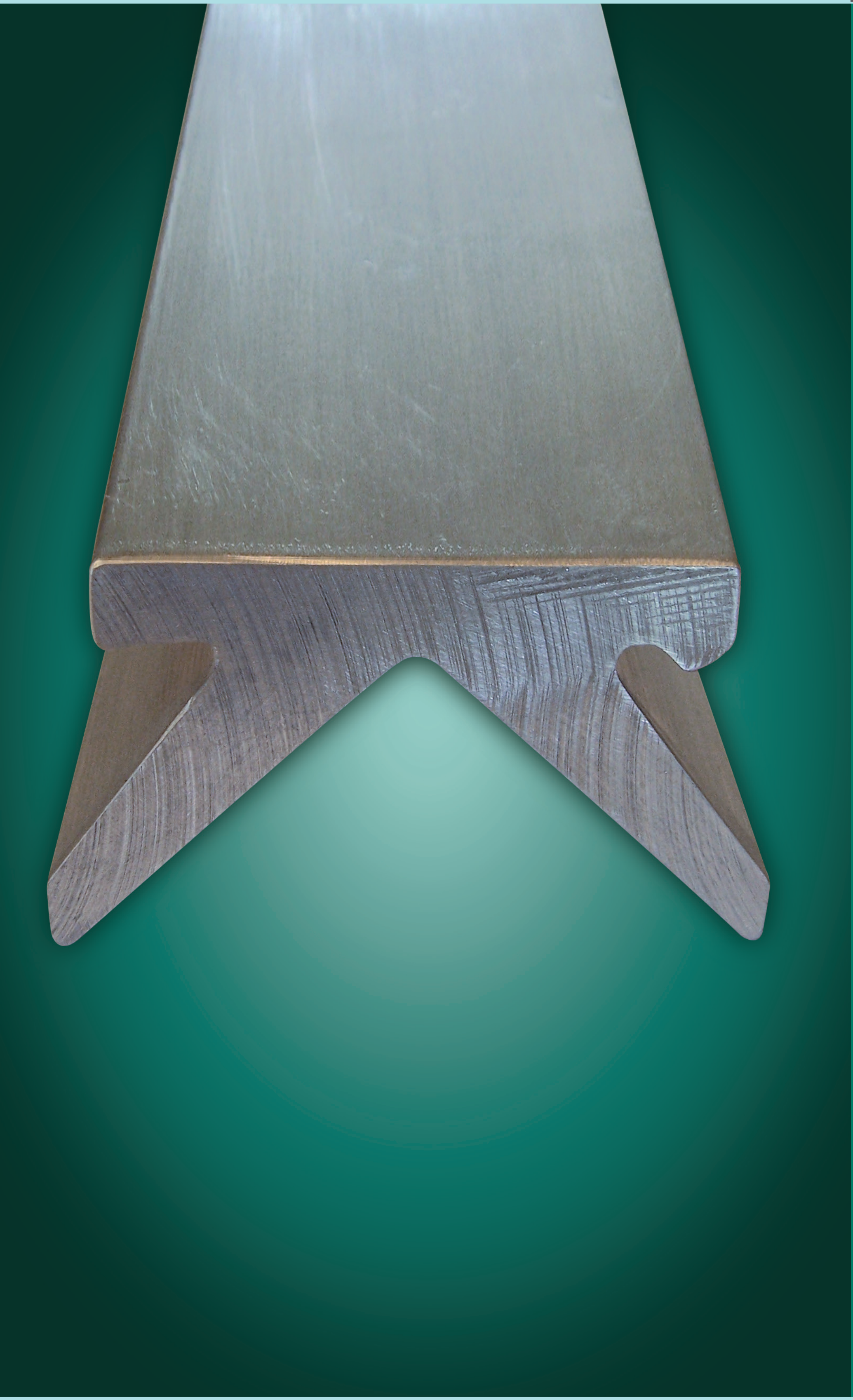
VBar

Engineered Conductor System

TransTech™
POWER TRANSFER SYSTEMS



Inverted 'V' Design Protects Contact Surfaces

Excellent Chemical and Weather-Resistance

High Current Capacity

Suitable for Long Conductor Runs

Rigid and Lightweight

Easy Installation Using Common Hand Tools

Moving Electrification *Forward*

Outdoor Slab Yard Crane

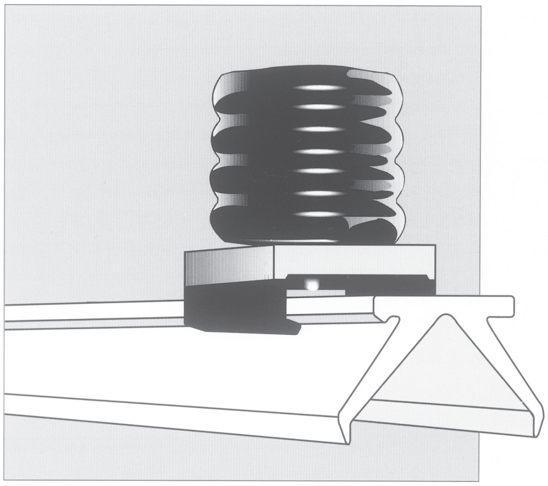
Features

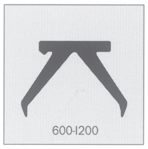
- High current capacity aluminum extrusion with excellent chemical resistance properties
- Highly rigid cross-sectional geometry resists bending and twisting and permits hanger spacing up to 15 feet
- Systems are engineered to customer specifications, including system layout and installation support
- 'V' shaped interface provides large contact area and collector tracking for efficient current collection
- Full range of standard components including hangers, anchors, feeders, splice joints, fixed and floating expansion joints and isolation joints
- Multiple collector configurations available

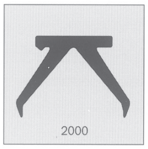
Inverted 'V' Aluminum Conductor System

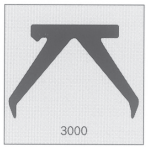
Inverted V-Bar conductor systems were designed to provide an efficient and economical means to supply power to all types of cranes, or other movable equipment requiring a constant source of electrical energy.

Inverted V-Bar is particularly adaptable in areas of high contamination and outdoor installations where the system is subjected to icing conditions. In addition, the "V" configuration acts as a guide for the collector shoe; thereby compensating for minor conductor misalignment on long installations.









Aluminum V-Bar Systems come in standard ratings of 600, 1200, 2000, and 3000 amperes. Higher ratings in aluminum or bronze and copper systems are available upon request.

The inverted V offers simplicity of erection in that no field welding, drilling, or cutting is required. Assembly is accomplished by means of standard wrenches as hex head bolts are used on all assemblies. Conductors are furnished in factory pre-cut lengths to fit your requirements. Installation and application drawings engineered for your particular requirements are furnished with each system locating the various components for erection.

A variety of standard metal enclosure designs are available for personnel protection. In the event modifications are required, a custom designed enclosure to meet your needs can be developed.

V-Bar is another of the TransTech family of conductor systems available for current collecting applications.

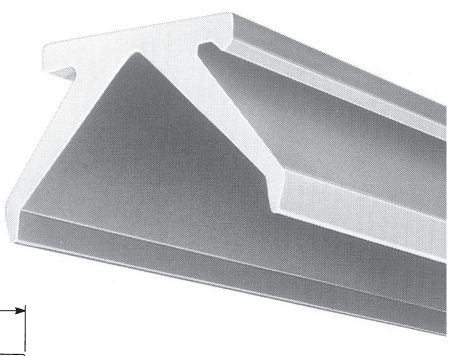
Our sales personnel and engineering staff are available for aiding in the selection of the most economical system for your present and future requirements.

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.

Standard Components - Aluminum V-Bar Conductor Systems				
Component	System Component Catalog Number			
	600 V-Bar	1200 V-Bar	2000 V-Bar	3000 V-Bar
Conductor*	98724-L*	98724-L*	94801-L*	93531-L*
Hanger with 5/8″ Bolt	11455801	11455801	11468601	11449901
Splice Joint	95913	95912	94810	93536
Anchor	96426	96426	94807	96350
Feeder	96374	105454	96412	96367
Fixed Expansion Joint R.H.	96669	96497	96492	96493
Fixed Expansion Joint L.H.	96386	95930	94813	96303
Floating Assembly Joint	105547	99167	97545	106321
Isolating Joint	99910	99910	97963	109021
Collectors - Single Arm	99572	99572	99305	99305
Collectors - Double Arm	99573	99573	98986	98986
Collectors - Four Arm	---	99574	99542	99542
*"L" designates conductor length in feet. Standard length is 30'. An application of dry lubricant, Part No. 91592, is required on the conductor contact surface prior to use. Oxide inhibiting paste, Part No. 90918, is required on all splice joints, feeders, and expansion joints.				

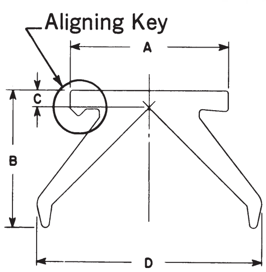
Conductor



The V-Bar Conductor is designed for main runway or cross-travel applications. The recommended mounting is in the inverted V position (^) with the collectors underrunning. The conductors are normally mounted horizontally; however they can be vertically stacked. Phase spacing depends on conductor rating and collector selection.

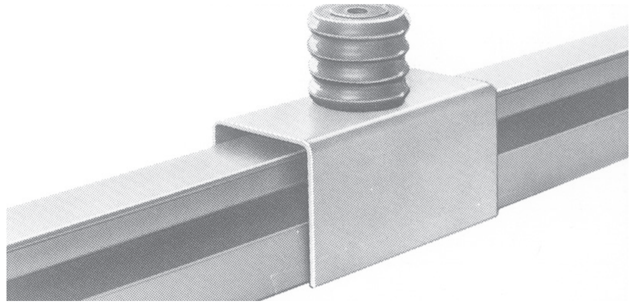
The conductor is extruded from high conductivity aluminum alloy in maximum 30 foot lengths. Shorter lengths are available (5 foot minimum) in one foot increments to coincide with runway length requirements.

A keying feature incorporated into the conductor configuration assures that all components are properly installed.



System Ampere Rating*	Conductor Cat. No.	A	B	C	D	Cross Sectional Area		Weight Lbs/Ft.	DC Resistance Ohms/ 1000 ft. at 20°C.	AC Resistance Ohms/ 1000 ft. at 20° C.	Self Geometric Distance d s - Inches
						Sq. Inches	CMx 10^6				
600	98724-L	2 3/8″	2 1/16″	1/4″	3 3/8″	2.1	2.7	2.45	0.00705	0.0100	1.218
1200	98724-L	2 3/8″	2 1/16″	1/4″	3 3/8″	2.1	2.7	2.45	0.00705	0.0100	1.218
2000	94801-L	3″	2 1/8″	7/16″	3 5/8″	3.3	4.2	3.84	0.00452	0.00724	1.377
3000	93531-L	3 1/2″	3″	9/16″	5 1/8″	4.9	6.2	5.7	0.00305	0.00630	1.700
6000	Contact TransTech										
*Ampere rating based on 30˚C rise over a 40˚ ambient.											

Insulated V-Bar Systems



Aluminum systems, ratings 600 through 3000 amperes, are available with an extremely tough electrical grade thermoplastic red jacket suitable for indoor or outdoor installations.

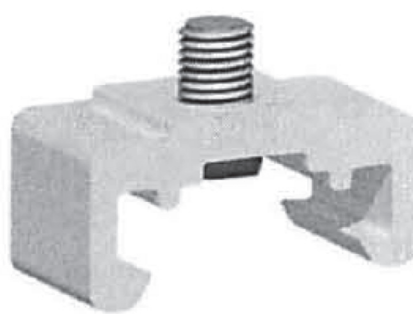
The insulating jacket is normally installed during installation.

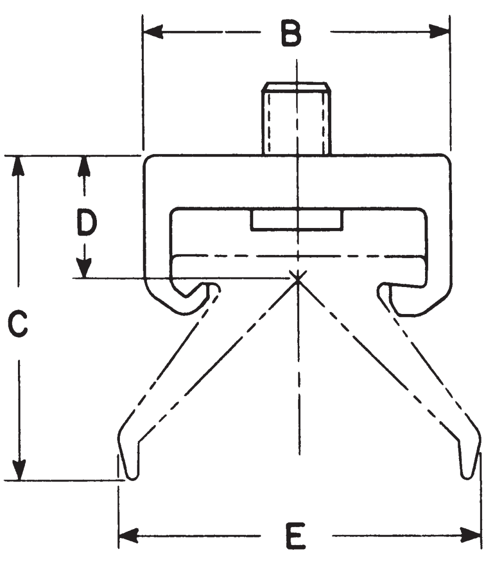
The insulation provides protection to personnel by enclosing the top and two sides of the conductor. Special covers are provided for splice joints, anchors, feeders, hangers, expansion joints, and isolating joints in order to provide a completely insulated system.

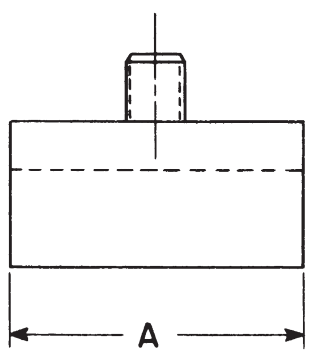
Hanger Assembly

The hanger assembly is used to support the conductor section with the aid of an insulator. The assembly consists of a molded casting with a $\frac{5}{8}$-11 bolt for insulator mounting. Hangers are nylon coated to assure free movement of the conductor during expansion or contraction. Insulators are not furnished with the assembly.

Insulator selection depends on mounting clearances and operating voltage.



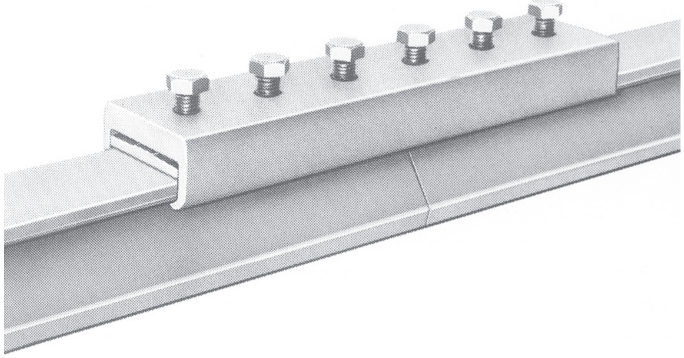


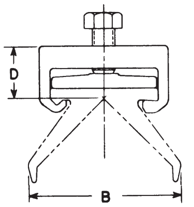


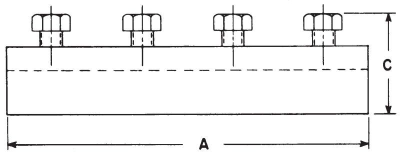
System	Hanger Cat. No.	A	B	C	D	E	Maximum Support Centers Feet	Net Weight Lbs.
600	11455801	3″	$2\frac{7}{8}$″	$2\frac{15}{16}$″	$1\frac{1}{8}$″	$2\frac{15}{16}$″	12′	.9
1200	11455801	3″	$2\frac{7}{8}$″	$2\frac{15}{16}$″	$1\frac{1}{8}$″	$2\frac{15}{16}$″	12′	.9
2000	11468601	3″	$3\frac{5}{8}$″	$3\frac{5}{16}$″	$1\frac{9}{16}$″	$3\frac{5}{16}$″	14′	1.2
3000	11449901	3″	$4\frac{1}{4}$″	$4\frac{9}{16}$″	$2\frac{1}{16}$″	$4\frac{9}{16}$″	15′	1.2

Splice Joint Assembly

The splice joint assembly connects electrically and mechanically, adjoining conductor sections without drilling or welding. The assembly consists of an extruded section containing bolts and a Belleville spring-type plate which insures positive electrical connection. All splice joints have a current capacity of greater than 100% when compared by the resistance test method (NEMA SGI-5.02) to an equal length of conductor.







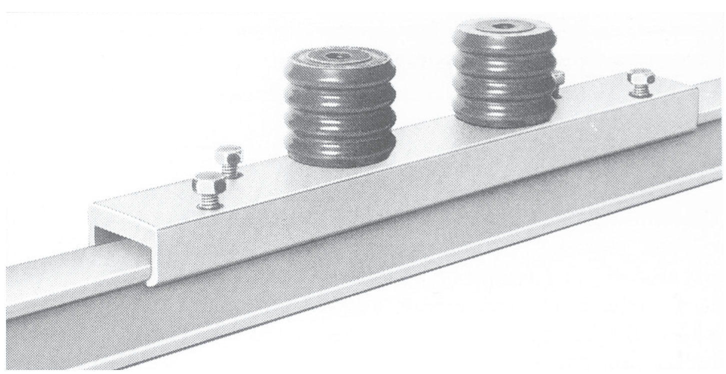
System	Splice Joint Cat. No.	A	B	C	D	Number of Bolts	Rating Amperes 30˚C. Over 40˚C.	Net Weight Lbs.
600	95913	8″	3 3/8″	2 1/4″	1 1/8″	4	600	2.0
1200	95912	12″	3 3/8″	2 1/4″	1 1/8″	6	1200	3.1
2000	94810	16″	3 5/8″	2 3/4″	1 9/16″	8	2000	7.8
3000	93536	18″	5 1/8″	3 9/16″	2 1/16″	8	3000	10.9

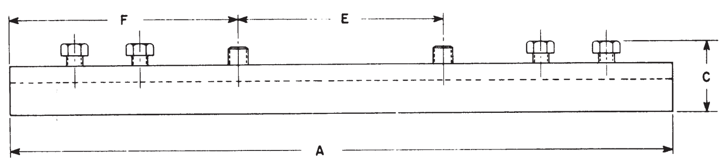
Anchor Assemblies

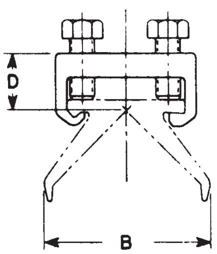
Anchor assemblies are normally employed at one point in the system to provide a fixed point from which the conductor can expand or contract through the hangers. When expansion joints are employed additional anchors may be required.

The assembly consists of an extrusion with bolts that securely clamp it to the conductor and two studs for insulator mounting. An anchor is used in place of a hanger and requires two insulators which are not furnished with the assembly. Insulators should have the same height as the one used with the hanger assembly.

Insulator selection depends on the operating voltage of the system.





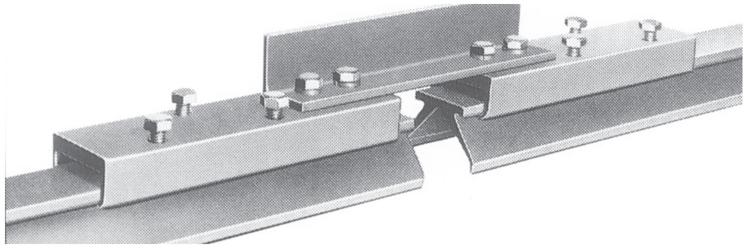


System	Anchor Cat. No.	A	B	C	D	E	F	Insulator Bolt	Net Weight Lbs.
600	96426	20 1/4″	3 3/8″	2 3/16″	1 1/8″	6 1/4″	7″	5/8″-11 UNC	4.3
1200	96426	20 1/4″	3 3/8″	2 3/16″	1 1/8″	6 1/4″	7″	5/8″-11 UNC	4.3
2000	94807	22″	3 5/8″	2 7/8″	1 9/16″	6 1/4″	7 7/8″	5/8″-11 UNC	7.5
3000	96350	20″	5 1/8″	3 9/16″	2 1/16″	6 1/4″	6 7/8″	5/8″-11 UNC	9.8

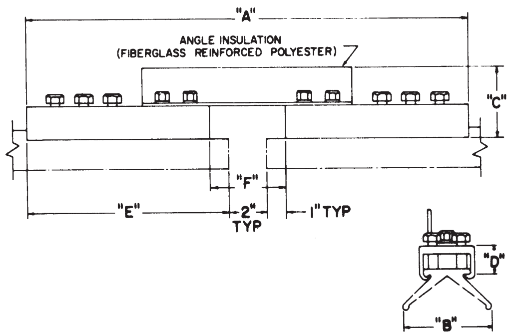
Isolating Joint Assembly

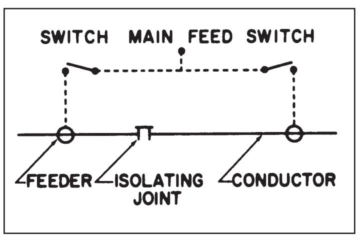
The isolating joint assembly is used to insulate adjacent conductor sections from each other without interfering with collector travel. It allows portions of the system to be electrically disconnected while operations continue on other live sections. At installations where more than one crane will be 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.)

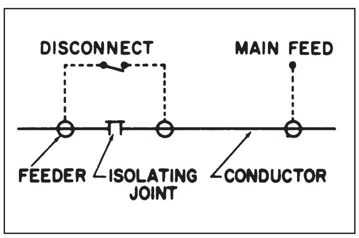
Each side can be fed individually through adequate safety switches or the isolation joint can be by-passed with the use of feeder assemblies and a suitable disconnect switch.



System	Isolating Joint Cat. No.	A	B	C	D	E	F	Net Weight Lbs.
600	99910	25″	3 3/8″	3 29/64″	1 1/8″	10 1/2″	4″	5.0
1200	99910	25″	3 3/8″	3 29/64″	1 1/8″	10 1/2″	4″	5.0
2000	97963	29″	3 5/8″	4 1/32″	1 9/16″	12 1/2″	4″	11.1
3000	109021	29″	5 1/8″	5 1/16″	2 1/16″	12 1/2″	4″	14.5







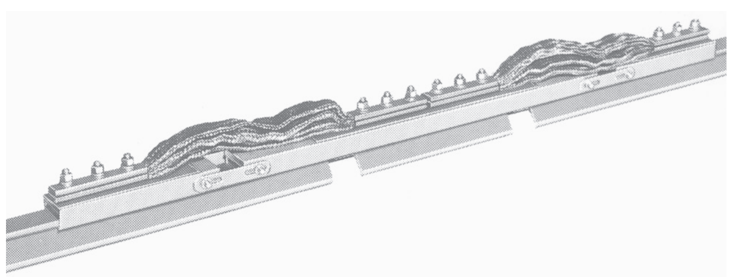
Floating Expansion Joint

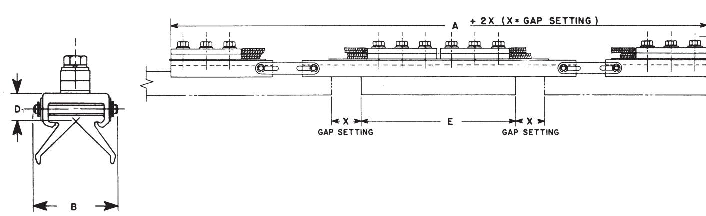
Floating expansion joints are used only when the expected expansion exceeds the fixed expansion joint capability.

The assembly is normally installed between anchor assemblies across a building expansion joint.

The assembly consists of three extruded sections, one short length of conductor, flexible copper shunts, bi-metal plates, connecting links, and bolts. No insulators are required.

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.





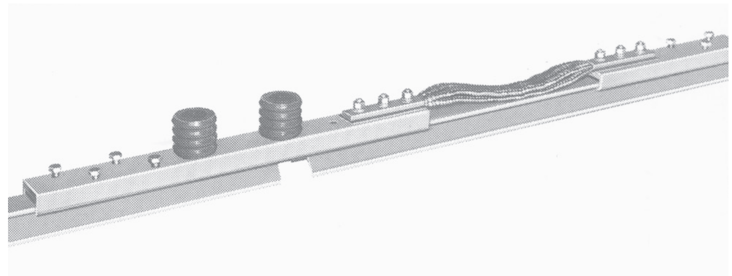
System	Expansion Joint Cat. No	Maximum Expansion (2X) inches	A	B	C	D	E	Rating Amperes 30˚C Over 40˚C	Net Wt Lbs.
600	105547	5″	56″	4″	2 7/8″	1 1/8″	12″	600	26.8
1200	99167	5″	56″	4″	3 3/8″	1 1/8″	12″	1200	37.6
2000	97545	5″	56″	4 7/8″	3 7/8″	1 9/16″	12″	2000	71.8
3000	106321	5″	56″	5 1/2″	4 1/8″	2 1/16″	12″	3000	84.8

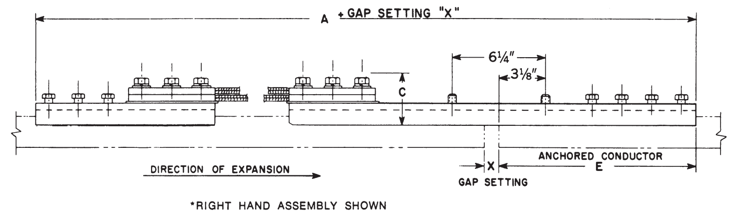
Fixed Expansion Joint

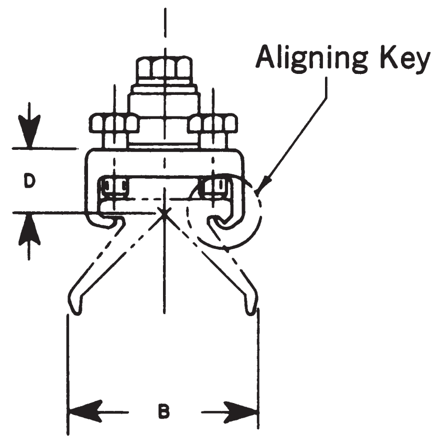
Fixed expansion joints are sometimes required when the system crosses a building expansion joint or when the runway is excessively long. In addition, extreme variations in temperature along the length of the runway warrant the possible use of an expansion joint assembly. Recommended maximum system lengths with center anchor are shown in adjoining chart. Longer systems should include expansion joints.

The assembly consists of two extrusions, shunts, bolts, and two insulator mounting studs. The insulator side of the assembly is the fixed section and acts as an anchor. The other section is bolted to the conductor and with the aid of flexible copper shunts maintains electrical continuity across the conductor gap. Shunts are separated from the aluminum with 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.

There are two assemblies-right hand and left hand. This is due to the aligning key on the conductor. Normally the key side of the conductor is located on the side nearest the centerline of the crane runway. When standing in the center of the runway facing the conductor system, a right hand assembly allows conductor expansion to the right, a left hand assembly to the left.

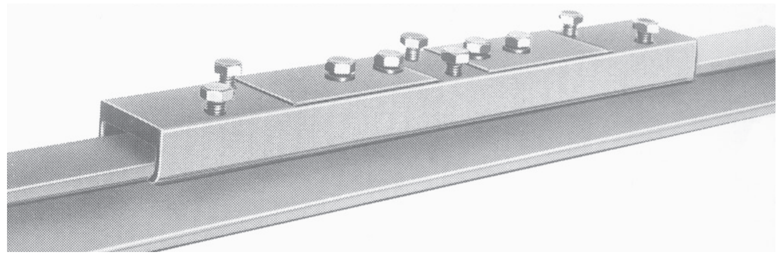




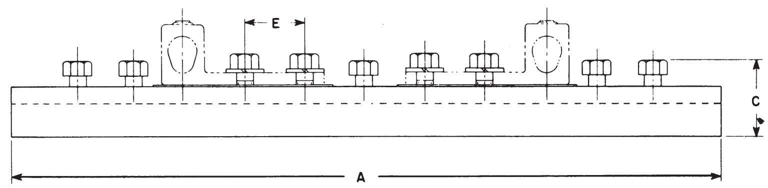


System	Expansion Joint Cat. No		Maximum Expansion (X) inches	A	B	C	D	E	Insulator Bolt		Rating Amperes 30˚C Over 40˚C	Recommended Max. System Length: Ft. Center Anchor		Recommended Max. System Length: Segment Between Expansion Joints		Net Wt Lbs.
	Right Hand*	Left Hand							Qty	Size		Indoor	Outdoor	Indoor	Outdoor	
600	96669	96386	2 1/2″	57″	3 3/8″	2 7/8″	1 1/8″	14 1/2″	2	5/8-11 UNC	600	600	500	300	250	14.9
1200	96497	95930	2 1/2″	57″	3 3/8″	3 3/8″	1 1/8″	14 1/2″	2	5/8-11 UNC	1200	600	500	300	250	19.3
2000	96492	94813	2 1/2″	63″	3 5/8″	3 7/8″	1 9/16″	18 1/2″	2	5/8-11 UNC	2000	800	700	400	350	39.2
3000	96493	96303	2 1/2″	63″	5 1/8″	4 1/8″	2 1/16″	18 1/2″	2	5/8-11 UNC	3000	1000	800	450	400	51.2

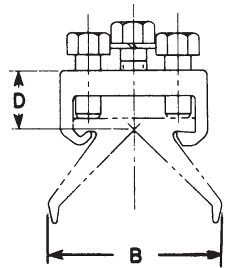
Feeder Assembly



The feeder provides the electrical connection from the power source to the conductor system. It may be located at any point within the system, preferably near the center. This location reduces the effective system length, which in turn reduces voltage drop. No field drilling or welding is required for installation. Feeders should be located no closer than six inches from the nearest component to prevent conductor lock-up during expansion or contraction. The feeder consists of an extrusion with bolts that clamp the assembly securely to the conductor. Bi-metal plates are provided to prevent electrolytic action when using bronze or copper lugs.



Provisions are made for one, two, or three feeder lugs. Lugs are *not* furnished with the assembly except by request at additional cost. Feeders are tapped for standard NEMA-type lugs.



System	Feeder Cat. No	A	B	C	D	Feeder Lug Provision			Rating Amperes 30˚C Over 40˚C	Net Wt Lbs.
						Quantity	Bolt Size	Bolt Spacing "E"		
600	96374	$16\frac{3}{4}$"	$3\frac{3}{8}$"	$2\frac{3}{16}$"	$1\frac{1}{8}$"	1	$\frac{1}{2}$-13 UNC	$1\frac{3}{4}$"	600	3.7
1200	105454	$20\frac{3}{4}$"	$3\frac{3}{8}$"	$2\frac{3}{16}$"	$1\frac{1}{8}$"	2	$\frac{1}{2}$-13 UNC	$1\frac{3}{4}$"	1200	4.7
2000	96412	$19\frac{3}{4}$"	$3\frac{5}{8}$"	$2\frac{7}{8}$"	$1\frac{9}{16}$"	2	$\frac{1}{2}$-13 UNC	$1\frac{3}{4}$"	2000	7.1
3000	96367	$20\frac{3}{4}$"	$5\frac{1}{8}$"	$3\frac{1}{2}$"	$2\frac{1}{16}$"	3	$\frac{1}{2}$-13 UNC	$1\frac{3}{4}$"	3000	10.7

Collector Assembly

The collector assembly is used to collect current from the conductor and transmit it to the equipment. Normal recommended mounting is underrunning.

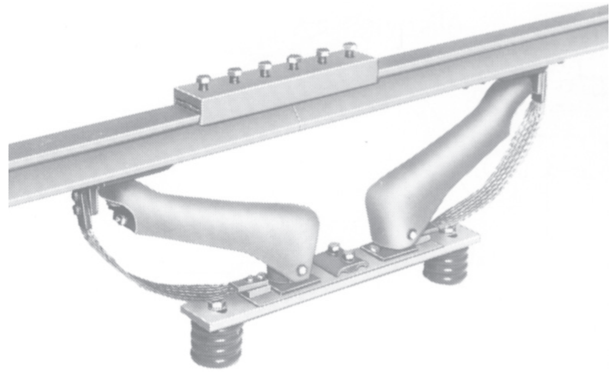
The contact shoe which rides inside the "V" is made of a metal graphite composition which insures long shoe life without affecting conductor wear.

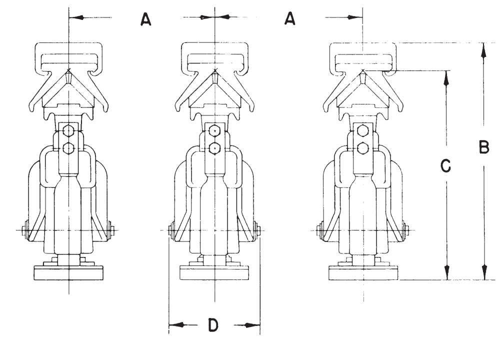
The collector arms are cast aluminum and have provisions for varying the contact shoe pressure by means of an adjustable spring. The arm assembly provides for vertical misalignment while the contact shoe assembly, mounted on a ball joint, tracks within the "V" shaped conductor compensating for horizontal misalignment.

The contact shoe assembly consists of two metal graphite contact shoes mounted on a contact shoe holder. The shoe assembly can be used on either aluminum, copper, or bronze systems.

Collectors are available with one, two, or four arms depending on the current requirements. Two mounting insulators, which are not furnished with the collector assembly, are required with the one and two arm collectors, four insulators with the four arm unit. Normally the same insulator used for the hangers would be employed.

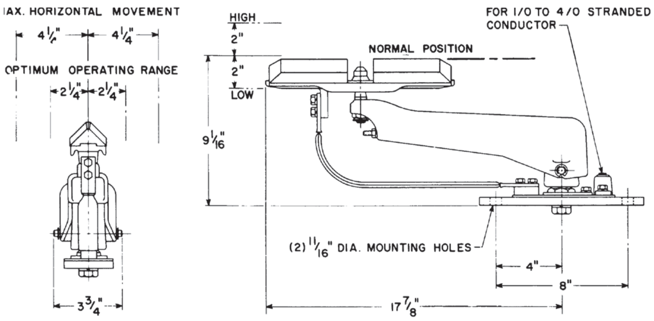
Collector arms, sub-assemblies, contact shoes, and other components are readily available and can be ordered separately in the event replacements are required.





System	Collector Cat. No.	Collector Rating Amperes 30˚C Over 40˚C	No. of Arms	A Min.	B	C	D	Net Weight Lbs.
600 - 1200	99572	250	1	5″	$10^{3}/_{16}$″	$9^{1}/_{16}$″	$3^{3}/_{4}$″	24
	99573	600	2					47
	99574	1200	4					102
2000	99305	500	1	$5^{1}/_{2}$″	$12^{7}/_{16}$″	$10^{7}/_{8}$″	$4^{3}/_{16}$″	36
	98986	1500	2					67
	99542	3000	4					148
3000	99305	500	1	$6^{1}/_{2}$″	$12^{15}/_{16}$″	$10^{7}/_{8}$″	$4^{3}/_{16}$″	36
	98986	1500	2					67
	99542	3000	4					148

Current Rating		System					
		600 - 1200 V-Bar			2000 - 3000 V-Bar		
		Single Arm (1)	Double Arm (2)	Four Arm (4)	Single Arm (1)	Double Arm (2)	Four Arm (4)
Catalog Number		99572	99573	99574	99305	98986	99542
Continuous Duty Amperes 40˚C Ambient	30˚C	250	600	1200	500	1500	3000
	40˚C	350	750	1500	650	1750	3500
Intermittent Duty Amperes 40˚C Rise Over 40˚C Ambient	1 Min - On 1 Min - Off	1050	2200	4400	1850	3800	7600
	5 Min - On 5 Min - Off	950	2000	4000	1700	3600	7200
	15 Min - On 15 Min - Off	600	1400	2800	1200	3000	6000



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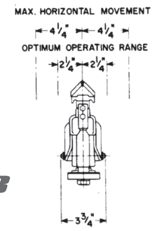

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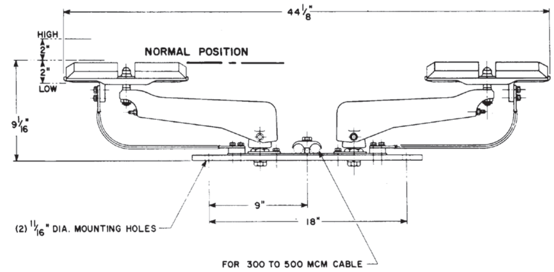

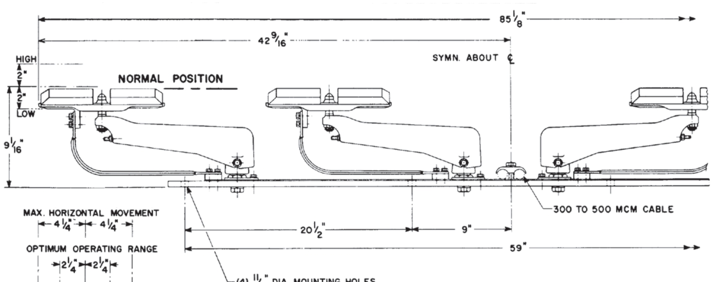

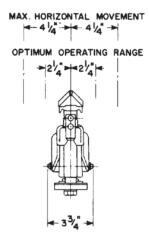

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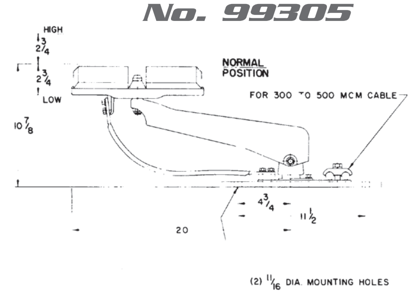

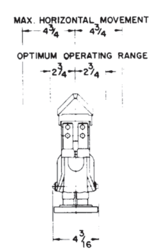

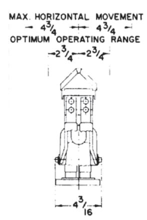

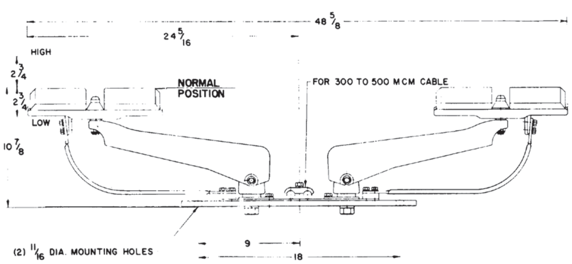

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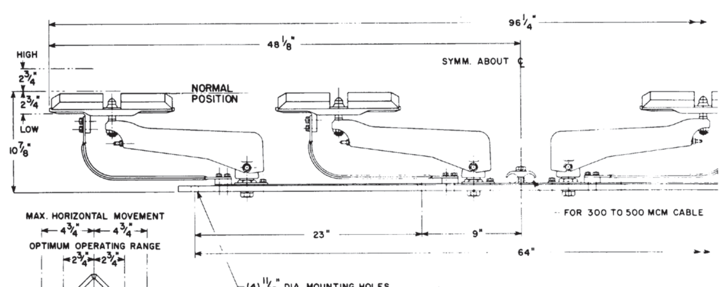
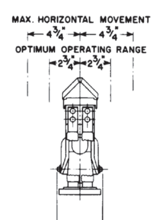




No. 99542

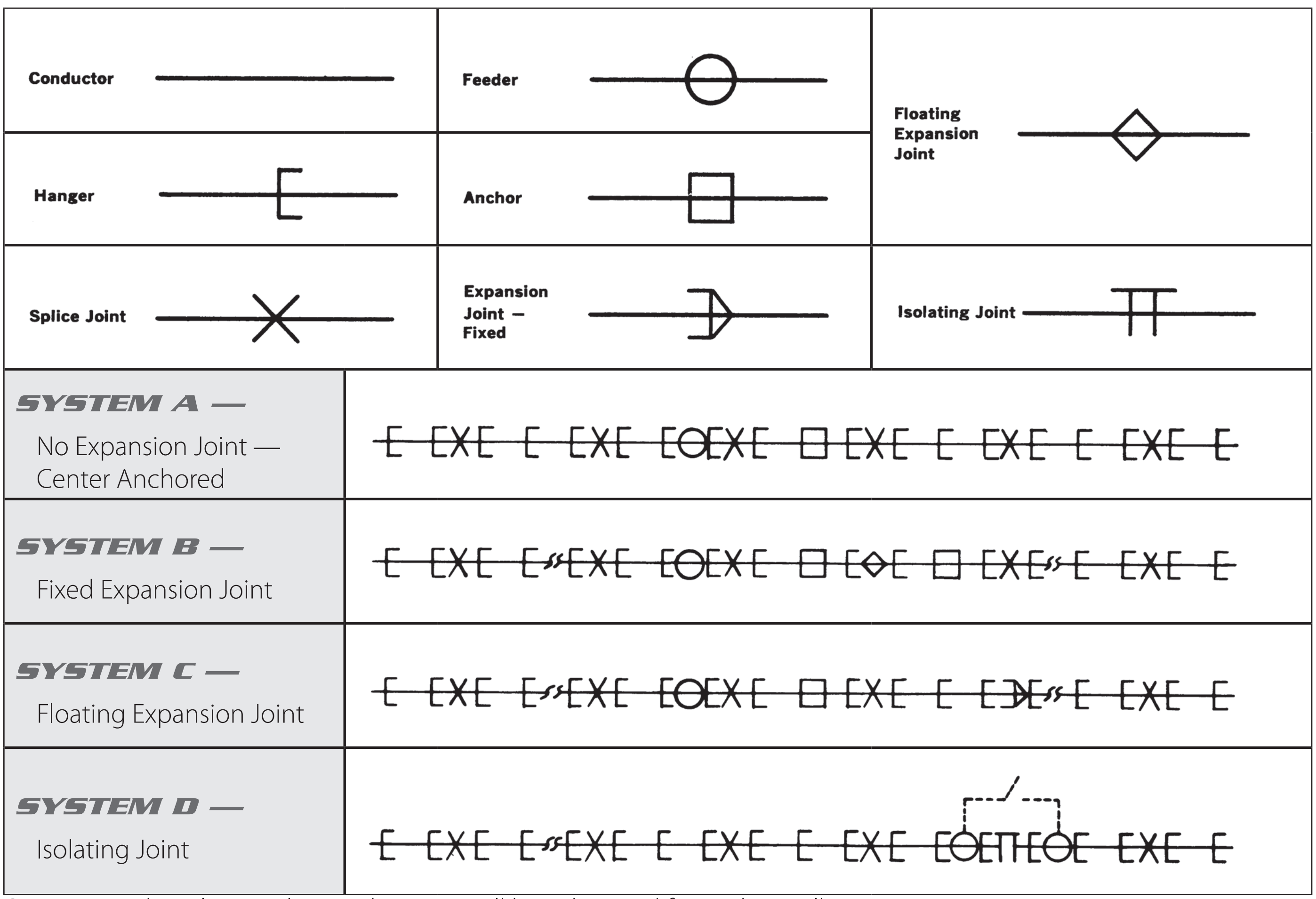
System Layout

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 3. 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.



Our prepared application layout drawings will be submitted for each installation.

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 6 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 280

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 could select the 1200 aluminum V-Bar series for this application.

From Table B, the 1200 Series with a 6 inch phase spacing has a K multiplier of 57.60 x 10˚ - therefore:

VD (Voltage Drop) = I x L x K

$VD = 945 \times 200 \times (57.60)(10^{-6})$

VD = 10.8 volts

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

$$\text{Regulation} = \frac{10.8.}{440-10.8} \times 100 = 2.5\%$$

TABLE A Amperes Per Horsepower Conversion		
Current	**Voltage**	**Multiplier***
D.C.	115	8
	230	4
	600	1.6
A.C. (3ø)	110	7.0
	220	3.0
	440	1.5
	550	1.2
	2300	0.25
A.C. (2ø)	110	6.0
	220	2.6
	440	1.3
	550	1.1
	2300	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 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										
V-Bar Conductor Series	"K"-Voltage Loss Multiplier X 10^{-6}									
	Conductor Phase Spacing — Inches									
	5	$5^1/_2$	6	$6^1/_2$	7	8	9	10	11	12
600	53.5	55.4	57.6	59.5	61.0	63.7	66.1	68.9	71.5	74.0
1200	53.5	55.4	57.6	59.5	61.0	63.7	66.1	68.9	71.5	74.0
2000	-	50.3	51.8	53.6	55.2	58.1	61.0	63.4	65.8	67.7
3000	-	-	-	43.2	45.4	49.6	53.5	56.7	59.3	61.1

Expansion Joint Gap Setting Chart

The gap setting chart is to be used to establish the expansion joint gap setting at the time of installation.

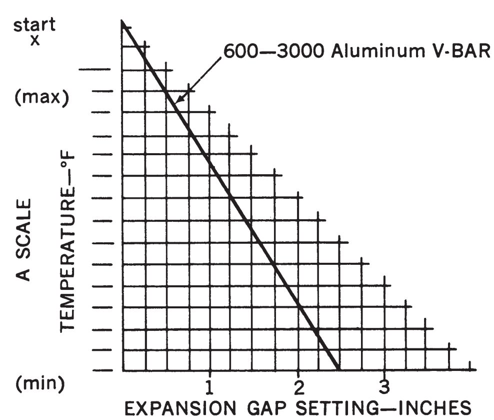
The chart should be used according to the following procedure:

(a) Determine local ambient temperature range. Example -20 to 100°F

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

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

Note: The system should be checked at maximum and minimum temperatures as they first occur. Gap settings will require adjustment if they open greater than maximum at the low ambient, or if they are completely closed at the high ambient.



GENERAL SPECIFICATIONS

Conductor-Collector System

The conductor-collector system shall be of the V-Bar Aluminum 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 section shall be one-piece aluminum of "V" beam configuration with an inverted V contact surface. The conductor aluminum alloy shall have a minimum conductivity of 56% IACS and a current carrying capacity of (600) (1200) (2000) (3000) amperes baaed on a 30°C rise over 40°C ambient when operating in still, but unconfined, air. The conductor shall have sufficient thermal capacity to withstand a 300% overload for intermittent duty cycles.

The conductor hangers shall be made from an aluminum casting and shall be nylon coated to provide free conductor movement through the hanger, accommodating expansion or contraction. Splice joints, anchors, feeders, and expansion joints shall be provided as required. These elements shall be manufactured from aluminum extrusions. 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 a current capacity 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 30˚C rise of the conductor with which they are used.

Insulators

The insulators shall be molded from fiber glass reinforced polyester material, as manufactured by Trans-Tech.

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	420VPM	D149
Arc Track Resistance	190 Seconds	D495
Track Resistance Inclined Plane, Min.	Over 1200	D2303
Flammability	Self-Exting.	D635
Heat Distortion Temp. @ 264 psi	595˚F	D648
Dissipation Factor, 60HZ	.042	D150
Impact Strength, Ft-Lbs.	4.5	D256
Flexural Strength, psi	18,000	D790

Collectors

The collectors shall have a current carrying capacity of (250) (500) (600) (1200) (1500) (3000) amperes based on a 300˚C rise over a 40°C ambient when operated in still, but unconfined air. The collectors shall have sufficient thermal capacity to withstand a 300% overload for intermittent duty cycles. The collectors shall incorporate means of adjusting the contact pressure. The collector shall consist of a high strength aluminum arm which covers the collector spring.

The Fandstan Electric Companies

Fandstan Electric Group

The Fandstan Electric Group specializes in engineering solutions for the supply of electrical power and data to moving objects, both linear and rotary. Applications are as wide ranging as public mass transit, mobile cranes, industrial equipment, robots and wind turbines. The Group's Knowledge of the electrical interface is unrivalled. Fandstan is an independent, privately owned, electrical engineering group with major subsidiaries in Europe, America, Asia (including China) and Australia. The Group, which was founded in 1979, has grown both organically and by acquisition and now employs over 700 people, manufactures across four continents and sells throughout the world. The global positioning of the companies within the Group enables Fandstan Electric to supply close support to the customer and operator.

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The Leaders In Power Transfer Technology

TransTech is a subsidiary of Fandstan Electric, a global group of companies focusing on energy transfer systems with installations in over 100 countries. Working synergistically with our European sister companies such as Brecknell-Willis, Stemmann and AKAPP, we are able to leverage a broad product portfolio and a wealth of technical expertise. Our goal is to better serve our power transfer markets by continuing to provide solutions that improve product life, performance, and reliability.

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