# HCBar
Engineered Conductor System

TransTech
POWER TRANSFER SYSTEMS

High Current Capacity

Indoor or Outdoor Applications

Highly Durable

Low Maintenance

Suitable for Top-running or Under-running Installations

Easy Installation Using Common Hand Tools

Moving Electrification *Forward*

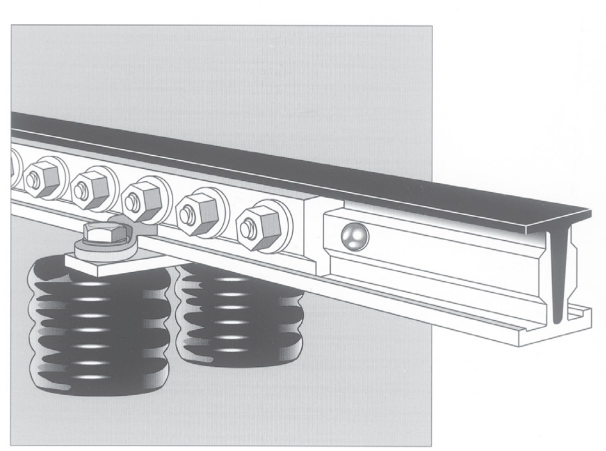
*80" Roll Processing Crane*

## Features

- High current capacity aluminum extrusions compression-bolted to the steel section with an oxidation inhibitor at the aluminum/steel interface
- Full range of standard components including hangers, anchors, feeders, splice joints, expansion joints, isolation joints and collector assemblies
- Systems are engineered to customer specifications, including system layout and installation support
- Installation requires only common hand tools

## Composite Aluminum/Steel Conductor System

HC-Bar was developed to provide a constant source of electrical power to movable equipment . . .easily and economically. Designed primarily for use on cranes, HC-Bar can be used for practically all applications — exterior and interior — where a steel contact surface is preferred.



The high carbon steel contact surface is adaptable for use with both gravity or spring-loaded collectors using cast iron contact shoes. The aluminum section of the rail provides the conductivity necessary to carry the system's amperage requirements without the use of booster cables. This HC-Bar System is thus able to provide the advantages of both steel and aluminum in one lightweight unit.

Simplicity of design reduces installation costs. Single or double insulator rail supports and anchors offer the flexibility of choice between single insulator mounting, requiring only one hole in support bracket; or double insulator mounting for the larger series rails. Either type system may be mounted in the overrunning or underrunning position.

Flexibility of insulator heights ranging from $2^5/_8$" to $3^1/_2$", permits additions to existing steel rail or other type systems.

The HC-Bar Composite Systems can be used for various AC or DC voltage applications depending on insulator selection.

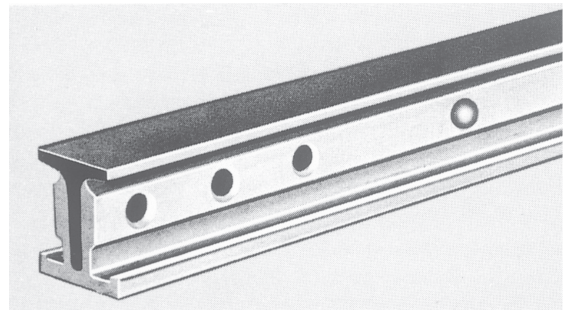
A variety of metal enclosure designs are available for personnel protection under different mounting conditions. Our sales personnel and engineering staff are available for aiding in the selection of the most economical system for your present and future requirements. (Engineered installation drawings are furnished with each system upon request.)

## Project Engineering and On-Site Installation Support

TransTech's engineers custom-configure our products and systems to meet each customer's unique application requirements. We provide on-site technical installation support and layout drawings to our customers and their installation teams.

Moving Electrification **Forward**

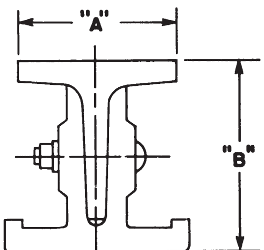
## Conductor



The HC-Bar conductor is designed for main runway or cross-travel applications. It may be mounted in either the overrunning or underrunning position.

The rail consists of two metals-aluminum and high carbon steel. The design of the aluminum body is such that the steel "T" is pressed into position and held firmly by "Compression Bolts." Before assembly the steel "T" section is thoroughly cleaned and coated with a no-oxide compound, creating a sealed interface between the aluminum and steel. This retards oxidation that normally would occur with untreated metals.

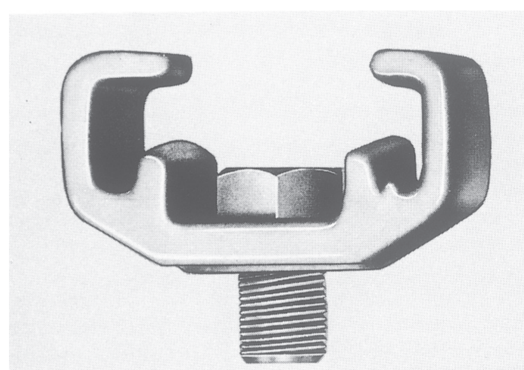
Conductor sections are normally supplied in 30 foot sections — each end drilled for splice plates. Shorter lengths can be furnished upon request or if particular application so demands.



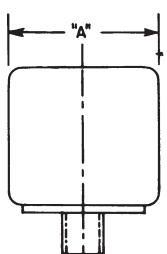

| Conductor Rating * | Conductor Cat. No. | D.C. Resistance Ohms/1000 Ft. | A | B | Wt./Ft. |
|---|---|---|---|---|---|
| 1000 | 107799 | .0105 | 2 | 2 3/8 | 5.0 |
| 1250 | 107800 | .0085 | 2 | 2 3/8 | 5.4 |
| 1500 | 107801 | .0071 | 2 | 2 3/8 | 5.8 |
| 1750 | 107802 | .0060 | 2 | 2 1/2 | 6.3 |
| 2000 | 107803 | .0046 | 3 | 2 7/8 | 9.5 |
| 2500 | 107804 | .0037 | 3 | 3 1/4 | 10.4 |
| 3000 | 107805 | .0030 | 4 | 3 3/4 | 14.5 |
| 4000 | 107806 | .0024 | 4 | 4 | 15.8 |
| 5000 | 107807 | .0019 | 4 | 5 | 22.0 |

*Rating based on 40˚C rise over 40˚C ambient.

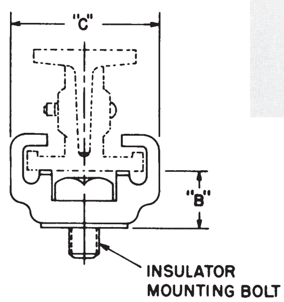
## Hanger Assembly



The hanger assembly is used to support the conductor section either in the underrunning or overrunning position. It is made of cast aluminum, nylon coated to assure free sliding during expansion and contraction of the conductor through the hanger. Conductor "lock-up" has been eliminated by this added feature. This particular assembly requires only one support insulator. Therefore, only one hole is required in the support bracket. It is particularly adaptable for underrunning systems as the hanger and insulator can be slid into position on the conductor and the whole assembly hoisted into position. The hanger can be installed at a splice joint for either underrunning or overrunning operation.



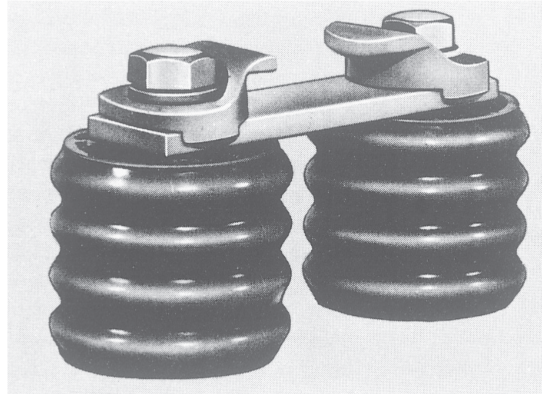
SIDE VIEW (HANGER)



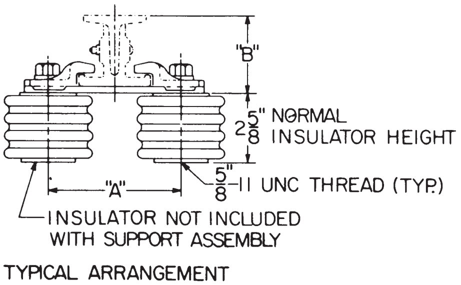

Insulator selection depends on the operating voltage of the system and the hanger bolt size.

| Conductor Rating | Hanger Cat. No. | A | B | C | Insulator Bolt | Support Centers (Max.) | Net Weight Lbs. |
|---|---|---|---|---|---|---|---|
| 1000-1750 | 106126 | 2 | 1″ | 2 7/8 | 5/8-11 UNC | 12′ | .31 |
| 2000-2500 | 106127 | 3 | 1 5/16 | 4 5/8 | 5/8-11 UNC | 12′ | 1.2 |
| 3000-4000 | 106128 | 3 1/2 | 1 3/4 | 5 7/8 | 5/8-11 UNC | 12′ | 3.1 |
| 5000 | 106129 | 4 | 1 15/16 | 7 | 3/4-10 UNC | 12′ | 4.2 |

## Dual Insulator Conductor Support

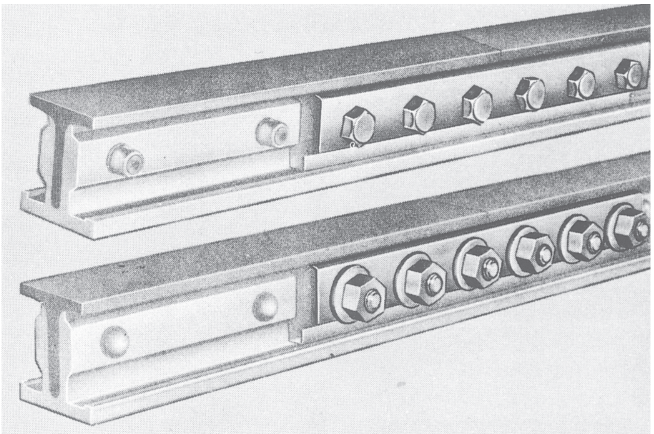


The dual insulator conductor support is designed to provide additional cantilever strength particularly when using the larger series conductors. It can be used in the underrunning or overrunning position. The assembly consists of a steel bar connecting plate with ductile iron rail grips and steel bolts. The bar and grips are nylon coated to assure free sliding of the conductor during expansion and contraction. The rail grip has a radius contact surface to the rail which prevents conductor "lock-up." In addition, it allows the installation of the conductor to be made without removing the bolts from the insulator. The support can be located at a splice joint in either the underrunning or overrunning position.

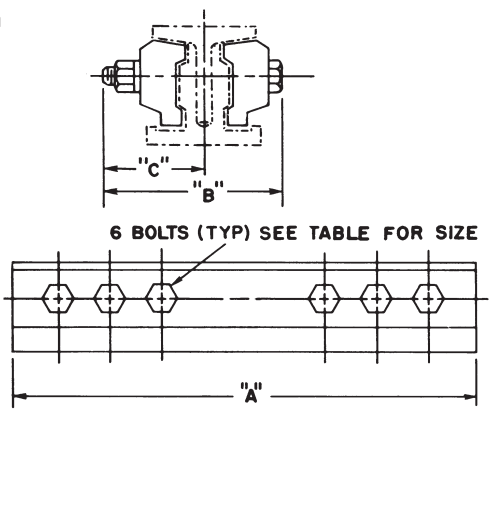



| Conductor Rating | Rail Support Cat. No. | A | B | Insulator Bolt | Support Centers (Max.) | Net Weight Lbs. |
|---|---|---|---|---|---|---|
| 1000 | 107826 | 4 1/4 | 2 5/8 | 5/8-11 UNC | 12′ | 4.3 |
| 1250 | 107826 | 4 1/4 | 2 5/8 | 5/8-11 UNC | 12′ | 4.3 |
| 1500 | 107826 | 4 1/4 | 2 5/8 | 5/8-11 UNC | 12′ | 4.3 |
| 1750 | 107826 | 4 1/4 | 2 3/4 | 5/8-11 UNC | 12′ | 4.3 |
| 2000 | 107827 | 6 | 3 3/16 | 5/8-11 UNC | 12′ | 4.9 |
| 2500 | 107827 | 6 | 3 9/16 | 5/8-11 UNC | 12′ | 4.9 |
| 3000 | 107828 | 6 7/8 | 4 1/8 | 5/8-11 UNC | 12′ | 5.7 |
| 4000 | 107828 | 6 7/8 | 4 3/8 | 5/8-11 UNC | 12′ | 5.7 |
| 5000 | 107829 | 8 | 5 3/8 | 5/8-11 UNC | 12′ | 6.0 |

## Splice Joint Assembly



The splice joint assembly connects and aligns adjoining conductor sections without drilling or welding. Simplicity of the assembly requires only standard hex wrenches. Galvanized steel bolts and nuts used in conjunction with Belleville spring-type washers are employed to securely fasten the two aluminum splice plates to the conductor. The aluminum splice joint has an electrical efficiency of greater than 100% when compared by the resistance test method (NEMA SGI 5.02) to an equal length of conductor. The splice joint can be used for either overrunning or un

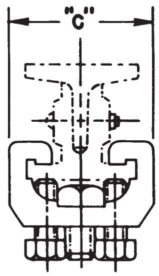



| Conductor Rating | Splice Joint Cat. No. | A | B | C | Bolt Size | Net Weight Lbs. |
|---|---|---|---|---|---|---|
| 1000 | 107830 | 12 | 3 11/32 | 2 | 1/2-13 UNC | 2.6 |
| 1250 | 107830 | 12 | 3 11/32 | 1 7/8 | 1/2-13 UNC | 2.6 |
| 1500 | 107831 | 12 | 3 5/8 | 2 1/16 | 1/2-13 UNC | 4.2 |
| 1750 | 107832 | 12 | 3 5/8 | 2 | 1/2-13 UNC | 4.3 |
| 2000 | 107833 | 18 | 4 1/16 | 2 1/4 | 1/2-13 UNC | 7.0 |
| 2500 | 107834 | 18 | 4 1/16 | 2 1/4 | 1/2-13 UNC | 7.5 |
| 3000 | 107835 | 18 | 5 5/16 | 3 | 1/2-13 UNC | 12.2 |
| 4000 | 107836 | 18 | 5 5/16 | 3 | 1/2-13 UNC | 11.8 |
| 5000 | 107837 | 18 | 5 13/32 | 3 | 1/2-13 UNC | 18.3 |

## Anchor Assembly

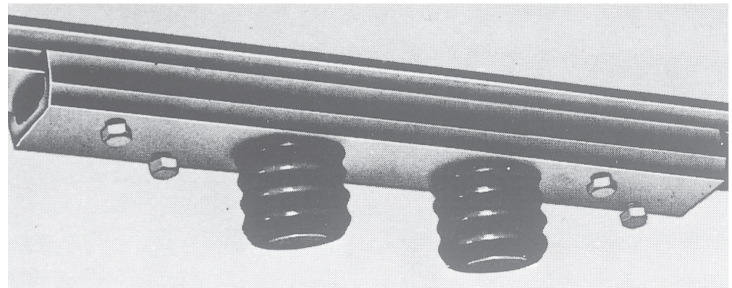
Anchor assemblies are used at one or more points in the system to secure the conductor to a fixed point from which it can expand or contract through the hangers. The assembly consists of an aluminum extrusion with bolts that clamp securely to the aluminum section of the rail.

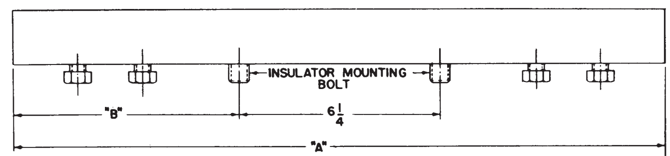
An anchor assembly replaces a hanger in the system and requires two mounting insulators. Insulators are not furnished with the assembly. Insulator height should be the same as used on the hanger assembly.




Insulator selection depends on the operating voltage of the system and the anchor bolt size.

The anchor assembly can be used for either overrunning or underrunning operation.






| Conductor Rating | Anchor Cat. No. | A | B | C | Insulator Bolt | Net Weight Lbs. |
|---|---|---|---|---|---|---|
| 1000-1750 | 106141 | 21 | 7 3/8 | 2 7/8 | 5/8-11 UNC | 5.3 |
| 2000-2500 | 106142 | 25 | 9 3/8 | 4 1/2 | 5/8-11 UNC | 15.1 |
| 3000-4000 | 106143 | 25 | 9 3/8 | 5 25/32 | 5/8-11 UNC | 25.5 |
| 5000 | 106144 | 29 | 11 3/8 | 6 29/32 | 5/8-11 UNC | 42.0 |

## Dual Insulator Anchor Assembly

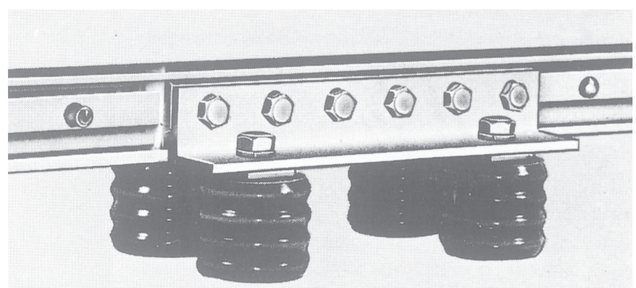
The Dual Insulator Anchor Assembly is used with the double insulator rail support shown on page 3. Anchors are used at one or more points in the system to secure the conductor to a fixed point from which it can expand or contract through the rail supports.

The assembly consists of galvanized steel tie plates, steel angles, and hardware. The anchor replaces a splice joint and hanger and can be installed without field drilling.

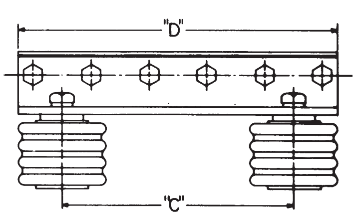
In the event an anchor is required in a location other than at a splice joint, a special assembly is available.

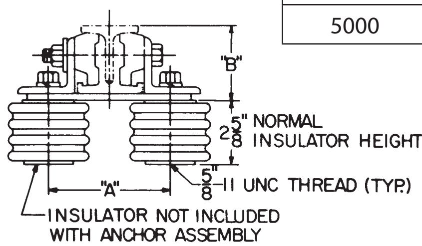
Insulators, four required, are not furnished with the assembly.

The anchor assembly can be used for either overrunning or underrunning operation.



| Conductor Rating | Anchor Cat. No. | A | B | C | D | Net Weight Lbs. |
|---|---|---|---|---|---|---|
| 1000 | 107911 | 4 1/4 | 2 5/8 | 8 | 12 | 9.5 |
| 1250 | 107912 | 4 1/4 | 2 5/8 | 8 | 12 | 9.5 |
| 1500 | 107913 | 4 1/4 | 2 5/8 | 8 | 12 | 10.6 |
| 1750 | 107914 | 4 1/4 | 2 3/4 | 8 | 12 | 10.7 |
| 2000 | 107915 | 6 | 3 3/16 | 12 | 18 | 18.5 |
| 2500 | 107916 | 6 | 3 9/16 | 12 | 18 | 19.0 |
| 3000 | 107917 | 6 7/8 | 4 1/8 | 12 | 18 | 24.3 |
| 4000 | 107918 | 6 7/8 | 4 3/8 | 12 | 18 | 24.0 |
| 5000 | 107919 | 8 | 5 3/8 | 12 | 18 | 35.5 |



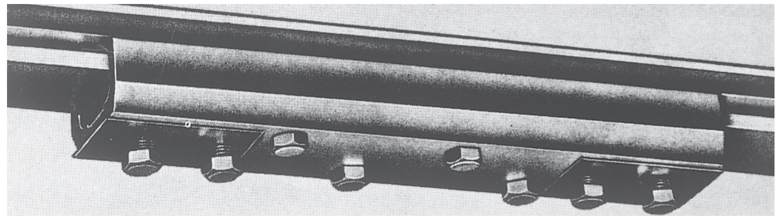
## *Feeder Assembly*

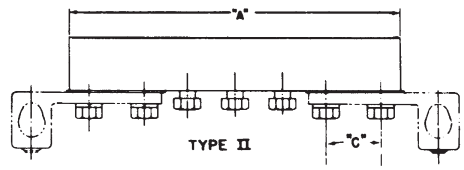
The feeder assembly provides the electrical connection from the power source to the conductor system. It may be located at any point within the system. *NO* field drilling or welding is required. On long systems the feeder should be located near the center of the system which reduces the effective system length, consequently reducing voltage drop.

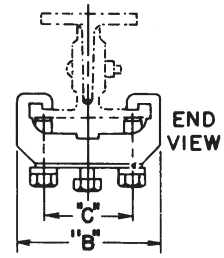
Feeders should be located no closer than six inches from the nearest component. The assembly consists of an aluminum extrusion with bolts and clamps securely to the aluminum section of the rail. Bi-metal plates are provided to prevent electrolytic action between the aluminum and the bronze, or copper lug.

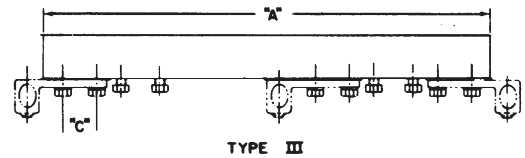
Provisions are made for 1, 2, 3, or 4 feeder lugs. Lugs are not furnished with the assembly except by request. Feeders are tapped for standard NEMA type lugs.

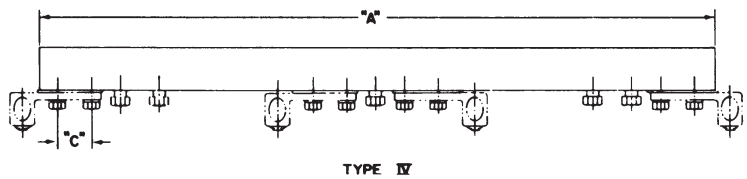
The assembly can be used for either overrunning or underrunning operation.

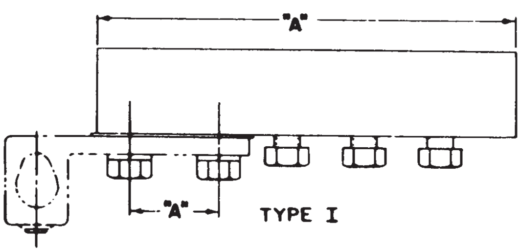




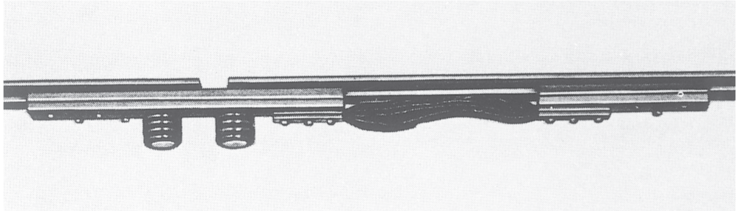



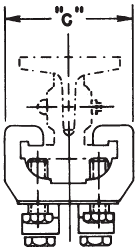



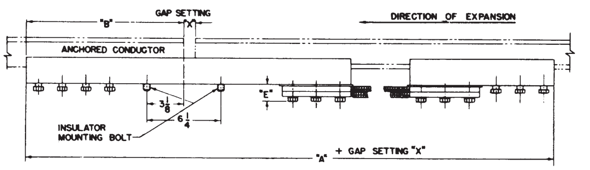

| Conductor Rating | Feeder Cat. No | Type | A | B | Feeder Lug Provision | | | Net Wt Lbs. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Qty | Bolt Size | Spacing "C" | |
| 1000-1750 | 107950 | I | $8^{1}/_{4}$ | $2^{7}/_{8}$ | 1 | $^{1}/_{2}$-13 UNC | $1^{3}/_{4}$" | 2.1 |
| | 106172 | II | 14 | | 2 | | | 3.6 |
| | 106173 | III | 23 | | 3 | | | 5.7 |
| 2000-2500 | 106174 | III | $23^{3}/_{4}$ | $4^{1}/_{2}$ | 3 | $^{1}/_{2}$-13 UNC FOR LUGS HAVING HOLES FOR (2) OR (4) BOLTS | | 14.9 |
| | 106175 | IV | 35 | | 4 | | | 21.5 |
| 3000-4000 | 106176 | II | $18^{1}/_{2}$ | $5^{25}/_{32}$ | 2 | | | 20.3 |
| | 107948 | III | $27^{3}/_{4}$ | | 3 | | | 30.1 |
| | 107949 | IV | 39 | | 4 | | | 42.1 |
| 5000 | 106177 | III | $29^{1}/_{4}$ | $6^{29}/_{32}$ | 3 | | | 42.7 |
| | 106178 | IV | 41 | | 4 | | | 59.7 |

## Fixed Expansion Joint

Fixed expansion joints are sometimes necessary to accommodate building or support structure expansion. Normal indoor installations do not require expansion joints if temperature ranges do not exceed 80°F. Extreme variations in temperature will require expansion joints on longer systems. Electrical continuity is maintained through flexible copper shunts. Shunts are separated from the aluminum by use of bi-metal plates. Conductor gap setting is based on both the ambient temperature at the time of installation and the expected temperature variation to which the system will be exposed. Two insulators are required with each fixed expansion joint. The assembly can be used for either overrunning or under-running operation.

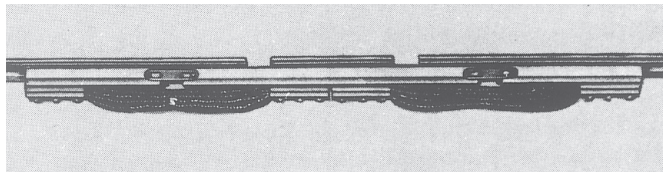




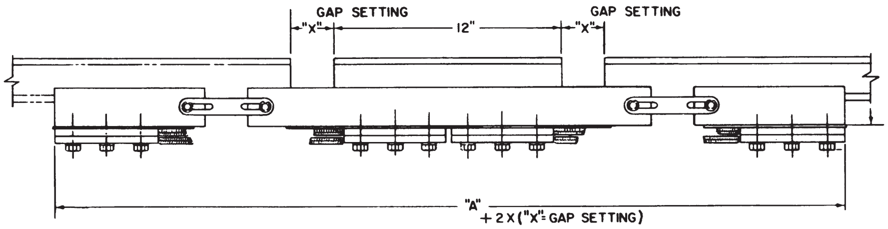



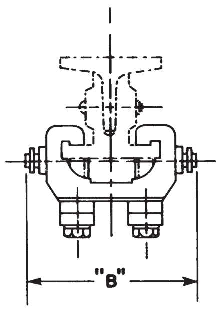

| Conductor Rating | Expansion Joint Cat. No | Maximum Expansion (X) inches | A | B | C | Insulator Bolt | Recommended Max. System Length | | | | Net Wt Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Ft. Center Anchor | | Segment Between Expansion Joints | | |
| | | | | | | | Indoor | Outdoor | Indoor | Outdoor | |
| 1000 | 106151 | $2^{1}/_{2}$ | 57 | $14^{1}/_{2}$ | $2^{7}/_{8}$ | $^{5}/_{8}$-11 UNC | NOT REQUIRED FOR NORMAL INSTALLATIONS | 500 | --- | 250 | 18.0 |
| 1250 | 106151 | $2^{1}/_{2}$ | 57 | $14^{1}/_{2}$ | $2^{7}/_{8}$ | $^{5}/_{8}$-11 UNC | | 1000 | --- | 250 | 18.56 |
| 1500-1750 | 106152 | $2^{1}/_{2}$ | 57 | $14^{1}/_{2}$ | $2^{7}/_{8}$ | $^{5}/_{8}$-11 UNC | | 1500 | --- | 250 | 19.96 |
| 2000-2500 | 106153 | $2^{1}/_{2}$ | 63 | $18^{1}/_{2}$ | $4^{1}/_{2}$ | $^{5}/_{8}$-11 UNC | | 2000 | --- | 400 | 45.91 |
| 3000 | 106155-1 | $2^{1}/_{2}$ | 63 | $18^{1}/_{2}$ | $5^{25}/_{32}$ | $^{5}/_{8}$-11 UNC | | 2500 | --- | 400 | 48.71 |
| 4000 | 106155 | $2^{1}/_{2}$ | 63 | $18^{1}/_{2}$ | $5^{25}/_{32}$ | $^{5}/_{8}$-11 UNC | | 2500 | --- | 400 | 49.00 |
| 5000 | 106157 | $2^{1}/_{2}$ | 63 | $18^{1}/_{2}$ | $6^{29}/_{32}$ | $^{3}/_{4}$-10 UNC | | 2500 | --- | 400 | 54.57 |

## Floating Expansion Joint



Floating expansion joints are used only when the gap setting exceeds the fixed expansion joint capability. Electrical continuity is maintained through flexible copper shunts. Shunts are separated from the aluminum by use of bi-metal plates. Conductor gap setting is based on both the ambient temperature at the time of installation and the expected temperature variation to which the system will be exposed. No insulators are required. The assembly can be used for either overrunning or under-running operation.



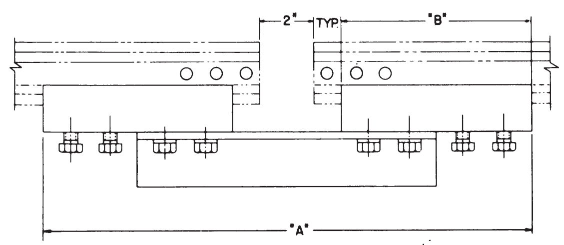




| Conductor Rating | Expansion Joint Cat. No | Maximum Expansion (2X) inches | A | B | Net Wt Lbs. |
|---|---|---|---|---|---|
| 1000 | 107860 | 5 | 56 | $3\frac{13}{16}$ | 37.0 |
| 1250 | 107860-1 | 5 | 56 | $3\frac{13}{16}$ | 37.4 |
| 1500 | 107861 | 5 | 56 | $3\frac{13}{16}$ | 40.6 |
| 1750 | 107862 | 5 | 56 | $3\frac{13}{16}$ | 41.1 |
| 2000 | 107863 | 5 | 56 | $5\frac{1}{2}$ | 71.2 |
| 2500 | 107864 | 5 | 56 | $5\frac{1}{2}$ | 73.1 |
| 3000 | 107865 | 5 | 56 | $6\frac{3}{4}$ | 101.5 |
| 4000 | 107866 | 5 | 56 | $6\frac{3}{4}$ | 102.8 |
| 5000 | 107867 | 5 | 56 | $7\frac{7}{8}$ | 130.3 |

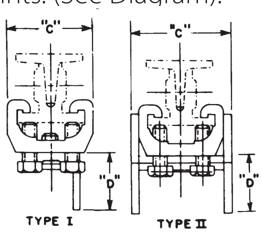
## Isolating Joint Assembly

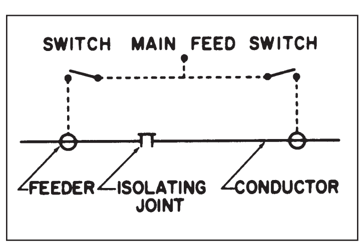
The Isolating Joint Assembly is used to insulate adjacent conductor sections from each other without interfering with collector travel. It allows portions of the system to be electrically disconnected while operations continue on other live sections. At installations where more than one crane will be operated on a single conductor system, the isolating joint is used to create maintenance and repair bays. The isolating joint may be inserted at any point on the system in place of a standard splice joint assembly. When installed, it assures correct alignment between adjacent conductors. There are two methods of feeding the conductor system at isolation joints. (See Diagram).

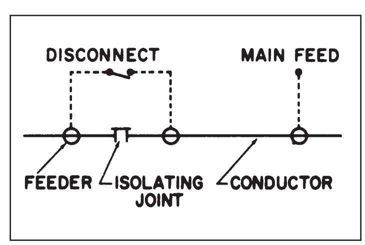
| System | Isolating Joint Cat. No. | Type | A | B | C | D | Net Weight Lbs. |
|---|---|---|---|---|---|---|---|
| 1000-1750 | 106146 | I | 21 | $8\frac{1}{2}$ | $2\frac{7}{8}$ | 2 | 4.7 |
| 2000-2500 | 106147 | II | 25 | $10\frac{1}{2}$ | 5 | $2\frac{1}{4}$ | 14.5 |
| 3000-4000 | 106148 | II | 29 | $12\frac{1}{2}$ | $6\frac{3}{8}$ | $2\frac{1}{4}$ | 28.8 |
| 5000 | 106149 | II | 30 | 13 | 8 | $2\frac{1}{4}$ | 40.5 |




Each side can be fed individually through adequate safety switches or the isolation joint can be by-passed with the use of feeder assemblies and a suitable disconnect switch.



## Collectors

### Features

Collectors consist of an assembly of a vertical mounting frame plus a spring loaded arm supporting the contact member. Adjustable spring assures proper contact with the conductor and may be varied to meet the particular working conditions.

Types LMI, LM Pony and LM Standard are assembled at TransTech for either overrunning or underrunning service.

The mounting frame is provided with a corrugated surface around an elongated slot interlocking with a corrugated washer for vertical adjustment.

Feeder connections are made to a bronze solderless connector on the mounting frame. Flexible copper cable connects the terminal lug and the contact member, thus bridging and bonding the hinged portion.

Replaceable contact member on all styles are reversible, thereby providing increased life. These contact members have a swiveling action to allow for any slight misalignment in the conductor.

**LMI Pony Size Collectors**

| LMI Collector | Extension B | Contact Member | Range* | | Net Wt. Each—Lbs. | Catalog Number |
|---|---|---|---|---|---|---|
| | | | Up | Down | | |
| Overrunning | 7 3/8″ | 88810 | 1 5/8″ | 1 5/8″ | 16 | 95659 |
| Underrunning | 7 3/8″ | 88810 | 1 5/8″ | 1 5/8″ | 16 | 95659 |

*Range measurements apply to the vertical range with the collector in a horizontal position and measured from the point at the center of the member.
**When ordering, specify by catalog number.

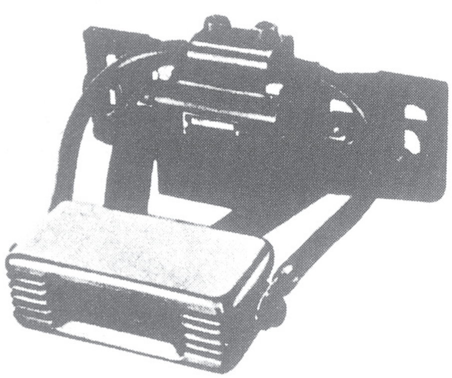
**LM Pony Size Collectors**

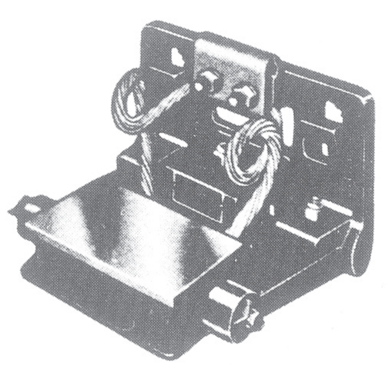
| LM Pony | Extension B | Contact Member | Range* | | Net Wt. Each—Lbs. | Catalog Number |
|---|---|---|---|---|---|---|
| | | | Up | Down | | |
| Underrunning | 4 15/16″ | 45650 | 5/8″ | 1″ | 12 | 98637 |
| Overrunning | 4 15/16″ | 45650 | 1″ | 5/8″ | 12 | 76512 |
| Underrunning | 7 3/8″ | 45650 | 1″ | 1 5/8″ | 13 | 98634 |
| Overrunning | 7 3/8″ | 45650 | 1 5/8″ | 1″ | 13 | 76514 |

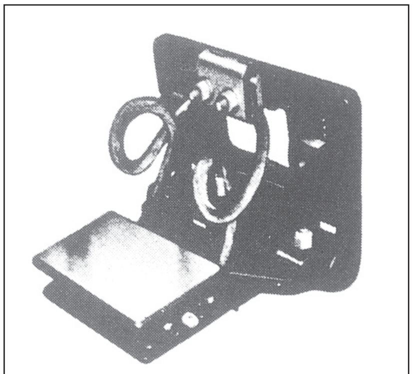
**LM Standard Size Collectors**

| LM Standard | Extension B | Contact Member | Range* | | Net Wt. Each—Lbs. | Catalog Number |
|---|---|---|---|---|---|---|
| | | | Up | Down | | |
| Underrunning | 9 5/16″ | 45715 | 1″ | 1 1/4″ | 67 | 45712 |
| Overrunning | 9 5/16″ | 45715 | 1 1/4″ | 1″ | 67 | 76507 |
| Underrunning | 10 13/16″ | 45715 | 1 1/4″ | 1 3/8″ | 69 | 45713 |
| Overrunning | 10 13/16″ | 45715 | 1 3/8″ | 1 1/4″ | 69 | 76508 |
| Underrunning | 12 5/16″ | 45715 | 1 1/2″ | 1 3/4″ | 71 | 45714 |
| Overrunning | 12 5/16″ | 45715 | 1 3/4″ | 1 1/2″ | 71 | 76509 |
| Underrunning | 15 1/16″ | 45715 | 1 7/8″ | 2 1/2″ | 75 | 48474 |
| Overrunning | 15 1/16″ | 45715 | 2 1/8″ | 2 1/8″ | 75 | 76510 |

*Range measurements apply to the vertical range with the collector in a horizontal position and measured from a point at the center of the member.


LMI PONY

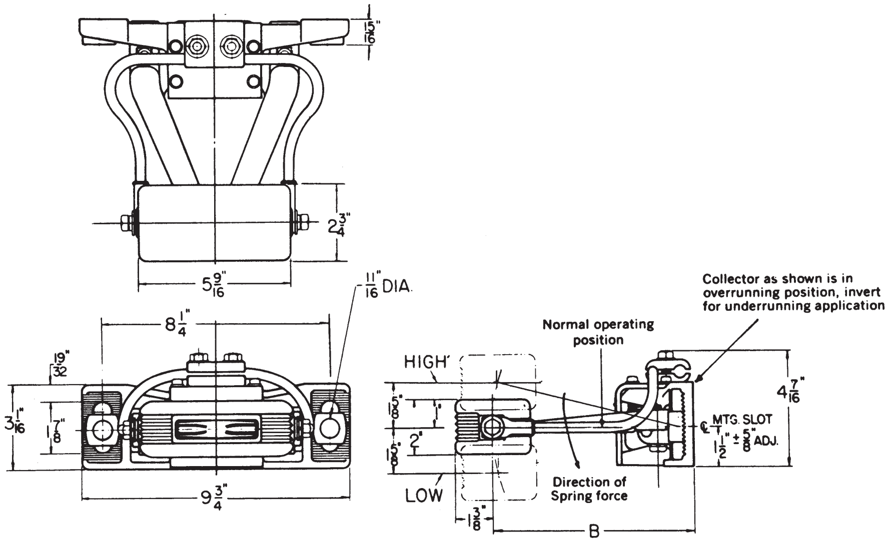

LM PONY


LM STANDARD

# Collectors

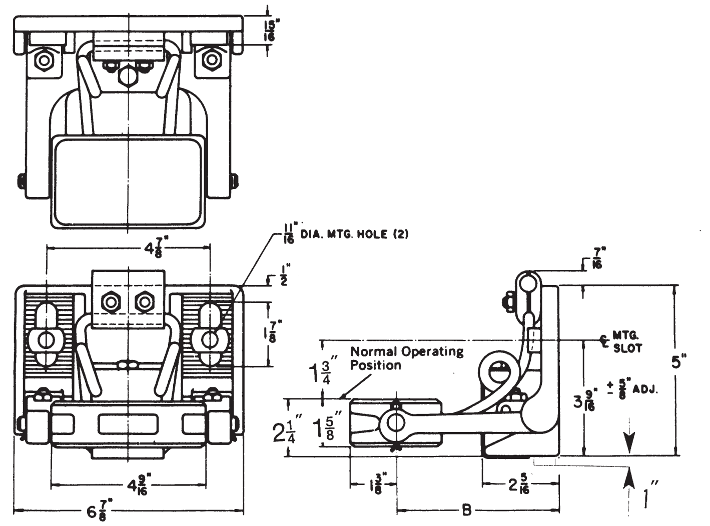
## LMI Pony Size

95659 (Overrunning)
95660 (Underrunning)



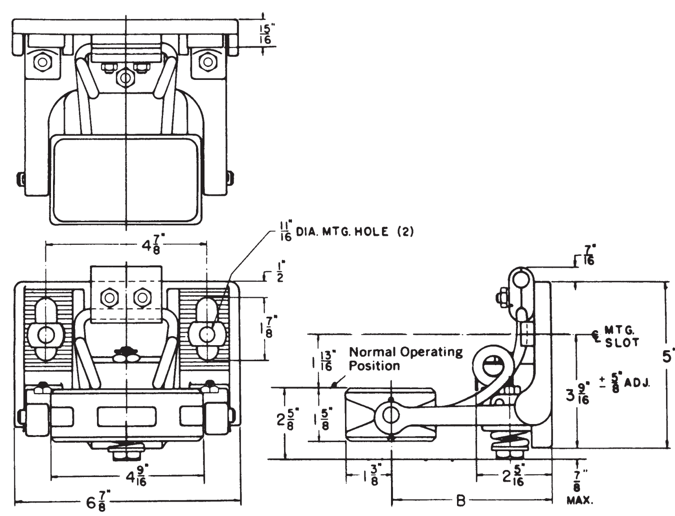

## LM Pony Size

(Overrunning)
76512
76514




## LM Pony Size

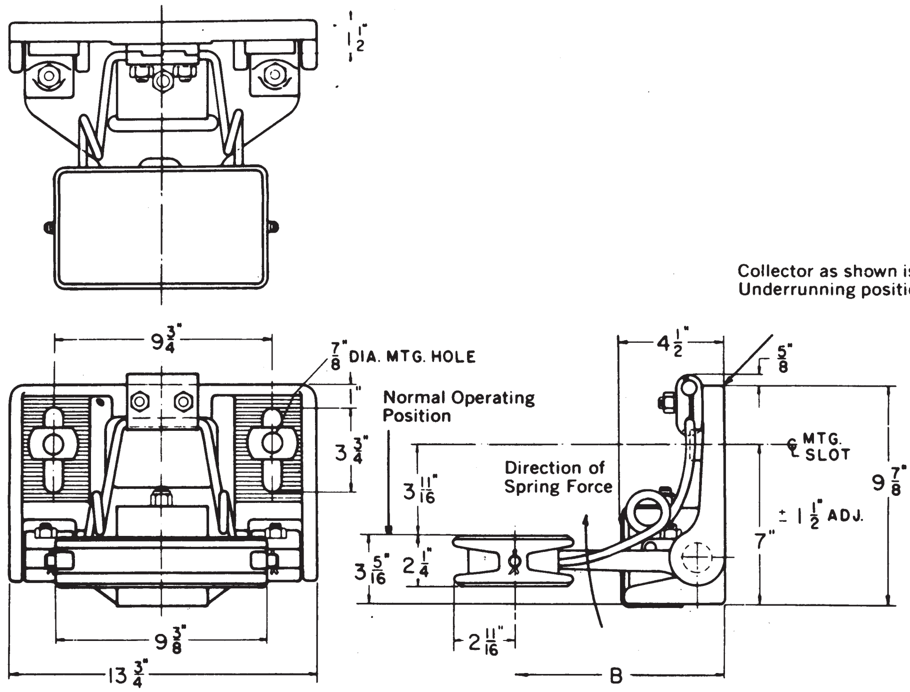
(underrunning)
98637
98634



## Collectors

### LM Standard Size

(Underrunning and Overrunning)




| Comparison Chart | | | |
|---|---|---|---|
| | LMI Pony Series | LM Pony Series | LM Standard Series |
| Approx. Current Capacity(Amperes)<br>Continuous Load<br>Intermittent Load | 250<br>500 | 250<br>500 | 550<br>1000 |
| Contact Member | Contact Surface<br>2 3/4″ x 5 9/16″<br>Cast Iron.<br>Copper Coated.<br>Reversible. | Contact Surface<br>2 1/2″ x 4 1/2″<br>Cast Iron.<br>Reversible. | Contact Surface<br>5″ x 9″<br>Cast Iron.<br>Reversible. |
| Bronze Cable Terminals | Adjustable for wire diameters .414″ to .528″ | Adjustable for wire diameters .414″ to .528″ | Adjustable for wire diameters .536″ to .772″ |
| Service | Under or Overrunning | Under or Overrunning | Under or Overrunning |
| Height of Mounting Back | 3 1/16″ | 5″ | 9 7/8″ |
| Vertical Adjustment of Corrugated Mounting Washer | 1 1/4″ | 1 1/4″ | 3″ |
| Mounting Bolt Diam. (Not Included with Collectors | 5/8″ | 5/8″ | 5/8″ |
| (Mounting Bolt Length Depends on Mounting conditions.) thickness of back and corrugated washer | 15/16″ | 15/16″ | 15/16″ |

# TECHNICAL DATA

## CONDUCTOR SIZE CALCULATION

There are two accepted methods of determining the maximum ampere demand of one or more cranes on a single runway.

### Method A

Maximum load equals the sum of all main and auxiliary hoist H.P. plus one-half ($^1/_2$) the sum of all bridge motor and trolley H.P.

### Method B

Maximum load equals one-half ($^1/_2$) the sum of all motor and accessory H.P.

## CALCULATION

Load H.P. (Method A or B) x amperes per H.P. (Table A) = maximum ampere demand.

Maximum ampere demand x crane factor (Table C) = adjusted maximum ampere demand.

## VOLTAGE DROP CALCULATION

### Symbols

VL = Line Voltage at Feeder (Source).

VD = Voltage Drop.

I = Load Amperes.

L = Effective System Length in Feet. Maximum distance from feeder to end of system.

RDC = D. C. Resistance-ohms/1000 feet.

K = Voltage Drop Multiplier (Table B). A factor derived from tests which accounts for variables such as A. C. resistance, inductive reactance, power factor, phase spacing, and conductor shape factors.

### Formulas

Direct Current

$$VD = \frac{ILR_{DC}}{500}$$

Alternating Current - Three Phase

(80 percent Power Factor-Flat Spacing)

VD=I L K (Line to Line*)

*For Line to Neutral Voltage Drop divide by 1.73.

### Voltage Regulation

$$\% \text{ Regulation} = \frac{VD}{VL-VD} \times 100$$

### Example

Length of runway, 400 feet, operating on 440 volts, 3 phase, 60 cycle, phase spacing 5 inches, feeder location-center of runway, one crane on runway. By Method "A," the maximum ampere demand would be calculated as follows:

| | ACTUAL H.P. | CALCULATED H.P. |
|---|---|---|
| Main Hoist | 200 | 200 |
| Auxiliary Hoist | 250 | 250 |
| Bridge (2 motors at 150 each) | 300 | 150 |
| Trolley | 60 | 30 |
| | | Total 630 |

H.P.

From Table A multiplier is 1.5. 1.5 x 630 H.P. = 945 maximum ampere demand. Based on a 30˚C rise over 40˚C ambient, you would select the 1000 series for this application.

From Table B, the 1000 Series with a 9 inch phase spacing has a "K" multiplier of $96 \times 10^{-6}$ - therefore:

VD (Voltage Drop) = I x L x K

$VD = 945 \times 200 \times (96)(10^{-6})$

VD = 18.13 volts

$$\% \text{ Regulation} = \frac{VD}{VL-VD} \times 100$$

$$\text{Regulation} = \frac{18.13}{440-18.13} \times 100 = 4.3\%$$

| TABLE A<br>Amperes Per Horsepower Conversion | | |
|---|---|---|
| **Current** | **Voltage** | **Multiplier*** |
| D.C. | 115<br>230<br>600 | 8<br>4<br>1.6 |
| A.C. (3ø) | 110<br>220<br>440<br>550<br>2300 | 7.0<br>3.0<br>1.5<br>1.2<br>0.25 |
| A.C. (2ø) | 110<br>220<br>440<br>550<br>2300 | 6.0<br>2.6<br>1.3<br>1.1<br>0.21 |
| *Average conversion factors calculated from National Electric Code Full Load Current Motor Charts. Motors built for especially low speeds or high torques may require more running current. In which case, name-plate or design current ratings should be used. | | |

| TABLE C<br>CRANE FACTOR ($C^F$) | |
|---|---|
| **Current** | **Multiplier*** |
| 1 | 1 |
| 2 | 0.95 |
| 3 | 0.91 |
| 4 | 0.87 |
| 5 | 0.84 |
| *In the event there are two or more cranes operating on the same load side of the feeder, the multiplying factors shown in Table C would be applied to the maximum ampere demand calculated by Method A or B. | |

| TABLE B | | | | | | | |
|---|---|---|---|---|---|---|---|
| Conductor Rating | “K”-Voltage Loss Multiplier X $10^{-6}$ | | | | | | |
| | Conductor Phase Spacing — Inches | | | | | | |
| | 6 | 9 | 12 | 14 | 16 | 18 | 20 |
| 1000 | 84.7 | 96.0 | 103.7 | 107.8 | 110.9 | 111.8 | 112.8 |
| 1250 | 75.6 | 87.5 | 94.4 | 98.5 | 101.0 | 103.2 | 104.8 |
| 1500 | 71.8 | 80.7 | 88.3 | 92.4 | 95.4 | 97.8 | 100.4 |
| 1750 | 67.1 | 77.1 | 84.2 | 87.7 | 90 | 93 | 94.8 |
| 2000 | 59.5 | 71.9 | 80.1 | 83.7 | 86.7 | 88.5 | 89.8 |
| 2500 | | 65.4 | 72.5 | 76.2 | 78.7 | 80.7 | 82.5 |
| 3000 | | 61.1 | 69.5 | 74.0 | 77.4 | 80.2 | 82.3 |
| 4000 | | 53.6 | 61.9 | 66.5 | 70.2 | 73.1 | 75.5 |
| 5000 | | 49.6 | 58.1 | 62.4 | 66.6 | 69.1 | 71.8 |

## Expansion Gap Setting Guide

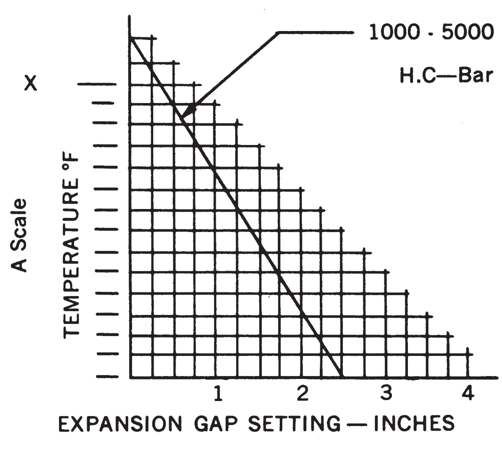
The following chart is provided as a means of determining the initial expansion gap setting, depending upon application ambient conditions.

The chart should be used according to the following procedure:

(a) Determine local ambient temperature rang: Example -20 to 100˚F.

(b) Starting at point X on A scale, write in the ambient range starting at highest expected ambient and decrease in 10 degree increments to the lowest expected ambient.

(c) Determine ambient temperature at time of gap setting. From the existing ambient temperature, A scale, read across to the appropriate curve and down to the gap setting. Adjust conductor accordingly.



## System Layout

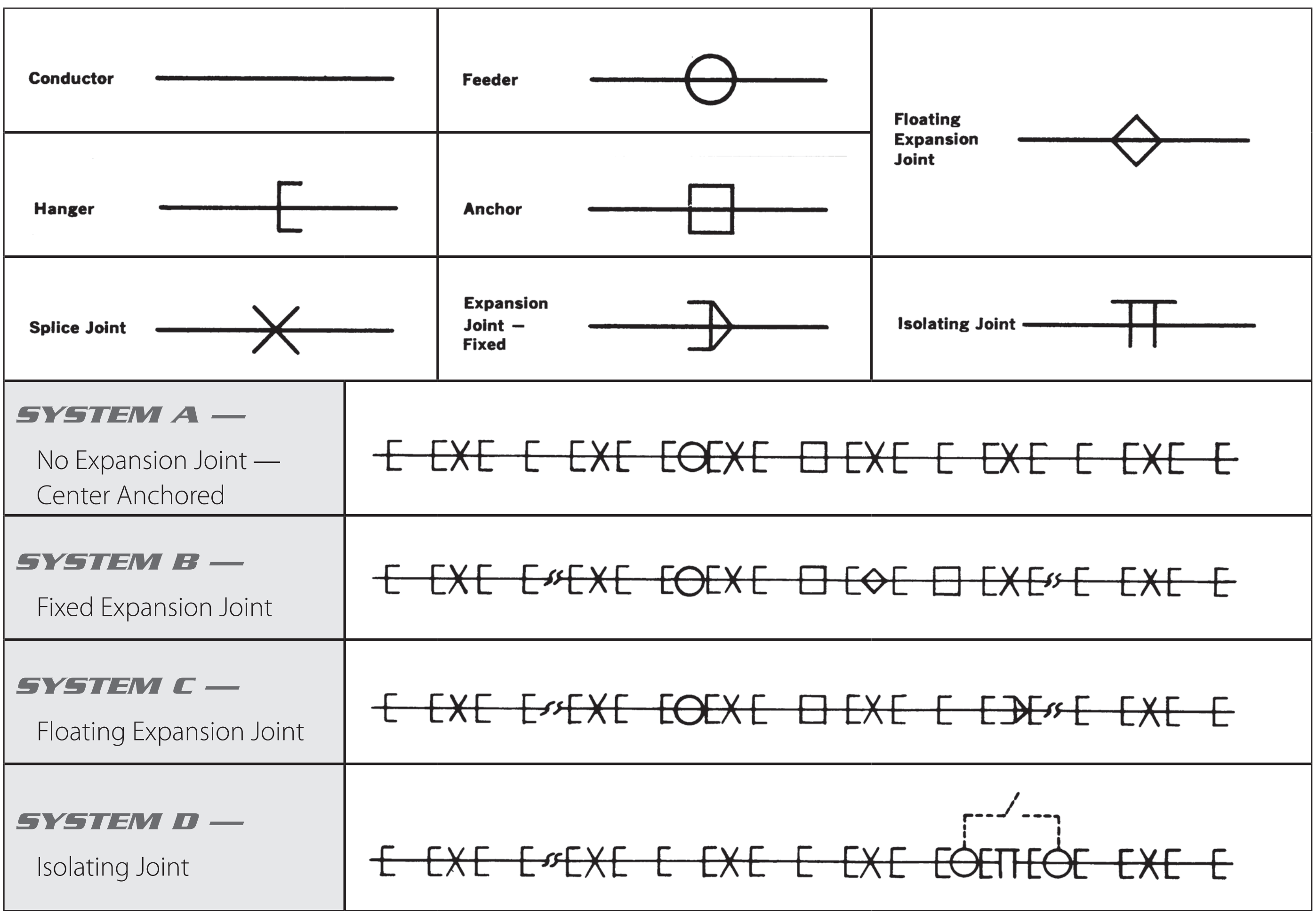
The first step in preparing a system layout is to select the proper conductor rating required for the installation. Once the conductor size has been selected, the hanger support-centers for that particular size conductor may be selected from the chart shown with the hanger assembly on Page 2. In order to determine if an expansion joint is required, refer to the fixed expansion joint chart. In the majority of installations none is required. In the event a building expansion joint occurs near mid-point in the system, a floating expansion joint assembly should be considered. Where no expansion joints are required the system should be anchored approximately in the center. Anchor assemblies are shown on Page 4.

The feeder assembly, if possible, should be located near the center of the system.

This reduces the effective systems length "L" which is used in the formula to determine the proper conductor amperage rating. Feeders with provision for one to three lugs may be selected from the feeder assemblies.

Careful attention must be given to mechanical clearance between components. All splice joints, expansion joints, feeders, and isolation joints must be kept at a minimum of six (6) inches away from the nearest insulated hanger to insure free sliding of the conductor through the hanger

The following symbols and example layouts are intended for a guide in preparing a layout. However, upon request, TransTech will prepare an application layout to fit your requirements.



## GENERAL SPECIFICATIONS

The conductor-collector system shall be of the HC-Bar Composite Series as manufactured by TransTech.

Each system shall consist of necessary conductor sections, hanger supports, insulators, anchor supports, expansion joints, collectors, and/or special components as determined from plans and specifications.

The conductor shall be made of a slotted aluminum extrusion, with a steel tee section pressed into the slot. The steel and aluminum sections are fastened together at 18 inch intervals by means of steel Compression Bolts. The top of the steel tee shall serve as a flat contact service. The aluminum portion of the conductor shall have a minimum conductivity of 56%, IACS. The conductor shall have a current carrying capacity of (1000) (1250) (1500) (1750) (2000) (2500) (3000) (4000) (6000) amperes based on a 40˚C rise over a 40°C ambient. The conductor shall have sufficient thermal capacity to withstand a 300% overload for intermittent duty cycles.

The hanger will be nylon coated to provide free conductor movement through the hanger to accommodate expansion or contraction of the conductor rail. Splice joints, anchors, feeders, and expansion joints shall be provided as required. The design shall be such that only bolting to the conductor is required; no drilling or welding of the rail at erection shall be necessary.

The splice joints, feeders, and expansion joints shall have an electrical efficiency of greater than 100 percent when compared by the resistance test method (NEMA SGI-5.02) to an equal length of conductor.

The temperature rise of the accessory components shall not exceed the 40˚C rise of the conductor with which it is intended.

### Insulators

The insulators shall be molded from fiberglass reinforced polyester material, as manufactured by TransTech.

The insulator shall have a dew flashover strength when tested per ABA Specification C29.1 of at least four (4) times normal system voltage.

The basic insulator material shall exhibit the following minimum performance levels when tested in accordance with American Society of Testing Materials Specifications. (ASTM)

| Property | Minimum | ASTM No. |
|---|---|---|
| Dielectric Strength | 400VPM | D149 |
| Arc Track Resistance | 180 Seconds | D495 |
| Flame Retardance | Self-Exting. | D635 |
| Heat Distortion Temp. @ 264 psi | 400˚F | D648 |
| Dissipation Factor, 60 Cycle | .035 | D150 |
| Impact Strength, Ft-Lbs. | 4 | D256 |
| Flexural Strength, psi | 16,000 | D790 |

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