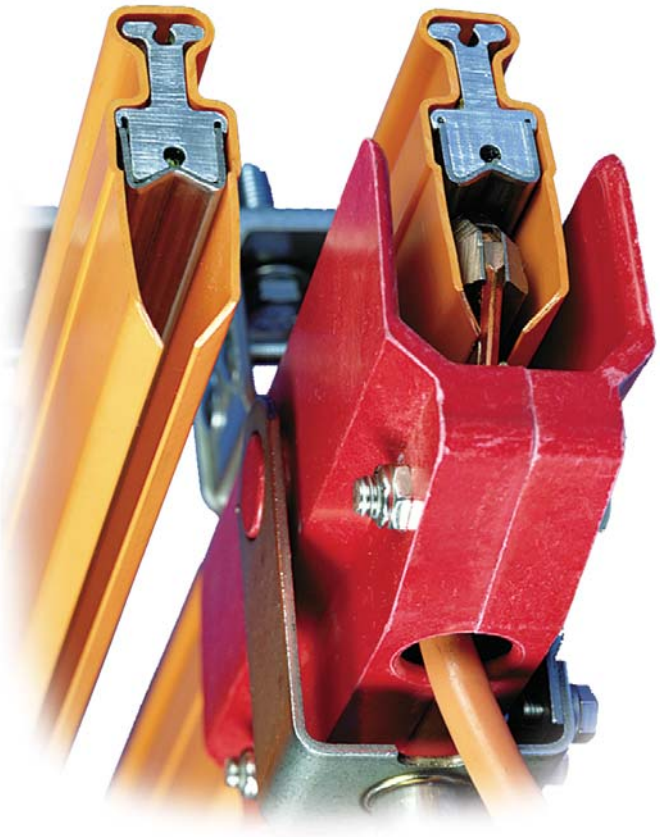
Insul-8 Mobile Electrification

◆ Cable & Hose Reels ◆ Conductor Bar ◆ Festoon ◆ Pendants ◆
◆ Radio Controls ◆ Slip Rings ◆

Solutions From A Single Source

Hevi-Bar
Conductor Bar Systems



For the Electrification of

- Cranes
- Mining Equipment
- Amusement Park Rides / Trams
- People Movers

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CONDUCTIC DIVISION
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About Insul-8 Corporation

Your Single Source for Mobile Electrification

Since our inception in 1902, Insul-8 Corporation's parent company, Delachaux S.A., has been a leading international presence in the business of providing mobile electrification. As the Delachaux arm in North and South America, Insul-8 Corporation (formerly sister companies Insul-8 and Industrial Electric Reels, Inc. - *a.k.a. IER*) carries on this tradition of innovation and excellence. Insul-8 and IER became part of the Delachaux Group in 1975 and officially became one company on December 31, 1996. Each company has its own rich history.

You'll find Insul-8 products in use everywhere from irrigation systems and manufacturing plants in the heartland of the United States to public transportation systems in Malaysia.

Industrial Electric Reels, Inc., began in 1924 with the founding of Industrial Electric Works (IEW), an electrical contractor based in Omaha, Nebraska. After World War II, IEW began the manufacture of electric cable reeling equipment and started IER as an operating division in 1948. IER's first cable reel, the hand rewind Series 102 PORT-O-REEL, was quickly followed by light-duty spring retractable cable reels. IER pioneered the development of cable reeling devices and slip rings. Soon the business expanded to larger, custom built motor driven reels and custom engineered slip rings. IER's reputation spread as a quality manufacturer of reels running the gamut from small commercial duty reels to large custom built reels for the most demanding applications such as container cranes, stacker/reclaimers and bulk material ship loaders and unloaders.

Insul-8 products can electrify items from small industrial machinery to large amusement park rides and international public transit systems.

Insul-8 Corporation has been a pioneer in providing safety-covered metal conductor systems for the material handling industry since 1944. Insul-8 was the first company to design and produce a stainless steel capped aluminum conductor and the only manufacturer of such a product for almost 20 years. Today, there are over 20 million meters (nearly 12,500 miles) of Insul-8 contact conductors and tens of thousands of collecting devices throughout the world. Every major port in the United States currently uses Insul-8's aluminum/stainless steel contact conductors on container cranes due to the dependability of the bar under the most severe conditions. Insul-8's festoon systems range from the smallest box-track systems to our most rugged Heavy-Duty Festoon. Insul-8's festoons are known for their safe and efficient operation in which large numbers of conductors can be handled in minimum space.

Insul-8 has been in the business of supplying power from stationary sources to mobile systems for 60 years. Insul-8's cable reels, slip rings, conductor bar, festoon systems, pendants and radio controls are used in a wide variety of applications ranging from material handling and mass transit systems to water treatment plants and performing arts theaters.
As it has been for the last 60 years and always will be, "conducting" business will continue to be our only business.

In December 1997, after a nine month endeavor, Insul-8 Corporation became ISO 9001 certified for the design and manufacture of our entire line of mobile electrification products in both of our U.S.A. plants in Omaha, Nebraska, and Harlan, Iowa.

◆ cable and hose reels ◆ conductor bar systems ◆ cable festoon systems ◆
◆ slip rings ◆ pendant stations ◆ radio controls ◆

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Specifications may change without notice. All products F.O.B. Omaha, NE, or Harlan, IA, unless otherwise specified.

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Proven Technology for Severe Applications

Dependable electrification systems that provide high capacity service required by heavy-duty, high speed applications such as material handling cranes and ship loading equipment. Similar to it's performance proven Insul-8 Bar counterpart, Hevi-BarI systems are designed and manufactured for safe, dependable, and economical operation under the most strenuous conditions. All components are carefully insulated and designed for both indoor and outdoor use. Hevi-Bar's long wearing, corrosion resistant stainless steel contact surface is specially designed to permit higher operating speeds. It's strong, rigid assembly is capable of withstanding high fault loads.

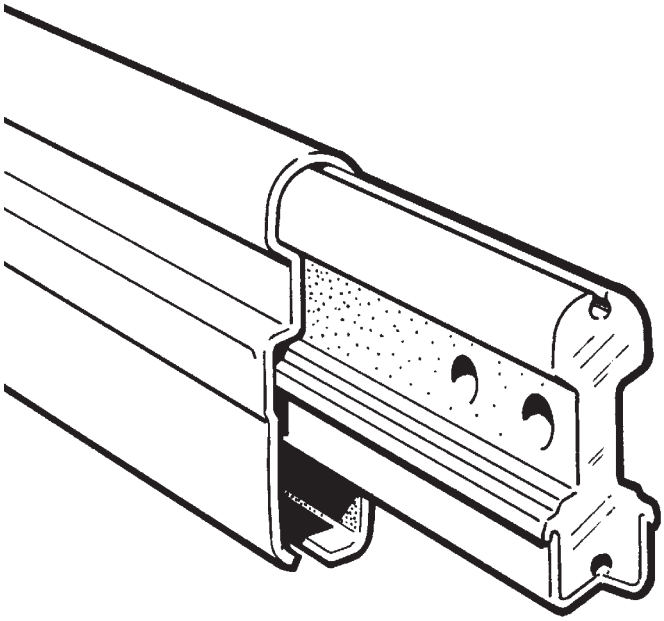
File No. E16232
(for 600 volts)

Installation References Available by Request

Hevi-Bar I Components

Conductor Bar

Conductor Bar assemblies consist of conductor and PVC insulating cover. Black covers are for outdoor installations. Consult factory for curves and higher voltage requirements.

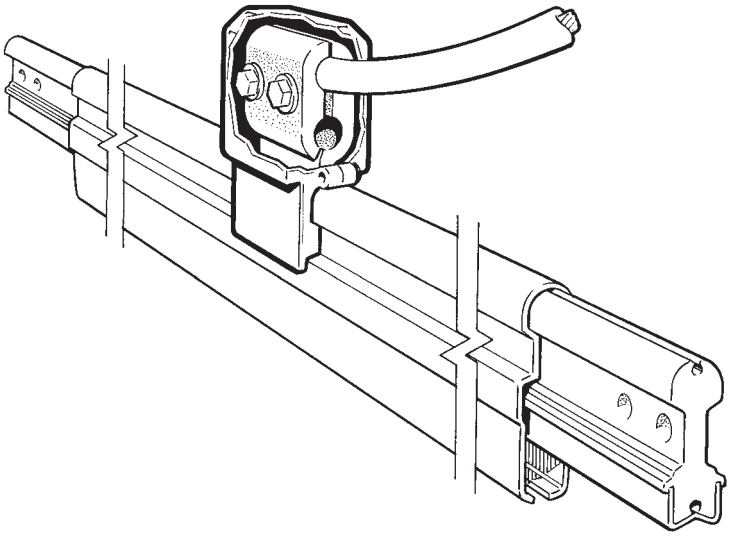


Length	Amperage	Cover	Part No.	Weight
30' Special✱ 30' Special✱	700	PVC PVC BLACK BLACK	15723 15724 15723B 39020	55 lbs.
30' Special✱ 30' Special✱	1000	PVC PVC BLACK BLACK	15727 15728 15727D 39022	84 lbs.
30' Special✱ 30' Special✱	1500	PVC PVC BLACK BLACK	15731 15723 15731E 39026	111 lbs.
NOTE: ✱ = Specified Length Required				

Note: Bolted splice kits, splice covers and end covers are not included with these assemblies and must be ordered separately.

PowerFeed

Lug fitting, factory welded to a standard length of conductor bar. Powerfeeds are designed to accept up to two flexible 500 MCM cables; lug covers are molded of high impact polycarbonate.



Length	Amperage	Cover	Part No.	Weight
30' Special✱ 30' Special✱	700	PVC PVC BLACK BLACK	15795 15796 39065 39066	57 lbs.
30' Special✱ 30' Special✱	1000	PVC PVC BLACK BLACK	15799 15800 39069 39070	86 lbs.
30' Special✱ 30' Special✱	1500	PVC PVC BLACK BLACK	15803 15804 39072 39073	115 lbs.
NOTE: ✱ = Specified Length Required				

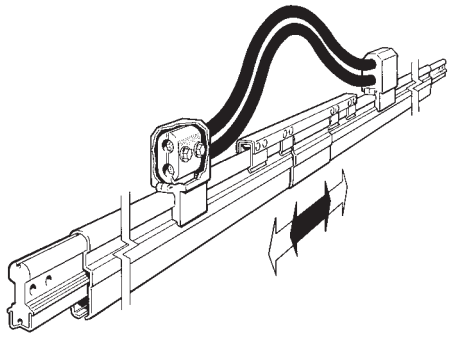
Note: Specify length of conductor bar and desired location of fitting on the conductor bar. Powerfeed section will be supplied with lug, welded 2 feet from end unless otherwise specified. Use flexible cable to allow movement of conductors with expansion and contraction.

Hevi-Bar I Components

Expansion Section

These 20' conductor bar assemblies are used at all structural expansion joints and for long runways to compensate for thermal expansion. The over-lapping design provides continuous contact with the collector shoes. Powerfeeds and flexible jumpers are factory installed to meet electrical and mechanical requirements of each system.

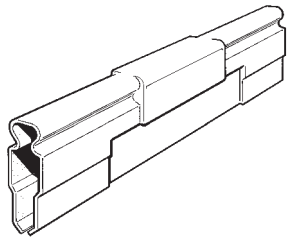
Amperage	Voltage	Part No.	Cover	Weight
700	600 Volts 7.5kV 600 Volts 7.5 kV	15838 17755 39088 39089	PVC PVC BLACK BLACK	46 lbs.
1000	600 Volts 7.5kV 600 Volts 7.5 kV	15839 27077 39097 39098	PVC PVC BLACK BLACK	71 lbs.
1500	600 Volts 600 Volts	15840 39096	PVC BLACK	103 lbs.



Splice Cover

These assemblies provide continuous insulation at splices by overlapping the conductor bar covers without obstructing collector travel.

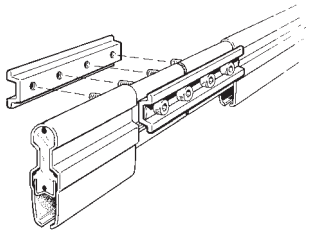
Amperage	Part No.	Cover	Weight
700	15200 39082	PVC BLACK	0.5 lbs.
1000	15201 39086	PVC BLACK	0.8 lbs.
1500	15202 39087	PVC BLACK	1.0 lbs.



Splice Assemblies

Each assembly consists of two splice bars complete with bolts, nuts and washers.

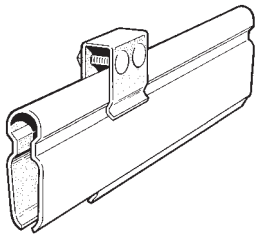
Amperage	Cover	Part No.	Weight
700	PVC BLACK	13947 23877	0.4 lbs.
1000	PVC BLACK	15035 33227	0.8 lbs.
1500	PVC BLACK	15039 16677	1.0 lbs.



End Cover

Each assembly consists of two splice bars complete with bolts, nuts and washers.

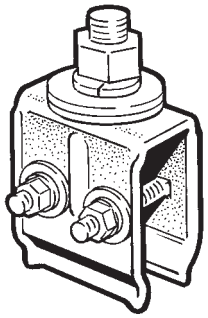
Amperage	Cover	Part No.	Weight
700	PVC BLACK	11366 39075	1.3 lbs.
1000	PVC BLACK	11367 39076	1.5 lbs.
1500	PVC BLACK	11368 39077	1.5 lbs.



Hanger Clamps

Hanger Clamp

These easily installed hangers are used for both anchor-tight and sliding tight connections. Indoor or outdoors. All clamps are die formed from heavy gauge type 304 stainless steel. Pull-out support is over 500 lbs. Order separately, one for each 10 linear feet of conductor plus one for each conductor run.



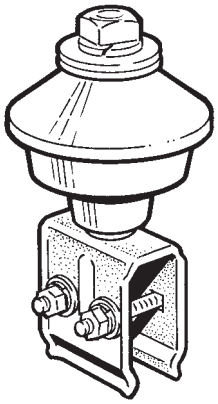
See Page 9 for Selection Assistance.

Amperage	Part #	Weight
700	11369	1.0 lbs.
1000 - 1500	11370	1.0 lbs.

600 Volt & 5 kV Insulated Hanger Clamps

600 volt and 5 kV insulators are molded of fiberglass reinforced polyester, high impact plastic with high resistance to arc-tracking, these are suitable for outdoor or indoor uses as described. Stud inserts, nuts and washers are plated steel. See Page 9 for Selection Assistance.

600 Volt

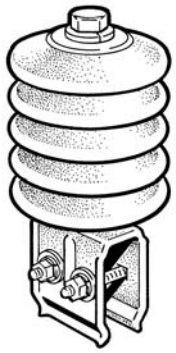


5 Kv

Amperage	600 Volt with Insulator		5kV Volt with Insulator	
	Part No.	Weight	Part No.	Weight
700	11378	2.0 lbs.	11381	2.3 lbs.
1000-1500	11379	2.0 lbs.	11382	2.3 lbs.
Insulator Only	11375		11376	

7.5 kV Insulated Hanger Clamps

The porcelain insulator is for extra heavy duty and higher voltages to 7.5kV. Nuts and washers are plated.
See Page 9 for Selection Assistance.



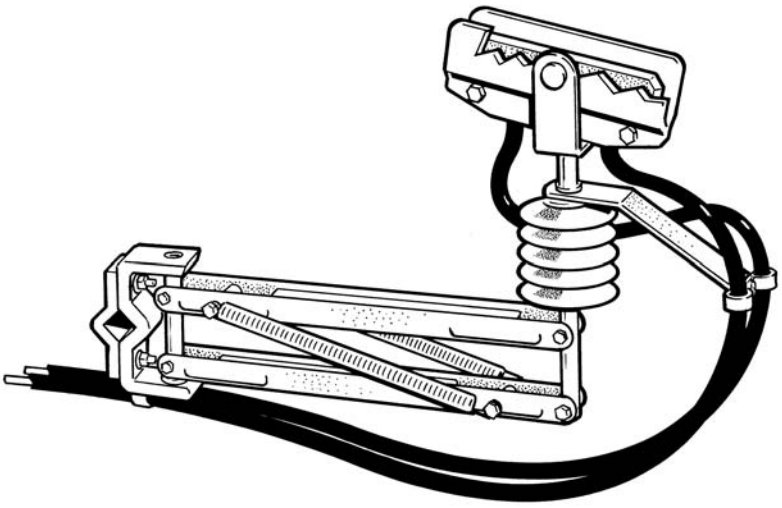
Amperage	7.5 kV with Insulator	
	Weight	Part No.
700	2.0 lbs.	11384
1000-1500	2.0 lbs.	11385
Insulator Only	20117	

Single and Tandem Collectors

These are parallelogram devices which both articulate and swivel. Positive contact with the conductor bar is maintained by spring loaded arms through 10" of vertical and 12" horizontal travel. Spring pressure is 25 to 30 lbs. throughout this working range. Exposed metal parts are stainless steel and anodized aluminum.

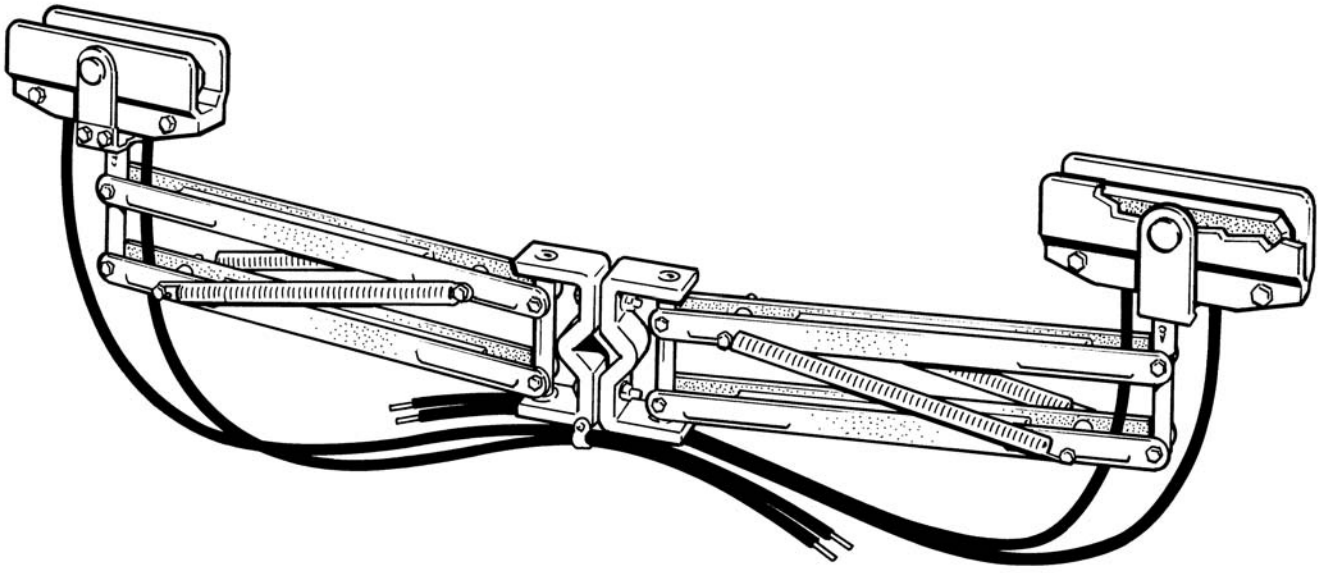
The replaceable contact shoes are mounted in non-conducting cases. Metal parts are grounded to the collector mounting brackets. Flexible leads are furnished to assure free movement and tracking of the collector shoe.

Consult the Factory for systems requiring higher collector voltage or ampacity.



Single Head - 7.5 Kv

Part No.	Weight	Rating
13109	15 lbs.	300 Amp 600 Volt
13121	30 lbs.	600 Amp 600 Volt
12157	19 lbs.	300 Amp 7.5 kV
12176	38 lbs.	600 Amp 7.5 kV



Tandem Head - 600 Volt

Engineering Data

Proper selection of conductor and covers for HEVI-BAR™ contact conductor systems is simple, requiring only the ampacity, voltage and ambient conditions.

AMPACITY: "The current carrying capacity of electric conductors expressed in amperes." If not already known, it can be readily computed from the horsepower rating of the motors as shown below.

The method determining the rating for cranes and hoist is completely outlined in NEC 610-14(e). Further references to the Code are made where applicable.

I. For a single crane, simply use the nameplate full load ampere rating of the largest motor or group of motors for any one function plus half the rating of the next largest motor or motor groups.
For multiple cranes, use the same method for each crane, add the results and multiply by the demand factor shown in table 610-14(e) NEC Book. Examples: (data taken from motor nameplates—all are 460V, 3ϕ, 60 Hz).

1) Hoist = 65a x 1 = 65
Bridge = 27a x .5 = 13.5
Total 78.5 amps

2) Crane #1
Hoist = 65a x 1 = 65
Bridge = 27a x .5 = 13.5
78.5 amps

Crane #2
Hoist = 52a x 1 = 52
Bridge = 14a x .5 = 7
59 amps

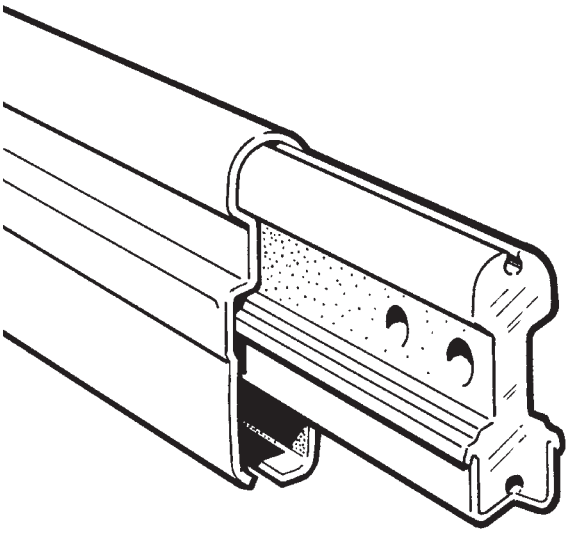
Total 137.5 x .95 = 130 amps

II. When the motor ampere ratings are unknown, a good approximation may be made using the nominal horsepower ratings of the motors, converting them to full load amperes per NEC table 430-150 and proceeding as above. If the motors are not three-phase, applicable tables 430-147 through 430-149 must be used.

A few examples from the tables are:

Full-Load Current (Three-Phase Alternating-Current Motors)

HP	230V	460V	575V
10	28	14	11
15	42	21	17
20	54	27	22
25	68	34	27
30	80	40	32
40	104	52	41
50	130	65	52
60	154	77	62
75	192	96	77
100	248	124	99
125	312	156	125
150	360	180	144
200	480	240	192



Full-Load Current in Amperes, Direct-Current Motors Armature Voltage Rating (Direct-Current)

HP	240V	HP	240V
10	38	60	206
15	55	75	255
20	72		
25	89		
		100	341
30	106	125	425
40	140	150	506
50	173	200	675

VOLTAGE DROP: "The arithmetical difference between the voltages at the feed point and the load at extreme end." It is usually expressed as a percentage of the supply voltage and can be calculated as shown below.

National Electrical Manufacturers Association Standard 7-21-1954. Further references to NEMA Standards are made where applicable.

Voltage drop increases in direct proportion to the length of the conductors. The Electrical Overhead Crane Industry specifications limit total voltage drops to 3% on runways and 2% on bridge conductors. Since powerfeeds are usually located at the mid-point of a system, the effective length is the distance from powerfeed to the end of the runway. On longer systems it may be necessary to provide additional feed points.

Conductor Aluminum Stainless Steel	*3ϕ 60 Hz 5 in. Spacing	*3ϕ 60 Hz 6.5 in. Spacing	*Resistance D.C. Microhms Per Foot	Example
700 Amp	.686	.731	17	700 Amp 3ϕ 350' long, 250 amp load
1000 Amp	.518	.564	10	Vd = .686 x 3.5 x 2.5 = 6.0V
1500 Amp	.438	.483	7	Assume load pF is .90

* These are voltage drop multipliers per 100 ft. per 100 amps.

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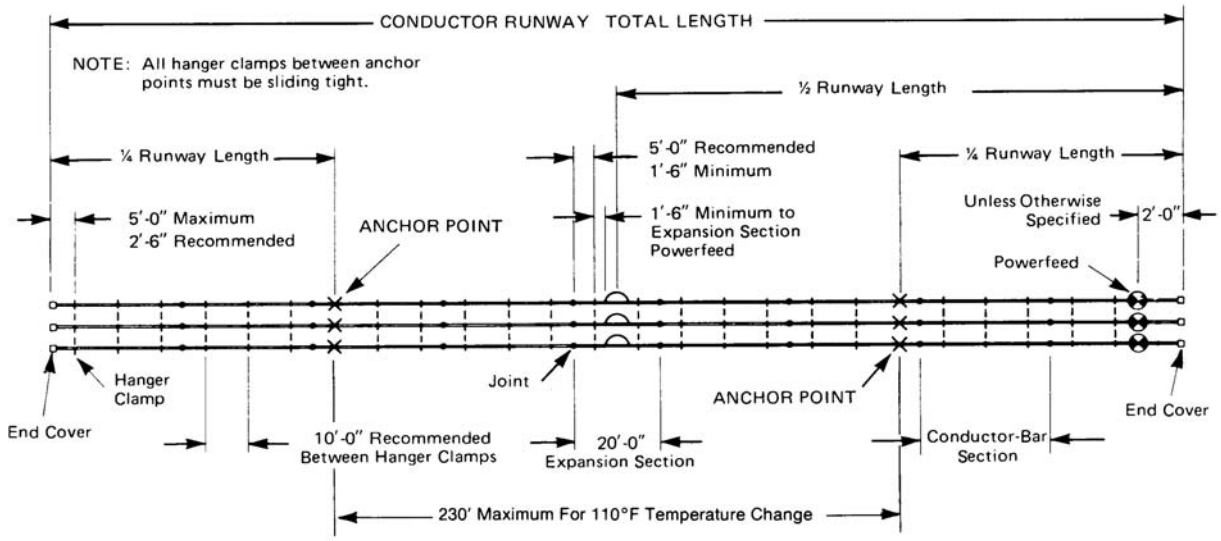
Typical Hevi-Bar 3 Phase Runway



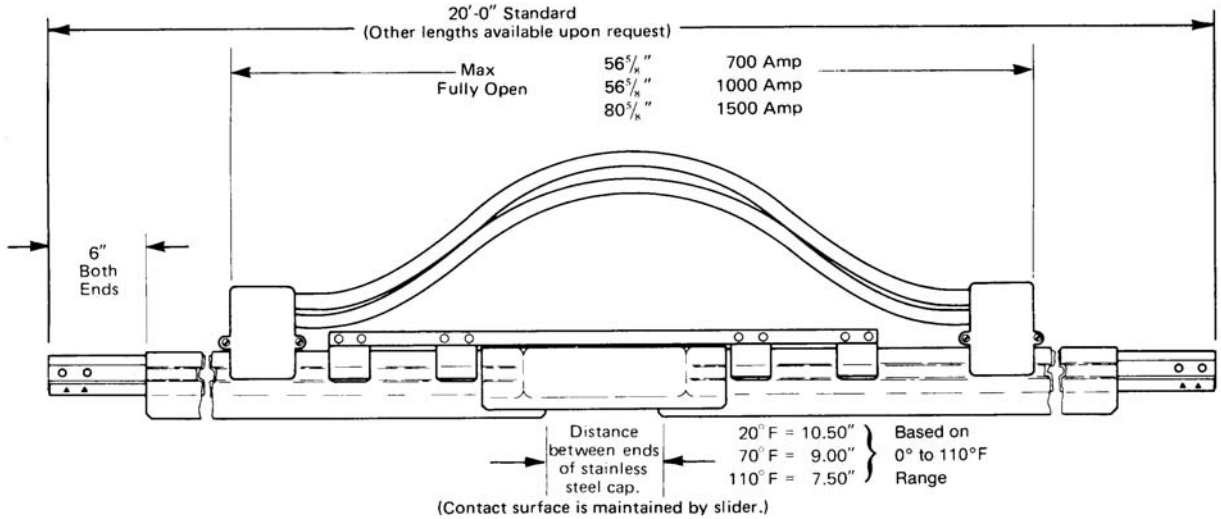
EXPANSION SECTION APPLICATIONS

1. Consideration at structural expansion joints.
2. Use as required by system thermal expansion, based on the standard design conditions of 110°F (61°C) maximum temperature change:

   For example, in the above sketch the distance between anchor points is not to exceed 230'. Longer runs or severe ambient conditions will require additional expansion sections. Consult factory.

ANCHOR POINT LOCATIONS

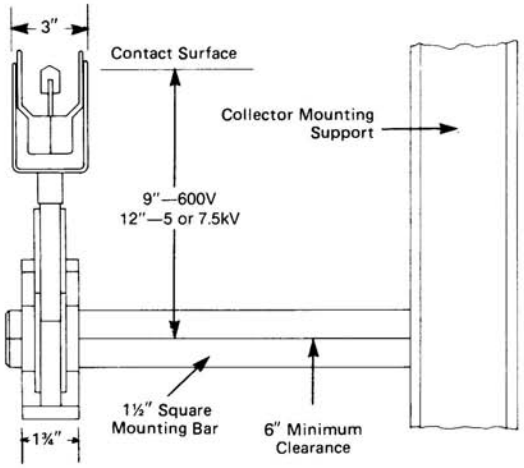
1. Systems without expansion sections: anchor tight at center of run only; all others must be sliding-tight.
2. Systems with one expansion section see layout above.
3. Systems with more than one expansion section:
   a. Anchor point to be midway of each expansion section.
   b. Anchor point also midway of last expansion section and end of runway.
4. Anchor Point: Standard hanger clamp with cross bolts tightened so clamp is rigid with conductor.



NOTES:
1. Consult factory for operating or ambient temperatures beyond the above range.
2. All hanger clamps except anchor points must be sliding-tight.
3. These sections are to be installed with two hanger clamps, minimum.

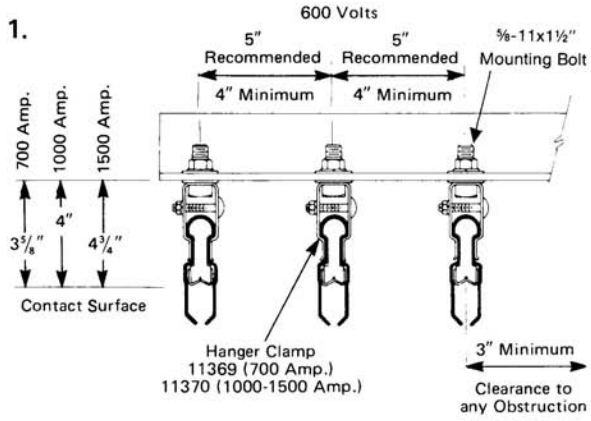
Engineering Data

COLLECTOR (End View)



CONDUCTORS (End View) 1. thru 4.

1.



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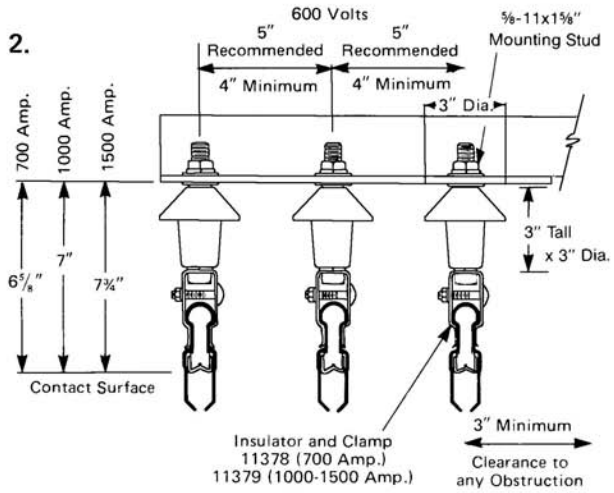

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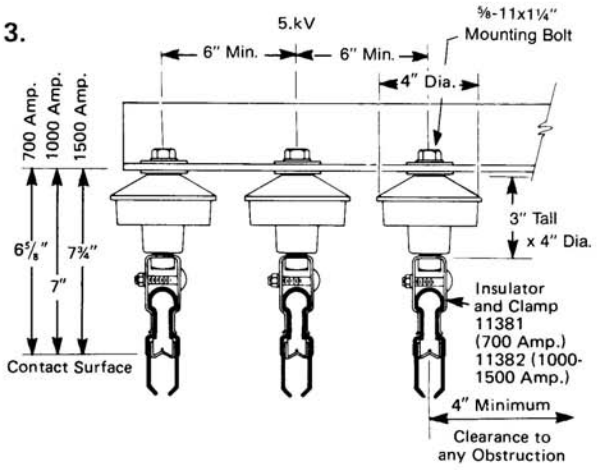
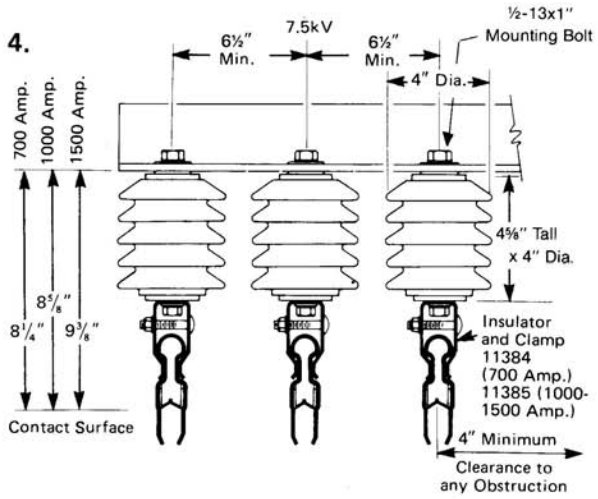


4.



Type of Installation	Use Hanger Clamp With:
1. Indoor locations, clean and dry	No insulators
2. Indoor locations, dirty or wet	Medium duty polyester Insulators 600V
2. Outdoor locations, Normal	
3. Outdoor locations, dirty or marine	Heavy duty polyester Insulators 5 kV
3. Pickling areas	
4. Extra heavy duty and high voltages	Heavy duty porcelain Insulators 7.5 kV

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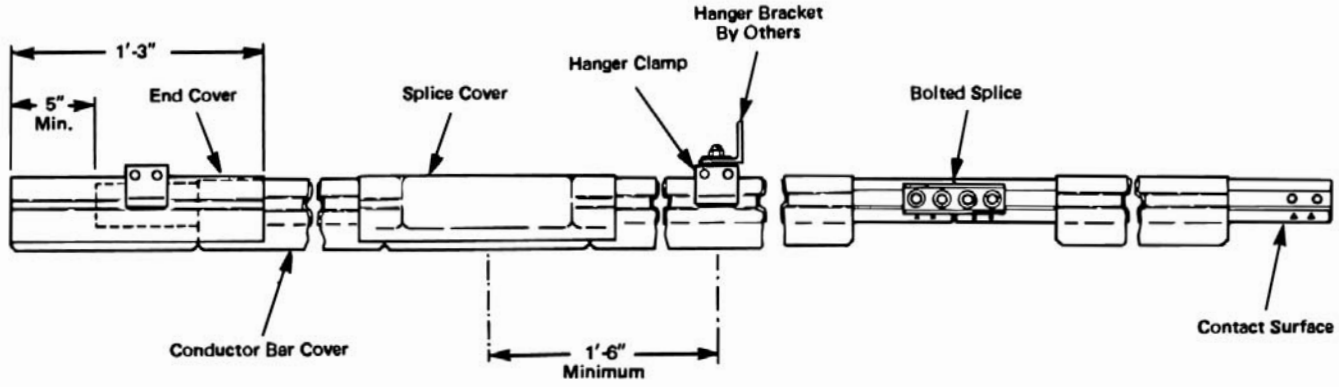
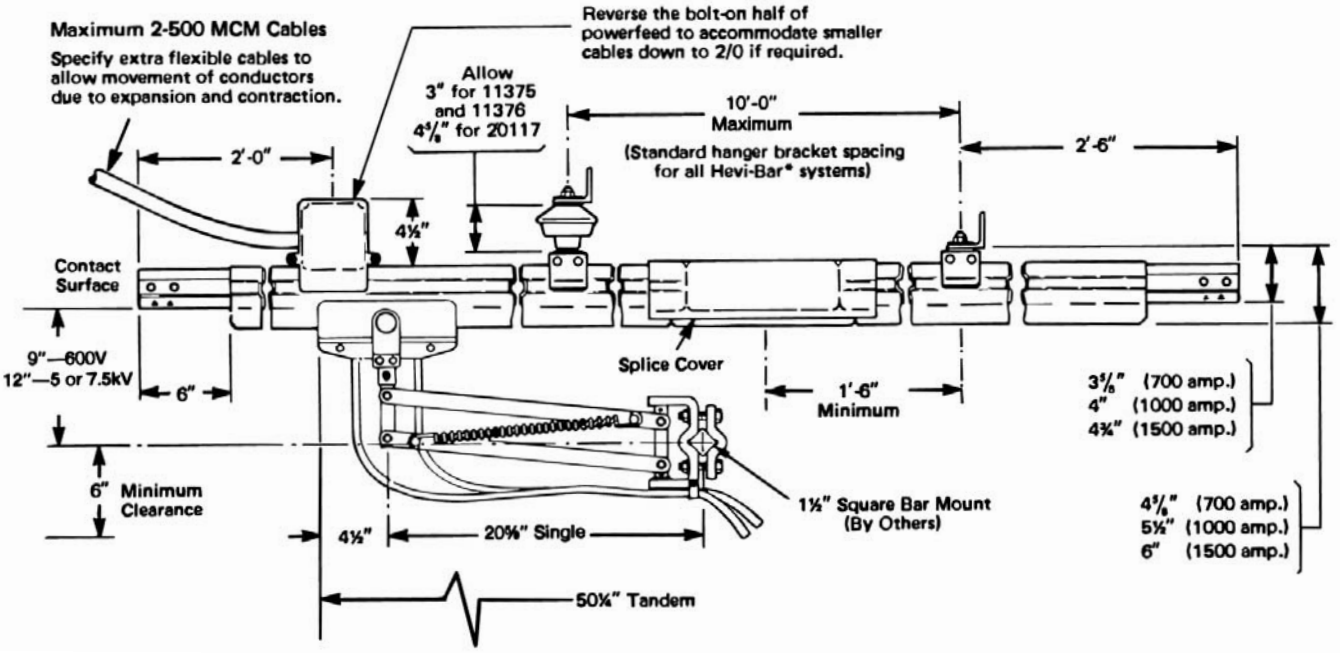
Installation Information



NOTE: Provide minimum of 1'-0" of conductor-bar beyond maximum collector travel at lowest ambient temperature.



Engineering Data

COLLECTOR PARTS

DESCRIPTION	WT	CATALOG NO.
Head assembly	2.5	11416
Shoe half, copper graphite (pair)	1.0	11417X
Shoe half, Insuloy (pair)	1.0	20255X
Cast Iron Shoe	1.0	28267
Case half	.60	11419
Base	1.3	12047
Base clamp	.5	12049
Arm (2 per collector head)	1.8	11422
Spring, stainless steel (2 per collector head)	.8	11424
Yoke assembly	.7	11425
Shoe and holder assembly (two copper shoe halves 11417 mounted on copper shoe holder 23444)	2.0	23452
Shoe holder, copper	1.0	23444
Pigtail #2 AWG 600 Volt, 42 inches long (Standard)	2.0	13696
Yoke post	.7	11970
Base post	.7	12048
Leveling spring	2.0	16386
Pigtail #4 AWG 8 kV, Specify length	.5/ft	25361

COLLECTOR ASSEMBLY

			WT	CATALOG NO.
300 Amp	600 Volt	(Covered)	15	13109
600 Amp	600 Volt	(Covered)	30	13121
300 Amp	7.5 kV	(Covered)	19	12157
600 Amp	7.5 kV	(Covered)	38	12176
300 Amp	600 Volt	(Bare)	17	14492
600 Amp	600 Volt	(Bare)	34	11980

PVC CONDUCTOR COVERS

CAPACITY	LENGTH	CATALOG NO.
700 Amp.	9 ft.	11351
	19 ft.	11352
	29 ft.	11353
1000 Amp.	9 ft.	11354
	19 ft.	11355
	29 ft.	11356
1500 Amp.	9 ft.	11357
	19 ft.	11358
	29 ft.	11359

CONDUCTOR COMPONENTS

DESCRIPTION	WT	CATALOG NO.
Alignment clamp for Cadweld and shielded-arc welds	8	11426
Powerfeed lug cover	.7	11415
Powerfeed lug	1.3	11499

INSULATORS

DESCRIPTION				WT.	CATALOG NO.
600 Volt	3" Dia.	3"	Tall	1.0	11375
5 kV	4" Dia.	3"	Tall	1.3	11376
7.5 kV	4" Dia.	4⅝"	Tall	4.0	20117

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Notes

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Notes

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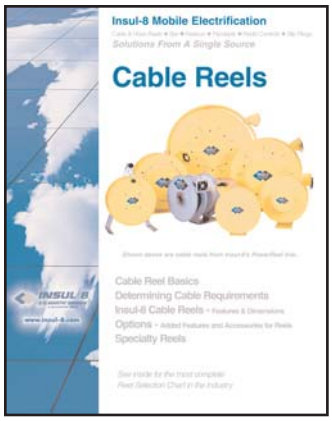
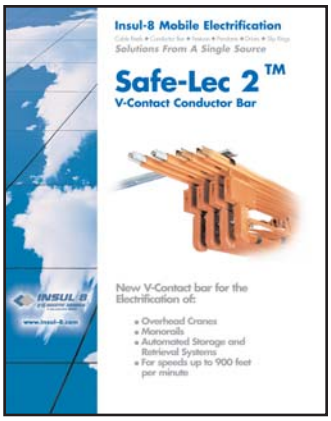
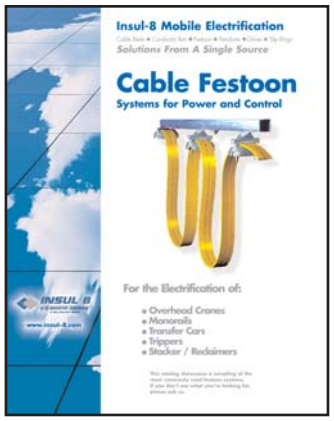


SPRING DRIVEN REELS



CONDUCTOR BAR



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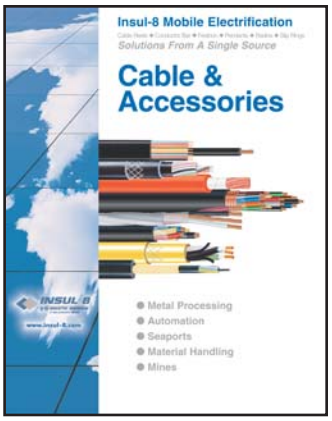

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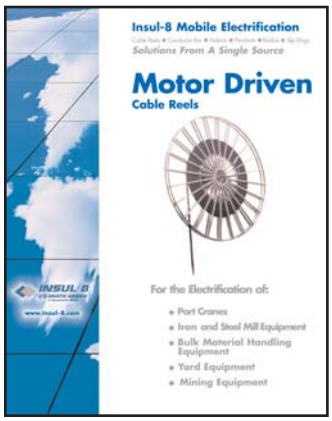

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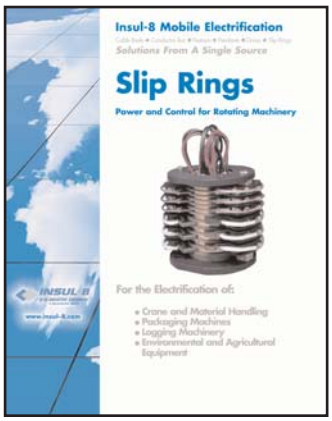

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