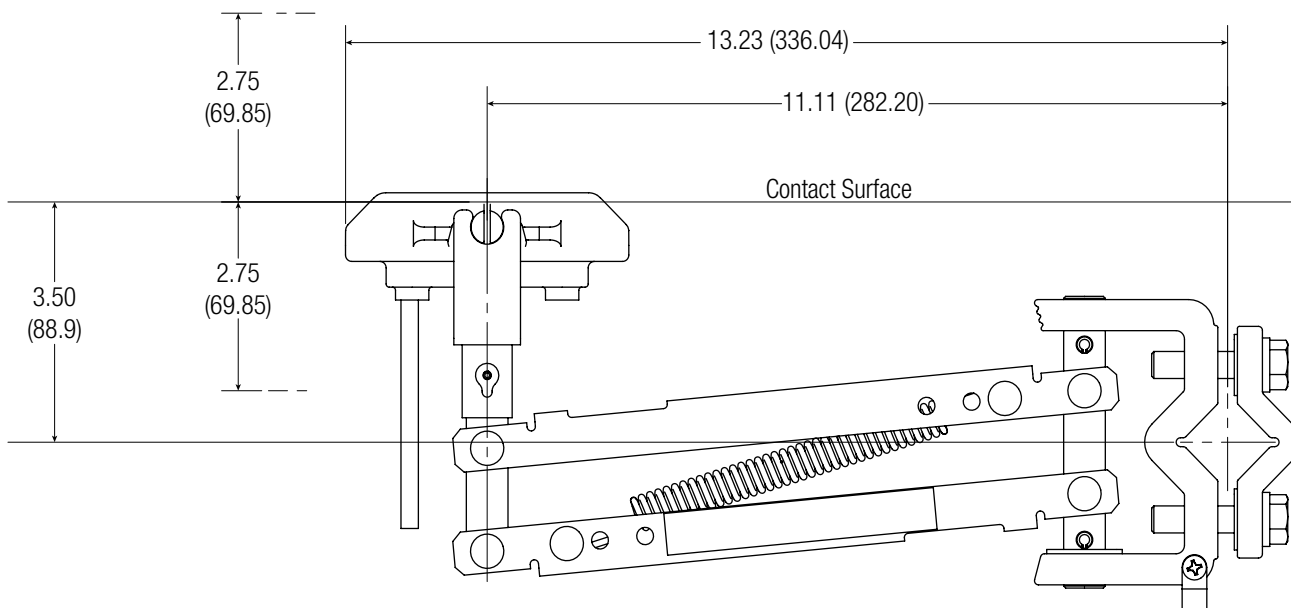


Figure: 7-1

SECTION 7 - TYPICAL COLLECTOR MOUNTING

7.1 Standard Vertical Mount "H" Base - Standard Mount - XA-13131

NOTE:

- Torque mounting hardware to 8-10 ft-lbs.

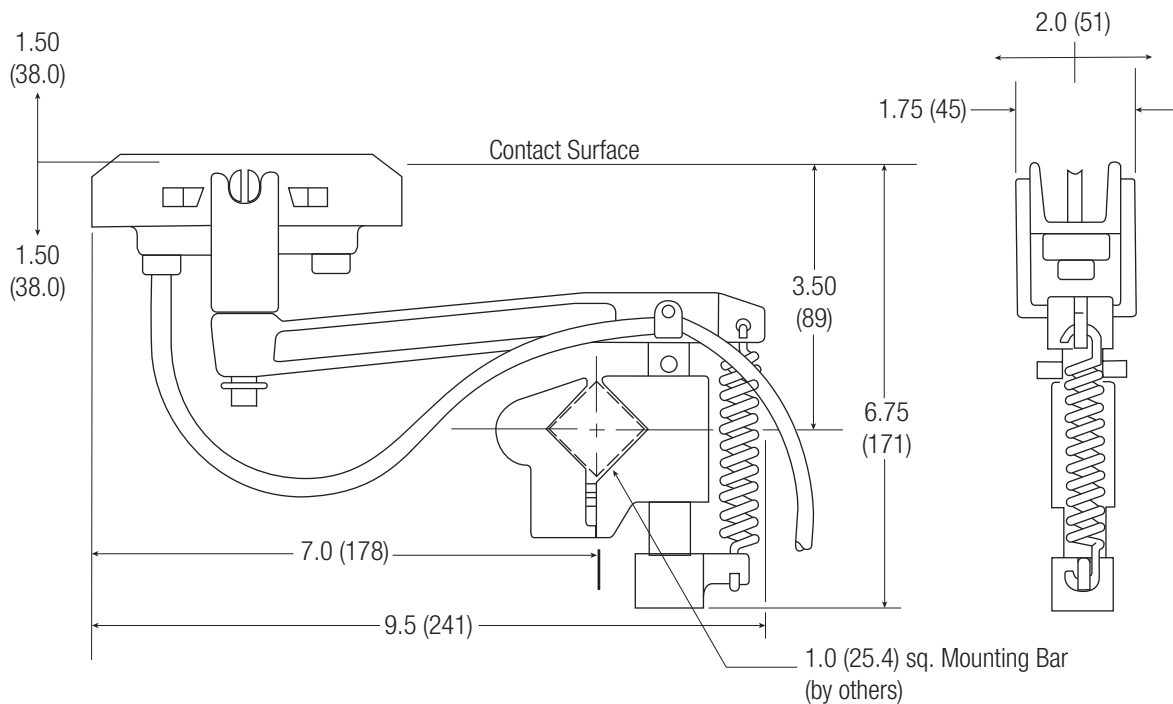


Figure: 7-2

SECTION 7 - TYPICAL COLLECTOR MOUNTING

7.2 "T" Base - Tandem Mount - XA-8BC-60T-19-JT

NOTE:

- Torque mounting hardware to 8-10 ft-lbs.

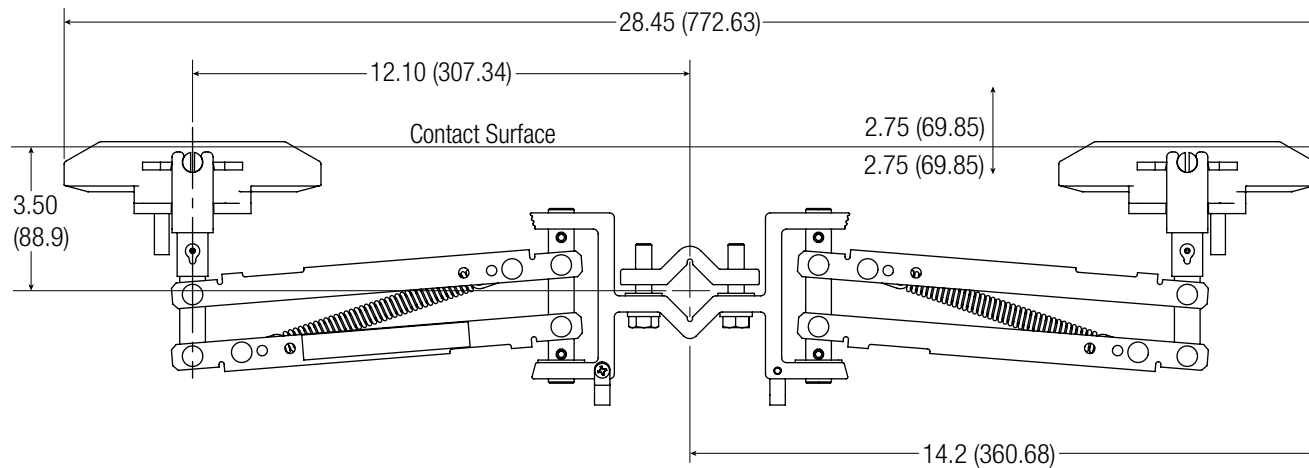


Figure: 7-3

SECTION 8 - EXPANSION GAP & ANCHORING REQUIREMENTS

8.0 Installation of Expansion Sections

8.0.1 Installation Overview

8.0.1.1 Expansion sections are installed in the same manner as standard 10' sections of conductor bar.

8.0.1.2 Expansion sections are shipped with 2 guide bracket clamps secured anchor tight at the other 2 guide bracket clamps at sliding tight.

NOTE:

- The anchor tight side is the side with the pin installed at the end of the bar. See Figure: 8-1.

Expansion Gap Settings Table															
Ambient Temp. Range	0° - 100°F (-17.7° - 37.7°C)					20° - 120°F (-6.6° - 48.8°C)					40° - 140°F (4.4° - 60°C)				
Ambient Temp.	0	25	50	75	100	20	45	70	95	120	40	65	90	115	140
Gap Setting - In.	2.25	1.75	1.25	.75	.25	2.25	1.75	1.25	.75	.25	2.25	1.75	1.25	.75	.25

Table:8-1

8.0.1.3 After installation, set the expansion gap. See Table 8-1 above.

8.0.1.4 Tighten the two sliding tight guide bracket clamps to anchor tight.

NOTE:

- The ones to be tightened are on the side without the pin at the end of the conductor bar.

8.0.1.5 Proceed with installation of the remaining conductor bars.

NOTE:

- After the conductor bars have been installed, loosen the 2 clamp bolts on the side of the guide bracket which was tightened to anchor tight (as done in step 2) on all expansion sections to sliding tight.
- Recheck the expansion gap after installation and adjust if necessary.

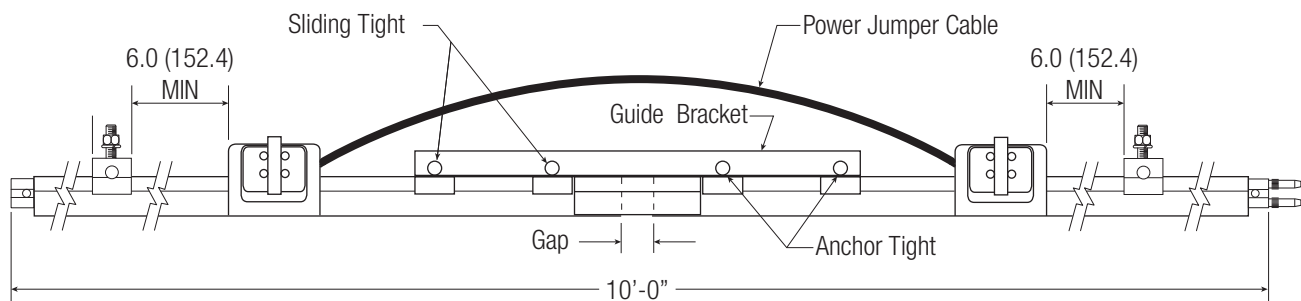


Figure: 8-1

SECTION 8 - EXPANSION GAP & ANCHORING REQUIREMENTS

8.1 Expansion and Anchor Location Diagram

8.1.1 Location of expansion sections is critical for proper functioning of the systems.

8.1.2 Follow installation drawing, if no drawing is available, see **Figure 8-2**.

8.2 Anchors

8.2.1 Anchor points are required at midpoint on all systems without expansion sections. For systems with expansion sections, anchors are required midpoint between expansions and between the first and last expansions and the ends of the run. See **Figure 8-2**.

NOTE:

- Dimensions "A & B" in **Figure 8-2** are based on a system temperature range of 100° F.

8.2.2 Cross-bolt hangers can be used as anchors on systems without expansion sections. On systems with expansion sections it is recommended that anchor clamps be used. Proper torque for anchor clamp cross bolts is 12-14 ft-lbs. See **Figure 8-3**.

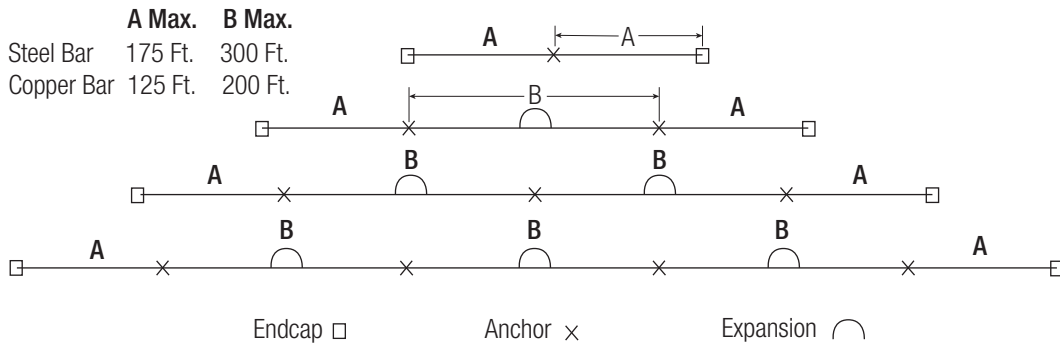


Figure: 8-2

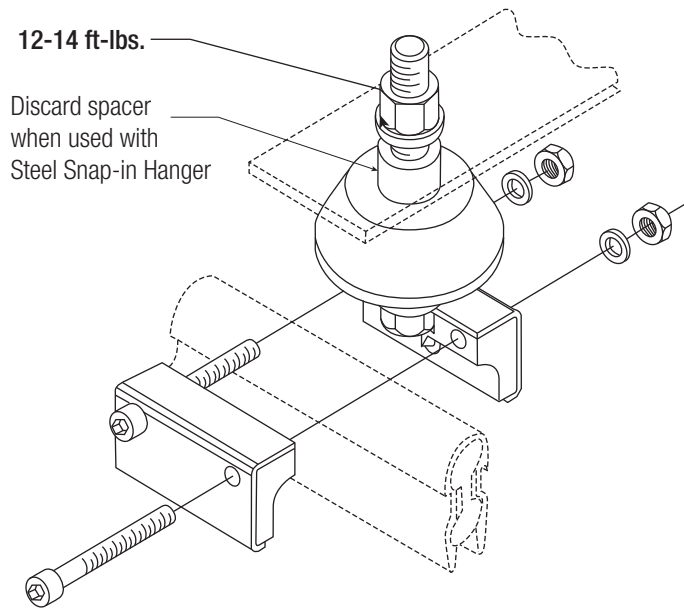


Figure: 8-3

SECTION 9 - INSTALLATION PROCEDURE

1. Install hanger and anchor clamps as required. See **Figure 9-1**.
2. Install conductor bar.
 - A. For steel snap-in hangers, torque mounting bolt to 12-14 ft-lbs. after installing all conductor bars. See **Figure 9-2**.
 - B. For plastic snap-in hangers, torque mounting bolt to 8 ft-lbs. after installing all conductor bars. See **Figure 9-3**.
 - C. For cross-bolt hangers, torque mounting bolt to 12-14 ft-lbs. after installing all conductor bars. See **Figure 9-4**. See **Table 9-1** for cross-bolt torque specs.

Cross-Bolt Torque Specs		
Hanger Material	Part Number	Anchor Tight
Plated Steel	XA-11076	4.0 - 5.0 ft-lbs.
Stainless Steel	XA-11078	3.0 - 4.0 ft-lbs.

Table: 9-1

- D. Tighten until .02-.05 inch clearance remains between the hanger clamp and the conductor bar.

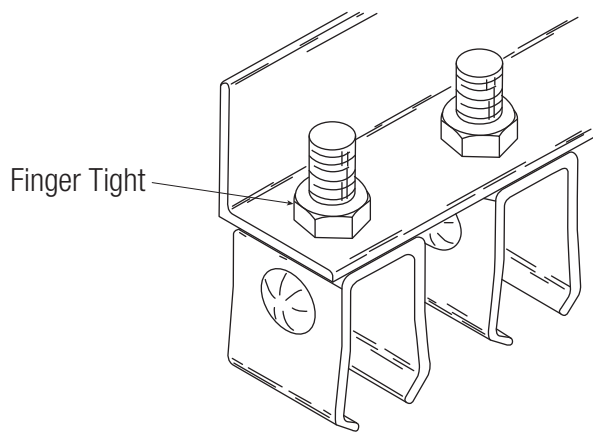


Figure: 9-1

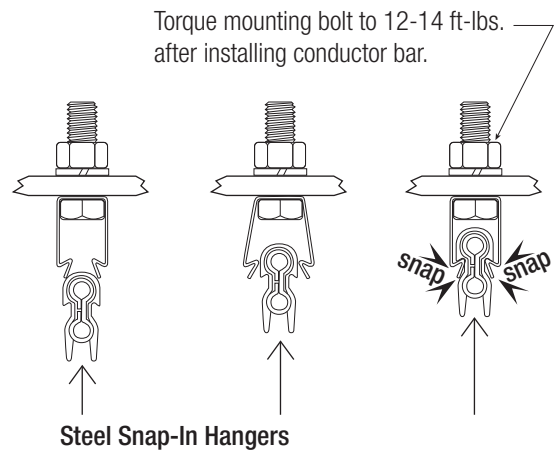


Figure: 9-2

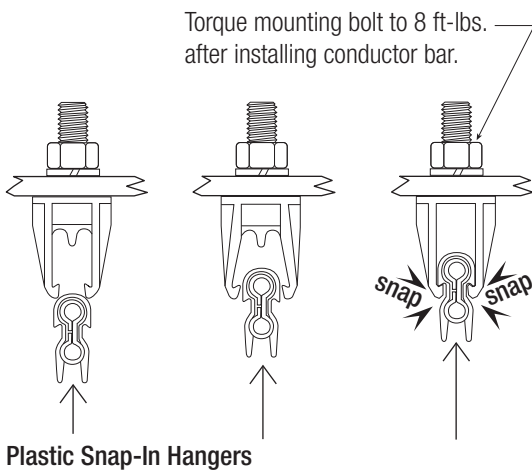


Figure: 9-3

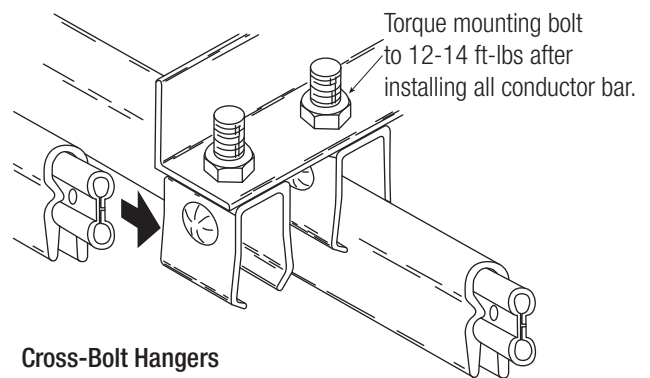


Figure: 9-4

SECTION 9 - INSTALLATION PROCEDURE

3. Join conductor bar

A. For joining pinned conductor bars, see **Figure 9-5**.

B. For joining bolted conductor bars, see **Figure 9-6**.

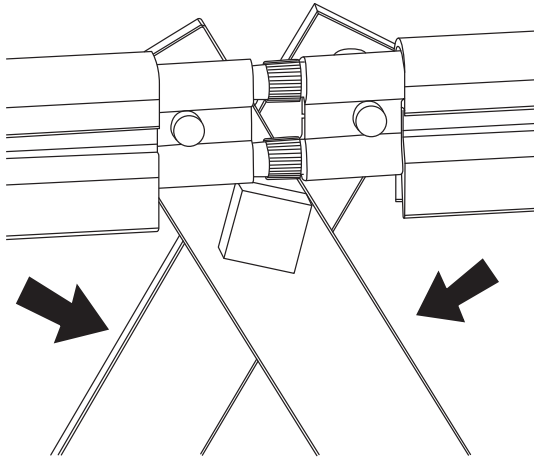


Figure: 9-5

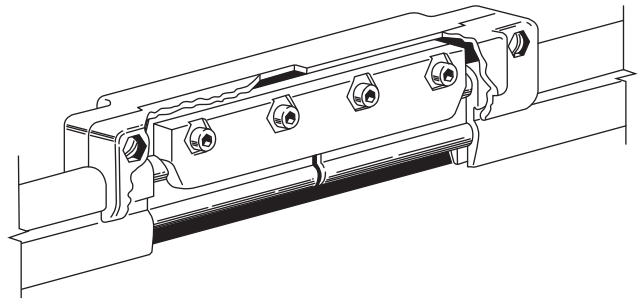


Figure: 9-6

SECTION 9 - INSTALLATION PROCEDURE

4. Install joint keepers

NOTE:

- Only copper bars require joint keepers
- A. Slide the long end of the joint keeper under the conductor bar cover on the smooth side of the bar. See **Figure 9-7**.
- B. Push the pins into the holes on the bar. See **Figure 9-8**.
5. Install joint covers.
- A. Snap joint cover over all 8-bar joints. See **Figure 9-9**.
- B. For high heat joint cover (PN: XA-11123), see **Figure: 9-10**.
- a. Snap 4.5" cover over exposed conductor. Then snap on 6" cover and center it over the joint.
 - b. Complete the joint cover by clamping both covers in place with the provided cross-bolt clamp.

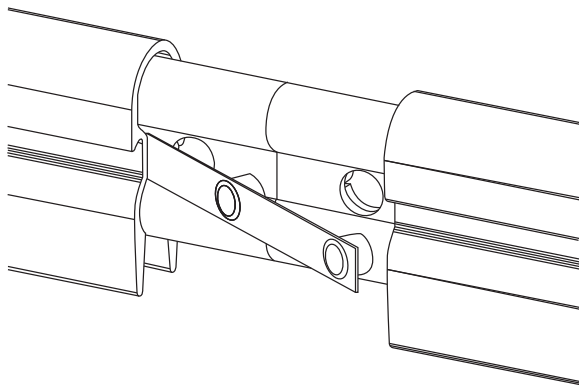


Figure: 9-7

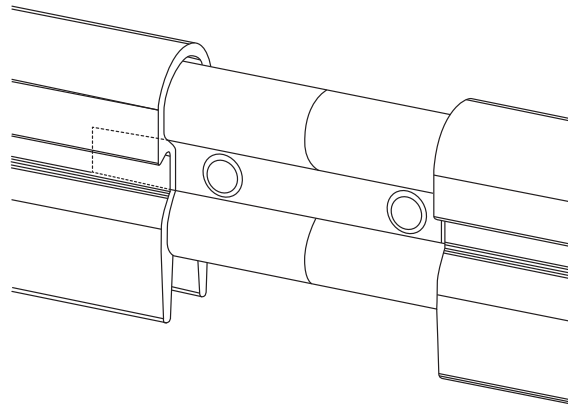


Figure: 9-8

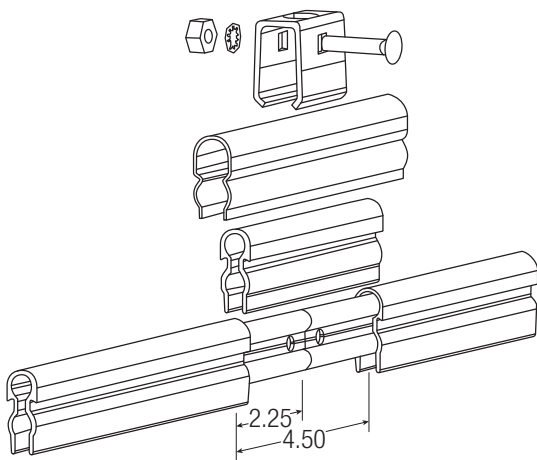


Figure: 9-9

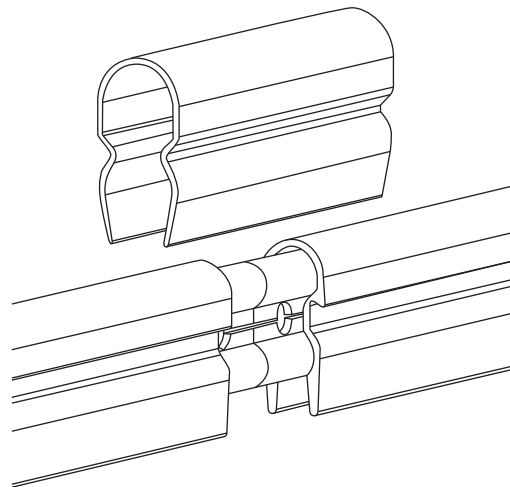


Figure: 9-10

SECTION 9 - INSTALLATION PROCEDURE

6. Install Powerfeeds

- A. Install powerfeeds at locations on installation drawing. If no drawing provided, locate powerfeeds following the designated space considerations as shown. See **Figure: 9-11**.
- B. Cut conductor bar as shown. See **Figure 9-11**.

NOTE:

- When using large cables, be sure that the customer supplied connector is attached to the clamp in such a manner that it does not interfere with the powerfeed case. See **Figure 9-12**.

7. Install end covers / transfer caps

- A. Center end cover / transfer cap on the end of the bar. Tap lightly with a hammer until securely seated. See **Figure 9-12**.

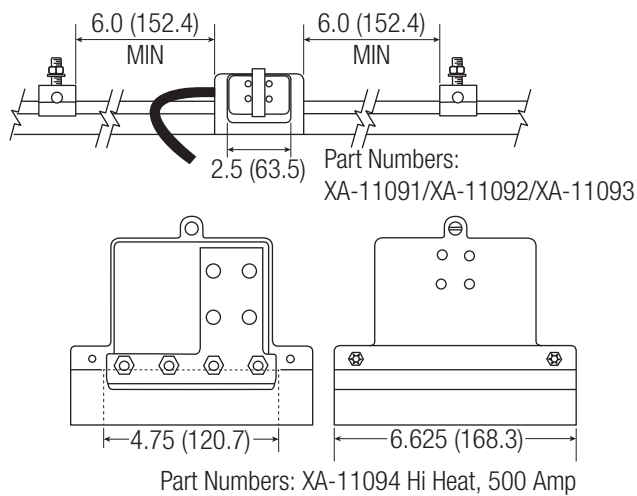


Figure: 9-11

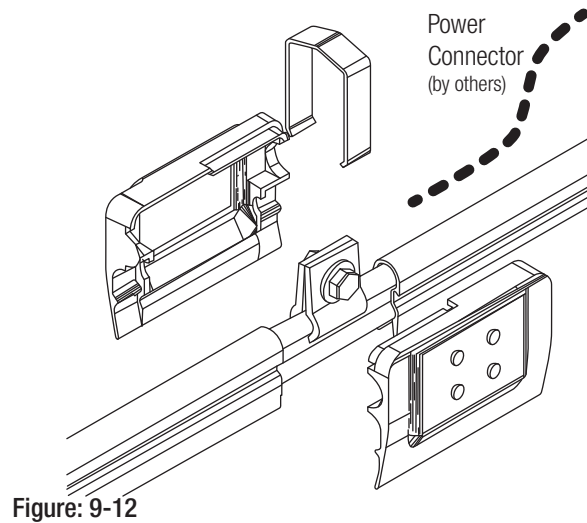


Figure: 9-12

SECTION 9 - INSTALLATION PROCEDURE

8. Install End Caps
 - A. Place end caps at the ends of the conductor lines. Using a hammer and “gently” tap the end cap until it is fully seated. See **Figure 9-13**.
9. Conduct a final inspection
 - A. Sight down the installed conductor runs and straighten any areas where conductor bar is out of alignment. Verify mounting bolts on hangers are torqued to their proper values.
 - B. Make sure collectors are aligned properly with the conductor bar.
 - C. Check the distance between the center line of 1” square bar collector mounting staff and contact surface on conductor bar. Distance should be 3.5 (88.9).
 - D. Make sure anchor clamps are properly positioned and anchor tight.
 - E. Make sure clamps on one side of expansion section have been made sliding tight. Verify that the expansion section air gap is correct for ambient bar temperature.
 - F. Make sure all joint covers and, if applicable, all joint keepers are securely in place.
 - G. Check all electrical connections.
 - H. Prior to introducing the system to service, run the application at slow speed through the entire runway length in both directions to verify operations.

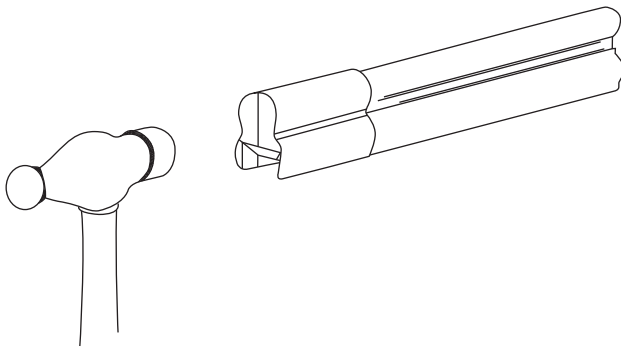


Figure: 9-13

SECTION 10 - SPECIAL APPLICATIONS

10.0 Field Cutting

10.0.1 Cut conductor with a hack saw to desired length.

10.0.2 Cut Cover

- PVC Cover: 0.75" (19.05) shorter than conductor bar.
- Hi-Heat Cover: 2.25" (57.15) shorter than conductor bar.

10.0.3 Deburr/file field cut end as necessary.

10.0.4 Ream conductor lobes. See **Figure 10-1**.

- 40, 110-350 Amp Bar: "D" Size drill bit
- 90 Amp Bar: "M" Size drill bit.

10.0.5 Install as usual.

10.1 Curves

10.1.1 Install curved sections of conductor bar before any straight sections.

10.1.2 Maximum hanger spacing on curves is 36" (914.4).

10.1.3 Curves are generally anchored at the apex, at midway between the straight sections. Contact the factory with specific application questions for further information.

10.1.4 Minimum conductor bar spacing is 2.0" (50.8) on curves 3.0" (76.2) recommended.

10.1.5 Cross bolt hanger clamps must be used on all curves.

10.2 Discontinuous Systems

10.2.1 Cross-bolt hanger clamps on pickup guide assemblies are required to be anchor tight.

NOTE:

- Pickup guides must be mounted on 2 hanger supports.
- Collectors should not be used to interrupt current.

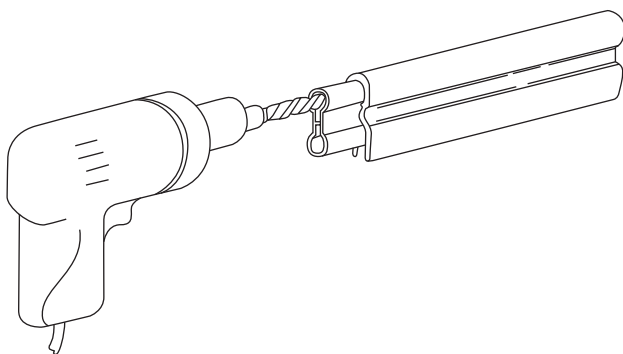


Figure: 10-1

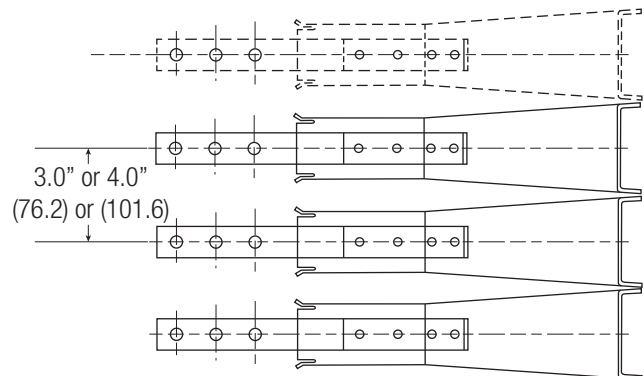


Figure: 10-2

SECTION 10 - SPECIAL APPLICATIONS

10.3 Interlock, Switches, or Fixed Gaps

10.3.1 Cut off cover than position on transfer cap must be as shown. Hanger clamps to be anchor tight at "x". See **Figure 10-3**.

Note:

- Switch sections over 25' (7.62 m) may require expansion section.

NOTE:

- For laterally mounted systems, contact the factory 800-521-4888.

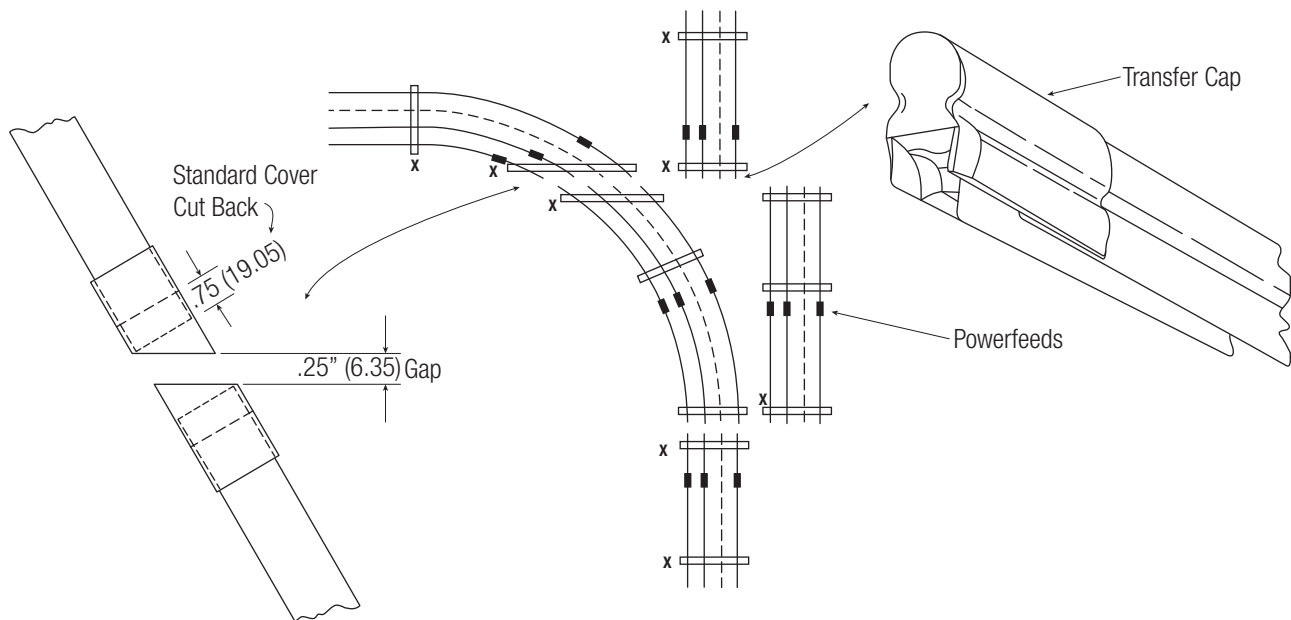


Figure: 10-3

SECTION 11 - TROUBLESHOOTING

11.0 8-Bar Conductor Troubleshooting

Problem	Probable Cause	Solution
Burned joints or burned cover at joints	Loose joint, excess vibration, or over-tightened hanger clamps. Joint keeper not used.	Tighten joint, install joint keeper, check hanger clamps, and replace joint cover.
Distorted cover	Too high ambient temperature, under rated bar.	Use high or medium heat cover. Check total current draw under worst conditions.
Pitted or burned conductor	Improper shoe pressure or worn out shoe.	Check collector mounting and spring pressure. Check for worn out shoe. If the above are corrected and condition persists, install tandem collectors.
Damaging environment	Acid fumes, salt air, extremely dirty atmosphere.	May require copper or stainless steel conductor. Under these conditions conductor should always be mounted for vertical entry.

11.1 8-Bar Collector Troubleshooting

Problem	Probable Cause	Solution
Shoe wears unevenly	Collector not mounted directly under conductor. Square bar is rotated out of position.	Remount or adjust collector.
	Lead wire not slacked.	Loosen lead wire.
	Collector movement too tight.	Free collector movement and lubricate.
Shoes pitted and burned	Insufficient shoe pressure. Excessive bouncing or hand pulled trolley not stable.	Check shoe pressure and mounting distance. Excessive bouncing can be reduced with tandem collectors. Install guide rollers and hand pulled trolleys. Also see; Pitted or burned conductor.
De-tracking	Distorted cover or joint cover	Check condition and replace as necessary.
	Misalignment at switches or crossovers	Re-align and re-anchor. Check switch movement.
	Improperly installed	Correct misalignment. Bad misalignment may require long arm collectors or expansion sections.
	Hanger clamp (cross-bolt type) too tight making bar "snake" to where collectors interfere with each other.	Loosen hangers so bar will slide. Tighten one hanger in center or between each expansion section.

SECTION 12 - REPLACEMENT PARTS

12.0 Replacement Parts

12.0.1 The following is a suggested list of maintenance parts for use in the field

- 1 extra set of contact shoes for each collector
- 1 extra spring for each collector
- 6 extra lengths of bar or 5% of total footage for average sized installations
- 1 clamp connector and cover for each extra length of bar where clamp replacement is desirable
- 3 complete collectors for 3 phase system, where use is severe

NOTES

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